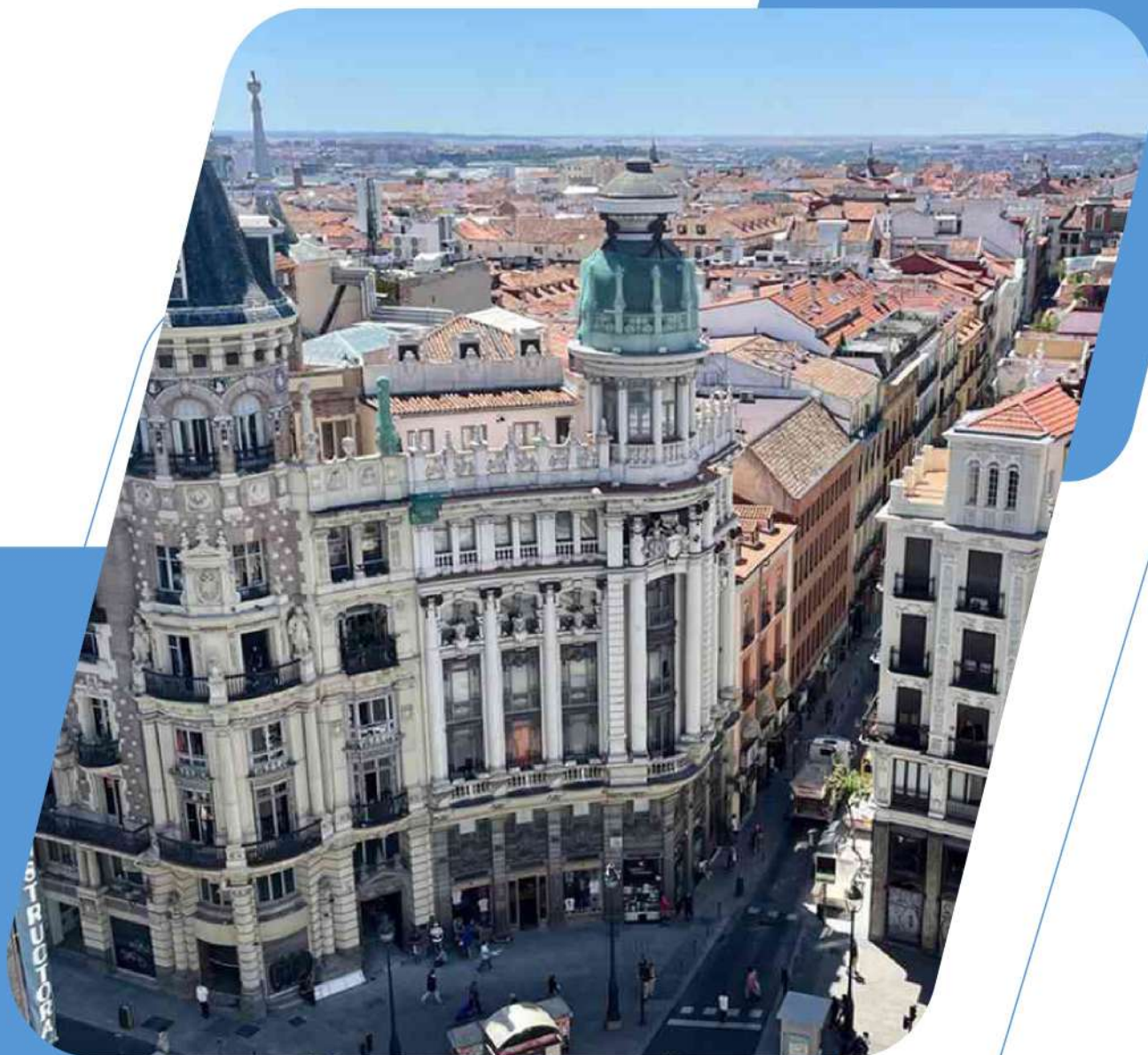




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# MODERN SCIENCE: THEORETICAL AND PRACTICAL VIEW

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## Arts

### THE NEW GENERATION OF ARTISTS OF THE "ASTANA OPERA" THEATER

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### НОВОЕ ПОКОЛЕНИЕ АРТИСТОВ ТЕАТРА «АСТАНА ОПЕРА»

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#### **Abstract**

The article is devoted to the analysis of trends and prospects of modern ballet in the capital of Kazakhstan. The 11th theatrical season introduced new names to the "Astana Opera" theater through premiere national ballet performances. Within the framework of the modern cultural paradigm, ballet in Kazakhstan can be considered an important element of the "national brand," acting as a guardian of traditions and the spiritual values of the country's culture. Based on the analysis of new productions, the author concludes that contemporary ballet art in Kazakhstan demonstrates stylistic diversity, which is reflected in a variety of styles and directions, as well as in the vivid expression of the "director's theater" phenomenon.

#### **Аннотация**

Статья посвящена анализу тенденций и перспектив современного балета столицы Казахстана. XI театральный сезон открыл новые имена театра «Астана Опера» в премьерных национальных балетных номерах. В условиях современной культурной парадигмы балет в Казахстане можно рассматривать как важный элемент «национального бренда», выступающего как хранитель традиций и духовных ценностей культуры страны. В результате анализа новых постановок, автор заключает, что сегодня балетное искусство Казахстана демонстрирует стилистическое разнообразие, которое проявляется в многообразии стилей и направлений, а также в ярком выражении феномена «режиссерского театра».

**Keywords:** modern Kazakh ballet, national traditions, national brand, neoclassical ballet, Kazakh ballet.

**Ключевые слова:** современный казахстанский балет, национальные традиции, национальный бренд, неоклассический балет, хореограф.

Введение. Казахский балет в XXI веке стал ярким и активно развивающимся видом искусства. В настоящее время он характеризуется разнообразием стилей и направлений. Театральные критики и сами представители балетного искусства неоднократно отмечали его многогранность. Так, один из ведущих исследователей казахского балета Гульнара Жумасеитова отмечала: «Развитие казахского балетного театра нельзя рассматривать как прогрессирующе-поступательный процесс. Часто новаторские поиски в нем сменялись заученным традиционализмом, обращение к значительным вещам – мелкотемьем, постановки классических произведений – банальным копированием. И все же даже беглый взгляд на его историю и анализ сегодняшних происходящих в нем процессов убеждает нас в том, что казахский балет за последние двадцать лет изменился, обретя свое индивидуальное лицо» [1, с. 15].

В современном театроведении многогранные и динамичные тенденции развития казахского балета пока не получили достаточного обобщения и систематизации, что подчеркивает актуальность данной темы. Целью статьи является систематизация и анализ тенденций и перспектив, определяющих казахский балет на современном этапе его эволюции. Для определения направлений и перспектив развития казахского балета в наши дни

требуется разобраться с множеством идей, оценок и понятий, которые часто бывают противоречивыми и касаются как поверхностных взглядов на жизнь, так и столкновения различных точек зрения в условиях глобализации и информатизации.

Основная часть. Изучение явлений современного казахстанского балета опирается на проблему быстрой смены эстетических парадигм, которые определяли развитие жанра в последние десятилетия. При этом учитывается тенденция сосуществования разнообразных стилей и направлений в современном хореографическом искусстве. Анализ наиболее значимых явлений современного балета позволил выделить ряд тенденций, характеризующих казахстанский балет: экспериментальный подход, основанный на эстетике постмодернизма; стремление развивать и продолжать классические традиции русской балетной школы и продвигать их как «бренд» казахской культуры; формирование современного казахстанского балета через деятельность опера балетных и академических театров танца (таких как Государственный театр оперы и балета «Астана Опера», Казахский национальный академический театр оперы и балета им. Абая, театр «Астана Балет», Государственный академический театр танца, Шымкентский городской театр оперы и балета, Туркестанский музыкально-драматический театр и Карагандинский академический театр музыкальной комедии, которые имеют свои балетные труппы); развитие различных стилей в контексте авторской режиссуры; стремление к популяризации и широкому освещению балета в СМИ и интернете.

Одной из ключевых особенностей развития современного казахстанского балета является его экспериментальный характер. В рамках этого направления балет Казахстана демонстрирует стремление уйти от традиционного восприятия техники и строгой социальной иерархии, а также переосмысливает культурное наследие. Для него характерны черты постмодернистской эстетики, такие как акцент на равенство и свободу в искусстве, идея «цивилизации молодых», противостояние информационному и медийному давлению стареющего общества. В искусстве проявляется эклектика, использование симфонической и инструментальной музыки, (в том числе этно-фольклорной) не адаптированной для танца, а также открытая драматургия с элементами плакатности и символизма.

Хотя отправной точкой для экспериментов в жанре остается классический танец, современные режиссеры активно стремятся преобразить национальный балетный танец, учитывая изменения в эстетике танца, образе танцовщика и визуальной стилистике постановок. Такая трансформация в значительной степени вдохновлена опытом, полученным казахстанскими постановщиками от зарубежных коллег, среди которых солисты балетной труппы театра «Астана Опера» Султанбек Гумар и Айдан Калжан, также преподаватели по специальным дисциплинам Казахской национальной академии хореографии Анвара Садыкова и Алмат Шамшиев. По мнению Алии Шанкибаевой: «Балетмейстеры с разных позиций подходят к решению проблемы с самобытности национальной хореографии и, соответственно, ее развития на нынешнем этапе. Находясь в напряженных и противоречивых поисках, они в своей практике вырабатывают определенные принципы в понимании национального танцевального искусства, критериев использования народного танца в балетной постановке, что приводит отдельных постановщиков к оригинальному интерпретированию фольклорных образов. В других случаях все остается пока на уровне эксперимента» [2, с.143]. Современный казахстанский балет приобрел экспериментальный характер под влиянием постмодернистской эстетики. Постмодернизм, как известно, характеризуется полистилистикой и сочетанием противоположностей, таких как классическое и современное, ретро и авангард, национально-патриотическое и транскультурное, массовое и элитарное.

На XI сезон театра «Астана Опера» запланировала ряд вечеров балетов, большинство из которых состоялись во второй половине театрального сезона. Это было связано с рядом причин, включая трагическое событие — гибель карагандинских шахтеров, после которого в стране был объявлен траур. На тот момент, на конец октября в программе театра были заявлены гала-балеты, однако из-за чрезвычайного происшествия спектакли проходили в упрощенном формате. В этом сезоне в основном были представлены балетные постановки из постоянного репертуара театра, которые часто повторяются в течение года. Однако их количество было сведено к минимуму. Эксклюзивные, авторские спектакли такие как: «Золушка» Прокофьева и «Бетховен Бессмертие Любовь» на сборную музыку великих европейских композиторов, «Сколько длится сейчас» музыка из разных кинофильмов, все три балета в постановке немецкого хореографа Раймондо Ребека. Национальный балет «Зов Степи» Патрика

да Бана на музыку казахстанских композиторов с компиляцией современной аранжировки европейских и африканских стилей музыки.

Одиннадцатый сезон театра «Астана Опера» стал испытанием, с которым коллектив успешно справился, представив публике новое поколение артистов балета. Молодое поколение получило шанс продемонстрировать свои способности. На этом фоне следует сосредоточиться на ключевых моментах. Так, 25 февраля и 3 марта 2024 года состоялись первые вечера балета. Концертная программа включала премьеры номеров на национальную тему, классические *Ras de deux* из различных балетов и сольные выступления, соблюдая пропорцию 90/10. Проверая реакцию аудитории, художественное руководство театра решило постепенно вводить новые казахские хореографические номера. Эксперимент заключался в предоставлении молодым постановщикам полного карт-бланша.

Классические номера в основном доверили недавним выпускникам Казахской национальной академии хореографии. Молодые талантливые артисты балета Акбар Иминов и Камила Шахманова исполнили *ras de deux* «Голубая птица» из балета «Спящая красавица». Вега Камар Икбалова в дуэте с опытным партнером Александром Корниловым выразительно исполнили номер из балета «Барышня и Хулиган». «Цыганский» танец в постановке Касьяна Голейзовского на музыку Валерия Желобинского из балета «Дон Кихот» в исполнении Газизы Молдахмет выглядел весьма впечатляюще. Премьерные показы национальных номеров, таких как «Аңсау» и «RUH», продемонстрировали новые идеи в хореографии. Первый из них был поставлен Анварой Садыковой на музыкальное произведение «Шерменде» Ардака Елеусиза. Автор исполнил его вместе со своей супругой Тогжан Умбет. Хореограф-постановщик А. Садыкова творчески переосмыслила музыкальное произведение, символично разделив музыкантов по диагонали. Этот прием отразил ее замысел в танце, передавая историю двух душ, которые не могут быть вместе и томятся в разлуке. Музыкальный дуэт гармонично дополнял сценическую пару в исполнении Заслуженного деятеля РК Анель Рустемовой и перспективного артиста балета Жаксылыка Саукымбекова. Для Садыковой принципиальное значение имело живое музыкальное сопровождение, поскольку исторически сложилось, что во времена первой профессиональной казахской танцовщицы Шары Жиенкуловой музыка исполнялась исключительно вживую.

Номер «RUH», поставленный хореографом Султанбеком Гумаром, произвел настоящий фурор. Зрители проникались энергией патриотизма и гордостью за свою нацию. Вдохновение для создания хореографического произведения автор черпал из книги народного писателя и выдающегося государственного деятеля Казахстана Әбіша Кекілбаева «Абылай Хан». Этот исторический образ, символизирующий объединение трех казахских Жузов под единым знаменем, занимает особое место в национальной памяти. Хореографическая композиция, продолжительностью около четырех минут, стала яркой демонстрацией многогранного таланта Султанбека Гумара. В этом номере он проявил себя не только как хореограф-постановщик, но и как сценограф, художник по свету и костюмам. Нельзя не отметить его серьезный подход к каждой детали постановки. Султанбек приходит на сценическую репетицию тщательно подготовленным, заряжая исполнителей духом кочевников-воинов. «Известно, что художник-творец формируется в тесной связи со всей окружающей его действительностью и тогда на смену устаревшему приходит новое современное. Изменяется и амплитуда преемственности, соединяющая поколения, она постоянно углубляется, вбирая в себя достижения и опыт других культур» [1, с. 67]. Тесное сотрудничество с зарубежным постановщиком Патриком да Бана сыграло важную роль в профессиональном становлении Султанбека Гумара. Их совместные проекты, такие как хореографическая миниатюра «Қилы заман» и полнометражный балет «Зов степи» стали значимыми этапами его творческого пути. Эти работы помогли развитию Султанбека как самостоятельного и самобытного хореографа-постановщика. «Что касается музыкальной составляющей, композиция «Аманат», написанная и исполненная этно-фольклорной группой «Хассақ», на премьерных показах звучала под фонограмму. Однако на следующий театральный сезон хореограф-постановщик решил использовать живое исполнение этно-фольклорного ансамбля на сцене театра «Астана Опера», тем самым усилив визуально-звуковой эффект постановки.

Концерт, приуроченный к весеннему празднику равноденствия Наурыз, уходящего корнями в тюркскую культуру и не связанному с исламом, отмечается 21 марта, а в некоторых странах — 22 марта. Праздничное мероприятие под названием «Әз Наурыз» состоялось в театре «Астана Опера» 23 марта. В концерте приняли участие все творческие подразделения театра: оркестр, хор и балет. Что касается балетных номеров, основными исполнителями стали

солисты балетной труппы, а также артисты, представившие сольные выступления.

Как упоминалось ранее, сотрудничество Султанбека Гумара с французским хореографом Патриком да Баной принесло ощутимые результаты в создании современного номера «Қилы заман». Этот номер исполняется на большинстве концертных мероприятий и международных балетных фестивалей, включая такие, как «Ballet Globe», посвященный современной хореографии. Национальный номер «Аңсау» в постановке Анвары Садыковой в этот раз был представлен под фонограмму. Русский танец из балета «Лебединое озеро», поставленный Заслуженными деятелями РК Турсынбеком Нуркалиевым и Галией Бурибаевой, органично дополнил тематику концерта, символизируя дружбу между этносами и соседними странами. «Все творения М.Петипа, Л.Иванова у нас остаются, поскольку это мировой традиционный спектакль. Нам повезло в том, что в первом акте дополнили вальс. В этом акте - эпизод, который ранее не шел в театре им.К.Байсейитовой - предчувствие любви у Зигфрида на очень красивый музыкальный момент П.Чайковского. Второй акт никто никогда не трогает, в силу традиции. В третьем акте есть неополитанский и русский танец, который мы поставили с Турсынбеком Нуркалиевым...», - пояснила Г.Бурибаева» [4]. Украинский танец «Гопак» из балета «Тарас Бульба» с завидной регулярностью включается в программы всех театральных мероприятий. Цыганский танец и хореографический номер «RUH» проходят сценическую адаптацию, способствуя совершенствованию исполнительского мастерства.

С программой под ярким и амбициозным названием «Мечты сбываются» молодое поколение артистов балета выступило на главной сцене оперного театра «Астана Опера». Представив на суд зрителей как классическое балетное наследие, так и стилизованное наследие номадов. Практический разделившись на первое и второе отделение.

Среди классических постановок стоит отметить премьерные выступления опытных артистов балета, среди которых особенно выделился Рустам Чахалов. Выпускник Казахской национальной академии хореографии, он удостоился чести исполнить партию вместе с ведущей солисткой Шугылой Адепхан. Вместе они исполнили *pas de deux* из балета «Щелкунчик» Петра Чайковского в постановке Василия Вайнонена. Их выступление отличалось верностью традициям чистой классики и академической школы. В соответствии с порядком концертной программы следующим номером стал дуэт, в котором приняла участие японская выпускница Мао Шибата. Её партнёром на сцене выступил молодой балетный артист Райымбек Болат. Артисты представили публике дуэт из балета «Шехеразада» Николая Римского-Корсакова в хореографии Михаила Фокина. Особого внимания заслуживает их актерская игра, ярко передававшая страстные чувства между персонажами. В следующем номере на сцену вышла ещё одна представительница Японии Мао Судо и Нима Токов из Республики Алтай, оба выпускники Академии хореографии». *Pas de deux* из балета «Пламя Парижа» Бориса Асафьева в постановке Василия Вайнонена продемонстрировало высокую академическую подготовку обоих молодых артистов балета. Мужскую вариацию из балета «Барышня и хулиган» Дмитрия Шостаковича в хореографии Константина Боярского исполнил Аспан Бекбай. Он достойно справился с техническими сложностями хореографии, успешно передав образ хулигана через актерскую игру. Дуэт из балета «Призрачный бал» на музыку Фредерика Шопена в постановке Дмитрия Брянцева представили Камилла Орманова и Жаксылык Саукымбеков. В целом исполнители продемонстрировали достойную академическую подготовку в классическом танце. *Pas de deux* «Венецианский карнавал» из балета «Сатанилла» Цезаря Пуни в хореографии Мариуса Петипа исполнили Алина Зырянова и представитель киргизской диаспоры Эркин Базарбаев. Строгая выучка выпускников Казахской национальной академии хореографии была заметна с первых минут их выступления. В номере «Панадерос» из балета «Раймонда» Александра Глазунова, поставленном Константином Сергеевым, Газиза Молдахмет и Арман Кзайбек достойно воплотили характерный испанский стиль танца.

Второе отделение Гала-балета открыло адажио из балета «Лебединое озеро» Петра Чайковского в хореографии Мариуса Петипа. Этот изящный дуэт исполнили подающая надежды молодая артистка балета, солистка-стажёр София Адильханова и ведущий солист балета Олжас Тарланов, выпускник Алматинского хореографического училища имени А. В. Селезнёва. Следующие номера программы стали премьерными постановками: «Temptation» на музыку Витторио Монти в хореографии Айдан Калжана, «Адажио» Томазо Альбинони, поставленное Игорем Чернышевым, а также «Мәңгүрт» на музыку Актоты Раимкуловой в обработке этнофольклорного ансамбля «Туран», созданное хореографом Султанбеком Гумаром.

Итак, первый премьерный номер — «Temptation», что в переводе означает «Искушение»,

стал дебютной постановкой артиста балета Айдана Калжана, который впервые воплотил свою идею на сцене театра «Астана Опера». В реализации его замысла приняли участие исполнители Амина Кисембаева и уже знакомый зрителям артист балета Жаксылык Саукымбеков. «Вешние воды» на музыку Сергея Рахманинова в хореографии Асафа Мессерера исполнили молодая артистка балета, представительница киргизской диаспоры Вега Камар Икбалова и ведущий солист балета Арман Уразов, выпускник Алматинского хореографического училища имени А. В. Селезнёва. Премьерный показ «Адажио» Томазо Альбини в хореографической постановке Игоря Чернышева исполнили Гульназ Жанаева и Амир Хван. Оба классических номера были исполнены на высоком уровне, что продемонстрировало мастерство артистов и не вызвало особых замечаний.

К номеру «Маңғұрт» подготовка была тщательной и скрупулезной, с акцентом на внимание к деталям. Особенно ярко в этом номере проявилась визуально-звуковая составляющая: световая палитра, разработанная Султанбеком Гумаром, и стихи из книги назидания Абая, звучащие на казахском языке в оригинале, создавали сильное впечатление. Это всё вызывает философские размышления и трогает душу до глубины. Вот как звучит перевод: «Остаться одиноким – всё равно, что умереть. Все беды падут на голову одинокого. В миру много порочного, но и утешение, и веселье существуют в нем же. Кто с достоинством выдержит первое? Кто устоит во втором? Кому из нас не приходилось бывать в беде? Теряет надежду только слабый. Верно, что в мире нет ничего неизменного, но ведь и зло не вечно. Разве после суровой зимы не приходит полноводная цветущая весна?» [5, с. 166]. Философский контекст, который Султанбек Гумар связал с произведением Чингиза Айтматова, был вдохновлён романом «И дольше века длится день». В этом произведении Айтматов затрагивает вечные вопросы о человеческой природе, ответственности, духовных ценностях и борьбе с судьбой. Эти глубокие философские размышления нашли своё отражение в номере «Маңғұрт», создавая мощную эмоциональную и интеллектуальную связь с произведениями Айтматова. «Взятый в плен человек, превращенный в бездушное рабское создание, полностью подчиненное хозяину и не помнящее ничего из предыдущей жизни. В романе рассказывается о том, как молодого кочевника Жоламана, сына Доненбая, попавшего в плен к жуаньжуанам, сделали манкуртом. Его мать Найман-Ана долго искала сына, но, когда она нашла его, он её не узнал. Более того, он убил её по приказу своих хозяев» [6]. Это состояние прекрасно передали артисты балета Лимара Айдарова и Руслан Канагат, выпускник Алматинского хореографического училища имени А. В. Селезнёва. Их исполнение глубоко отражало философские идеи и эмоциональный настрой произведения, создавая сильное воздействие на зрителей.

*Pas de deux* из балета «Талисман» на музыку Рикардо Дриго в хореографии Мариуса Петипа исполнили Шугыла Адепхан и молодой артист балета Акбар Иминов. Он успешно справился с поставленной задачей, продемонстрировав хорошую технику и гармонию в дуэте. Завершал Гала-балет национальный номер «RUH», в котором главную сольную партию исполнил Ислам Кайыпбай, продемонстрировав достойное исполнение. До этого эту роль примеряли Айдан Калжан и солист-стажёр Галымжан Нурмухамет, выпускник Алматинского хореографического училища имени А. В. Селезнёва.

За месяц до завершения XI театрального сезона в театре «Астана Опера» состоялся ещё один Гала-балет в рамках Международного музыкального фестиваля «Опералия». На этом мероприятии зрителям представили исполнителей из России и Китая, которые исполнили в основном произведения мирового классического балетного наследия. Однако самым важным событием для нас стали два новых национальных номера: «Жәрменке» и «Сарматская жрица» в постановке А. Садыковой. В создании первого номера А. Садыковой помогал А. Шамшиев. Вместе они воплотили общую идею в номере «Жәрменке», который был исполнен на музыку этно-фольклорного ансамбля «Туран». Шуточные танцевальные моменты, наполненные легкостью и местами гротеском, были воплощены артистами балета Бостаном Кожобековым, Бейбарысом Акарысом и Ерсултаном Тойгуловым. Главное, что артисты правильно поняли концепцию номера, в котором центральной темой является сельская ярмарка, полная веселья и задора. Со слов А. Садыковой: «Без поддержки педагогов репетиторов Елены Шерстневой и Гаухар Усиной этот проект не состоялся бы» [3]. Необходимо отдать должное педагогам-репетиторам театра «Астана Опера» за их старание, терпение и профессионализм. Их упорный труд и внимание к каждой детали сыграли ключевую роль в успешной подготовке и исполнении номеров.

В номере «Сарматская жрица» предлагаемые обстоятельства имеют более исторический

характер и корни этого произведения необходимо искать в археологии. Садыкова тесно сотрудничала с казахстанским художником-реставратором, основателем и руководителем Научно-реставрационной лаборатории «Остров Крым», академиком и заслуженным деятелем Казахстана Крымом Алтынбековым. Их совместная работа помогла создать глубокую историческую атмосферу, отражающую суть образа и эпохи. Огромный вклад в работу над воссозданием исторического факта в хореографической интерпретации внес директор Западно-Казахстанского центра истории и археологии, доктор исторических наук, профессор Мурат Сдыков. Также значительную роль сыграл научный сотрудник Западно-Казахстанского центра истории и археологии Яна Лукпанова. Их знания и профессионализм помогли глубже понять исторический контекст и обеспечить достоверность хореографической постановки. Я.Лукпанова была главным консультантом по пошиву костюмов для хореографического номера, работая в команде с художником по костюмам театра «Астана Опера» Даригой Тайшиковой. Комплексная реконструкция, проводимая при раскопках, делилась на несколько этапов, но мы сосредоточимся на тех, которые были наиболее важны для этого проекта. Так «Создание скульптурного образа в материале. Разработка форэскиза, создание модели в натуральную величину, мягкой модели формы, формовка скульптуры. Воссоздание костюма. Подбор и крашение ткани, войлока, меха, кожи, раскрой, шитье, подгонка. Монтаж украшений и атрибутов. Крепление украшений костюма, размещение аксессуаров и атрибутов, корректировка экспозиции» [7, с. 11]. Единственное, что смущало А.Садыкову, — это историческое повествование, согласно которому жрица держала под своим контролем шаманов. Однако с разрешения М.Сдыкова и К.Алтынбекова она решила ввести в танец сакских воинов несмотря на то, что исторически они появились позже. Если в первом номере артистам балета помогали в развитии постановочной идеи, то в этом номере хореографический текст подсказывал артист балета Сунгат Кыдырбай. Музыку для этого номера предоставила альтернатив-фолк-группа Steppe Sons. За проекцию на сценическом пространстве отвечал видеограф Алексей Некрасов, который создал визуальный ряд, идеально сочетающийся с хореографической концепцией.

Артисты, принимавшие участие в концертных программах, являются учениками таких педагогов, как: Кауков Сержан, Бестембаев Адильбек, Тулегенова Раушан, Мырзакулов Асет, Аяпбергенова Асем, Джаканов Бауржан, Алиева Гульнар, Луковкин Антон, Раимбекова Адина, Юсупов Амангелды, которые внесли значительный вклад в их профессиональное развитие и подготовку к выступлениям. Выпускники Алматинского хореографического училища имени А. В. Селезнева завершили своё обучение под руководством таких педагогов, как Султан Косманов педагога по классическому и народному танцу Александра Медведева, чьи знания и опыт сыграли ключевую роль в их профессиональном становлении и успехах в балетном искусстве. За всем этим стоит тяжёлый ежедневный труд педагогов, которые выучили и воспитали своих учеников, передав им не только технические навыки, но и любовь к балетному искусству, дисциплину и стремление к совершенству. Их самоотверженная работа и преданность своему делу являются основой успехов молодых артистов.

Заключение. Таким образом, предпринятый анализ современных тенденций развития казахского балета позволяет выявить следующие перспективы его развития на современном этапе:

**Интеграция традиций и инноваций** – продолжение работы над гармоничным сочетанием классических балетных форм с элементами национальной хореографии, что позволит сохранить культурную идентичность и в то же время привнести новые художественные концепции.

**Развитие национальной хореографии** – создание новых произведений, которые отражают богатое историческое и культурное наследие Казахстана, с акцентом на этно-хореографические формы и элементы.

**Международное сотрудничество** – расширение контактов с зарубежными театрами и балетными школами для обмена опытом, участия в международных фестивалях и постановке совместных проектов.

**Совершенствование педагогической базы** – продолжение подготовки высококвалифицированных педагогов и репетиторов, а также улучшение условий для обучения и развития молодых талантов в области балетного искусства.

**Использование новых технологий** – внедрение цифровых технологий и мультимедийных решений для создания более ярких и современных сценических постановок, что позволит

привлечь более широкую аудиторию, включая молодёжь.

Эти направления позволят казахскому балету развиваться и укреплять свою уникальность на мировой балетной арене.

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## Biological sciences

### ENZYMES: PRINCIPLES AND BIOTECHNOLOGICAL APPLICATIONS

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#### **Abstract**

Engineering enzymology is one of the areas of biotechnology that is based on the use of enzymes (or enzyme systems), in isolated form or in the structure of living cells, as catalysts in order to obtain certain target products. The introduction of such biotechnological products as enzymes into production has dramatically increased its capabilities and quality. However, there is a problem of enzyme instability; isolated enzymes quickly lose activity due to the lack of protection by the cellular homeostasis systems of the organism into which they are introduced. The problem of instability has been solved by creating so-called "industrial biocatalysts" - immobilized enzymes. In this case, immobilization means binding the enzyme to an insoluble carrier while maintaining the catalytic activity of the enzyme.

**Keywords:** Immobilized enzymes, instability, biotechnology

#### **Carriers for enzyme immobilization**

Materials used in the process of enzyme immobilization must have the following characteristics: high biological and chemical resistance, insolubility, hydrophilicity, permeability for enzymes and coenzymes, substrates and reaction products, rapid activation of the carrier (transition to a reactive form).

Carriers for the enzyme immobilization process are divided into organic and inorganic (Fig. 1).

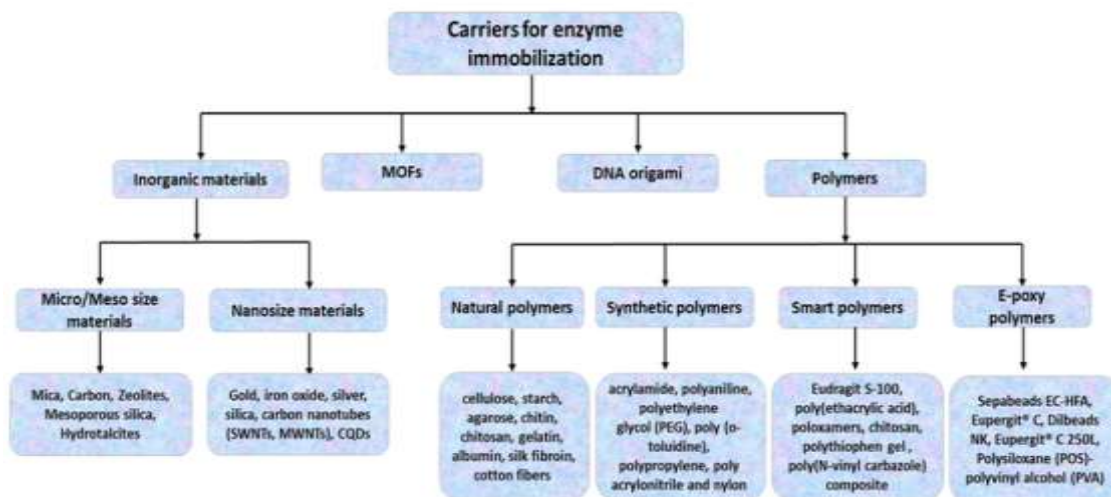


**Fig. 1. Classification of carriers for enzyme immobilization**

**Organic polymer carriers.** All organic polymer carriers that currently exist can be divided into synthetic and natural. It should be noted that synthetic and natural carriers are further subdivided depending on their structure.

Among natural polymers, lipid, protein and polysaccharide carriers are distinguished, and among synthetic ones, polyamide, polymethylene and polyester. Natural carriers have a number of advantages, namely, polyfunctionality, availability and hydrophilicity, but along with this, they also have disadvantages - biodegradability and high cost.

Immobilized enzymes have a number of advantages:

- being heterogeneous catalysts, they are easily separated from the reaction medium, can be used repeatedly and ensure the continuity of the catalytic process;

- the immobilization process leads to a change in the properties of the enzyme, which allows for regulation of substrate specificity, stability, and the dependence of activity on environmental conditions;
- Immobilized enzymes are durable and many times more stable than free enzymes.

All of the above properties ensure high efficiency, cost effectiveness and competitiveness of technologies that use immobilized enzymes.

Dextran, cellulose, agarose and their derivatives are often used among polysaccharides in the immobilization process. To impart stability to the chemical structure, the linear chains of dextran and cellulose are cross-linked with epichlorohydrin. The mesh structures obtained by cross-linking are used to introduce various ionogenic groups. A new carrier, spongy starch, which is highly resistant to glycosidases, has been synthesized by chemical modification of starch with cross-linking agents (glutaraldehyde, formaldehyde, glyoxal).

Of the natural aminosaccharides, chitin is used as a carrier in the immobilization process. It accumulates in significant quantities as waste as a result of industrial processing of crustaceans (shrimp, crabs). Chitin is chemically resistant and has a pronounced porous structure.

Among proteins, structural proteins have found practical application as carriers: keratin, collagen, gelatin (a product of collagen processing). The listed proteins are widespread in nature, which explains their availability in significant quantities, low cost and the presence of a large number of functional groups for enzyme binding. It should be noted that proteins are capable of biodegradation, which is necessary when constructing immobilized enzymes for medical purposes. The disadvantages of proteins as carriers include their high immunogenicity.

Along with natural carriers, synthetic polymer carriers are widely used in engineering enzymology due to their diversity and availability. Synthetic carriers include polymers based on styrene, polyvinyl alcohol, acrylic acid; polyurethane and polyamide polymers. Many synthetic polymer carriers are mechanically strong, but when formed, they have the ability to provide a wide variation in the size of pores and thus allow the entry of various functional groups. Some synthetic polymers can be produced in various forms: granules, fibers, tubes. All of the listed properties are useful for different methods of enzyme immobilization.

*Inorganic carriers.* The most commonly used inorganic carriers are clay, glass, ceramics, silica gel, graphite soot; in addition, silochromes and metal oxides can be used. A feature of inorganic carriers is that they can be subject to chemical modification; for this purpose, they are coated with a film of aluminum, zirconium, titanium oxides or treated with organic polymers. It should be noted that the main advantage of inorganic carriers is ease of regeneration; in addition, like synthetic polymers, they can be produced in any form and can be obtained with varying degrees of porosity.

Thus, by now a significant number of different carriers for enzyme immobilization have been created. However, for each individual enzyme used in a certain technological process, acceptable variants of both the carrier and the methods and conditions of immobilization must be selected.

#### *Enzyme immobilization methods*

Enzyme immobilization methods are divided into two groups: physical methods - without the formation of covalent bonds between the enzyme and the carrier; and chemical immobilization methods - with the formation of a covalent bond between them (Fig. 6.2).

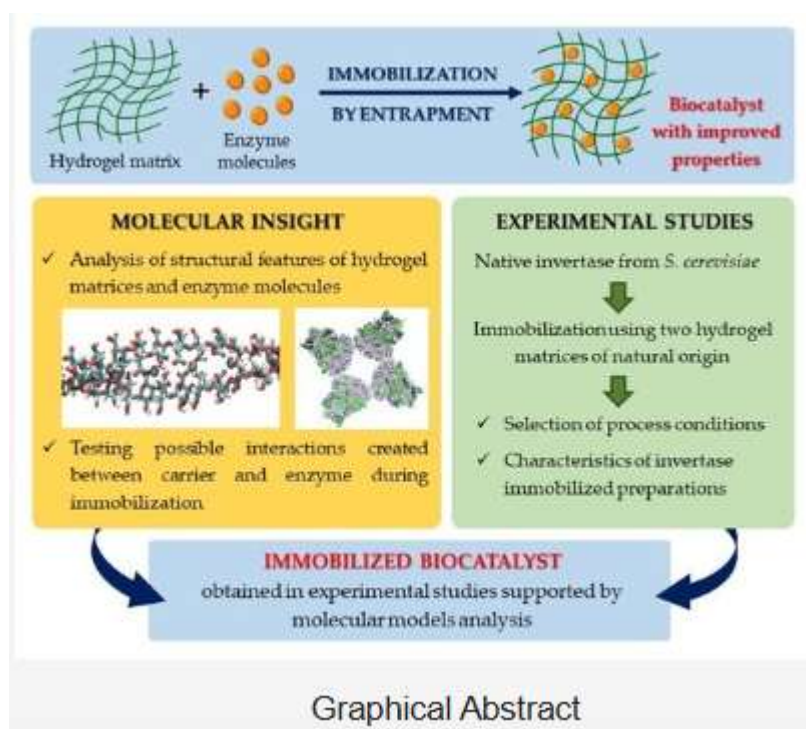


Fig 2. Methods of enzyme immobilization: F — enzyme molecule

The implementation of physical methods of enzyme immobilization is carried out by adsorption of the enzyme on an insoluble carrier by including it in the pores of a cross-linked gel, in semipermeable structures or two-phase systems.

Adsorption of enzymes on insoluble carriers. In adsorption immobilization, the protein molecule is retained on the carrier surface due to hydrophobic, electrostatic, dispersion interactions and hydrogen bonds. To determine the efficiency of adsorption of a protein molecule on a carrier, it is necessary to take into account the specific surface (density of sorption centers) and porosity of the carrier. It should be noted that the process of adsorption of enzymes on carriers that are insoluble is extremely simple and is achieved by contact of an aqueous solution of the enzyme with the carrier. With this type of immobilization, the enzyme activity remains at almost 100%.

Enzymes are highly specific proteins that are part of all cells and tissues of living organisms and play the role of biological catalysts.

According to the nature of the catalyzed reactions, enzymes are divided into six classes (Table 1).

Table 1. Main classes of enzymes

| Name                  | Catalyzed reactions                                                                                                          | Examples                                                |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Oxidoreductases       | Reduction and oxidation processes                                                                                            | Glucose oxidase, catalase, alcohol dehydrogenase        |
| Transferases          | Transfer of various chemical groups from one substrate to another                                                            | Protein kinase, glycogen phosphorylase, pyruvate kinase |
| Hydrolases            | Hydrolytic cleavage of chemical bonds of substrates                                                                          | Proteases, amylases, cellulases                         |
| Liazy                 | The elimination of a chemical group to form a double bond or, for example, the addition of a chemical group to a double bond | Aspartase, fumarase                                     |
| Isomerases            | Changes within the substrate molecule                                                                                        | Glucose isomerase, triose phosphate isomerase           |
| Ligases (synthetases) | Linking substrate molecules using high-energy compounds                                                                      | tryptophan synthetase                                   |

Thanks to enzymes, biological catalysts, all transformations of substances necessary for their vital activity are carried out, directed and regulated in living organisms.

It is estimated that a living cell can contain up to 2000–2500 different enzymes, each of which accelerates a particular biochemical reaction.

Biological catalysts (enzymes) differ from inorganic catalysts in a number of ways.

The main differences are that enzymes "work" in very mild conditions (low temperature, normal pressure, low pH values). For example, hydrolysis of starch to monosaccharides occurs when heated in an acid solution at 100 °C for several hours. With the participation of the appropriate enzyme, this process

occurs at room temperature in just a few minutes.

In addition, enzymes have high specificity in the type of catalyzed reaction and in relation to the structure of the substrate. Each enzyme catalytically accelerates, as a rule, one single reaction or a group of reactions of one type. Without enzyme specificity, an ordered metabolism in cells and, consequently, life itself would be impossible. Enzymes have a high ability to "respond" to the regulatory effect of subtle changes in the properties and composition of the environment.

It is important to note that enzymes isolated from the body do not lose their ability to perform a catalytic function. This is the basis for their practical application in the chemical, food, light, pharmaceutical industries and medicine.

#### Sources of enzymes

In humans and higher mammals, enzymes are secreted by the cells of the pancreas into the intestine, where proteins and polysaccharides are broken down into monosaccharides and amino acids and are easily absorbed by the cells of the macroorganism.

A "secret" (enzyme complex) was isolated from the pig's pancreas, which in dried and crushed form began to be used for digestive disorders. The isolation of this enzyme complex from an animal organ is considered the first example of the isolation and practical use of enzymes.

The first sources of raw materials from which enzymes began to be isolated were various animal organs (pig's stomach, mucous membranes of the stomach and small intestines of pigs, cattle abomasum, milk calf and lamb abomasum, testicles of sexually mature animals).

The pancreas contains a large number of various enzymes: chymotrypsin, collagenase, elastase, trypsin, amylase, lipase, etc. The mucous membrane of the stomach of pigs and the abomasum of cattle serve as a source of pepsin and lipase. Rennin (rennet) is obtained from the abomasum of milk calves and lambs. The testicles of mature cattle contain the enzyme hyaluronidase.

All large meat-packing plants have workshops for collecting and freezing organs of slaughtered animals for subsequent production of enzyme preparations from them.

Of course, a large number of enzymes are also contained in plant cells. However, the extraction of enzymes from them on an industrial scale is economically unprofitable, since it is seasonal in nature and requires the costs of processing a large amount of raw materials. At the same time, in the USA, for example, up to 100-200 tons of papaya fruits are still processed annually to obtain papain. This enzyme is used for processing - tenderization (from the English tender - tender), softening meat in the production of dry-cured sausages.

Over the past 30 years, there have been significant changes in the industrial production and use of enzymes. This is due to the use of microorganisms as sources of enzymes. This process should be considered quite natural, given the basic properties and characteristics of the enzyme systems of microorganisms.

#### Sources of enzymes are:

- various animal organs;
- plant cells;
- microorganism cells.

Of the listed sources of enzymes, the most preferable are microorganism cells.

#### Advantages of microorganisms as a source of enzymes

The main reason is explained by the ease with which it is possible to increase the amount of enzymes synthesized by a microbial cell. This can be achieved both by genetic manipulation of the microorganism and by changing the surrounding conditions. A microbial cell can process such an amount of substrate in a day that is 30-40 times greater than its own mass, since it has a high rate of enzymatic reactions.

Recombinant protein (from English recombinant protein) is a protein consisting of amino acid sequences of various natural proteins, obtained using recombinant DNA technology. Recombinant proteins are widely used in medicine for both the treatment and prevention of diseases, and for diagnostic purposes.

Many proteins of higher eukaryotes are found in natural sources (in particular, in the human or animal organism) in very small, trace amounts. Using genetic engineering methods, it is possible to introduce the corresponding genes responsible for the synthesis of such proteins into the cells of microorganisms or mammals and obtain the expression of these genes.

For example, in *E. coli* cells, expression of about 70 different proteins was obtained: insulin, somatostatin, enkephalin, interferon, human growth hormone (somatotropin), hepatitis B virus antigen,

*foot-and-mouth disease virus, etc.*

A number of companies are setting up protein production using recombinant yeast. Yeast has advantages over *E. coli* :

- the presence of secretory systems, thanks to which extracellular proteins can be obtained;
- absence of toxic substances found in *E. coli*.

The human body produces many different compounds that participate in the regulation of metabolic processes. Hormones occupy an important place among such compounds. Most hormones were previously obtained from cadaveric material or from animal organs, but genetic engineering methods for obtaining them have now been developed.

*Getting insulin*

Insulin is a protein hormone produced by the  $\beta$ -cells of the pancreas to maintain blood glucose homeostasis. Insulin deficiency in the blood due to acquired or inherited factors leads to diabetes. This systemic disease, which results in high blood glucose levels, causes damage to many internal organs and body systems, which inevitably leads to a deterioration in the quality of life, and without treatment - to death. Diabetes is called the "disease of civilization", since its first descriptions date back to ancient times. Insulin is a vital drug that the World Health Organization recommends that countries with a population of over 50 million people produce themselves.

Insulin was first isolated in pure form and used for treatment in 1921, and its mass production began in 1923. At that time, the only source of insulin available for industrial use was the pancreatic fat of cattle and pigs coming from slaughterhouses. As data on the effects of insulin therapy accumulated, it became clear that a large number of patients developed a number of serious complications as they used animal insulin: sensitivity to the administered insulin decreased, which led to constant adjustments to the administered dose; various allergic reactions appeared; antibodies to insulin accumulated, etc. These problems were associated with the development of an immune reaction caused by the structural differences between human insulin and animal insulins. It was only in 1955 that Sanger established the structure of insulin and determined the amino acid sequence in the two polypeptide chains A and B (Fig. 8.1, see color insert).

Insulin is a peptide hormone consisting of two peptide chains: the A chain of 21 amino acid residues and the B chain of 30 amino acid residues. The A and B chains are linked by disulfide —S—S bonds, which provide the spatial structure of the insulin protein. During insulin synthesis in the pancreas, the insulin precursor proinsulin is initially formed, which consists of the A chain, B chain, and C peptide, consisting of 35 amino acid residues. The C peptide is cleaved by carboxypeptidase and trypsin, and proinsulin is converted into active insulin.

Pig and bovine (cattle) insulin differs from human insulin in amino acid composition. Bovine insulin differs in amino acids in three positions, while porcine insulin differs in one position (position 30 in chain B). It is therefore not surprising that treatment with bovine insulin results in much more frequent adverse immunological reactions than therapy with porcine or human insulin.

Human insulin can be produced in the following ways:

- total chemical synthesis;
- extraction from human pancreas;
- semi-synthetic;
- biosynthetic.

The first two methods are not suitable due to their uneconomical nature, insufficient development of the first method and lack of raw materials (human leukocytes) for mass production by the second method.

The human insulin preparations used for treatment at present are obtained either by a semi-synthetic method using a chemical-enzymatic replacement of B-30, the amino acid alanine in porcine insulin, with threonine, or by a biosynthetic method using genetic engineering technology. Both methods allow obtaining highly purified human insulin. This has been proven by numerous expensive and highly sensitive analytical methods.

The advantage of the semi-synthetic method is that it is possible to use well-known, improved methods of production and purification to obtain the initial substance, i.e. porcine insulin. Theoretically, the only way to "contaminate" the final product is to get enzyme residues or by-products of semi-synthesis, which arise during the enzymatic replacement of one amino acid. However, the appearance of such secondary impurities in the insulin preparation can be prevented by appropriate quality control. The disadvantage of the semi-synthetic method is the constant dependence of production on the initial raw material - porcine insulin.

Various methods have been proposed for the biosynthetic production of human insulin. The necessary gene material is transferred into the cells of a microorganism, which begins to synthesize insulin precursors. One of the following two methods is most commonly used:

Immunobiotechnology is an important section of modern biotechnology, including scientific development and technological production of prophylactic, diagnostic and medicinal products, in which various agents and/or processes of the immune system are used as active components.

The human immune system has evolved to control the genetic constancy of the internal environment based on the principle of self-or-foe recognition in order to preserve species and biological individuality. The immune system is a specialized, anatomically distinct lymphoid tissue that is distributed in the form of various formations and individual cells throughout the body and accounts for 1–2% of body weight. It consists of central organs: bone marrow, thymus gland, embryonic liver, lymphoid formations of the colon and appendix, and peripheral organs: spleen, lymph nodes, lymphoid tissue clusters (group follicles, tonsils). Lymphopoiesis, i.e. maturation of immunocompetent cells, occurs in the central organs; the immune functions are directly implemented in the peripheral organs.

The main functional cells of the immune system include lymphocytes, the number of which reaches  $10^{12}$ . In addition to T- and B-lymphocytes, the functional cells in the lymphoid tissue include granular and mononuclear leukocytes, dendritic and mast cells, white epidermal cells of the skin (Langerhans cells), etc. Some cells are concentrated in individual organs of the immune system, while others move freely throughout the body.

The functioning of the immune system can develop in the direction of non-specific (innate, natural) and specific (adaptive or acquired) reactions, in some cases representing stages of a single process aimed at protecting the body. In this case, non-specific immunity acts as both a first-line and a final stage of protection. The acquired immunity system takes on the intermediate functions of specific recognition and memorization of foreign agents, as well as the function of connecting innate immunity factors at the final stage of the process (Fig. 9.1, see color insert).

Innate immunity is realized in the form of two important processes: inflammation and phagocytosis, which consists of "eating" and destroying foreign bodies by leukocytes and macrophages. In this case, recognition and removal of foreign agents occur without taking into account their specificity. Lysozyme and bacteriolysin are also considered factors of non-specific immunity. This system reacts only to corpuscular agents (foreign microparticles, microorganisms) and cytotoxic substances.

A more advanced and powerful mechanism of protecting the body from the impact of biological aggressive factors is specific immunity. Evolutionarily, specific immunity arose later and means recognizing the most subtle, barely perceptible differences between foreign agents. The modern understanding of the structure and functions of the immune system as a whole is primarily associated with specific immunity.

The most important achievement of immunological research was the discovery of two independent effector mechanisms in the specific immune response. One of the mechanisms is associated with B-lymphocytes responsible for the humoral response, consisting of the synthesis of immunoglobulins, the other - with the T-lymphocyte system, the consequence of whose activity is a cellular response, consisting of the accumulation of lymphocytes sensitized by antigens.

It should be noted that the division of immunity into cellular and humoral is very conditional. The basis of cellular immunity is lymphocytes, which migrate from the bone marrow to the thymus for the purpose of maturation, as a result of which this part of the lymphocytes is called thymus-dependent or T-lymphocytes. In the human body, T-lymphocytes after maturation first enter the lymph, then the blood, where they exhibit their properties, and then return to the organs again. During the entire life cycle, a lymphocyte can "travel" more than 100 km. Such intensive circulation allows lymphocytes to quickly appear in "hot spots" when there is a need for lymphocytes.

The thymus is where different types of T cells are formed. Some of them ("helpers", "conductors of the immune response") participate in the regulation of B cell development and antibody formation, i.e. in the implementation of the humoral immune response; others interact with phagocytes, helping them to destroy absorbed microbial cells. An important function of "helpers" is also participation in the process of recognizing foreign substances by B lymphocytes and other types of T lymphocytes. Some T lymphocytes are called cytotoxic or "killers" for their ability to destroy cells containing a foreign antigen.

There are also T-suppressors, whose function is to suppress the activity of the immune response when it is not needed. If immune cells work for a long time, then the body's own healthy cells will begin to be affected, and this, in turn, will contribute to the development of various autoimmune diseases.

Human immunity is a complex of reactions, the purpose of which is to protect the body from agents foreign to humans, which include nucleic acids, proteins, microorganism cells, viruses, antibiotics, pesticides and others, united under the general name of antigens. It should be noted that the formation of antibodies is not directed against the entire antigen molecule, but only against certain small areas on their surface, called antigenic determinants (epitopes). For example, in the case of a protein molecule, antigenic determinants are areas that include only about five amino acid residues. In the case of bacterial cells, short chains of three to five sugar residues that form the wall of bacteria often act as antigenic determinants.

Amino acids belong to the group of carboxylic acids containing one or more amino groups —NH<sub>2</sub>. The general formula of amino acids is RCH(NH<sub>2</sub>)COOH (except for proline and oxyproline).

Amino acids play a major role in healthcare, animal husbandry, and light industry. Amino acids are the basis of all natural proteins and are an integral part of human food and animal feed rations.

Natural proteins consist of 20 amino acids. The physiological significance of amino acids is not the same. Some of them are not synthesized at a sufficient rate and in the required quantities in the human and animal organisms, and therefore must be supplied with food. These are the so-called essential amino acids. These include valine, arginine, histidine, lysine, leucine, isoleucine, methionine, threonine, tryptophan, and phenylalanine. Normal metabolism in the human and animal organism occurs only when essential amino acids are supplied in sufficient quantities and in a certain ratio. A deficiency of even one of the essential amino acids can lead to a serious metabolic disorder in the organism, to a slowdown in its growth and development.

The daily human requirement for essential amino acids:

- tryptophan - 0.5 g;
- lysine - 1.6 g;
- valine - 1.6 g;
- leucine - 2.2 g;
- phenylalanine - 2.2 g;
- threonine - 1.0 g;
- methionine - 2.2 g;
- isoleucine - 1.4 g.

Replaceable amino acids are synthesized in vivo from ammonia and various carbon sources.

Amino acids are widely used in many industries, which determines the high level of their production - about 500 thousand tons per year.

The largest amount of produced amino acids (about 66%) is used in agriculture as a feed additive.

In addition to agriculture, one of the main consumers of amino acids is the food industry - about 31%. Amino acids are used as fortifiers of plant foods to increase their nutritional value, as well as seasonings, since they have flavoring properties and can give the product a certain aroma and taste.

Lysine and methionine are most often added to food as a nutritional supplement. Sodium glutamate and glycine are used as aromatic substances to enhance and improve the taste of food. Glycine has a refreshing, sweet taste. It is added to sweet drinks, where it exhibits bacteriostatic properties. Cysteine prevents food from burning, improves baking in bread baking, and imparts the taste and smell of meat to artificial food.

In addition, amino acids are used in the synthesis of surfactants and fats, as additives to some types of fuel, in electrochemistry, medicine, cosmetology and in laboratory research.

L-methionine ranks first in the world in terms of production volume and importance among feed amino acids. In many countries, it is added to soy flour, a protein supplement for feed that is deficient in L-methionine.

Arginine is used in medicine. In combination with aspartate and glutamate, it helps with liver disease. Under the influence of arginine, the activity of the immune system increases in postoperative patients. K-Na-aspartate relieves fatigue and is prescribed to relieve heart pain, it is recommended for liver disease and diabetes. Cysteine protects SH enzymes in the liver and other tissues from oxidation and has a detoxifying effect. It also exhibits protective properties in damage caused by radiation. Tryptophan is an antidepressant, it is used in the treatment of alcoholism and insomnia. Glycine is a regulator of metabolism, normalizes excitation and inhibition processes in the central nervous system, has an anti-stress effect, and improves mental performance. Dehydroxyphenylalanine and phenylalanine are effective in Parkinson's disease. Their analogue, 5-hydroxy-L-tryptophan, is used as a psychotherapeutic agent. Polyamino acids are used to produce surgical material used to replace human skin in the treatment of burns.

Amino acids are used to make an artificial sweetener, aspartame, which is 150 times sweeter than glucose. Amino acids are also used in cosmetics. They are added to creams to maintain normal skin function. Cysteine is added to shampoos. Thus, amino acids have a variety of uses.

Microorganisms themselves synthesize all the amino acids they need from ammonia and nitrates, and carbon "skeletons" - from the corresponding ingredients. Based on this assessment of amino acids, scientists have long sought to use the ability of microorganisms to produce replaceable and essential amino acids in tangible quantities.

Methods for obtaining amino acids

There are currently four ways to obtain amino acids:

- 1) isolation of natural protein-containing raw materials from hydrolysates;
- 2) chemical synthesis;
- 3) chemical-enzymatic synthesis;
- 4) microbiological synthesis.

The first method is currently almost never used, as it has a number of disadvantages: a shortage of natural protein raw materials and the labor-intensive process of separating the amino acid mixture.

Chemical synthesis produces mainly racemic mixtures of L- and D-forms of amino acids, which are difficult to separate into individual compounds.

Chemical-enzymatic method — as a result of chemical reactions, amino acid precursors are obtained, then transformation is carried out using the enzyme systems of the corresponding microorganisms. However, the substrate specificity of enzymes, their limited availability, the complexity of their isolation and purification limit their use for these purposes. Despite the fact that enzymatic syntheses overcome all the above problems, the low yield of purified enzymes limits the use of chemical-enzymatic reactions.

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**PHYSIOLOGICAL ADAPTATIONS TO WEIGHT LOSS AND FACTORS FAVOURING WEIGHT REGAIN****Huseynova Leyla Mammad**

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**Abstract**

Weight regain after successful weight loss through lifestyle modification is a major problem in the context of overweight and obesity management. Understanding the underlying mechanisms of weight regain may help researchers and clinicians identify effective strategies to combat this phenomenon and reduce obesity-related metabolic and cardiovascular complications. This review summarizes the current understanding of a number of potential physiological mechanisms underlying weight regain after weight loss, including the role of adipose-derived immune cells; hormonal and neuronal factors affecting hunger, satiety, and reward systems; resting energy expenditure and adaptive thermogenesis; and lipid metabolism (lipolysis and lipid oxidation). The authors describe and discuss obesity-related changes in these mechanisms, their operation during weight loss and weight restoration, and their relationship to weight regain. Interventions based on these factors to prevent or limit weight regain, such as diet, exercise, pharmacotherapy, and biomedical strategies, as well as current knowledge about the effectiveness of these interventions, are also reviewed.

**Keywords:** underlying mechanisms, physiology, weight loss

**Introduction**

Weight regain following initial weight loss is common. This weight regain appears to be due to activation of compensatory physiological mechanisms that are triggered by the negative energy balance and accompanying weight loss during calorie restriction (and/or other lifestyle changes) and that may persist after the low-energy diet is discontinued. Sustained activation of these mechanisms will facilitate weight regain. Although they are likely to be a natural response to weight loss in order to maintain adequate body mass and energy stores, such mechanisms are not operative in obese individuals who wish to lose weight.

In a previous review, the authors discussed a number of adipose tissue-related factors that may influence weight regain, including the role of adipokines, microRNAs, fatty acid metabolism, and adipocyte stress [1]. The current review examines in more detail other potentially causal biological factors: the persistence of obesity-associated immune cell phenotypes in adipose tissue following weight loss, adipocyte extracellular matrix (ECM) adaptations, metabolic adaptations such as decreased energy expenditure, decreased lipid oxidation and lipolysis, changes in gut hormone secretion patterns, and changes in neurons that enhance appetite and mediate reward responses to food intake. The authors focus on lifestyle-induced weight loss because it is likely to differ from the response to surgically induced weight loss, particularly with respect to gastrointestinal signaling to the central nervous system to alter food intake patterns [2]. In addition, the authors touch on some strategies for preventing weight regain based on these factors.

Weight regain following weight loss through lifestyle interventions (e.g. dietary changes or exercise) is common and poses a major challenge in long-term weight management. A systematic review and meta-analysis of weight regain following weight loss through a structured lifestyle intervention in the United States, which included mostly observational studies, found that after an average weight loss of approximately 14 kg, approximately 75% of the lost weight was regained after five years [160]. A more recent systematic review and meta-analysis of a much larger number of randomised controlled trials of lifestyle interventions in overweight or obese adults conducted in 2022 with long-term ( $\geq 12$  months) follow-up [161] found that the mean weight loss at the end of the programme was  $-4.9$  kg (SD 3.8) in the intervention groups and  $-2.1$  kg (SD 3.3) in the control groups (difference 2.8 kg [95% CI  $-3.2$  to  $-2.4$  kg]). Weight regain after programme completion was 0.12–0.32 kg per year greater in the intervention group than in the control group, and the mean time to achieve no weight difference between the intervention and control groups was estimated to be 168 months (i.e. 14 years). Weight re-gain occurs not only after weight loss as a result of lifestyle intervention; It also commonly occurs after weight loss

due to bariatric surgery [162] and after stopping weight loss pharmacotherapy [163].

Although weight loss through lifestyle modification is often followed by weight regain, there is considerable interindividual variation: some individuals are able to maintain all or most of their lost weight for long periods of time (years), while others regain most or all of their lost weight within a few months. Understanding the triggers for weight regain and the factors that explain individual differences is important to improve the effectiveness of long-term obesity treatment.

#### **Obesity-associated immune cell phenotypes in adipose tissue**

Obesity is accompanied by changes in the innate and adaptive immune systems of adipose tissue in humans [3, 4] and mice [5, 6, 7]. It is characterized by massive invasion of macrophages, which are attracted by adipocytes stressed by hypoxia, hypertrophy, or cell death. When adipocytes are surrounded by macrophages, crown-like structures can be observed under the microscope. At the same time, tissue-resident macrophages differentiate into a spectrum of multiple macrophage populations. These populations include M2 and M1 states that utilize oxidative phosphorylation and glycolysis, respectively, as well as macrophages with metabolic characteristics of both M2 and M1 that secrete proinflammatory cytokines including IL-1, IL-6, and tumor necrosis factor (TNF) [8, 9]. With the development of obesity in adipose tissue, the ratio and functions of not only macrophages but also many other classes of immune cells are altered [10].

Studies examining changes in adipose tissue inflammatory gene expression during weight loss have yielded conflicting results. They may indicate that weight loss through calorie restriction reduces the expression of these genes compared to pre-weight loss levels [11]. Alternatively, the results may indicate that inflammatory gene expression is increased during calorie restriction and decreased as weight loss is maintained, even to levels lower than pre-weight loss levels [12, 13]. In 2022, it was demonstrated that lipopolysaccharide-induced cytokine production by adipose tissue macrophages is increased during the development of obesity and is not subsequently reduced by weight loss [14]. These observations support the concept that obesity followed by weight loss creates an “obesogenic memory,” also called “obesity memory” [15]; that is, a combination of factors occurring during obesity and subsequent weight loss that creates a risk of relapse to obesity. An example of key factors associated with obesity memory are persistent inflammatory cells in adipose tissue. The persistence of immune cell populations may be based on epigenetic changes in gene expression in response to environmental cues [9, 16]. A 2023 paper [17] hypothesized that long-term imprinting of obesity and weight loss in adipose tissue immune cells, termed “trained immunity” of the innate immune system [18, 19], underlies chronic inflammation as well as innate immune memory. The idea is that such “training” (i.e., immunometabolic and epigenetic reprogramming of myeloid cells) makes immune cells more responsive to future stimuli. Interestingly, trained immunity is also thought to induce changes in bone marrow progenitor cells; This may explain the maintained or persistent presence of certain immune cell populations in adipose tissue during cycles of weight gain and loss [18].

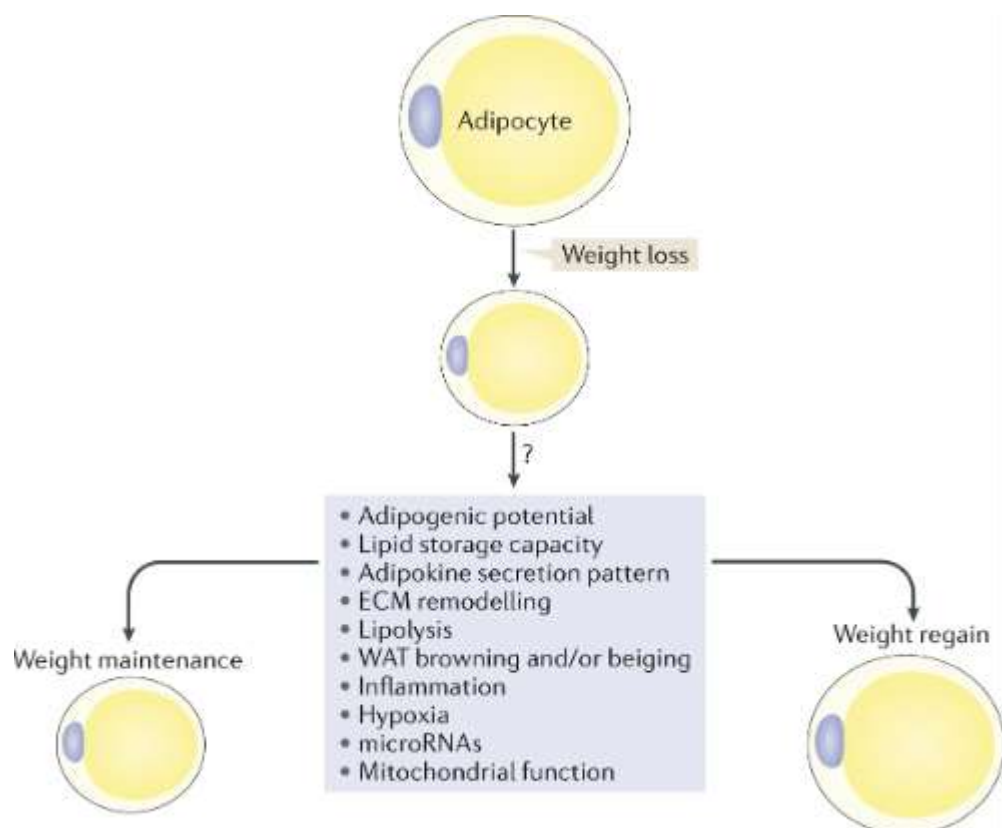
In mice undergoing a cycle of weight gain, loss, and recovery, new methods have provided a more detailed picture of the different immune cell populations in adipose tissue associated with obesity. These include fluorescence-activated cell sorting combined with single-cell sequencing and cell-based indexing of transcriptomes and epitopes using surface protein sequencing. A 2022 study [10] found that tissue-resident macrophages decrease with obesity, weight loss, and weight regain, while lipid-associated macrophages increase with obesity and are maintained during weight loss and weight regain. Adipose-derived regulatory T cells decrease in proportion to adipose  $\alpha\beta$  T cells during the development of obesity and remain lower during weight loss and weight regain compared to the pre-obese state. Exhausted phenotype T cells increase in adipose tissue during obesity, weight loss, and weight regain. This phenotype is characterized by a gradual loss of function and specific changes in gene expression [20, 21]. The proportions of antigen-presenting dendritic cells in adipose tissue are largely unchanged, but activated dendritic cell subpopulations are enriched in obesity and these subpopulations are maintained during weight loss and weight regain [10]. These data on the maintenance of cell populations suggest that in mice, weight gain followed by weight loss primes macrophages and other immune cells in adipose tissue to act as an innate immune memory of inflammation. To date, such changes in adipose immune cell populations have been studied mainly in male mice. Sex differences in the inflammatory responses to adipose lipolysis have been reported in diet-induced obese mice [22]. Therefore, observations should not be extrapolated to female mice and humans without further experimentation. Thanks to the new techniques mentioned above, such as single-cell sequencing and proteomics, the necessary information may soon become available.

### **Obesity Memory and Weight Gain**

*In mice, obesity memory formed in immune cells during obesity and weight loss has been shown to play a role in increasing the risk of weight regain. A 2017 study [23] found that after a cycle of weight gain and loss, mice fed a high-fat diet (HFD) gained weight faster than mice of similar weight that had not previously undergone a cycle. This phenomenon was observed even two months after weight loss. CD4<sup>+</sup> T cells were found to be necessary for weight gain after weight loss, since systemic CD4<sup>+</sup> T cell depletion leads to the disappearance of obesity memory. Moreover, naïve, previously obese Rag1<sup>-/-</sup> mice were found to acquire obesity memory upon CD4<sup>+</sup> T cell transfer, which is important for enhanced weight gain after weight loss, since systemic CD4<sup>+</sup> T cell depletion leads to the disappearance of obesity memory. Moreover, naive immunodeficient Rag1<sup>-/-</sup> mice, which had no history of obesity, acquired a memory of obesity following the transfer of CD4<sup>+</sup> T cells from previously obese mice.*

*In humans, a link between the immune status of adipose tissue and weight regain after weight loss was suggested by the YoYo dietary intervention study. In this study, overweight or obese individuals lost 8% of their body weight on a low-calorie diet (1250 kcal/day) or a very low-calorie diet (VLCD) (500 kcal/day) (weight loss phase), then continued on a balanced diet for four weeks to maintain the weight loss (weight stability phase). They were then followed for nine months, during which time weight regain was observed [24]. The expression of 277 ECM genes was examined in subcutaneous adipose tissue. In individuals who lost weight using VLCD, changes in the expression of a cluster of integrin genes during the weight stability phase were positively correlated with the percentage of weight regain [25]. The integrin genes were found to be specific for leukocytes. The results showed that people with the smallest decrease in leukocyte-specific gene expression in the weeks following weight loss (weight-stable phase) were more likely to regain weight. These findings are consistent with the role of obesity memory in humans, which is based on persistent myeloid cells, but also demonstrate individual differences in this phenomenon.*

*The persistence of certain immune cell populations after weight loss, a mouse CD4<sup>+</sup> T cell study, and an association between leukocyte-specific gene expression and weight regain suggest a role for immune cell-based inflammatory memory of obesity in the risk of weight regain in humans. Although clear mechanistic data are lacking, it is conceivable that ECM-modifying enzymes secreted by macrophages not only play a role in immune cell infiltration but may also be part of the obesity memory. As adipocytes proliferate, their ECM may lose its dynamic character because hypoxia prevents the proper functioning of collagen-modifying oxygen-dependent enzymes such as lysyl oxidase and prolyl 4-hydroxylase [26]. Ultimately, the loss of ECM dynamism will counteract further growth [27], and adipocyte signaling will be adjusted to reduce energy consumption and storage within these cells (Figure 1A). During the development of obesity, ECM-modifying enzymes secreted by macrophages may weaken the ECM and reduce the barrier to growth and hence energy intake (Fig. 1A). Following weight loss, a proportion of immune cells remain in adipose tissue (Fig. 1B). Upon re-challenge with positive energy balance (e.g., return to a pre-weight loss diet), the ECM-modifying enzymes of these persistent immune cells become readily available. As before, these enzymes remodel the extracellular matrix to support adipocyte growth and prevent suppression of energy intake, thereby promoting weight regain (Fig. 1B). The involvement of immune cells in this mechanism also supports the possibility that pro- and anti-inflammatory cytokines influence the risk of weight regain [28, 29]. However, this possibility has not yet been studied in sufficient detail. [3].*

*Picture 1. Mechanisms of weight regain after weight loss — the role of adipose tissue*

Notably, ECM-modifying enzymes play a critical role in the proposed mechanism. Cathepsin S is part of the expression cluster of leukocyte-specific integrins that correlated with weight regain in the YoYo study, as described above [25]. Cathepsin S belongs to the cathepsin protease family, which has both intracellular and extracellular functions and is involved in health maintenance and disease [31, 32]. Cathepsin S is expressed and secreted by macrophages and may be involved in immune cell infiltration into adipose tissue. In the YoYo study, individuals with the lowest decrease in adipose cathepsin S RNA levels during the weight stabilization phase after weight loss had the highest risk of weight regain [25]. Thus, cathepsin S persistence may be part of the obesity memory that enhances the risk of weight regain through immune cell infiltration and inflammation. Two other members of the cathepsin gene family, cathepsin B and cathepsin D, are part of another co-expression cluster identified in the YoYo study, and changes in the expression of these cathepsins in adipose tissue during weight stabilization have been associated with weight regain [25]. The function of this gene cluster has been defined as “ECM modification” [25]. Like cathepsin S, cathepsins B and D are expressed in macrophages, while cathepsin B is also expressed by adipocytes. Cathepsin B is one of the processing enzymes required to form cathepsin D [33].

Thus, obesity is accompanied by infiltration of macrophages and other immune cells. After weight loss, part of the immune profile is preserved (Fig. 1). Limited data in mice and humans suggest that this “obesogenic memory” is involved in the risk of weight regain. A possible mechanism involves macrophage-secreted ECM-modifying enzymes, some of which may be part of the cathepsin protease family. Further experimental data are needed to understand how the immune profile is preserved and its role in weight restoration, especially in humans.

#### **Energy expenditure and metabolic adaptation**

It is generally accepted that high energy intake rather than low energy expenditure is the primary driver of weight gain. However, it is also possible that low energy expenditure without a correspondingly low energy intake contributes to weight gain. Furthermore, metabolic adaptation to weight loss (i.e., a decrease in energy expenditure greater than expected given body composition) may potentially play a role in weight regain.

#### **Energy consumption**

A seminal 1986 paper reported that in a Pima Indian population, kinship explained part of the variance in resting energy expenditure (REE) (adjusted for the amount of metabolically active tissue, i.e.,

fat-free mass [FFM]) [34], indicating a genetic component to variation in REE. However, individuals from families with lower REE had no higher rates of obesity than individuals from families with higher REE, which the authors suggested was likely partly explained by the close correlation between FBM and percentage of body fat mass. This indicates that REE adjusted for FBM had already been partially adjusted for obesity. A follow-up study in 1988 found that participants' adjusted REE at the initial visit predicted weight gain over a four-year follow-up period. Moreover, daily energy expenditure measured in a breathing chamber was correlated with the rate of body weight change over a two-year follow-up period in another group of Pima Indians [35]. On the other hand, a 2022 analysis using the International Doubly Labeled Water Database to measure 24-hour energy expenditure found no association between 24-hour energy expenditure and gains in body weight or fat mass [36]. However, a non-significant association ( $P = 0.094$ ) was found in those individuals who were followed for more than four weeks. Thus, the lack of a clear association may be due to the short follow-up period.

Although, as mentioned above, there is some evidence that low baseline REE (adjusted for BFM) is associated with weight gain, the authors of this review are aware of only one study that found lower baseline REE (adjusted for BFM) to be associated with greater weight gain following diet-induced weight loss [37]. It remains unclear whether the lower baseline REE in this study reflected a familial characteristic or was a consequence of previous weight loss attempts or negative energy balance.

### **Metabolic adaptation**

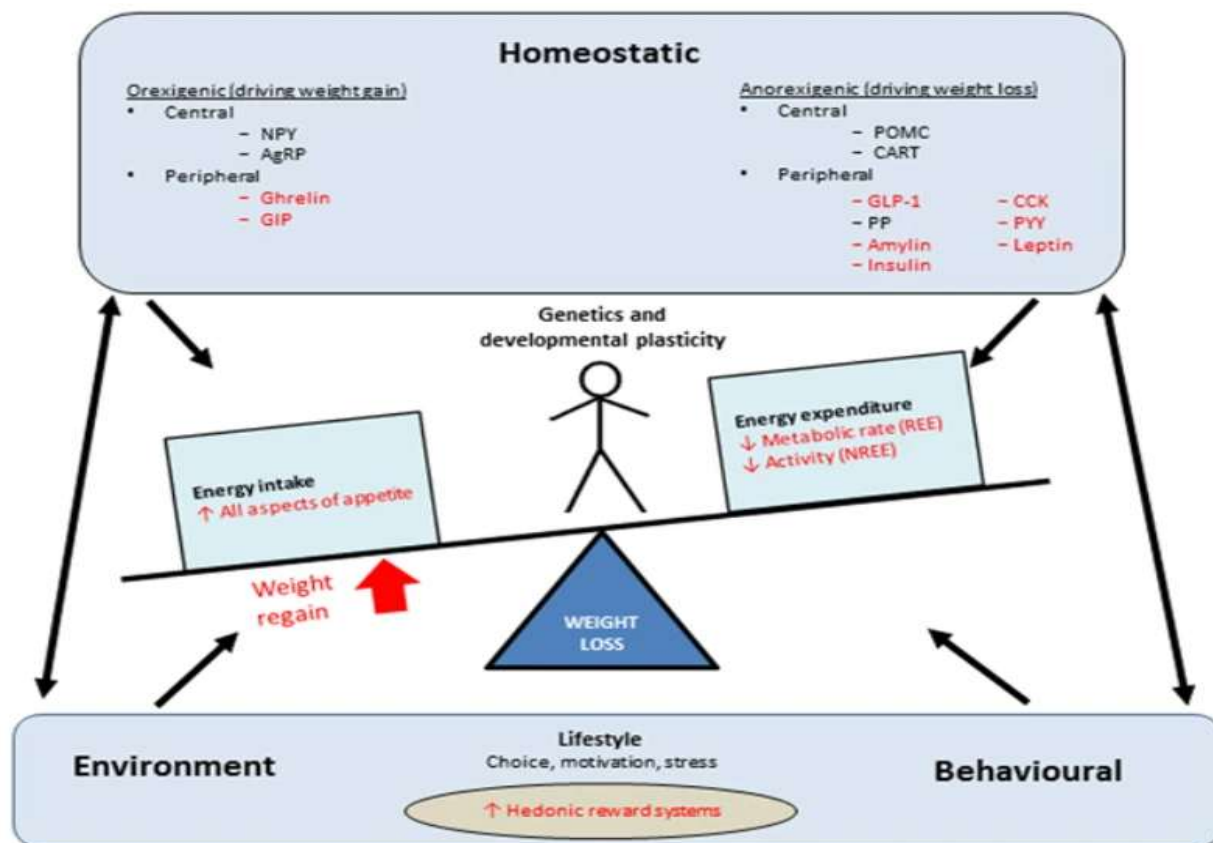
Metabolic adaptation, also known as adaptive thermogenesis, has no clear definition [38]. Definitions of metabolic adaptation vary and may have different meanings in different contexts. In the context of weight loss, adaptive thermogenesis refers to a decrease in REE and non-resting energy expenditure associated with caloric restriction that is independent of changes in body mass and tissue composition [38]. Many studies have focused only on REE or energy expenditure during exercise and therefore may not provide a complete picture. The concomitant state of energy balance at the time of energy expenditure measurement following weight loss can have a profound effect on the detection of metabolic adaptation and is not always clearly described in the literature. Individuals who have lost weight but are still in negative energy balance when their metabolic adaptation is measured will have greater metabolic adaptation than individuals who are in zero energy balance at the time of measurement [39]. Diet-induced energy expenditure is also lower under conditions of energy restriction, which may result in lower REE values even after an overnight fast of 12–14 h [40]. Furthermore, accurate measurements of body composition that account for changes in the anatomical and molecular composition of REE induced by weight loss are often lacking, a deficiency that may lead to an overestimation of metabolic adaptation [41]. Furthermore, methods for calculating changes in metabolic adaptation vary [42], making results from studies of metabolic adaptations during weight loss and their role in weight restoration sometimes difficult to interpret and compare. However, most studies have shown that metabolic adaptations to calorie restriction-induced weight loss exist for REE and activity energy expenditure [43, 44, 45]. A 2020 review of potential mechanisms of metabolic adaptation to energy restriction [46] found that adaptation includes changes in BMF composition, decreased sympathetic nervous system activity, decreased circulating leptin, insulin, and thyroid hormones, and increased mitochondrial efficiency. The level of metabolic adaptation appears to influence the degree of weight loss with a calorie-restricted diet, with individuals with strong metabolic adaptation losing less weight [47, 48], fat mass [49], or both [50] than individuals with less metabolic adaptation.

There is considerable debate about whether these metabolic adaptations persist after energy balance is restored and body weight is stabilized [39, 51, 52, 53] and whether they cause weight regain. Some studies suggest that metabolic adaptations persist for longer periods of time after the initial diet-induced weight loss ( $\geq 1$  year) [54, 55, 56, 57, 58], while others suggest that metabolic adaptations disappear rapidly (within weeks) after energy balance is restored [39, 45, 49]. Thus, studies are inconsistent with respect to the persistence of weight loss-induced metabolic adaptations. The discrepancies may be due to a lack of standardization of the conditions under which metabolic adaptation was measured across studies, which components of 24-hour energy expenditure were measured, and the extent of weight loss and gain across study participants. Several studies have addressed the question of whether the degree of metabolic adaptation associated with weight loss influences weight regain, but to date none have found evidence to support this [39, 49, 56, 59, 60, 61]. In the Biggest Loser participants, who were re-measured six years after the end of the competition, better weight maintenance at that time was associated with greater metabolic adaptation, suggesting that this is driven by and may act as a counterbalance to ongoing weight loss efforts [56].

Thus, although low individually determined energy expenditure (EE) may be associated with the

risk of weight gain, there is little evidence that low *EEE* in obese individuals will predict weight regain after weight loss. Furthermore, it is still unclear whether the metabolic adaptations that occur with weight loss are maintained on an energy-restricted diet in the absence of negative energy balance (Figure 2). There is still no evidence that the degree of metabolic adaptation after weight loss predicts how much weight regain will occur.

Fig. 2. Physiology of weight regain.



Physiological changes during weight loss in negative energy balance and after restoration of energy balance, with possible effects on weight regain. Arrows indicate differences from pre-weight loss: upward arrows indicate increases, downward arrows indicate decreases, and horizontal arrows indicate no significant change. It should be noted that the results of studies were sometimes contradictory (represented by several arrows in different directions for the same factor).

#### Lipid oxidation and lipolysis

A balance between energy intake and expenditure is necessary for weight stability. Such a balance can only be achieved if macronutrient intake and expenditure are also balanced. Carbohydrate and protein stores are tightly regulated by adjusting oxidation rates to intake, and thus any disturbance in energy balance during the day is largely compensated for by changes in lipid storage and utilization [62]. In the long term, changes in free fatty acid (FFA) levels and insulin sensitivity caused by increases or decreases in adipose tissue affect the average rate of lipid oxidation [63]. Subsequently, body composition will approach the level of fat accumulation at which lipid oxidation matches dietary fat intake [63]. Lipid oxidation is constrained by high glycogen levels [64], so individuals who maintain relatively high glycogen stores require a greater increase in adipose tissue mass.

#### Lipid oxidation

One of the first studies to show a potential link between lipid oxidation and obesity was a study in Pima Indians, which found that higher 24-hour respiratory quotient (a measure of an oxidized substrate mixture), and thus lower lipid oxidation, was associated with weight gain, regardless of whether RER levels were high or low [65]. On the other hand, a 2020 study [66] found no association between baseline RER and weight regain one and two years after a weight loss program in overweight premenopausal women. These differences may be due to differences between RER and 24-hour RER, between initial and subsequent weight regain, and/or differences in the study populations. Weight loss has been found to reduce lipid oxidation at rest and during exercise [67, 68], and 24-hour respiratory quotient was higher

in adults who lost a large amount of weight and maintained the reduced weight for at least two months compared with weight-matched controls who had previously lost weight [69]. Similarly, obese rats with reduced weight showed lower 24-hour lipid oxidation when fed a low-fat diet (LFD) ad libitum after energy restriction compared with obese rats fed the same diet ad libitum, which were also energy-matched to the former rats. These results suggest that the adaptations induced by weight loss on lipid oxidation are independent of energy imbalance [70]. In contrast, a 2019 study showed a decrease in respiratory quotient with weight loss, accompanied by an increase in fasting FFA levels in obese adults [71]. The reason for this discrepancy is not entirely clear, but may be related to the different measurement conditions in the two studies. However, participants with a smaller decrease in respiratory quotient induced by weight loss and lower FFA levels after weight loss had a greater weight regain [71]. Therefore, changes in FFA metabolism induced by weight loss may influence weight recovery. This result was supported by the fact that adipose tissue-specific gene expression indicates a major role of adaptations in fatty acid metabolism induced by weight loss in weight regain [71].

### **Lipolysis**

Fasting lipid oxidation is primarily mediated by adipose tissue lipolysis and is driven by high levels of circulating FFA [72]. An interesting question therefore arises: is the reduction in lipid oxidation that is often observed in obese individuals and that may be further reduced following weight loss accompanied by a reduction in lipolysis?

### **Basal and stimulated lipolysis in obesity**

For decades, researchers have observed an association between obesity and impaired adipose tissue lipolysis [73, 74]. Based on subcutaneous adipose tissue microdialysis studies [76, 77], basal lipolysis in adipose tissue, which is mediated primarily by adipose tissue triglyceride lipase (ATGL) [75], appears to be independent of obesity. However, in a 2008 study using labeled glycerol [76], the overall frequency of basal glycerol was similar in obese and non-obese men, but significantly lower in obese men after adjusting for body fat mass. An explanation for the lower basal lipolysis in obesity may be obesity-related insulin resistance. Insulin resistance has been found to be associated with decreased mRNA and protein expression of ATG [78].

Stimulation of adipose tissue lipolysis by the  $\beta$ -adrenergic system occurs mainly due to the activity of hormone-sensitive lipase (HSL) [75]. In obese adults and children, stimulation of lipolysis via the  $\beta$ -adrenergic system is weakened. This resistance to catecholamine-induced lipolysis is explained by a decrease in the expression of lipolytic  $\beta$ 2-adrenergic receptors, an increase in the antilipolytic properties of  $\alpha$ 2-adrenergic receptors, and a decrease in the expression of HSL [75]. Moreover, single nucleotide polymorphisms in the  $\beta$ 2-adrenergic receptor gene have been associated with a decrease in catecholamine-stimulated lipolysis [79] and obesity [80]. A microdialysis study showed that  $\beta$ 2-adrenergic stimulation of lipolysis is also blunted in the skeletal muscle of obese individuals [81]. In addition, both basal and stimulated lipolysis may be influenced by inflammatory markers such as TNF [82].

### **Effect of weight loss on basal and stimulated lipolysis**

A 2007 study [78] showed that TGLV mRNA and protein expression in subcutaneous adipose tissue was reduced during diet-induced weight loss (under negative energy balance). Consistent with these data, interstitial glycerol concentrations measured by microdialysis showed that basal lipolysis in subcutaneous adipose tissue was reduced following diet-induced weight loss in obese women (under negative energy balance) and was maintained during weight regain [83].

With regard to stimulated lipolysis, a 1997 study [67] found that, compared with values before weight loss, in vitro adrenaline-stimulated lipolysis in isolated subcutaneous abdominal and gluteal adipocytes was reduced in cells isolated from participants who had undergone diet-induced weight loss. Consistent with this finding is the observation that in overweight or obese individuals, HSL mRNA and protein expression in subcutaneous adipose tissue is reduced during weight loss (under negative energy balance) [79]. In a 2012 study [83], in premenopausal obese women,  $\alpha$ 2-adrenergic receptor antilipolytic activity was reduced during weight loss, resulting in increased adrenaline-induced lipolytic activity in adipose tissue. However, this effect disappeared during the subsequent weight maintenance phase and thus appears to be related to negative energy balance rather than weight loss itself.

### **Lipolysis and weight regain**

A 2019 study [84] compared lipolysis in mice treated with DVSF for eight weeks followed by DNSF for four weeks with lipolysis in mice treated with DNSF for 12 weeks by measuring FFA production ex vivo in adipose tissue. After 12 weeks, norepinephrine-stimulated lipolysis activity was not different between the two groups. However, when both groups of mice were subsequently treated with DVSF,

stimulated lipolysis was significantly lower in the treated group than in the control group. In addition, HSL phosphorylation and gene expression of  $\beta$ 1-adrenergic,  $\beta$ 2-adrenergic, and  $\beta$ 3-adrenergic receptors were lower in the treated group, although expression of the antilipolytic  $\alpha$ 2-adrenergic receptor was also reduced. The differences in these parameters between the groups were very similar to the situation after the first eight weeks of DVSF or DNSF treatment. It has therefore been suggested that memory in obesity has not only an inflammatory but also a metabolic component, in particular with regard to lipolysis.

The impairment of lipolysis following weight loss observed in overweight or obese individuals also suggests that decreased lipolysis may be involved in weight regain. It has been hypothesized that decreased adipocyte lipolytic activity following weight loss may shift the net balance toward FFA uptake and storage by adipose tissue (as opposed to FFA secretion and utilization), particularly because FFA oxidation is also reduced. However, direct evidence for this hypothesis from human studies is currently limited. A 2013 study found that changes in adipose tissue TGFA protein expression during weight loss predicted weight regain: the greater the decrease in TGFA, the greater the weight gain [85]. In the YoYo study, greater weight loss-induced decreases in plasma FFA, likely reflecting decreased lipolysis, predicted greater weight regain [86].

Thus, obese individuals have, on average, low levels of lipolysis and lipid oxidation. Both lipolysis and lipid oxidation are further impaired by weight loss, and there is some evidence that this impairment persists after weight loss has ceased and that greater impairment of lipolysis after weight loss is associated with greater weight regain (Figure 2).

#### **Factors related to appetite**

It is likely that the level of homeostatic regulation of body weight is determined by environmental and behavioral influences and their interaction with genetics [87]. Appetite has both behavioral and biological aspects: signals from outside the body (behavioural, cognitive, and environmental) and from within the body (hormonal, neural, and metabolic) are integrated to determine energy intake. Measuring appetite in all its forms is complex and must include an assessment of the strength of motivation to eat, how food choices influence eating behavior, and the hedonic processes that modulate the homeostatic system in the context of the environment and daily energy expenditure [88]. In addition, the role of circulating levels of appetite-related hormones such as leptin, ghrelin, cholecystokinin, glucagon-like peptide 1 (GLP1), peptide YY, amylin, pancreatic polypeptide, and gastrointestinal peptide (GIP), as well as pre- and post-meal afferent neuronal activity as biomarkers, is unclear. Obesity may arise from strong food cravings, poor food choices, and/or poor post-meal satiety, but there is large individual variation in each of these factors, and any given population is likely to have different appetite control phenotypes [88].

For example, individuals who are unable to gain weight even if they want to (constitutionally obese) appear to experience positive energy balance after a short-term overeating bout, as indicated by changes in hunger and satiety, and a reduction in subsequent energy intake [89]. On the other hand, individuals at high risk of weight gain (obese individuals who have lost weight) do not appear to properly perceive the caloric excess associated with overeating. These findings were accompanied by clear differences in brain activation patterns in response to images of high- versus low-hedonic value foods between the groups, as assessed by functional MRI [89].

In another study, in lean participants, intragastric infusions of glucose and lipids induced orosensory-independent and preference-independent, nutrient-specific brain neuronal activity and striatal dopamine release. In contrast, obese participants had severely impaired brain responses to postprandial nutrients, which may induce overeating [90]. A 2022 systematic review and meta-analysis [91] examined the results of studies examining differences in gastrointestinal hormone levels involved in appetite regulation in obese and non-obese individuals. The meta-analysis found that basal and postprandial total ghrelin and postprandial peptide YY concentrations were lower in obese than non-obese individuals, whereas no differences were found in fasting and postprandial GLP1 and cholecystokinin concentrations. However, there was considerable heterogeneity among the studies analyzed [91]. Appetite-related signals from the gut directly or indirectly (via activation of the afferent vagus nerve) influence brain centers involved in homeostatic and reward-induced food intake. Gastrointestinal hormones and neural signals released during eating appear to act via the brainstem, whereas homeostatic signals act directly via the hypothalamus [2]. The development of obesity appears to be associated with resistance to both leptin and ghrelin [92].

Weight loss is accompanied by adaptations in the appetite system, such as increased appetite and food reward, craving, and orosensory sensations [93], which tend to counteract weight loss, comparable to metabolic adaptations. Furthermore, abnormalities in neural responses to intragastric nutrient

administration in obese individuals were not restored after diet-induced weight loss [90]. In parallel, a systematic review found that in most studies, levels of the orexigenic gut hormone ghrelin increased after energy restriction, in addition to increased appetite, while levels of the anorexigenic gut hormones GLP1, peptide YY, cholecystokinin, pancreatic polypeptide, and amylin decreased [94]. Another review found that although circulating ghrelin levels increased with diet-induced weight loss, this did not occur with VLCD- and ketogenic diet-induced weight loss. Following weight loss, circulating peptide YY and GLP1 concentrations either decrease or remain unchanged, while amylin and cholecystokinin levels decrease and GIP levels increase [95]. However, the effects of weight loss on satiety hormone levels are highly inconsistent across studies, which may be due to differences in the diet, the magnitude of weight loss, the conditions under which the hormone concentrations were measured (in or out of energy balance), and the methods of measurement (e.g., fasting, postprandial, active, or total concentrations). Circulating leptin concentrations decrease during diet-induced weight loss [96]. The decrease is due to a combination of a decrease in adipose tissue mass and the presence of negative energy balance [96], both of which suppress leptin secretion from adipose tissue.

*The role of diet, exercise, pharmacotherapy and biomedical strategies in preventing weight regain*

Clearly, a better understanding of strategies to prevent or limit weight regain after weight loss is needed to achieve better long-term weight loss and improve health in overweight and obese individuals (Table 2). Here, the authors describe several strategies to reduce or prevent weight regain based on the physiological mechanisms discussed in this review.

### **Diet**

Diet composition and eating patterns can influence a number of mechanisms associated with weight regain, such as appetite, energy expenditure, and body composition. Dietary strategies to prevent weight regain have been previously reviewed by the authors [1, 103, 104]. A more recent review from 2022 specifically looked at the role of diet in inflammation [105], although not in direct relation to preventing weight regain.

There is some evidence that higher protein content in diets combined with lower glycemic index and/or glycemic load is associated with reduced weight regain [104], but more data are needed on the mechanisms involved. No difference in weight gain after weight loss was found between diets containing isocaloric amounts of more satiating foods and diets containing less satiating foods [106]. Anti-inflammatory diets (rich in olive oil, tomatoes, green leafy vegetables, nuts, fatty fish and fruits, and low in refined carbohydrates, fried foods, sugar-sweetened beverages, red meat and margarine – e.g. the Mediterranean diet) may reduce the likelihood of weight regain [107], but this possibility needs to be investigated in randomised controlled trials specifically designed to test this hypothesis. Additionally, more data are needed on the role of dietary regimens such as time-restricted feeding and alternate-day intermittent fasting in weight restoration following weight loss.

### **Exercises**

Regular exercise (or high levels of physical activity) has significant health benefits and is attenuated by some of the weight restoration mechanisms discussed earlier. Exercise may help maintain weight loss through mechanisms such as improved leptin sensitivity, increased sympathetic tone, decreased hunger, increased satiety, increased oxidation of dietary fat, and preservation of muscle mass [108]. Exercise may also suppress low-grade chronic inflammation, a beneficial effect also seen in obese individuals [109].

Data on the potential beneficial effects of exercise on weight regain mediated by increased leptin sensitivity are very limited and come from animal studies [110]. According to a 2023 study [111], obesity-associated leptin resistance is not reversed by diet-induced weight loss alone, as diet-induced adipose tissue inflammation and associated hypothalamic inflammation, as well as leptin resistance, are maintained. Exercise has been shown to reduce hypothalamic inflammation in obese animals and, as measured by surrogate peripheral markers, has similar effects in obese humans [112]. It will be interesting to see whether exercise can also reduce such persistent hypothalamic inflammation following weight loss and thus increase leptin sensitivity and thereby potentially reduce weight regain.

A series of randomised controlled trials have investigated the role of varying amounts of exercise combined with dietary interventions in long-term ( $\geq 1$  year) weight loss in humans. Many of these studies found no difference in long-term weight loss between groups [108, 113, 114], but some studies found better long-term weight loss in the exercise group [115] and that more exercise was associated with greater weight loss [116]. However, there are few randomised controlled trials in which participants were randomised to participate in a physical activity maintenance programme or no physical activity [117–120]. Three of these studies found no significant difference in weight maintenance between the

exercise and control groups [117–119], but one study found that weight regain at 1 year was less in the exercise group than in the control group [120]. In a study in which participants were randomized after a weight loss intervention to three different levels of physical activity, no differences in weight recovery after weight loss were found between groups [121].

Post hoc analyses of negative study results have often shown that individuals who exercised more were more effective at losing weight in the long term [118, 122–126]. A 1997 study demonstrated that after weight-loss treatments, higher physical activity energy expenditure, as measured by doubly labeled water, predicted less subsequent weight gain in women whose weight was stable for 1 month after the treatment but who began to gain weight thereafter [127]. Furthermore, higher levels of self-reported physical activity during the follow-up period after weight-loss treatments have been found to be associated with less weight regain [24, 128, 129]. Individuals who successfully maintained their weight reported high levels of physical activity [130] and also expended more energy through such activity than weight-matched controls; they also had higher total daily energy expenditure, as measured by doubly labeled water [131]. Subsequent decreases in physical activity over time in these individuals were associated with weight regain [132].

Although evidence for causality is limited, it suggests that exercise and physical activity may improve weight maintenance after weight loss. However, in randomized trials, there is a problem with long-term adherence, as some participants in the control groups may voluntarily increase their physical activity, while some participants in the exercise intervention group may be unable to adhere to the prescribed exercise, reducing the differences between groups. Whether there are differences in effectiveness between different types of exercise (e.g., aerobic exercise, high-intensity interval exercise, resistance exercise, or combinations of these) has not been studied.

#### **Pharmacotherapy**

Currently available pharmacotherapy for obesity mainly targets the appetite system. These drugs, especially newer generation ones, have proven to be very effective in producing long-term weight loss [133–135]. Several studies have specifically addressed the effects of GLP1 receptor agonist therapy [120, 136, 137] or subsequent drug withdrawal [138] on weight regain following weight loss. In a 2013 study, participants were randomized to receive the GLP1 receptor agonist liraglutide or placebo for 56 weeks following a 12-week weight loss period, during which both groups lost an average of 6% of their body weight on an energy-restricted diet. After 56 weeks, participants in the liraglutide group had significantly lower body weight than those in the placebo group. However, this was mainly due to ongoing weight loss in the liraglutide group, and body weight did not change significantly in the placebo group [136]. Thus, no conclusions can be drawn from this study about the effect of liraglutide alone on weight regain. A 2015 study had a similar design, but the degree of initial weight loss was greater (12%) [137]. After the 56-week weight maintenance period, body weight was significantly lower in the liraglutide group than in the placebo group, but again this was mainly because weight loss continued in the early phase of the weight maintenance period in the liraglutide group. After the nadir of weight loss, the rate of weight regain in the liraglutide group did not appear to be less than in the placebo group [137].

In contrast, in a 2021 study [120], some further weight loss was also observed in the liraglutide group during the maintenance phase, but in this study, weight regain after the nadir was less in the liraglutide group than in the placebo group. The addition of an exercise program during the maintenance phase improved weight loss in both the liraglutide and placebo groups [120]. A 2021 study found that switching some participants to placebo after a 20-week semaglutide run-in, which resulted in a 10% weight loss, resulted in weight regain in the placebo group over the 48-week follow-up period, while the semaglutide group lost an additional 8% of body weight [138].

Rosenbaum and colleagues found that in obese humans, replacing normal leptin levels with low doses could abolish the adaptations that result from 10% weight loss (reductions in energy expenditure, satiety, and food intake). In some studies, replacing leptin levels to pre-weight loss levels resulted in additional weight loss [54, 139], but in other studies this change was not statistically significant [140–142]. Whether leptin administration suppresses weight regain after weight loss has not been tested directly in humans. However, leptin administration after weight loss in diet-induced obese rats did not prevent subsequent weight regain [143].

New anti-obesity drugs currently being investigated for use in humans primarily target the appetite system and include dual and triple GLP1 agonists, leptin sensitizers, Y2 receptor agonists, amylin analogues, growth and differentiation factor 15, and agents that act on the ghrelin pathway [38]. Pharmacological options to target BMI preservation during weight loss and to influence weight loss-induced metabolic adaptations (reduced energy expenditure, FFA oxidation, and lipolysis) include

*promoting mitochondrial proton leak and uncouplers, effects on mitochondrial dynamics and biogenesis, calcium and substrate cycling, sympathetic nervous system activity, leptin, white adipose tissue browning, G protein-coupled receptor 75, growth hormone, inhibition of activin receptor type II, and urocortin 2 and 3 [38, 144, 145].*

*Animal studies have identified several pathways that influence weight regulation that could be explored to find new targets to prevent weight regain. A 2022 study [146] identified obesity-inducible genes in mouse adipocytes whose expression was not altered by weight loss. For 19 of these, knockout of the homologous gene in the worm *Caenorhabditis elegans* resulted in reduced food intake. In mice fed DVSG, knockout of one of these genes, ATP6V0A1, which encodes a component of the vacuolar ATPase complex, which serves to pump protons across membranes in several cellular organelles by hydrolyzing ATP, reduced both food intake and body weight. ATP6v0a1 mRNA and protein expression is also increased in adipocytes from obese humans compared with lean controls and is maintained after weight loss in obese human adipose tissue. In DVSG-treated mice that underwent a cycle of weight gain and loss, pharmacological inhibition of vacuolar ATPase with bafilomycin reduced food intake, decreased fat mass, and delayed weight regain.*

*NSAIDs and glucocorticoids have been used as drugs that target the immune system and reduce adipose tissue inflammation that often accompanies obesity and weight loss. However, systemic use of such drugs is currently thought to be associated with undesirable side effects, such as impaired glucose tolerance, hepatic lipid accumulation, and muscle wasting [147, 148]. A 2021 study [149] targeted mouse macrophages with dexamethasone by conjugating it to dextran, which binds to the mannose receptor and phagocytic receptors on the surface of macrophages. This resulted in a drug that was 20 times more effective than the free drug, as demonstrated by suppression of inflammatory genes in gonadal adipose tissue. Mice given an intraperitoneal injection of dexamethasone bound to dextran showed statistically significant weight loss after four weeks, which was accompanied by an increase in circulating FFA levels due to dexamethasone-induced lipolysis [150]. These results suggest that targeting macrophages with anti-inflammatory drugs may aid in weight control and potentially reduce weight regain.*

*Specific macrophages in adipose tissue are located close to neurons; they import and degrade norepinephrine [152, 153]. Obesity in mice results in increased levels of these macrophages, which acquire a proinflammatory phenotype when stimulated by the sympathetic nervous system. Blocking norepinephrine uptake by macrophages in mice causes white to brown adipose tissue conversion, increased thermogenesis, and sustained weight loss. Degradation of norepinephrine by adipose tissue macrophages in mice is enhanced during aging and may be responsible for age-related weight gain [147]. This particular class of macrophages has also been identified in humans [146] and may be an interesting target for weight management and prevention of weight regain.*

#### **Biomedical strategies**

*Instead of targeting macrophages, one could attempt to control weight by specifically reducing adipose tissue mass. In a 2004 study [154] that targeted endothelial cells of the adipose vasculature with a pro-apoptotic peptide, the total body weight of experimental mice decreased by 30% over four weeks, while their epididymal adipose tissue mass decreased by more than 70%. In a 2022 study [155], adipocytes were coated with gold particles modified with adipose tissue homing peptide and phosphatidylserine. This phosphatidylserine coating (phosphatidylserine is normally exposed to the extracellular environment only during apoptosis) resulted in the adipocytes being recognized as apoptotic cells and were attacked and killed by macrophages. Treatment of obese mice with these particles resulted in a 24% reduction in body weight after 15 days compared to pre-treatment body weight. For even more effective weight loss, the photothermal properties of gold particles were used. The abdominal area of the mice was irradiated with laser light, causing the gold nanoparticles to undergo a photothermal effect, which resulted in the depletion of lipid droplets from coated adipocytes, followed by cell shrinkage and necrosis. This procedure resulted in a 33% weight loss. After the treatments, the mice were placed on DIF for another 15 days. These mice gained significantly less weight than all control groups, demonstrating the potential of this approach for weight loss and prevention of weight regain.*

*Thus, weight regain after weight loss may be influenced to some extent by diet, exercise, and currently available pharmacotherapy. However, more specific studies are needed to fully evaluate the effectiveness of all of these strategies. New anti-obesity targets based on the physiological mechanisms described in this article are being discovered and should be investigated not only for their effects on weight loss but also on weight regain after weight loss. Given the multifactorial nature of weight regain after weight loss, a combination of strategies will likely be needed to optimally address this problem.*

### Conclusion

The review authors examine several physiological aspects associated with obesity, the consequences of weight loss due to lifestyle changes – mainly in the form of energy-restricted diets – and the sustainability of such changes. They also looked for evidence on the role of these physiological changes in weight regain after weight loss and discussed strategies based on these changes to limit or prevent this phenomenon.

Future research on the topics addressed here should address potential differences between weight loss-induced changes with and without negative energy balance, potential sex differences, individual differences, and the influence of a previous cycle of weight loss and weight restoration.

Obesity is accompanied by an infiltration of macrophages and other immune cells into adipose tissue. After weight loss, some of this immune profile persists. Limited data in mice and humans suggest that this obesogenic memory is involved in the risk of weight regain. However, more research is needed to characterize the exact combination of cells that contribute to obesity—particularly in humans—and to determine the specific role of each cell type in weight regain risk. To date, no human studies have examined whether interfering with the development or maintenance of obesogenic memory improves long-term weight loss outcomes.

Low REE may predict weight gain, and one study found that lower REE in obese individuals predicted greater weight regain after weight loss [37]. In general, a reduction in resting energy expenditure (also known as metabolic adaptation) is observed with weight loss on an energy-restricted diet, but there is controversy about whether this metabolic adaptation is maintained after energy balance is restored. There is no evidence that the degree of metabolic adaptation induced by weight loss predicts weight regain.

Obese individuals tend to have lower rates of lipolysis and lipid oxidation. Weight loss through calorie-restricted diets may further attenuate these processes. There is some evidence that the reduction in lipolysis and lipid oxidation persists after weight loss has ceased, and that the extent of this reduction is positively correlated with the extent of weight regain. A strategy to counteract the reduction in energy expenditure, lipolysis, and lipid oxidation is to increase exercise or physical activity. However, there are several reasons why studies of the effects of exercise on long-term weight regain are not always convincing. One is that long-term adherence to exercise is often problematic. Another reason may be that the increase in energy expenditure during exercise is offset to some extent by an increase in energy intake. These findings suggest the need for more comprehensive behavioral and environmental change strategies that facilitate sustained increases in physical activity and prevent or limit compensation through increased energy intake, such as by adjusting diet composition.

Obesity is associated with abnormal fasting and postprandial patterns of gut hormone concentrations, both orexigenic (ghrelin) and anorexigenic. However, the results of studies vary widely, which may reflect the different appetite phenotypes found in obese individuals. There have been conflicting data on the effects of energy restriction-induced weight loss on gut hormone concentrations and their maintenance after weight loss, as well as evidence that weight loss-induced changes in gut hormone concentrations are associated with weight regain. However, pharmacotherapy targeting gut hormones, such as single or dual GLP1 receptor agonists, are currently the most effective anti-obesity drugs, associated with significant long-term weight loss. However, whether these drugs suppress weight regain after nadir has been achieved is unresolved and requires further study. There are other new drug targets for weight regain based on the physiological mechanisms discussed above, and the authors hope that new drugs that also specifically prevent this process will be developed in the near future. At present, most of the data on the role of obesity- or weight loss-induced changes in weight regain come from association studies. Studies of the causal relationship of these changes are largely lacking and need to be conducted to better understand the underlying mechanisms.

Because of the multiple factors involved in the development of obesity, lifestyle-related weight loss, and weight regain, it is likely that optimal weight management will require multiple interventions. In the future, improved lifestyle habits combined with pharmacological treatment (using one or more drugs) that also prevents weight regain may help to maintain the well-being of individuals with obesity and the long-term management of this condition. Furthermore, given the multiple factors that regulate body weight, it is likely that there are different phenotypes not only of obesity but also of weight loss and weight regain, and personalization of therapy may help to further improve its effectiveness. Currently, studies focusing on weight regain after weight loss constitute a minority of weight management studies in both humans and laboratory animals. The impact of weight regain on long-term weight management and the health of individuals and populations requires significantly more scientific and medical attention.

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**EFFECTIVE METHODS AND APPROACHES IN TEACHING BIOLOGY****Zhumagulova Adolat Bazarbaykyzy***2<sup>nd</sup> year Master's degree student of Abay Kazakh National Pedagogical University,  
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*In today's innovative educational space, adapting to learning, fostering global awareness, developing thinking, making independent scientific conclusions, selecting scientific achievements based on needs, and enabling students to become the subject of their own actions are pressing issues. This is because only highly educated specialists can become leaders in society, economy, and social and cultural development. The teacher's task is not merely to increase knowledge but to provide the tools that allow students to acquire this knowledge independently, ensuring their personal development, shaping their identity, and cultivating the innovative needs to improve the surrounding world. The goal of using new technologies in the educational process is to enhance the quality of teaching and learning [1-3].*

*In the current context, the level of society's education and intellectual potential has become an important component of national wealth. A person's level of education, professional flexibility, creativity, and ability to act in non-standard situations form the foundation for the development of the Republic of Kazakhstan, ensuring the stability and security of society.*

*From this perspective, today, the teacher's main task is to incorporate new technological methods and approaches into the education system to effectively nurture the younger generation. Therefore, rather than following traditional forms of teaching, every educator should focus on using new teaching methods, technologies, and non-traditional lesson types. In this regard, various innovative approaches, based on science and practical experience, are being integrated into the education system [4-5].*

*Thus, selecting new methods and approaches in teaching depends on the content of the subject and the age characteristics of students. Nowadays, mastering advanced teaching technologies is crucial to becoming a competent, well-rounded specialist. The effective implementation of new technologies in the classroom depends on the individual teacher's skill. Currently, the teaching of natural sciences is considered in two aspects: the social aspect of natural sciences and the personal aspect [1-5].*

*Biology is one of the first subjects taught in secondary school, introducing students to the basic concepts of plant structures and plant biology. By enhancing the use of new technologies in teaching biology, it is possible to develop critical thinking and improve students' retention of information, thus increasing their interest in the subject.*

*Using strategies from the Critical Thinking Project helps organize research and inquiry-based activities for students. It is crucial to consider the individual characteristics of each student and understand their potential for self-directed learning and growth. The aim is to increase their interest in knowledge acquisition and self-education at a scientific level [4-6].*

*A study group of 8-A class, consisting of 26 students, was selected for the experiment. The academic performance of this class was average. A total of 7 lessons were taught. A control group, 8-B class with 24 students, also had 7 lessons. The overall number of students involved in the experiment was 51, with 14 lessons conducted.*

*To ensure the effective mastery of the topic, we created reference diagrams, test tasks, and a system of questions. Several methods were used to determine the most effective approach. For the purposes of the study, we divided the structure of the Critical Thinking Technology lesson into three main stages:*

*1. Activating interest (creating a bridge, brainstorming) – This stage aims to awaken the students' interest in the lesson. The teacher connects students' prior knowledge to new material, stimulating their curiosity. Through appropriate strategies, students' thinking is sharpened, and their motivation to engage in the lesson increases.*

*2. Introducing meaning – This stage helps students understand the relevance of the topic and provides clarity on the importance of the material.*

*3. Reflection – This stage involves summarizing, concluding, and consolidating new knowledge. Students are encouraged to reflect on what they have learned, express their creativity, and evaluate their work and the work of their peers.*

The effectiveness of these stages depends on the strategies chosen for each, which are outlined in the table below.

**Keywords:** Effective teaching methods, Biology education, Critical thinking, Student-centered learning, Innovative teaching technologies, Self-directed learning, Educational strategies, Cognitive development, Inquiry-based learning, Academic performance, Pedagogical innovation, Student motivation

## Introduction

Table 1.

Strategies used in different stages of the lesson

| Stage               | Strategies applied                                           |
|---------------------|--------------------------------------------------------------|
| Activating interest | Grouping, Bloom's Taxonomy, Brainstorming                    |
| Introducing meaning | Debate, Aquarium, INSER, Jigsaw, Cubism                      |
| Reflection          | Essay, Pyramid, Value Line, T-Chart, Key Words, Semantic Map |

## RESEARCH METHODS

The critical factor in the educational process is to increase students' interest and develop their intrinsic motivation to learn. The experimental group showed a marked improvement in students' academic performance, with the average grade rising from 4.3 to 4.6. In the control group, there was no significant improvement. The use of Critical Thinking strategies proved to be effective.

In the experimental group, students' activity increased, and their academic performance improved. In contrast, the control group followed a more traditional approach, where the teacher explained the material, and students were not given assignments. As a result, the students in the control group showed a lack of interest and did not engage deeply with the content.

Additionally, we incorporated auditory, visual, and cognitive techniques to help students process and retain information, as well as technological elements to enhance the learning experience. In the experimental group, we observed significant improvements in memory retention, whereas the control group demonstrated lower retention.

Based on the results of the experiment, it is evident that the use of Critical Thinking strategies increases students' creativity, interest in learning, and cognitive and aesthetic perspectives. The data confirmed that by applying these methods, students become more self-reliant and independent in their learning process.

Therefore, the main goal of the teacher is not just to provide knowledge, but to teach students how to apply it in real-world situations. To achieve this, teachers need to encourage independent learning and foster critical thinking.

In conclusion, through the application of effective methods in biology lessons, we observed:

1. The use of effective methods in biology classes significantly enhanced students' self-directed learning and cognitive activities.
2. These methods helped students become more active in class, manage their time better, and make better use of their abilities.
3. Teachers were able to guide students in solving personal issues and encouraged them to work independently.

The study confirmed that these methods can be widely implemented in school practice and can contribute to improving the educational process.

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## THE NECESSARY SKILLS AND RESOURCES FOR TEACHERS IN APPLYING BILINGUAL EDUCATION IN BIOLOGY

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### **Abstract**

*This article discusses the necessary skills and resources for teachers in applying bilingual education in biology. In the process of bilingual education, teachers must acquire a range of important skills, from correctly using scientific terminology to mastering communication skills and teaching methods. The article explores the main methods and tools used in bilingual education for biology, including linguistic resources, multimedia tools, and scientific literature. It is concluded that the knowledge and skills required by teachers help improve the quality of education and stimulate students' interest in science.*

**Keywords:** *biology, bilingual education, bilingualism in teaching, teacher skills, scientific terminology, linguistic resources, multimedia tools, teaching methods, secondary language education, educational technologies.*

**Introduction.** *In the modern education system, bilingual education plays an important role. In Kazakhstan, where both Kazakh and Russian languages are used in schools, biology is often taught bilingually. This approach not only deepens students' scientific knowledge but also aims to develop their linguistic skills. To implement bilingual education in biology effectively, teachers require specific skills and resources. This article explores the necessary skills and resources for teachers when applying bilingual education in biology.*

### **1. Features of Teaching Biology in Two Languages**

*Bilingual education allows students to learn new subjects and concepts in two languages. Since biology involves specific terms and concepts, teachers must master the features of scientific language. The main task of teaching biology bilingually is to simultaneously develop both subject knowledge and language skills in students. Therefore, teachers need to acquire specific skills to adapt to effective bilingual teaching.*

### **2. Necessary Skills for Teachers**

#### **2.1. Mastery of Scientific Language and Terminology**

*In bilingual biology education, teachers must use scientific terminology accurately and correctly. Many biology terms are used universally, but some may be difficult to translate. Teachers must understand the differences between terms in each language and be able to use them correctly and effectively. Teachers' deep understanding of terminology plays a crucial role in explaining new scientific concepts to students.*

#### **2.2. Communication Skills**

*When teaching in two languages, teachers need to be able to explain scientific content in both languages effectively. To do this, teachers must master the language structures and phrases of each language. For example, the ability to explain scientific information in both Kazakh and Russian during biology lessons enhances students' understanding of the subject. Furthermore, teachers must be able to present explanations and questions in a simple and understandable way, taking into account the students' language proficiency.*

#### **2.3. Applying Different Teaching Methods in Two Languages**

*Teachers must use various teaching methods while delivering bilingual lessons. For instance, conducting experiments, discussing diagrams and charts, and utilizing interactive methods help students develop their language skills and increase their interest in science. Teachers should introduce students to scientific literature by using additional materials and resources in both languages.*

#### **2.4. Mastery of Language Strategies and Teaching Technologies**

*In modern education, interactive tools and educational technologies play a significant role. Teachers should be able to use digital resources, educational platforms, video content, and multimedia materials when teaching biology bilingually. These tools engage students and improve their comprehension of the subject matter.*

### **3. Resources Needed for Bilingual Education in Biology**

#### **3.1. Linguistic Resources**

An important aspect of bilingual teaching is the correct use of terminology. Teachers should create or use bilingual biological terminology dictionaries (Kazakh-Russian) to assist students in mastering scientific terms. Additionally, bilingual textbooks and methodological guidelines will be useful for teachers. These tools help students accurately understand and use scientific terminology.

#### **3.2. Multimedia and Interactive Tools**

To effectively teach biology in two languages, it is necessary to use multimedia and interactive tools. These may include videos, animations, diagrams, and online tests. Such tools provide an effective way to present information in two languages, as they engage students' attention and help them understand concepts more easily.

#### **3.3. Scientific Literature and Educational Materials**

Teachers need to use scientific literature and educational materials when teaching biology in two languages. English-language international scientific articles and journals help students acquire new information. Furthermore, textbooks and additional educational materials in Kazakh and Russian play a vital role in bilingual education.

#### **3.4. Internet Resources**

Internet resources, scientific journals, and research articles provide an additional source of learning for both teachers and students. Online courses, webinars, video lectures, and scientific papers in two languages enhance students' interest in science and broaden their knowledge. Additionally, the internet allows students to develop research skills by accessing a variety of educational resources.

**Conclusion.** Bilingual teaching of biology helps develop students' linguistic and scientific skills. However, to achieve this goal, teachers must possess high professional competence, mastery of scientific language and terminology, communication skills, and knowledge of teaching technologies. The resources required for teachers, including linguistic, multimedia, scientific literature, and internet resources, must be integrated into the teaching process. The necessary skills and resources for bilingual education in biology play a key role in improving the quality of education and fostering students' interest in science.

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## **ENVIRONMENTAL EDUCATION AS A FACTOR IN THE FORMATION OF ENVIRONMENTAL CULTURE AND OPTIMIZATION OF SOCIO-NATURAL INTERACTION**

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### **Abstract**

The end of the twentieth and the beginning of the twenty-first century are marked by increased attention to the problems of the prospects for the development of mankind. Based on numerous comprehensive studies by domestic and foreign authors, the Club of Rome, and other international scientific organizations studying global development, it has become obvious that the world has come to a point that requires a radical change in the value orientation of each person and mankind as a whole, and compliance with the priorities of natural prerequisites in natural-historical development. The concept of sustainable development adopted at this conference essentially opens a new era in understanding the relationship between society and nature sustainable development is a self-sustaining, self-organizing process of balanced development of human society in harmony with the natural environment. As human society develops, ever greater interdependence and interdependence of processes occurring in the system "nature-man-society" is revealed. The current environmental situation has brought to the forefront the problems of interaction between society and nature, sharply raising the question of the role of environmental education in optimizing this interaction. sustainable development, environmental education indirectly, but very actively influences the optimization of interaction between nature and society. Recognition of the importance and necessity of environmental education in our time has not automatically led to an adequate understanding of its philosophical-methodological, theoretical foundations. The main attention turned out to be concentrated mainly on such issues as environmental pollution, resource depletion, etc. These vitally important issues for society are often considered at the level of common sense, without using the appropriate scientific methodology. But such an ineffective approach is hardly acceptable today.

**Keywords:** sustainable development, environmental education, socio-natural interaction

Recently, we hear more and more about ecology. What is ecology? Ecology is a science that has developed and transformed over decades and in the modern world has gone far beyond the natural sciences. Now ecology has also acquired social significance, helping people solve environmental problems and improve their living environment. Without knowledge in the field of ecology, it is impossible to solve the tasks set before a person. How can this knowledge be obtained?

First of all, environmental knowledge is acquired in the process of education. Education begins from the very birth of a person and lasts throughout his life. One of the tasks of environmental education is a cultural attitude to the environment, which is formed from childhood. One example of a cultural attitude to nature is when a mother teaches her child not to litter on the street, but to throw out garbage in the right place, separate collection of garbage for recyclable materials is also very important.

Such an example is laid in the mind of a person from childhood. From birth, parents are engaged in education, in kindergarten - educators, in school - teachers, in university - lecturers, and then a person educates himself and learns from his own mistakes. Throughout life, being children, adults or old people, environmental education remains in the mind of a person. In addition to environmental education, there is also environmental education - this is a more serious aspect of ecology.

### **Methodology of environmental education**

The main objective of environmental education is to teach a person to think ecologically. The objective of environmental education consists of three substructures: the formation of accurate environmental views, the formation of human-nature relationships, and the creation of a system of the ability to interact with nature. The presence of environmental knowledge does not ensure environmentally sound behavior of an individual; for this, there must also be an appropriate attitude

towards nature. Based on this, we can say that the main direction of the task of environmental education is the creation of an individual attitude towards nature. Education teaches how to interact with nature and apply appropriate technologies, including garbage removal.

The goals of environmental education: to organize work on environmental education and the development of environmental culture, to create a system of continuous environmental education of society, to attract city residents to participate in the work to improve and preserve the environment (monthly clean-up days in each city of the country to improve their own city).

One of the methods of environmental education is the creation of environmental trails. For example, in Crimea there is just such a trail, which is called the Big Environmental Trail of Crimea. The length of the Big Trail is more than 500 km - this is a large environmental and educational route. You can travel along the Trail all year round. The task of the guides is to teach visitors to notice the diversity of anthropogenic factors in wildlife. The peculiarity of such trails is that a pupil, student or ordinary citizen has the opportunity not only to relax, but also to study natural objects.

Environmental education in modern society is one of the main parts of the modern education system. Today, increased attention is paid to issues of environmental education, in connection with this, a large number of environmental educational projects are being developed for various groups of the population. Each program takes into account local conditions and ethnic traditions of peoples. In connection with the development of technology, distance learning programs have also been developed that are available to anyone. Environmental education helps not only to deepen one's own knowledge in the field of ecology, but also to obtain the ability to apply the acquired information in practice in various areas of modern society.

In the modern world, a large number of environmental problems have arisen, an important aspect in their solution is the formation of a culture of environmentalism and education of the younger generation.

Environmental education necessarily includes a cognitive component. It can and should be embodied in technical and technological, socio-economic, political and legal, spiritual and moral forms, requirements and standards, etc. On the other hand, environmental education cannot and should not be separated from the education of an environmentally responsible individual, his or her active civic position. Just like education in general, environmental education is a unity of cognitive and value components, therefore, it has considerable potential both for the socialization of the individual and the humanization of society. It prepares a person for a certain type of activity that will be aimed at the survival of humanity, and not contribute to the approach of an environmental catastrophe, and forms the value orientations of the individual. The cognitive and educational components of environmental education are not absolutely separated. They are interconnected and complement each other.

Ecological education includes several aspects. Such as: reo-, bio-, socio-, anthropoecological education. In socioecological education, the emphasis is on the socialization of the individual, in anthropoecological education on the humanization of society. In addition to environmental education, ecologized education is distinguished.

The goal and result of environmental education is environmental culture. The point of view that considers the goal to be the formation of environmental consciousness has the right to exist, since the latter is a component of environmental culture.

In order to form an ecologically active personality in the process of ecological education it is necessary to: master scientific knowledge; learn moral value orientations in relation to nature; develop practical skills and abilities in preserving favorable conditions of the natural environment.

The basis of all ecological disciplines is one or another idea of the ecological system and the ecological approach. The ecological approach is an eco-oriented approach to the study of special spheres of reality - special ecosystems in which the "central" object and the "ecoenvironment" have a qualitatively heterogeneous character. Ecological interactions that are associated with the ecological approach and which are special (inter-level) eco-oriented interactions are the object of study of ecological sciences.

It is very important that environmental education has a single, common methodological basis on which to study all sections of ecology, including social ecology, which should form the basis of socio-ecological education. Social ecology is the science of the interaction of nature and society, aimed at optimizing this interaction. General socio-ecology is an important basis for the formation of an ecological culture of society.

The cognitive component of environmental education, first of all, should include the general theory of ecology, which is based on the ecological approach, biological, geographical, social and anthropological ecology. The allocation of global ecology as one of the sections of ecology is hardly

*appropriate, since the term "global" rather reflects the quantitative characteristics, the scale of problems, than their integrative nature, and is used in conjunction with the terms "regional", "local". In its scope, the content of the cognitive component of environmental education coincides with the sphere of environmental knowledge, while this knowledge should be conceptually organized in a certain way for more effective assimilation in the educational process.*

*Scientific judgment about the world should not avoid value-based worldview conclusions. The results of studying ecology are meaningless outside their cultural context. Their role is understood from the position of the human perspective within the framework of the value system determined by the necessity of co-evolution of society, man and nature. Hence, the synthesis of intellectual and spiritual experience within the framework of education is very relevant.*

*Fundamentalization of environmental education allows generalization of knowledge in the form of certain conceptual constructions. This will ensure a holistic, rather than fragmentary, coverage of environmental issues. The methodological need and necessity for obtaining environmental knowledge should be an environmental approach, and the general theory of ecology should take its rightful place in the cycle of environmental disciplines.*

*Since environmental consciousness, in addition to the epistemological aspect, includes an axiological one, then for its effective formation in the process of fundamentalizing environmental education it is absolutely necessary to include moral education.*

*Ecological culture, as one of the manifestations of culture in general, covers the sphere of relations of man, society to nature. In this sense, ecological culture is considered as a specific way of optimizing human activity, aimed at harmonizing relations of man, society with nature. Along with the ecological culture of society (and man), anthropoecological culture should also be distinguished.*

*The ecological culture of society is a way of socio-natural development. The essence of the ecological culture of society, therefore, is the combination of the social with the natural, their unity. Ecological culture should become a way of achieving co-evolution of man and nature based on a deeper knowledge of it and understanding of the process of interaction between society and nature.*

*Ecological culture is formed by deepening and parallel development of the connection between the cultures of the North and South, West and East, and harmonizing their interaction. Just as a holistic global ecosystem is made up of unique regional ecosystems, so the ecological culture of the world presupposes a dialogue of diverse national cultures.*

*The ecological culture of society determines the real possibilities in the construction of the noosphere. The concept of the noosphere is currently close to the idea of optimization, harmonization of the interaction of society with nature. The formation of the ecological culture of society is more purposeful, conscious.*

*The development of ecological aspects of culture through the disclosure of these aspects presupposes the transformation of economics into eco-economics, education into eco-education, aesthetics into eco-aesthetics, ethics into eco-ethics. The prefix "eco-" demonstrates only "greening", indicates that the role and significance of ecological aspects of culture among other aspects increases, its determining influence on culture as a whole is strengthened.*

*The role of socio-ecological education in society is the socialization and enculturation of its members, i.e. introduction to culture. It should ensure the transfer of those types of knowledge and experience, value relations that will serve as a support for the new generation in subsequent socio-cultural life. It is necessary to orient environmental education towards the future. Orientation towards the future can be realized by implementing, for example, an advanced model of education. "Advanced education" is not a new type of education, but an integral part of the educational system.*

*Optimization of relations between society and nature directly coincides, first of all, with the solution of problems on cardinal changes in the system "production-consumption". Production is the main form of interaction between nature and society. The main technological ways of optimization of interaction between nature and society are: greening of production and ecological production.*

*Based on the general theory of interaction between nature and society as distinct and interpenetrating entities, the dissertation author notes that the technological aspects of optimizing the interaction between nature and society are also closely related to natural and social transformations. This is due to the fact that the optimization of socio-natural interaction, directly implemented at the technological level, also depends on transformations in the natural and social world. These transformations should lead to the co-evolution of nature and society.*

*The development of a system of economic and legal support for overcoming the environmental crisis is of primary importance in modern conditions. Its effective implementation can maintain the*

*balance between the economy and the environment. The transition to a market economy is possible with the help of ecologically balanced economic reforms and the creation of an appropriate economic environment at the macro level. They determine what environmental protection measures will be carried out and what mechanism for environmental management will be formed. Environmental management greening is a specific general scientific approach to solving the problems of changing the relationship of man and society to natural resources and environmental conditions. For our country, the greening of the economy is complicated by the general economic crisis and the difficulties of the transition to a market economy. We cannot ignore the laws of the market, but we should not absolutize them either; we cannot subordinate the cultural and moral-spiritual aspects of people's existence in society to them.*

*The solution of environmental problems should be ensured not only by changes within each sphere of production, but also by mandatory personnel provision of environmental activities with trained specialists at all levels of management. The role of environmental and ecologized education is great in this.*

*Legal prerequisites for optimizing the interaction between nature and society can be formed at three levels: 1) environmental human rights; 2) environmental management, which is carried out directly in the area of interaction between nature and society; 3) environmental protection.*

*Positions describing the relationship between man and nature are characterized from anthropocentric to naturcentric. The naturcentric approach to understanding the role and place of man in the world is in itself capable of correctly and successfully solving environmental issues.*

*The attitude of man to nature is connected with morality precisely because it is also the attitude of man to man. The spiritual and moral foundations of the ecologization of human activity have two levels: 1) external, which consists of man's attitude to nature; 2) internal, which consists of man's attitude to man.*

#### *Conclusion*

*Thus, it is necessary to form educational and eco-cultural prerequisites for optimizing socio-natural interaction at the anthropo-technological level in unity with economic, legal, spiritual and moral regulations for the greening of human activities.*

*The development of new methodological approaches and solutions can contribute to the solution of environmental problems posed by a dynamically changing reality. In particular, the study of the role of environmental education in the formation of environmental culture and in the optimization of socio-natural interaction is becoming increasingly relevant for the theory of social development.*

*At the same time, the problem of optimizing the interaction of nature and society is very extensive. It requires studying nature, society, and directly the sphere of their interaction. Therefore, we can talk about the need for participation in a more in-depth and expanded study of the issues of optimizing the interaction of nature and society and their manifestation in modern social practice, specialists from different fields of knowledge.*

*Studying the features of the relationship between environmental education and environmental culture and their role in optimizing the interaction between nature and society shows that it is very relevant in modern conditions. Understanding this issue is necessary to understand that environmental education will certainly help society to get out of the environmental crisis. At the same time, it itself must get out of the crisis.*

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## Chemical sciences

### THE ROLE OF CHEMISTRY IN IMPROVING ENVIRONMENTAL LITERACY OF STUDENTS

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#### **Abstract**

*Chemistry plays a pivotal role in enhancing environmental literacy by providing students with a scientific understanding of the natural world and the impacts of human activities on the environment. Through the study of chemistry, students gain insights into fundamental environmental processes such as the water, carbon, and nitrogen cycles, which are essential for understanding the interdependence of ecosystems. Chemistry also helps explain environmental issues like pollution, climate change, and waste management by elucidating the chemical reactions and substances responsible for these problems. Furthermore, it promotes sustainable practices through the application of green chemistry principles, encouraging the design of eco-friendly products and processes. By exploring the chemistry behind renewable energy, carbon capture, and recycling, students develop critical thinking and problem-solving skills, enabling them to assess environmental challenges and propose viable solutions. Overall, integrating chemistry into environmental education empowers students to make informed decisions, advocate for effective policies, and contribute to global sustainability efforts.*

**Keywords:** *environmental literacy, chemistry, sustainability, pollution, climate change, green chemistry, renewable energy, recycling, waste management, critical thinking, chemical processes, environmental education, greenhouse gases*

#### **Introduction**

*The current environmental situation in the world poses an important task for humanity - the preservation of environmental living conditions in the biosphere. In this regard, the issue of environmental literacy and environmental culture of current and future generations is acute. Ecology should acquire special importance as a science that helps to find ways out of the scientific crisis. The situation can be improved through environmental education of the younger generation, which should be conducted by highly qualified, environmentally literate teachers, armed in addition to special knowledge with a number of effective techniques that allow, by comprehensively influencing the personality of students, to develop all components of environmental culture as personality qualities in terms of general human culture.*

*The situation can be improved through environmental education of the younger generation, which should be conducted by highly qualified, environmentally literate teachers, armed in addition to special knowledge with a number of effective techniques that allow, by comprehensively influencing the personality of students, to develop all components of environmental culture as personality qualities in terms of general human culture. Today, for the further development of civilization, the necessity of forming an ecological culture based on the values of environmental ethics becomes obvious. In order for environmental requirements to become the norm of behavior for every human being, it is necessary from childhood to purposefully cultivate a sense of responsibility for the state of the environment, the natural world, and its ecological beauty. Environmental education aims to implement an integrated process of education and upbringing, to develop educational models that organically combine the cognitive and value sides of consciousness. Modern education should be based on a solid natural science and humanitarian foundation, providing systemic interdisciplinary, integrative knowledge about nature and society, the principles of their interaction[1].*

*Chemistry plays a vital role in improving environmental literacy among students by providing them with the scientific foundation necessary to understand and address environmental issues. Chemistry helps students understand the fundamental processes that govern environmental systems, such as the water cycle, carbon cycle, and nitrogen cycle. By learning how these cycles work at the molecular level, students can better grasp the interconnectedness of natural systems and the impacts of human activity*

on the environment. Concepts like chemical reactions, energy transfer, and molecular interactions allow students to see how pollution (e.g., greenhouse gases, acid rain) or conservation efforts (e.g., renewable energy) can have tangible effects on ecosystems and climate.

Students learn about the chemical composition of pollutants such as plastics, carbon dioxide, sulfur dioxide, and nitrogen oxides, and how these substances contribute to environmental degradation. By understanding the chemistry behind pollutants, students are more likely to appreciate the need for sustainable solutions.

For example, the role of chemistry in developing cleaner energy sources, such as solar cells, hydrogen fuel cells, or biofuels, provides students with insight into how science can combat environmental problems.

### **Materials and methods**

Through chemistry, students learn about the importance of reducing, reusing, and recycling materials. Understanding the chemical properties of materials helps students assess which substances are biodegradable, which can be recycled, and which contribute to waste and pollution. Chemistry also introduces students to concepts like "green chemistry," which focuses on designing products and processes that minimize environmental harm. This encourages students to think critically about the materials and chemicals used in everyday products.

One of the most pressing environmental issues, climate change, is fundamentally based on chemical principles such as the greenhouse effect and the behavior of gases in the atmosphere. By studying the chemical makeup of greenhouse gases like carbon dioxide and methane, students gain a better understanding of how these gases trap heat and contribute to global warming. Students also learn about the chemical reactions involved in ozone depletion, acid rain formation, and the impact of human activities on the planet's climate. Chemistry provides students with the knowledge to understand the breakdown and recycling of materials. For instance, they can learn about how plastics degrade over time, the chemical processes involved in composting, or the principles behind waste-to-energy technologies. This encourages students to apply their knowledge of chemical processes to reduce waste, promote recycling, and think of innovative solutions for managing and reusing resources.

### **Results and Discussion**

Environmental policies often rely on scientific data, and chemistry is essential in understanding this data. Students learn how chemical analysis informs environmental legislation, from measuring air and water quality to setting safe limits for pollutants. By connecting chemistry with environmental law and policy, students can better understand the role of science in shaping decisions that protect natural resources. Chemistry, when integrated with other subjects like biology, physics, and geography, provides students with a holistic view of environmental science. For example, the chemical principles behind photosynthesis, ecological balance, and ecosystem functions offer students a more comprehensive understanding of environmental issues.

By studying the chemical processes that influence the environment, students develop critical thinking and problem-solving skills. They can assess environmental challenges and consider scientific solutions, weighing the benefits and drawbacks of different approaches to issues such as pollution control, renewable energy, and resource conservation.

In an era of escalating environmental challenges such as climate change, pollution, and resource depletion, environmental literacy has become an essential part of education. Environmental literacy refers to the knowledge, skills, and attitudes needed to understand and address environmental issues. One of the most effective ways to enhance environmental literacy is through the study of chemistry, a field that provides the scientific foundation for understanding the natural world and the impact of human activity on the environment. Chemistry plays a crucial role in equipping students with the tools needed to tackle these issues and make informed decisions about sustainability.

Chemistry helps students gain a deep understanding of the fundamental processes that govern environmental systems. Concepts like the water cycle, carbon cycle, and nitrogen cycle are central to understanding how ecosystems work. By learning about the chemical interactions that occur within these cycles, students develop a better appreciation for how natural systems function and how they are affected by human actions. For example, students can explore the role of chemical reactions in the breakdown of pollutants, the formation of acid rain, or the absorption of carbon dioxide by oceans. Understanding these processes is crucial for recognizing the broader environmental impacts of everyday activities and industrial practices. This knowledge fosters a sense of responsibility and encourages environmentally conscious behavior.

Chemistry provides a key framework for understanding pollution and its solutions. Many

environmental issues, such as air and water pollution, are the result of chemical reactions or the release of harmful substances. By studying the chemical composition of pollutants such as carbon dioxide, nitrogen oxides, and sulfur dioxide, students can better understand how these substances affect air quality, human health, and the environment. In addition to understanding pollution, chemistry also offers insights into potential solutions. For instance, the development of cleaner energy sources, such as solar energy, biofuels, and hydrogen fuel cells, is rooted in chemical research. By learning about these innovations, students gain a sense of hope and empowerment, knowing that science and technology can play a pivotal role in reducing the environmental impact of human activities.

Sustainability is at the heart of environmental literacy, and chemistry is integral to understanding how to reduce environmental impact. By learning about the properties of materials, students can make informed choices about which products are eco-friendly, biodegradable, or recyclable. For instance, chemistry explains why certain plastics take centuries to decompose while other materials, such as biodegradable polymers, break down more quickly without causing long-term harm to ecosystems.

Chemistry also introduces students to the concept of "green chemistry," a field focused on designing chemicals and processes that minimize environmental damage. Green chemistry principles encourage students to think about how products are made and how they can be produced in a way that reduces waste, conserves resources, and avoids harmful chemicals. This fosters a mindset of sustainability, encouraging students to apply these principles in their daily lives.

One of the most pressing environmental issues of our time, climate change, is deeply rooted in chemistry. The greenhouse effect, for example, involves chemical reactions between gases like carbon dioxide and methane, which trap heat in the Earth's atmosphere. By studying the chemical composition of greenhouse gases and their role in global warming, students can better understand the mechanisms driving climate change and its potential consequences.

In addition to understanding the causes of climate change, chemistry also provides insights into possible solutions. Through the study of renewable energy sources, such as wind, solar, and geothermal power, students learn about sustainable alternatives to fossil fuels. Chemistry is also fundamental in the development of carbon capture technologies, which aim to reduce the concentration of greenhouse gases in the atmosphere. Understanding these solutions gives students the knowledge and motivation to advocate for policies and practices that can mitigate climate change.

Waste management is another area where chemistry plays a key role in promoting environmental literacy. Students learn how different materials decompose or recycle, and how chemical reactions influence the breakdown and reuse of resources. For instance, they can study the chemical processes involved in composting, which turns organic waste into nutrient-rich soil, or the recycling of aluminum, a process that requires less energy than producing new aluminum from raw materials. By understanding the chemistry of waste, students can make more informed decisions about reducing, reusing, and recycling materials. They can also appreciate the importance of waste-to-energy technologies, which use chemical processes to convert waste into electricity, further reducing the environmental burden of landfills. Environmental policy is often informed by scientific data, and chemistry plays an essential role in generating this data. Students can learn how chemical analysis is used to monitor air and water quality, measure pollutant levels, and assess the effectiveness of environmental regulations. For example, understanding how chemical markers are used to detect toxic substances in water allows students to appreciate the importance of environmental regulations in safeguarding public health.

By connecting chemistry with environmental law and policy, students see how science can guide decisions that protect the environment. This understanding encourages students to engage with current environmental issues and advocate for policies that promote sustainability and environmental protection. One of the most valuable outcomes of studying chemistry is the development of critical thinking and problem-solving skills. Chemistry encourages students to analyze complex systems, consider multiple factors, and evaluate potential solutions. These skills are essential when addressing environmental challenges, which often involve complex interactions between science, society, and policy. For example, students can analyze the trade-offs between different energy sources—such as the environmental impact of extracting fossil fuels versus the challenges of scaling up renewable energy technologies. By applying chemical knowledge to these issues, students develop the skills needed to assess the feasibility and sustainability of various environmental solutions.

### **Conclusion**

Incorporating chemistry into environmental education is essential for improving environmental literacy. By understanding the chemical processes that shape the world around them, students are empowered to make informed decisions about environmental issues and contribute to solving global

challenges. Chemistry not only deepens students' understanding of environmental processes but also fosters sustainable thinking, problem-solving skills, and a commitment to protecting the planet. As environmental challenges continue to grow, chemistry will remain a crucial tool in shaping the environmentally literate citizens of tomorrow.

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## A NEW APPROACH TO THE SYNTHESIS OF ADAMANTYL-CONTAINING HETEROCYCLES

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**Introductions.** Heterocyclic compounds occupy a significant place among physiologically active substances. Among the fused heterocycles, the most famous are indoles, quinazolines, benzodiazepines. Pharmacophores based on them are widely represented in the literature. Condensed systems with a seven-membered heterocycle are much less common. Nevertheless, among them, compounds have been identified that exhibit antitumor and antiviral properties, are used as psychotropic drugs [1].

**Keywords:** Triazepines, 2-aminothiazole, natural amino acids, imidoyl chlorides, phosphorus pentachloride.

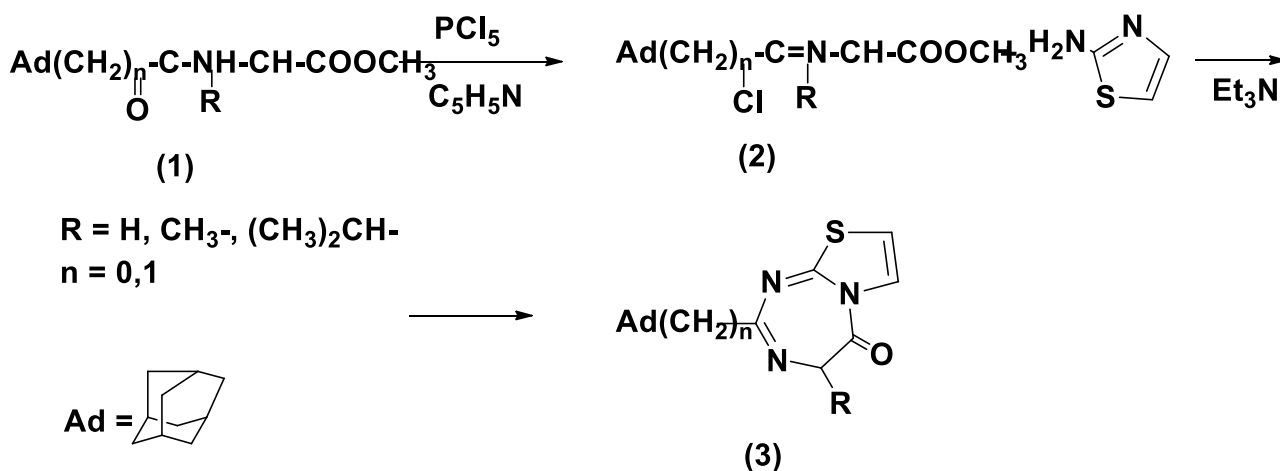
*Synthesis of adamantylcontaining triazepinones.*

*This work describes the synthesis of adamantylcontaining triazepinones by condensation of natural amino acid derivatives with 2-aminothiazole.*

Adamantyl-containing derivatives of natural glycine, L and D alanine, L and D valine (1) were obtained by the method [2] from methyl esters of the corresponding amino acids and acid chlorides of adamantyl-1-carboxylic and adamantyl-1-acetic acids. The esters of adamantylcontaining amino acids were hydrolyzed under alkaline conditions to N-acyl- $\alpha$ -amino acids. Which may be of interest as objects for biological research [3].

For the synthesis of imidoylchlorides (2) with retention of the ester group, a mixture of pyridine with phosphorus pentachloride was used [4].

Condensation of imidoyl chlorides (2) with 2-aminothiazole occurred in the presence of triethylamine with the formation of condensed heterocycle (3).



The yields of triazepinones depending on the adamantylcontaining amino acid fragment are shown in the table 1.

The yields of triazepinones depending on the adamantylcontaining amino acid fragment.

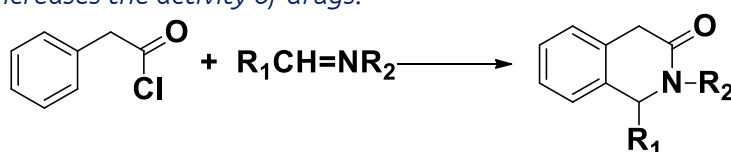
Table 1.

| Radical                      | Yield of products condensation, % |    |
|------------------------------|-----------------------------------|----|
|                              | L                                 | D  |
| 1-Adamantoyl-N-glycin        | 51                                |    |
| 1-Adamantoyl-N-alanin        |                                   | 45 |
| 1-Adamantoyl-N-valin         | 66                                | 47 |
| 1-Adamantoylmethyl-N-glycin  |                                   | 69 |
| 1-Adamantoylmethyl-N- alanin | 71                                |    |
| 1-Adamantoylmethyl-N-valin   | 70                                | 72 |

The structure of the target products was proved using  $^1\text{H}$  NMR,  $^{13}\text{C}$ -, IR spectroscopy and mass spectrometry.

Synthesis of adamantylcontaining 3-oxotetrahydroisoquinolines.

The core of tetrahydrozoquinoline is part of such well-known alkaloids as Coripulin, Glauzin, Pronunciferin and others. Many of them exhibit antimicrobial, antispasmodic, anti-inflammatory activity. On the other hand, it is known that the presence of volumetric frame substituents (adamantyl, diamantyl, etc.) in a molecule with pharmacophoric groups increases lipophilicity, reduces toxicity, in some cases significantly increases the activity of drugs.



I:  $\text{R}_1=\text{Ph}$ ;  $\text{R}_2=\text{Ad}$ ,  $\text{AdCH}_2$ ,  $\text{AdCH}_2\text{CH}_2$ -

II:  $\text{R}_1=\text{AdCH}_2$ ,  $\text{R}_2=\text{Ph}$

The purpose of the work presented is to synthesize potential active drugs containing in positions 1 and 2 of the isoquinolin nucleus various adamantyl-containing radicals.

The bases of Schiff were synthesized by method [5]. The reagents of the company Lancaster were used. Studies of NMR  $^1\text{H}$  spectra were performed on the JEOL spectrometer (90 MHz) in  $\text{CDCl}_3$ , chemical shifts were measured in  $\delta$ -shift. Chromatomass spectra are measured on the Hewlett-Packard 5890-II device with a detector MSD 59771A (capillary 30 m, HP-1, 100-250  $^\circ\text{C}$ , 10 $^\circ$  / min).

For the preparation of structures presented in the scheme, a method of amidoalkylating agents - the bases of Schiff [1] were used. The latter were synthesized on the basis of benzaldehyde and adamantyl-containing amines (I) and 2- (1-adamantyl) of ethanal and aniline (II).

The reaction was carried out in a dichloroethane medium and the presence of excess triethylamine.

The outputs of the target products were: for  $\text{R}_2 = \text{Ad}$  - 78%,  $\text{AdCH}_2$  - 84%,  $\text{AdCH}_2\text{CH}_2$  - 87%,  $\text{R}_2 = \text{AdCH}_2$  - 66%.

The structure of substances is proved by IR, NMR  $^1\text{H}$  and  $^{13}\text{C}$  spectroscopy.

A convenient method of synthesis of potentially physiologically active adamantyl-containing 3-oxotetrahydroisoquinolines has been developed.

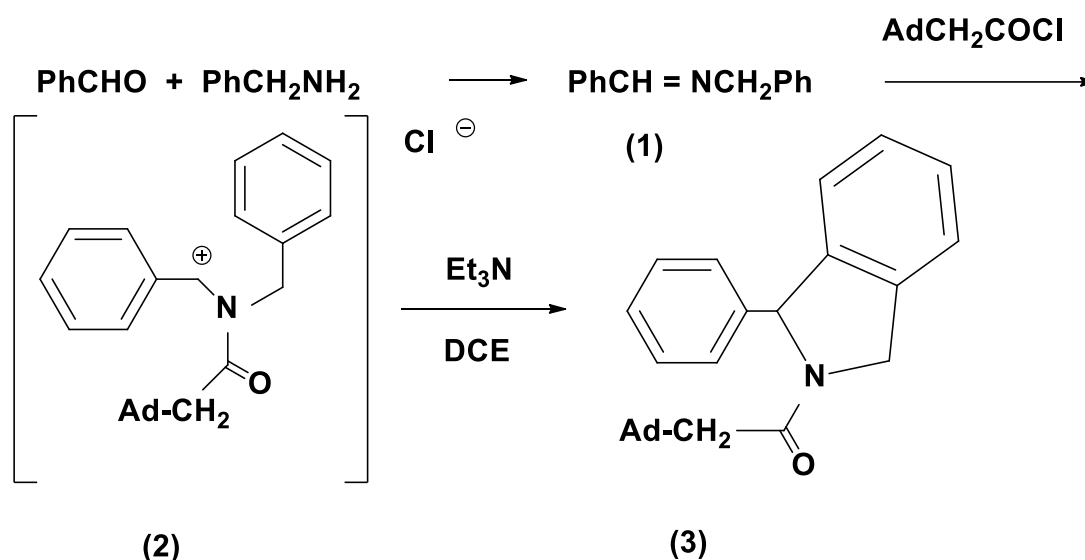
Synthesis of adamantanecontaining derivatives of dihydroisoindole.

Heterocyclic compounds occupy a significant place among physiologically active substances. Among the fused heterocycles, the most famous are indoles, quinazolines, benzodiazepines. Pharmacophores based on them are widely represented in the literature.

The aim of the presented work is the synthesis of potentially active drugs containing in positions 1 of the dihydroisoindole nucleus adamantylcontaining radical.

To obtain the structures presented in the scheme, the method of amidoalkylating agents - Schiff bases (1) was used [1]. The latter were synthesized on the basis of benzaldehyde and benzylamine. To obtain acyliminium salt (2), 1-adamantylacetic acid chloranhydride was used.

Heating a solution of an acyliminium salt in a solution of dichloroethane in the presence of triethylamine led with a yield of 58% to an isoindole derivative - N- [1-adamantylmethylcarboxy] -2-phenyldihydroisoindole (3).



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## Economic sciences

### **THE REPUBLIC OF MOLDOVA'S FINANCIAL SYSTEM BETWEEN CONSOLIDATION AND EFFICIENCY**

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#### **Abstract**

*The financial system of the Republic of Moldova has gone through several stages of reforms and changes to ensure a more stable and efficient functioning in the conditions of economic instability and external challenges. In recent decades, the country has been actively integrating its financial institutions into international systems, but problems in the field of consolidation and efficiency still remain relevant. Thus, the financial system of the Republic of Moldova is in the process of consolidation and reforms, but in order to achieve maximum efficiency, further efforts are needed to improve the internal structure and stability, increase trust and integrate into the international economic environment.*

**Keywords:** *financial system, financial intermediation, effective regulation, financial market infrastructure.*

#### **Introduction.**

*The financial system between consolidation and efficiency refers to the process of balancing financial stability and economic performance, essential for the development of a healthy economy. In this context, the financial system includes the institutions, markets and regulations that facilitate the flow of capital and the management of risks [1].*

*Consolidation involves strengthening the stability and resilience of the financial system, through strict regulations and prudent measures, designed to prevent financial crises and protect the economy from volatility. Consolidation often involves measures that can limit the risks and excessive exposures of financial institutions [2].*

*Efficiency refers to the ability of the financial system to allocate resources optimally, so as to support economic growth, innovation and the development of markets. This includes reductions in transaction costs, wider access to finance and stimulating competition to support productive economic activities [3].*

*The main challenge is to achieve a balance between consolidation (ensuring stability and protection) and efficiency (maximizing resources and supporting economic growth). These two objectives can conflict, as consolidation measures can restrict the ability of financial institutions to be flexible and innovative [4]. Also, too lax regulation can lead to instability and financial risks.*

*Thus, an optimal financial system must both support economic development and prevent risks, to ensure long-term sustainability.*

#### **Consolidation of the moldovan financial system.**

*The Republic of Moldova is characterized by its small economy, faces the issue of real incomes trailing behind those of other countries in the region. The prospect of achieving faster economic convergence is limited by significant structural weaknesses, such as weak governance, inadequate public services and an unstable business environment. These factors act as deterrents to investment and have contributed to substantial emigration. Growth is primarily sustained by remittances, driving private consumption, while exports are largely comprised of low-value-added products. Challenges in the labor market, including low participation rates and high emigration, further compound macroeconomic vulnerabilities.*

*The primary objective of EU regulations is to establish a level playing field and maintain the stability of financial institutions, specifically in the areas of banking, insurance, supplementary pensions, investment services, and securities markets. These regulations encompass guidelines on the authorization, functioning, and oversight of these institutions.*

*Moldova has demonstrated a certain degree of readiness in the realm of financial services. Notably, it has made commendable strides in partially harmonizing its legislation with the EU's Solvency II*

*Insurance Directive and the Motor Insurance Directive. However, there is still room for improvement as the country should strive to further align with the financial services acquis, with a particular emphasis on addressing the priorities identified in light of the existing circumstances.*

*The National Bank is actively enhancing the prudential regulatory and supervisory framework for the banking sector in Moldova, aligning it with the EU Capital Requirements Regulation and Directive [5]. While capital adequacy rules for investment firms have been implemented, there is still a need to establish requirements related to risk. Steps are being taken to address gaps in the macroprudential framework, such as amending the National Bank of Moldova Law to grant the Bank a clear legal mandate for ensuring financial stability.*

*Moldova has implemented a recovery and resolution framework that mirrors the tools, resolution powers, and safeguards outlined in the EU's Bank Recovery and Resolution Directive [6]. The framework operates on the principle of 'no creditor worse off' and includes a resolution fund funded by yearly contributions from banks. The goal is to reach a resolution fund level equivalent to 3% of guaranteed deposits by the conclusion of 2024.*

*In 2023, Pillar II and Pillar III of the EU Solvency II Directive were implemented, with a 5-year transition period for meeting minimum capital requirements. Moldovan law aligns with the EU Directive on distance marketing of financial services which aims to safeguard consumer rights. A balance sheet review is planned for insurers to assess readiness for Pillar I.*

*In relation to financial market infrastructure, Moldova has implemented crucial components of the acquis, as well as relevant sections of the European Directives MiFID I and II concerning Securities Markets and Investment Services [6]. Despite its limited scale, the country maintains a regulated capital market and operates a sole Multilateral Trading Facility through its Stock Exchange. It is important to highlight that no investment firm currently holds a trading license. These endeavors are closely linked to the National Bank.*

*Summarizing, Moldova must persist in its endeavors to align with the EU acquis in terms of regulating the banking and insurance sectors, which encompasses bank resolution and bank deposits guarantee schemes. Additionally, it should also focus on regulating securities markets, investment funds, and investment services.*

*The banking sector reforms have demonstrated their effectiveness once more, with banks staying well capitalized and profitable, effectively handling the increased risks. Therefore, in the are analyzed the performance indicators ROA, ROE and Efficiency ratio (this indicator has a positive evolution during the analyzed period which indicates the level of financial stability.*

*The Return on Equity for banking system (figure 1) shows that the value in the period 2018-2023 the value increased from 11.60 % in 2018 till 17.04 % in 2022 and decreased in 2023 (16.20%), this represents relatively high volume of owners' equity of the banking system and low capacity to obtain additional resources through loans. Overall result of this indicator of the banking system for the entire period from 2018 to 2023 was increased by 4,60 %, hence the banks use efficiently the management of the capital invested because the level of rate is 10% - 12 %, also this due to the fact increased the capacity to obtain additional resources through loans.*

*Return on assets of the banking system increased by 1,36% from 2020 to 2022. Value of this indicator registered a decline amounting to 0,11% between 2022 and 2023. It should be mentioned that banking system's value of the ROA in the period 2018 and 2023 the bank use efficiently the resources in order to maximize the profit and has positive result.*

*The international monetary system poses challenges for Moldova's financial system, but it also presents opportunities for growth and development. Moldova can capitalize on its integration into the global economy by adopting international best practices, establishing robust regulatory frameworks and enhancing its financial infrastructure. These measures will enable the country to attract investments, facilitate trade and enhance its economic resilience.*

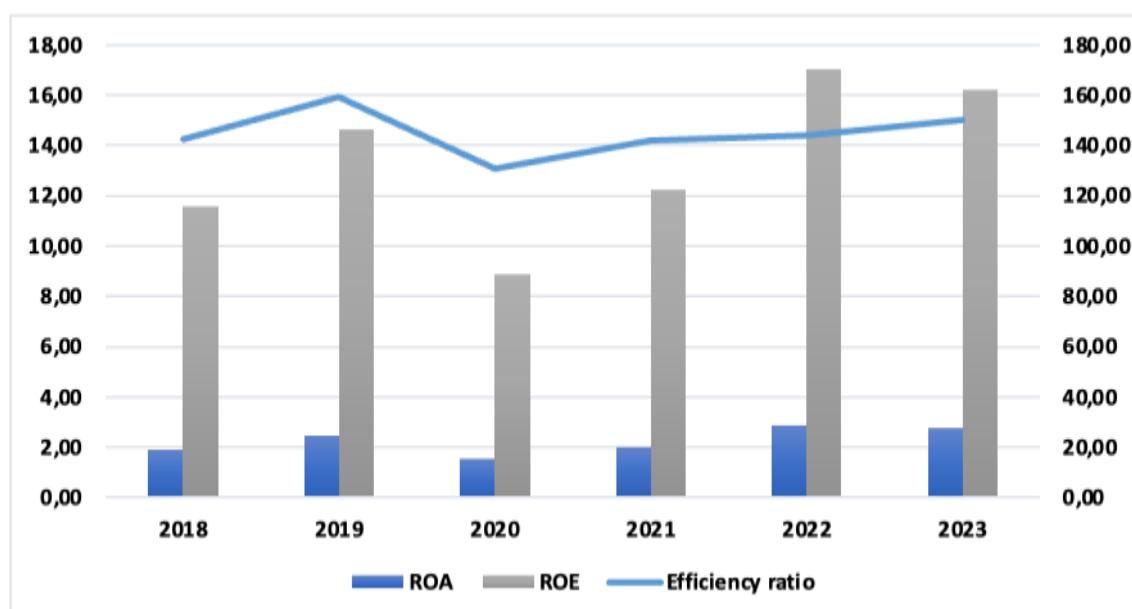


**Figure 1. Profitability indicators of the banking system, (percentage points)**

Source: elaborated by the author based on [7].

Deeper financial integration with international capital markets could be advantageous for Moldova, offering access to a variety of funding streams and reducing the need for domestic financing. By strengthening connections with regional financial institutions such as the European Bank for Reconstruction and Development (EBRD) and the International Monetary Fund (IMF), Moldova can receive both technical assistance and financial support to fortify the resilience of its financial sector.

Therefore, we can analyze the financial intermediaries which serve as an essential intermediary between two parties engaged in financial transactions. A key example is banks, which perform various functions including facilitating transactions between borrowers and lenders, and pooling resources for investment activities.

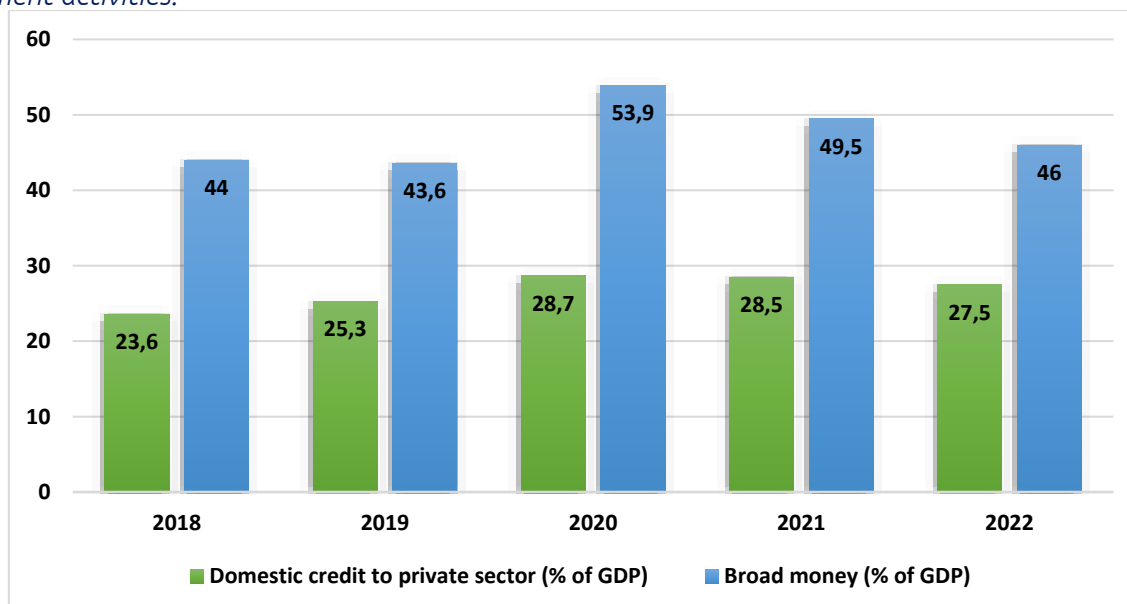


**Figure 2. Financial development evolution, (percentage points)**

Source: elaborated by the author based on data provided by the [8].

The efficiency of banking system is essential for facilitating financial intermediation and contributing positively to economic growth. Therefore, the financial intermediation (figure 2) plays a crucial role in economies with underdeveloped capital markets, where the banking sector efficiently provides funds for investment and trade, thereby reducing capital costs. By allocating funds to the real economy at low costs, the banking sector stimulates sustainable economic growth through the provision of financial products like loans, deposits and securities. The level of financial intermediation can be represented by indicators such as the Broad money/GDP and the share of private sector credit in GDP.

It can be inferred that the primary aim of the financial system is to ensure effective financial

intermediation, thereby facilitating the efficient movement of capital between different parties, especially, assessing the banking sector is necessary considering the crucial role of financial intermediation in the growth process, particularly the significant impact of banks as the key driver of the economy.

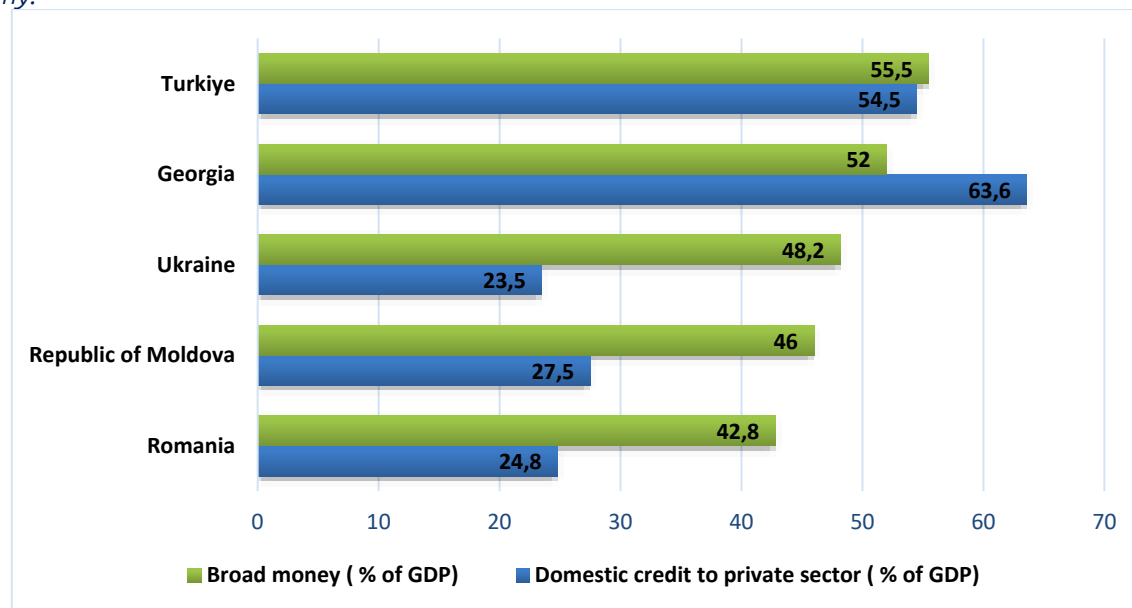


**Figure 3. Financial intermediation between the countries, 2022 (percentage points)**

Source: elaborated by the author based on data provided by the [8].

According, to the data from the figure 3 for the year, 2022, we can observe the dynamics of broad money and domestic credit to private sector between the countries, also the biggest percentage of broad money was reported in Turkiye at 55,5 % of GDP compared to the others countries, for example, with Ukraine the value of indicator decreased due to the war. Therefore, the biggest percentage of domestic credit to private sector in 2022 was in Georgia at 63,6% of GDP. Also, we can observe that the value of indicators of Republic of Moldova increased compared to Romania, so the financial resources provided to the private sector by financial corporations, such as through loans, trade credits are affecting economic activity and stimulates sustainable economic growth.

In conclusion, the international financial interactions heavily rely on the foundation provided by the international monetary system. This system facilitates trade, investment, and economic stability among nations. Moldova, positioned at the crossroads of Eastern Europe, is deeply intertwined with this system. As Moldova navigates through the ever-evolving dynamics of the global financial landscape, it encounters a range of opportunities and challenges.

The financial system of Moldova is currently facing a critical juncture, as it strives to find a balance between consolidation and efficiency in the context of international monetary system development. Although there have been advancements in reforming the banking sector and strengthening regulatory frameworks, there are still challenges in promoting transparency, enhancing risk management practices and facilitating access to finance.

### Conclusion.

In a volatile economic climate, the stability of the financial system relies on the proper management of risks associated with its operations. The stability and growth of an economy heavily rely on the proper functioning of the financial system. Essentially, the financial system plays a key role in ensuring the effective distribution of resources, managing risks and ensuring the effective operation of economic activities. This research thoroughly analyzes the complexities, risks, opportunities, dynamics and significance of the modern financial system from various perspectives.

The effective operation of the financial system is vital for the health and prosperity of contemporary economies. Through facilitating the efficient allocation of resources, promoting liquidity, price discovery and expanding access to financial services, the financial system sets the stage for sustainable economic growth and development. Policymakers, regulators and market participants must collaborate to ensure the integrity, stability and accessibility of the financial system, thereby maximizing its potential to create value and prosperity for society as a whole.

*In recent years, the financial system of the Republic of Moldova has undergone significant changes influenced by global financial developments. These changes involve international trade, economic policies, financial markets, crisis caused by COVID-19 and have significant consequences for Moldova's economic framework. The functioning of the financial system of the Republic of Moldova is influenced in a complex way by the global financial metamorphoses for economic stability, growth and development. In order to maintain efficiency of financial system, it is essential to comprehend the dynamics of global financial changes and capitalize on opportunities for sustainable economic growth.*

*Effective regulation plays a crucial role in ensuring the soundness of the financial system. The study points out the importance of a regulatory framework that balances the need for oversight with flexibility, ensuring both financial stability and innovation. It suggests that regulatory bodies need to adapt to changing financial environments.*

*Despite consolidation, the financial system still faces significant challenges in terms of operational efficiency. The need for digital transformation and the implementation of modern technologies is highlighted as essential for improving efficiency in financial services. This includes innovations such as automation, artificial intelligence, and better data analytics.*

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**PRIORITY DIRECTIONS OF STATE REGULATION OF THE AGRICULTURAL AND FOOD MARKET****Sevinc İbrahimova**

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**Abstract**

The article focuses on the priority areas of state regulation of the agro-food market and food security of the country. The article analyzes the development of agriculture in Azerbaijan in 2003-2023 and the need for the transition of the agricultural sector to the path of innovative development at the present stage. In 2023, Azerbaijan's agriculture continued to grow against the backdrop of complex processes in the global economy, demonstrating stability and sustainability. The implemented agrarian reforms made it possible to adequately respond to the risks and problems in the field of food security of the country.

**Keywords:** Food security, agro-food market, state regulation, competitiveness, commodity integration, agriculture, investment attractiveness, production efficiency, state support.

**1. Introduction**

In recent years, international economic processes taking place all over the world have taken on a global character and have significantly affected the economy of Azerbaijan. The national economy of the Republic of Azerbaijan is characterized by stable development. In recent years, the economy of the Republic of Azerbaijan has taken leading positions in the world in terms of growth rates. Starting from 2015, the country's economy has entered a qualitatively new era. During this period, the issues of increasing the level of economic security, protecting local agricultural producers, and increasing the competitiveness of the agri-food market have become even more relevant. The agrarian sector, being a strategic sector of the country's economy, reflects a complex system in which its activities take place under the influence of natural-climatic, social and economic regularities that determine the uniqueness of this sector. The analysis shows that the "production-processing-sale" chain does not function efficiently enough today. In the current conditions, it is necessary to clarify the factors and essence of the development of the agri-food market, the improvement of methods and tools for the development of the food security mechanism, and the main directions of the development of the agri-food market, which can increase the level of economic security of the country. The fact that agriculture is the second largest sector of the national economy after industry has conditioned the issues related to its development to become the subject of extensive scientific research. The results of the research work provide the further development of the theoretical and methodological concept of food security as an integral part of the economic security system as a whole.

**2. Results**

In modern conditions, increasing the level of economic security of the state and its main component, food security, is impossible without the effective development of the agri-food market and a significant strengthening of the role of the state in this area, state support measures. In conditions of increasing commodity integration, the local agri-food market is exposed to the negative consequences of various factors of instability. Therefore, strengthening the regulatory role of state bodies becomes an integral part of the activity and development of the agri-food market and an important condition for increasing the level of food security.

The state's interest in solving these issues is explained by a number of objective reasons listed below:

- Strengthening globalization processes and integration of national economies;
- Increasing complexity of production and economic relations;
- The nature of the rapidly changing market situation;

- The importance of improving the quality of the material and technical base of agriculture;
- The importance of increasing the efficiency of agricultural production and finding rational ways of its implementation;

The resolution of the issues we have mentioned will allow us to form a competitive agri-food market that can guarantee the country's food security in both the short and long term.

The main directions of state regulation are indicated in the "Food Security Program of the Republic of Azerbaijan", the "State Program on Reliable Provision of the Population with Food Products in the Republic of Azerbaijan in 2008-2015", the "Strategic Roadmap for the Production and Processing of Agricultural Products in the Republic of Azerbaijan" and other adopted documents, which indicates that the role of the state in regulating the agri-food sphere is quite important. These include the normative and legal regulation of crop and livestock farming, the development of state policy on the regulation of the agricultural products, raw materials and food markets, and the provision of state services to ensure the sustainable development of agricultural territories. The research work allows us to distinguish two types of justification of the state regulation mechanism:

1. The priority direction of economic theory determines the role of state policy in correcting errors and mistakes in the market. Therefore, the expediency and necessity of state intervention is based on the external effects of economic activity, market power, information problems or public goods. Today, many research economists agree with the postulate that it is necessary for the state to adopt measures to encourage the conduct of scientific research, its preparation and dissemination. Today, knowledge is becoming a decisive factor in ensuring economic growth and competitive stability.

2. From the point of view of evolutionary economics, one of the main tasks of state power is the development and strengthening of institutions that contribute to economic growth without direct intervention.

In conditions of increasing commodity integration, the role of the state should only be strengthened in terms of protecting the market by all possible means, as well as providing it with the necessary resources and incentives to develop the market. This includes creating favorable conditions for the development of appropriate institutions, enterprises and developing their infrastructure. At the modern stage of the development of the national economy, the state's activities in the field of regulating the agri-food market are not aimed at solving fundamental problems, which allows us to assess its activities as ineffective. Currently, there is a great need to improve the market infrastructure in order to reduce crop losses and increase the quality of agricultural products in the post-harvest period, and to facilitate the conditions for agricultural producers to sell their products in the agri-food market. The existing agri-food markets create difficulties for local agricultural producers to enter the sales channels on favorable terms, and in many cases, agricultural producers are forced to sell their products to trade intermediaries, therefore, at the price conditions they offer. The weak development of retail and wholesale markets based on the agri-food market infrastructure leads to a price difference between producer prices and agri-food market prices that is two to three times greater. Since agricultural producers are unable to solve such issues as modernization of production, application of innovative technologies, labor productivity and soil fertility, etc. without state support, they are faced with the need for state support and subsidies in all spheres of the agri-food market. the size of the agri-food market should be increased several times.

In our opinion, the modern model of agri-food market activity in most countries of the world clearly demonstrates the leading role of state regulation and the state in ensuring the sustainable development of the agri-food market. As a result of the role of the state in regulating the agri-food market, the competitiveness of agri-food products in both domestic and foreign markets, and ultimately the national security of the country, is ensured. The main signs of the importance of strengthening state regulation of the agri-food market in the country's economic security system include the following:

- An increase in the share of imported food products in local agri-food markets. In particular, an increase in the specific weight of imported products in the domestic market for meat, vegetables, potatoes, cereals, fruits and berries and other agricultural products for the production of which the country has sufficient resources and conditions;
  - Compliance of the population's diet with international criteria. Daily consumption per capita is 2400 kcal. According to international criteria, this level of 2600 kcal is considered normal;
  - Violation and non-compliance with food product quality and certification standards.
- In particular, these violations apply to products imported into the country.

The main reasons for such shortcomings are the failure of manufacturers to indicate production technology, exceeding the shelf life of the product, the shelf life of the product, and the violation of

*product storage technologies by sellers, etc.;*

- *The low level of investment attractiveness of agriculture compared to other sectors of the Azerbaijani economy;*
- *The high level of orientation of processing complexes to imported raw materials;*

*One of the main reasons for the situation in the agri-food market can be considered the lack of clear mechanisms for implementing state policy in the sphere of state support for the development of the agri-food market, which can be considered a dangerous shortcoming in connection with WTO membership. The production costs of local agricultural producers exceed profitability, and this situation is further complicated by the weak material and technical base. Under these conditions, agricultural producers are forced to turn to suppliers of imported raw materials, which leads to low competitiveness of manufactured products in the market, as well as increased dependence on imports. It should be noted that the unilateral nature of the adopted measures of state support for agricultural producers did not lead to an increase in the efficiency of agricultural production, the establishment of balanced relations between trade and processing enterprises, the formation of a self-sufficient market for food and raw materials, and ultimately to an increase in the level of food security of the country. All this necessitates the acceleration of the process of restructuring the structure of economic relations in the agro-food market, the adoption of measures to eliminate or mitigate the unfavorable consequences of agrarian reforms for production, the economy and the population, the provision of assistance in ensuring sustainable development, competitiveness and increasing the competitiveness of products, as well as the creation of conditions for increasing the level of competitive advantage of regional commodity producers, which will allow improving interregional commodity exchange and filling regional markets with local products.*

*Price support has the highest specific weight in the structure of state subsidies of foreign countries. Modern concepts of price formation for agricultural products in countries that are members of the WTO imply active state intervention in the system of price formation and regulation. The mechanism of state price regulation involves the following*

- *Determination of a conditional price, as well as the determination of such an upper and lower limit of price changes that the state also supports maintaining the price within this limit;*
- *Purchase or sale of products, or intervention in the commodity market in order to maintain the necessary price level;*
- *Monitoring a number of economic indicators: production costs by specialized economic groups (EU countries) or by types of production (USA), price parity for industrial and agricultural products, profitability of farmers and production sectors;*

*All countries with a market economy protect their commodity producers from dumped imports. In these countries, the government has the right to apply tariff measures or other methods of import protection when imports are likely to cause serious damage to domestic production competing with it, or have. State support measures for the agri-food market applied in foreign countries that are members of the WTO are divided into direct and indirect state influence measures. Direct state influence measures include support for a certain level of agricultural producers' incomes, which is concentrated in direct compensation payments from the state, compensation payments for damage caused by natural disasters, compensation for losses caused by the restructuring of production (reduction of arable land, forced slaughter of animals). The following can be attributed to indirect state regulation measures for the agri-food market:*

- *Price influence on the food market by supporting domestic prices for agricultural products, by establishing quotas and tariffs, and taxes on export and import products;*
- *Compensation of agricultural producers' costs for the purchase of means of production through the provided subsidies, as well as for the implementation of interest payments on loans;*
- *Implementation of measures on market development, transport works and product storage,*

*which*

*involves the allocation of budget funds for the preparation and implementation of market programs;*

- *Development of production infrastructures through the allocation of state funds for the construction of production sites, the implementation of irrigation projects, the creation of farmer associations, ensuring the increase in production efficiency and competitiveness;*

*The main measures of state support for the agro-food market can be divided into two blocks: direct subsidies and indirect subsidies.*

*All of the listed measures are implemented by the state in one way or another. Here it is important*

to constantly monitor additional competitive advantages that can ensure food accessibility and social well-being of the village. In order to identify and effectively manage the competitive advantages of agriculture in the medium term, the following measures can be implemented:

- Systematic analysis and identification of the most competitive local producers of goods (once every two years);
- Strengthening the material and technical base of agricultural and processed goods producers;
- Increasing production capacities, which will lead to an increase in the volume of food production and an expansion of product ranges;
- Regular updating of the regulatory legal framework and the establishment of compliance

between

Azerbaijani and world quality standards, which currently have a number of fundamental contradictions;

One of the important regulatory legal measures to ensure food security may be the preparation and adoption of a National Program for Ensuring the Quality of Agri-Food Products. Research shows that currently there is no such document in our country. This in many cases leads to different requirements for similar products produced in our country or imported into our country.

Solving food security problems requires the inclusion of ensuring food stability in the main issues of regulating the agri-food market, ensuring the physical and economic accessibility of the population to food products in accordance with established consumption norms, and ensuring an appropriate level of quality of food resources. The main directions of state regulation include the regulation of the production spheres of agriculture, the per capita consumption of the main groups of food products, the ratio between the real consumption level and the consumption norm and maintaining the energy level of the population's diet at a sufficient level, the level of import and export of agricultural raw materials and food, the volume of state reserves necessary to ensure the country's food security.

The systematization of various methods and techniques of state regulation of the agro-food market allows us to distinguish three large elements in the regulatory system: economic, administrative and social regulation.

Economic regulation includes measures to ensure the reproduction of agricultural producers. In our opinion, the main directions of economic regulation should include the following:

- Direct financing. This leads to the elimination of excess links in the financing chain and, as a result, a decrease in the specific weight of subsidies and subsidies in the structure of purchase prices;
- Maintaining price parity between agricultural and industrial products through the adoption of a single purchase price;
- Insurance of agricultural producers. Effective use of the insurance system will allow agricultural producers to carry out credit and leasing operations for their future products and to protect themselves from natural and climatic conditions. provides the opportunity to use it as collateral to reduce the risks.

Studies show that insurance premiums are set depending on the size of the loss and the frequency of unfavorable periods. It should be noted that due to the frequent recurrence of such periods, insurance tariffs have increased, reaching up to 15% of the value of the insured product, making insurance premiums a heavy burden for agricultural producers. This has led agricultural enterprises to refuse insurance services, and insurance has become inaccessible to many rural farms.

Based on the measures of economic regulation we have listed, we believe that state regulation aimed at increasing the level of economic security should be carried out by:

- Determining the list of state organizations (state accreditation of insurance organizations, expert organizations, etc.);
- Removing internal barriers;
- Substantiating the import of high-tech products;
- Creating insurance reserves at the expense of insurance premiums of agricultural organizations, as well as funds allocated from the budget;
- Formulating precise criteria for the occurrence of an insured event. We believe that these include natural disasters, lawsuits and animal diseases;
- Improvement of a unified system of information-methodological and advertising support for agricultural organizations through the creation of Internet resources, the release of information-methodical and practical literature, and free training events;
- Technical restructuring of agricultural production. First of all, this is due to the fact that today

*the level of the material and technical market in the agricultural sector is low; In a number of economic regions, the wear and tear of fixed assets in agro-industrial complexes has reached 50-55%. The wear and tear of equipment exceeds its renewal several times.*

*Administrative regulation reflects a set of measures to regulate the agro-food market through the development and application of targeted programs, regulatory and legal acts. Administrative regulation can be conditionally divided into two directions.*

*The main difficulty of administrative regulation is the need to take into account the individual characteristics of each region (financial situation, natural and climatic conditions, specialization, etc.). In this regard, the main function of regulation should be information dissemination.*

*The purpose of social regulation is to regulate the level of incomes of the population, the level of the subsistence minimum, the minimum wage, as well as to ensure purchasing power for food products.*

*In our opinion, one of the important issues is the correlation of purchasing power with established and regularly updated consumption norms. At the same time, social regulation should be aimed at the development of rural infrastructure.*

*In our opinion, in modern conditions of farming, state regulation should have a leading role in modern agrarian policy. It should be noted that it is state intervention that is of decisive importance in determining the prospects and fate of the local agro-food market and related sectors.*

*Along with all this, due to the traditionally low profitability of capital investments, state support for the agri-food market is necessary to solve environmental problems, increase soil productivity, develop rural infrastructure, and maintain the necessary level of social balance between urban and rural areas.*

*The main issues of state regulation of the agri-food market in the economic security system include the following:*

- Ensuring food security of the state;*
- Ensuring financial and economic stability for agricultural producers;*
- Regulation of price parity between agricultural, processing, trade, energy and other enterprises;*
- Formation and regulation of prices in order to take the necessary measures to maintain the profitability of food production;*
- Creation of an integrated economic space with a clearly coordinated infrastructure in production areas;*
- Formation of a common and agreed policy in the sphere of production and sale of the final product and the preparation and application of the results of the ET and LKI in production;*
- Strict priority of supplying the domestic market with products;*
- Ensuring customs protection, import quotas and export support that affect the volume of domestic production.*

*Thus, according to the results of our research, the following priority areas of regulation of the agri-food market in the system of ensuring economic security were attributed:*

- Life ensuring daily food availability in the quantity and quality necessary for the activity;*
- Regulation of relations between cities and regions;*
- Regulation of the food quality and standardization system;*
- Regulation of the financial and economic mechanism of the agro-food market;*
- Improvement of customs policy;*
- Development of cooperation and integration;*

*The research work included the creation of insurance reserves, the creation of a unified system of information-methodological and advertising support for agricultural companies, the development of a targeted program for the technical armament of agricultural production, etc., as additional measures of state regulation that could increase the level of food security in the country.*

### **III. Conclusion**

*Based on the research conducted, it can be concluded that the main regulator of the agri-food market is the state. The author confirms that in the economic security system, state regulation of the agri-food market should contribute not only to the efficient functioning of the market, but also to the development of the market by solving such issues as ensuring food security, ensuring the financial and economic stability of agricultural producers, regulating price parity between agricultural, processing, trade, and energy enterprises, formulating a common and agreed policy in the sphere of production and sale of products, providing the domestic market with products on a priority basis, and developing and effectively commercializing innovative technologies in agricultural production.*

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## INVESTIGATION OF ENVIRONMENTAL POLLUTION THROUGH DEVICES AND THEIR ECONOMICS IMPORTANCE

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### Abstract

A method has been developed for the determination of aromatic hydrocarbons contained in oil (Sulfation and aniline point method). Various methods for the determination of aromatic hydrocarbons, which are an important and stable indicator of their identification, have been investigated in various oil products. (Gas and liquid chromatography methods). To evaluate the composition of oil and oil products from various fields, measurements were made using the gas-liquid chromatography method. Quantitative assessment of the content of aromatic hydrocarbons in oil samples from different wells and gasoline samples from different producers was carried out.

**Keywords:** environmental, pollution, devices, measure, parameters, economics.

### Introduction

The impact of economic activity on the environment is directly related to emissions of harmful substances, the need to store waste, etc. It follows that one of the most difficult problems in the economics of nature management is considered to be the problem of economic assessment of natural resources and the problem of determining the damage that has been caused to the environment (in monetary terms). Damage from negative impacts on the environment is usually considered in several aspects: economic (loss of resources, costs of eliminating environmental damage, etc.), environmental (harm to water, land resources, atmospheric air, flora and fauna), socio-economic (deterioration of health of the economically active part of the population, and as a consequence a decrease in working capacity, and hence an increase in the number of days of temporary disability) and social (decrease in life expectancy of the population, deterioration in the quality of life, increased costs of medical care for the population, etc.). When assessing the impact of domestic production on the environment, it is customary to proceed from the idea that exceeding the level of pollution of the environment, as a rule, entails negative consequences both for a certain territory and for the entire ecosystem as a whole.

The investigation of environmental pollution is a critical aspect of protecting the environment and achieving sustainable development in modern times. Utilizing devices for studying environmental pollution allows for precise data collection, identification of pollution sources, and assessment of their impacts. These methods are widely applied in monitoring air, water, and soil pollution. Environmental pollution occurs as a result of extraction, transportation, processing and disposal of oil and oil products, as well as unauthorized discharge of oil products into water bodies, man-made accidents, and industrial production. Waste water from cities, seaports and various industrial facilities is also contaminated with these substances. Pollution with oil and oil products is found everywhere: in the soil layer, in the hydrosphere, in the atmosphere. Due to the deterioration of the ecological situation in the polluted areas, there is a significant deterioration in the condition of both flora and fauna. The reason for the negative impact of oil on the environment on such a large scale is its chemical composition. Oil contains several thousand liquid hydrocarbons, which make up 80-90%. Aromatic hydrocarbons are about 29% in the oil. Since these substances are pollutants, they have a negative impact on the environment.

### Main part

#### Devices for Air Pollution Investigation

Air quality measurement relies on the following devices:

- **Air analyzers:** Measure concentrations of pollutants such as CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub>.

- **Drones:** Used to assess pollution levels in specific areas. These are equipped with high-precision sensors.

- **Thermal cameras:** Detect thermal emissions and monitor industrial emissions.

#### **Devices for Water Pollution Investigation**

- **Multiparameter water analyzers:** Measure parameters like pH, electrical conductivity, dissolved oxygen, and temperature in water sources.

- **Spectrophotometers:** Analyze the concentration of dissolved substances in water.

- **Autonomous water drones:** Collect data on pollution levels in deep water areas.

#### **Devices for Soil Pollution Investigation**

- **XRF analyzers (X-ray Fluorescence):** Measure the concentration of heavy metals and other elements in the soil.

- **Soil moisture sensors:** Monitor soil moisture levels and indicators of contamination.

- **GIS systems:** Used for mapping pollution sources and collecting geographic data.

#### **Real-Time Monitoring Systems**

Modern technologies enable real-time monitoring of environmental pollution. Stations equipped with sensors transmit data to central databases using mobile networks and satellite technologies. Such systems are invaluable for tracking pollution dynamics and implementing timely measures.

#### **Data Analysis and Artificial Intelligence Applications**

Artificial intelligence algorithms and big data analysis are increasingly utilized to analyze collected data. This approach helps identify the causes of pollution more accurately and develop preventive measures.

#### **Devices for Detecting Air Pollution**

Various devices and technologies are used to detect air pollution. These devices measure the concentration of harmful substances in the air, monitor pollution levels, and identify pollution sources. Below is a list of key devices used to detect air pollution:

##### **1. Air Analyzers**

These devices measure the concentration of specific pollutants in the air:

- **Gas analyzers:** Measure gases like CO<sub>2</sub>, CO, NO<sub>x</sub>, SO<sub>2</sub>, and O<sub>3</sub>.

#### **Methods of determining the content of aromatic hydrocarbons in petroleum products**

##### **Method of liquid and gas chromatography**

An important indicator in the identification of oil products is the amount of aromatic hydrocarbons in their content. In the methods used in the study of petroleum products in environmental objects, gas chromatographic analysis is preferred due to its highest selectivity, sensitivity and accessibility, using different types of detection. On the other hand, during the determination of PAHs in oils and middle distillates, in the chromatograms, the analyte appears against the background of the "naphthenic hump" and paraffins, which form fragments of molecules under electronic conditions, which overlap with each other. Fragments of molecules of substances analyzed in terms of ion mass are placed on them and their mass spectra are analyzed. When performing such analyses, it is practically impossible to identify, quantify, and accurately estimate the signal intensity of peaks associated with polycyclic condensed arenes [1].

It is possible to determine the content of aromatic hydrocarbons in the gasoline fraction with a fairly accurate (with an error of 2-3%) liquid adsorption chromatography (fig. 1). Gasoline fraction is separated into aromatic and naphthenic-alkane parts by the development-modification method of liquid-adsorption chromatography. Knowing the mass of the fraction taken for separation and the mass of separated aromatic hydrocarbons, the composition of the latter can be calculated.



*Fig. 1. Nexera LC-40 Complex for determination of aromatic hydrocarbons in oil by High Performance Liquid Chromodynamics method.*

*Determination of the types of aromatic hydrocarbons and control of their content in oil distillates is carried out using liquid chromatography with refractometric detection. The Shimadzu company produces several models of liquid chromatographs: Nexera modular models can be an example (figure 2).*

*Composition of the complex:*

- Pump for mobile phase;
- Column thermostat capable of working at a temperature lower than the ambient temperature;
- Refractometric detector;
- Manual injector or automatic sampler;
- Separation column set;
- Six-port automatic backwash valve (if required)
- Set of standards for calibration.

*The method is applied to determine the mass fraction of monoaromatic, diaromatic and tri+aromatic hydrocarbons in diesel fuels with a volume of up to 30% and in petroleum distillates with a boiling range of 150°C to 400°C (Figure 3).*

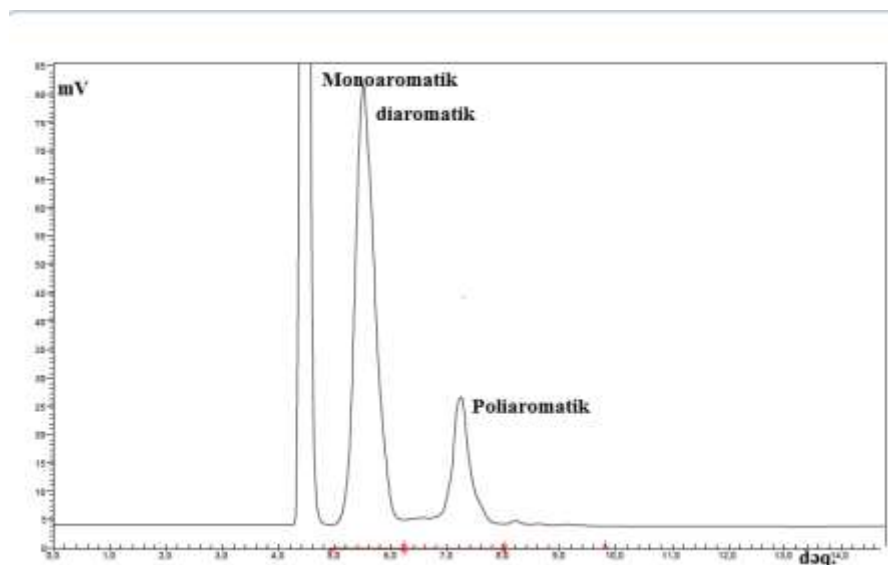


*Fig. 2. Identification chromatogram of aromatic hydrocarbons in diesel fuels. For gas chromatodynamics, a Nexis-GC gas chromatograph (Figure 4) is used.*



Fig. 3. Nexis-GC- gas chromatograph.

Rapid methods for the quantitative determination of aromatic hydrocarbons in gasoline fractions using fluorescent indicators have been developed based on liquid adsorption chromatography. A fraction sample containing a fluorescent indicator, which has the same adsorption capacity as aromatic hydrocarbons, is applied to the chromatographic column, and then alcohol is added. After the fraction completely saturates the adsorbent, the column is illuminated with ultraviolet light. The length of the fluorescence zone of aromatic hydrocarbons is measured, and the percentage of aromatic hydrocarbons is calculated, referring to the length of the column filled with adsorbent (it was determined that the length of the arene zone is proportional to their composition). There is no need to use special indicators in kerosene-gas oil fractions containing polycyclic aromatic hydrocarbons that fluoresce in ultraviolet light. In these fractions, a method was developed that allows to determine both the total content of aromatic hydrocarbons and the content of benzene homologues and polycyclic arenes separately. To determine the total content of aromatic hydrocarbons, a fraction of 0.4 ml is introduced into a thin glass column (length 50 cm, diameter 2.4-2.8 mm) containing silica gel, then alcohol as a displacer. When the fraction saturates the entire adsorbent, the column is illuminated with ultraviolet light. The fluorescence zone is measured and the total content of arenes is calculated by dividing the length of the fluorescence zone by the length of the adsorbent-filled portion of the column. Alumina is used as an adsorbent for the separation of alkylbenzenes and polycyclic arenes to determine polycyclic arenes. In this case, only polycyclic arenes are present in the fluorescent zone. By relating the length of this zone to the length of the arenes zone (when adsorbed on silica gel), the percentage of polycyclic arenes and the percentage of alkylbenzenes is determined [3].

Methods based on ultraviolet and infrared spectroscopy are also used for quantitative determination of aromatic hydrocarbons. The methods are based on the fact that the intensity of the bands in the absorption spectra of aromatic hydrocarbons is proportional to their concentration in the fraction. For example, there are methods for the determination of aromatic hydrocarbons in gasoline and kerosene-gas oil fractions based on the intensity of the absorption band (stretching vibrations of the C=C bond in the aromatic ring) at  $1600\text{ cm}^{-1}$ .

Gas Chromatography with an Agilent 7200 GC/Q-TOF Instrument



Figure 4. Agilent 7200 GC/Q-TOF Instrument.

Combined with the high-resolution spectral performance of Agilent's 7200 Q-TOF -TOF analyzer, it redraws the boundaries of GC/TOF technology. With an innovative ion source design, high-temperature quartz mass filter, high-efficiency collision cell, 32 Gbit/s data, sampling and temperature-stabilized ADC TOF electronics, the Agilent 7200 Q-TOF provides the highest detection selectivity and precise molecular formulation for structural elements and it allows you to perform the most difficult analytical calculations.

It is also possible to determine the aromatic hydrocarbons in the oil using the High Efficiency Liquid Chromodynamics method. For this, it is possible to use the Nexera LC-40 Complex [3].

• **Particulate matter meters:** Measure the concentration of particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) in the air.

#### **Optical Devices**

- **Laser-based devices:** Detect pollutants in the air using laser light.
- **Spectrophotometers:** Used for spectral analysis of gases in the air.

#### **Portable Sensors**

These are small, mobile devices used for on-site and real-time air quality measurements.

- Equipped with multi-functional sensors that measure pollutants like CO, NO<sub>x</sub>, SO<sub>2</sub>, and PM<sub>2.5</sub>.

#### **Thermal Cameras**

- Detect thermal emissions and track the spread of pollutants from industrial sources using heat signatures.

#### **Drones**

- Used to monitor air quality in remote and hard-to-reach areas.
- Drones are equipped with gas and particulate sensors to collect high-precision data.

#### **Meteorological Stations**

- Measure meteorological parameters such as temperature, humidity, wind speed, and direction, which help track pollutant dispersion.

#### **Ground-based Monitoring Stations**

- Stationary systems that provide long-term data collection.
- These stations offer real-time air quality indicators.

#### **Satellite Systems**

- Used to monitor large-scale atmospheric pollution.
- Satellites operated by agencies such as NASA and ESA map air composition and pollutant movement.

#### **Electronic Nose Systems**

- These devices detect odors and specific chemicals in the air.
- Used to study the impact of industrial and urban waste.

#### **Mobile Laboratories**

Equipped on transport vehicles, these devices can measure air quality at multiple locations simultaneously.

#### **Conclusion**

*Investigating environmental pollution through devices is an effective tool in environmental protection. These devices provide precise and timely data, playing a crucial role in identifying solutions to environmental challenges for government bodies, researchers, and the public. Advancements in modern technologies promise more efficient research methods in the future. Devices for detecting air pollution are essential tools for environmental protection and managing pollution sources. With the application of modern technologies, these devices become more accurate, reliable, and user-friendly.*

*And, perhaps, as the most effective and efficient method of determining environmental damage, one should adhere to the assessment through the cost of restoration work, since it implies taking into account the market value of natural resources and services involved in the work to restore ecosystems to the state prior to the damage caused.*

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## THE ROLE OF THE TOURISM SECTOR IN THE FORMATION OF THE GREEN ECONOMY IN AZERBAIJAN

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### **Abstract**

The article examines the role of the tourism sector in the formation of the green economy in modern Azerbaijan. The opportunities of tourism in the country, the economic characteristics of the tourist areas, the used tourist recreational resources have been determined. Directions of tourism development in the liberated territories were considered. Development postulates of southern, northern and western zones of the country are given to tourism. Knowledge and suggestions about tourism and green economy during the teaching of Sumgayit economy at the Faculty of Economics and Management of Azerbaijan State University were obtained in the article. Suggestions and proposals were made to determine the role of the tourism sector in the development of the structure of green economy in Azerbaijan in the short and long term.

**Keywords:** Azerbaijan, green economy, tourism sector, structure of green economy, potential of tourism sector, problems of development of tourism sector, directions of development of tourism sector.

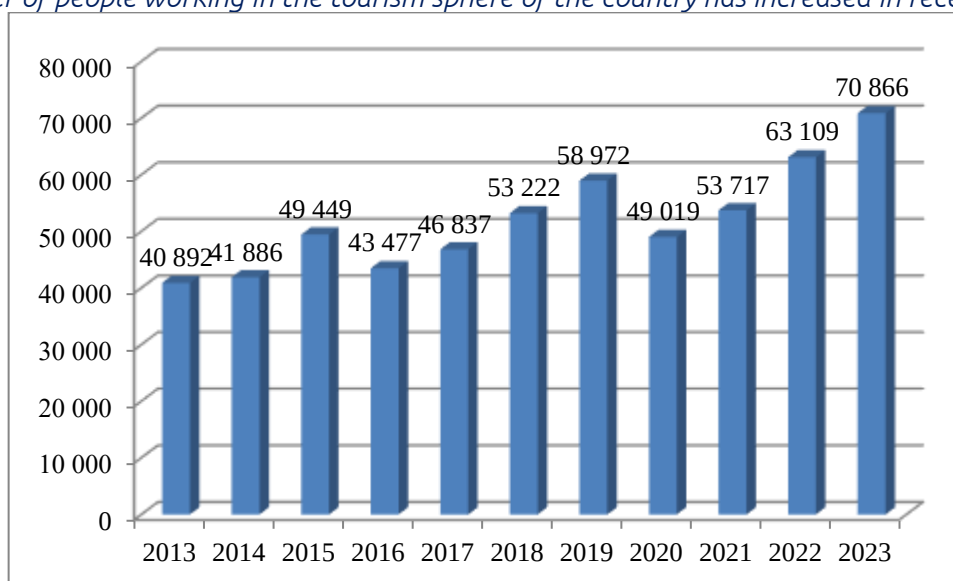
In today's world, global climate change is driving the importance of many issues. One of them is to switch to energy saving mode and reduce the amount of waste thrown into the environment. Reducing the share of greenhouse effect emissions is also considered as one of the global problems. In this regard, Azerbaijan has taken many initiatives at the global level and made significant contributions to the solution of global climate problems at the COP29 held in Baku in November 2024. In particular, financial mechanisms were developed and funds were created to provide assistance to countries affected by the negative impacts of climate change. At the same time, 2024 has been declared in Azerbaijan as the "Year of Solidarity for the Green World" [1]. The implementation of this decree will give a serious impetus to the formation of a clean environment in our country and the provision of a development model that meets the criteria of a green growth country. Moreover, it will create additional opportunities for stable development of the economy [2]. On the other hand, there will be opportunities to increase the export potential [3]. At the same time, new channels for the country's economy to access foreign markets will be created and the potential for the production of competitive export products will be expanded [4; 5]. Simultaneously, new sources of strengthening the security indicators of the economy will be created [6].

We accept the necessity of modernizing the economy with new challenges, developing green economy, ensuring sustainable development based on the principles of "green" economy, emphasizing the necessity of "greening" production and consumption based on the fact that ecology is today's economy [7]. In addition, we believe that the newly created economic regions of Karabakh and East

Zangezur have great resources for creating and increasing the potential of green energy [8]. We would like to draw your attention to the following if we take a look at a small analysis in order to imagine the current state of the ecological-economic system in our country. In our country, the volume of hazardous waste per capita was 15.5 kg in 2010, but in recent years it has increased to more than 30 kg. It's worth thinking about. The specific weight of processed hazardous waste is only 29-30%, but what about the rest? The total annual emissions of greenhouse gases in Azerbaijan amounted to 58.1 million tons (CO<sub>2</sub> equivalent) by the end of 2022, compared to 46 million in 2010. So we still have a lot of work to do. As for the protection of the air in our country and indicators that have a harmful effect on it, the total amount of pollutants released from stationary sources in 2010 was 491 thousand tons, and in 2022 this Picture will be 480 thousand tons. There is some progress. However, we must note that a total of 322,000 tons or 67.1% of these pollutants are captured and neutralized, and the rest undoubtedly pollutes the environment. Another statistic is very interesting. In 2010, the amount of production and consumption waste per person in Azerbaijan was 252 kg, and in 2022, this indicator was recorded at the level of 395 kg. In return, it is necessary to strengthen the energy security of the country and increase the potential of the green economy [9; 10]. In order to accelerate these processes, it is necessary to create a network of enterprises, including the green economy. In these processes, the role of marketing research is great [11]. Analogous development processes are also efficient in terms of economic diversification [12]. In order to accelerate the mentioned processes, special importance should be attached to the determinants of sustainable development of the economy and new economic tools should be used more [13; 14].

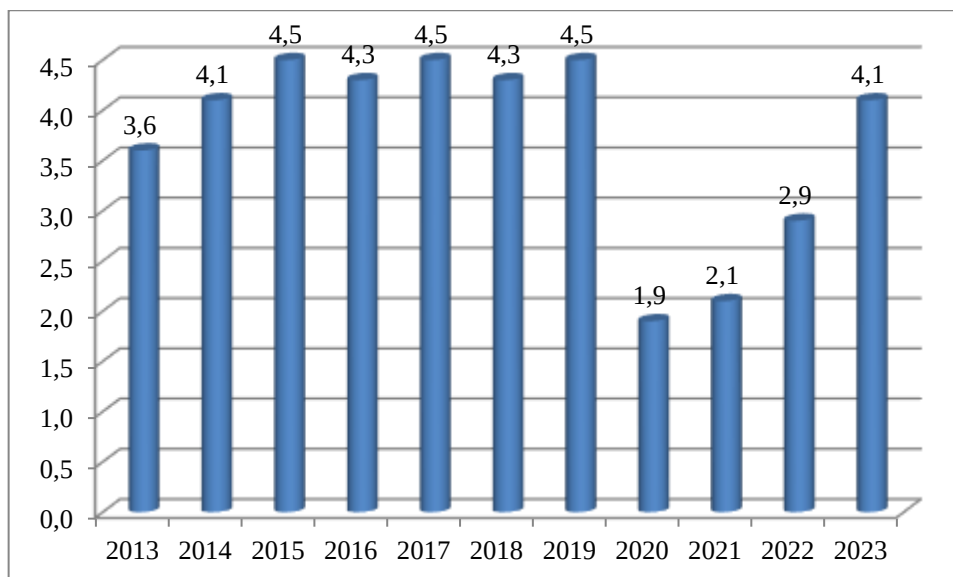
The solution of environmental problems is very important for the development of tourism. The state of Azerbaijan allocates funds for environmental protection and carries out state control over air protection. For example, in 2022, 231 million manats have been allocated to finance various environmental protection measures. Every year, the Ministry of Ecology and Natural Resources carries out inspections and air protection measures in more than a thousand enterprises. The amount of fines set for 2022 is 351,000 AZN [15].

The processes of creation of tourism enterprises in Azerbaijan continue at an increasing pace, and Picture 1 shows the number of employees working in the tourism sector of the country. It can be seen that the number of people working in the tourism sphere of the country has increased in recent years.



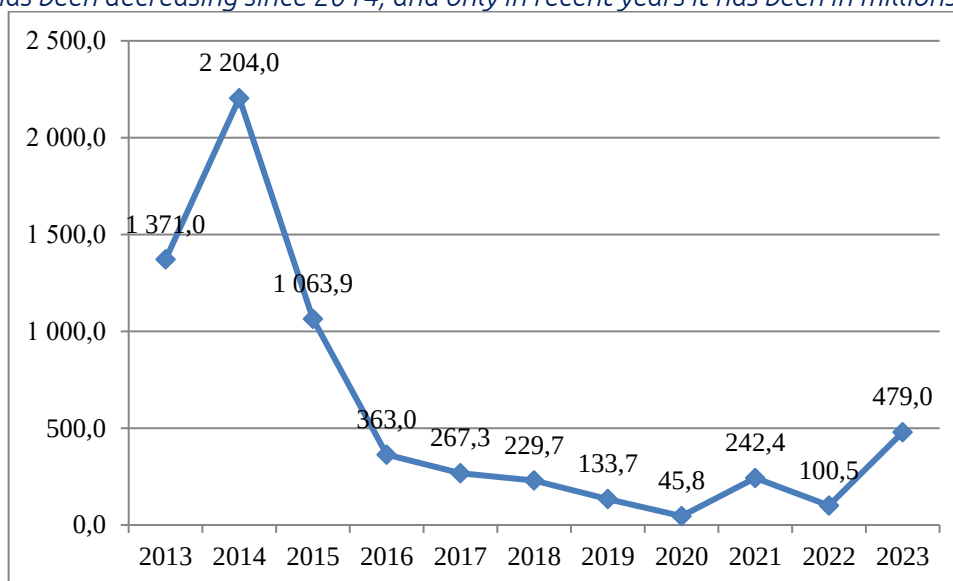
**Picture 1. The number of employees working in the fields typical for tourism in the Republic of Azerbaijan, number of people (prepared by the author on the basis of the data of ARSSK).**

Picture 2 shows the dynamics of the total value added in the tourism sector in Azerbaijan, and as it can be seen from the Picture, the share of these services decreased significantly in 2020 due to the COVID-19 pandemic. Only in recent years the growth rate has recovered and in 2023 it increases by 41.4% compared to 2020.



*Picture 2. The specific weight of the added value created in the fields typical for tourism in the Republic of Azerbaijan in the gross domestic product of the country, in percentage (prepared by the author on the basis of the data of ARSSK).*

Picture 3 shows the dynamics of the volume of investments made in the areas typical for tourism in Azerbaijan, and it can be seen from here that the volume of investments made in the field of tourism in the country has been decreasing since 2014, and only in recent years it has been in millions of manats.



*Picture 3. The volume of investments made in the areas typical for tourism, million manats (prepared by the author on the basis of the data of ARSSK).*

It should be noted that the untapped resources for the development of tourism in our country are remarkable. The development of tourism in Azerbaijan has grown rapidly in recent years and continues to expand with the strategic initiatives of the state. With its natural and cultural heritage, rich history and unique geographical location, Azerbaijan has become an attractive tourist destination. Among the main drivers of this development are several important factors: 1) Diversity of terrain and natural beauty: Azerbaijan's mountains, deserts, mountainous and coastal areas, especially the resorts on the Caspian Sea, make the country attractive for tourists who want to relax and merge with nature. Tourist places in Guba, Sheki, Lahij, Guba and other regions are famous for their natural beauty. 2) Cultural and historical heritage: Icherisheher, Gobustan, Gobustan National Park, Khinalig village, Sheki Khan Palace and other historical places in Baku are of interest to domestic and foreign tourists. Azerbaijan also hosts a large number of music and folklore festivals that promote cultural tourism. 3) Transportation infrastructure and air links: Baku has become an important hub for international flights with the Heydar Aliyev International Airport. In addition, the possibilities of convenient road and rail transportation to different

regions of the country have been increased. 4) Government support and promotion: The government of Azerbaijan considers the development of tourism as part of its economic policy. Since 2019, reforms in the visa regime, increased tourism promotion and participation in international exhibitions have also led to the growth of the tourism sector. 5) Special types of tourism: Offers for ecotourism, mountain sports, health and spa tourism, as well as wine-growing and gastronomic tourism are expanding in Azerbaijan. In particular, natural mineral waters and spa centers in Azerbaijan offer great opportunities to tourists in the field of health tourism. 6) International exhibitions and events: International events, sports competitions and exhibitions held in Baku also strengthen the tourist image of the country. For example, Formula 1 races, Eurovision Song Contest and other major events have increased the interest of tourists in the country. 7) Tourist infrastructure: In recent years, the development of hotels, guesthouses, restaurants and other tourist infrastructure has created comfortable and attractive conditions for both domestic and international tourists. The development in this direction has made Azerbaijan an important destination for more international tourists, and the tourism sector continues to occupy an important place in the economy of the country.

Post-conflict areas also offer serious opportunities for tourism development [16]. In particular, the development of green energy infrastructure in the Karabakh economic region creates additional incentives for the development of tourism [17]. It is well known that it is important to create competitive centers of activity in any economic sector. For example, Sumgayit can be presented as the center of petrochemical industry in our country [18]. We believe that Karabakh and East Zangezur economic regions can be one of the developed centers in the field of tourism, for which real projects should be implemented and these projects should have accessible financing mechanisms [19].

In addition, the following can be included in a group of factors that can develop the tourism sector in Azerbaijan: 1. Strategic geographical location: Azerbaijan, with its location between Asia and Europe, creates an interesting place for tourists as a unique place where both Western and Eastern cultures intersect. This position offers great opportunities to increase the flow of global tourists. 2. Natural and climatic diversity: The unique nature of Azerbaijan - mountains, coasts, forests and deserts - creates favorable conditions for the development of various types of tourism activities (ecotourism, rural tourism, winter tourism, etc.) in the country. Natural beauties such as Gobustan, Caspian Sea coast and Shahdag are attractive for tourists. 3. Historical and cultural heritage: Azerbaijan is famous for its rich historical and cultural heritage. Sites included in the UNESCO World Heritage List, such as the Ancient City, Gobustan rock carvings, Sheki Khan Palace, make the country attractive for historical tourism. Cultural festivals and folklore events also add to this interest. 4. Modern tourism infrastructure: In recent years, modern tourism infrastructure has been developed in Baku and the regions. Shahdag and Tufandag winter tourism complexes, high-class hotels, international airports, transport and communication facilities provide comfort for tourists. 5. State support and tourism policy: The declaration of tourism as a priority sector and the provision of various incentives by the government in this area accelerate its development. State investment in tourism, simplification of the visa regime and tax incentives increase interest in this area. 6. Regional development and integration: The development of tourism not only in the capital, but also in the regions is a great advantage for Azerbaijan. The nature and infrastructure of Shamakhi, Gabala, Guba, Sheki, Naftalan and other regions make it possible to create different types of tourism for tourists. 7. Tourism education and personnel training: Training qualified tourism personnel and improving service levels are also important factors. Vocational training, guide training, and other courses can increase the professionalism of local personnel and improve tourist satisfaction. 8. International relations and promotion: As Azerbaijan actively promotes its tourism potential at international exhibitions and forums, more tourists will be attracted to the country. In particular, campaigns on social media and well-known tourism platforms increase the attractiveness of the country. 9. Security and stability: A safe and stable environment is important for tourists. Azerbaijan is known as a stable and safe country, which allows tourists to come and explore the country with ease. 10. Medical and health tourism: The availability of naphthalene oil, healing waters and minerals has great potential for the development of medical and health tourism. Medical tourism can attract both domestic and foreign tourists. Effective use of these factors will lead to rapid development of Azerbaijani tourism and increase its competitiveness in the international arena.

In order to realize the mentioned issues, it is important to consider a group of factors, such as financial and economic aspects, innovative approaches, creation of banking infrastructure, assessment of resource potential, especially in post-conflict areas, and creation of an investment-attractive environment for intensifying investment activities in the formation of the green economy and expanding the opportunities of the tourism sector [20; 21; 22; 23; 24].

*It should be noted that the economic revival of Karabakh is a priority for Azerbaijan. By creating new economic opportunities, improving social welfare and building stable infrastructure in these areas, it is possible to turn Karabakh into one of the economic centers of the country. These can be more important as the main directions for the economic revival of Karabakh: 1. Reconstruction and development of agriculture: The territory of Karabakh has fertile lands for agriculture and creates favorable conditions for agriculture, animal husbandry, viticulture and horticulture; productivity can be increased by applying modern agricultural technologies, automated irrigation systems and innovative methods in the fields; with the development of agriculture and animal husbandry it is possible to contribute to the local market and export. 2. Renewable energy sources: The Karabakh region has the potential for solar, wind and hydroelectric power. The implementation of large-scale renewable energy projects in these areas will provide an environmentally friendly and sustainable source of energy; the construction of wind and solar power plants will both meet local energy needs and contribute to the national energy grid. 3. Establishment of industrial and processing zones: The creation of industrial zones and the establishment of processing facilities in Karabakh will help create jobs and increase local production. The creation of conditions for the processing of agricultural products, food industry and light industry in these areas will greatly contribute to the economy; the establishment of industrial parks in areas such as Agdam and Fuzuli can serve this purpose. 4. Development of tourism: Karabakh's rich history, cultural heritage and natural beauty strengthen its tourism potential. In particular, there are ample opportunities for cultural and eco-tourism. Tourism infrastructure can be created in Shusha, Agdam, Hadrut and other cities to attract the attention of foreign and local tourists; tourism can provide jobs for the local population by developing hotels, restaurants and transportation services. 5. "Smart City and Smart Village projects: The implementation of "Smart City" and "Smart Village" concepts in Karabakh will create conditions for both the creation of modern infrastructures and the efficient use of resources; within the framework of these projects, energy, water supply, public services and transportation systems will be provided with intelligent management. 6. Development of trade and logistics infrastructure: Karabakh's restored railways and highways make it possible to transform these areas into a transit and logistics center. Trade relations can be strengthened by increasing the connectivity of Karabakh's territory with international and regional markets; establishing logistics centers in these regions will both increase Karabakh's domestic market potential and expand export opportunities. 7. Investment attraction and state support: Attracting foreign and domestic investors can play an important role in Karabakh's economic revitalization. State tax benefits, credit support and other incentives will provide additional motivation for investors; creation of economic zones and stimulation of investment projects in the liberated territories can accelerate the development of Karabakh. 8. Ensuring a high rate of return: Taking into account the economic activities before the occupation, rehabilitation of these areas and attracting people to these areas will contribute to the economic revival of the region. By ensuring the return of the displaced persons living in Karabakh to their homes, it is possible to add labor to the local economy. 9. Establishment of ecological balance and green economy: Environmental protection, expansion of green areas and efficient use of natural resources are important for sustainable economic development of Karabakh. It is possible to protect nature and create new economic opportunities through green economy projects. 10. Education and training of personnel: Training qualified personnel and restoring the educational infrastructure in Karabakh is important for economic development. The establishment of vocational training institutions and the training of workers in the regions can provide additional support for economic revival. We believe that these measures will accelerate the revival of the Karabakh economic region, including the city of Shusha, which is an exceptionally important tourist and cultural center [25]. In order to intensify these processes, it is necessary to create multifunctional tourist zones and actively use the mechanisms of free economic zones [26; 27; 28; 29].*

*Therefore, more attention should be paid to a group of issues and measures in the formation of green economy in Azerbaijan and increase the role of tourism sector in these processes:*

- The transition of our country to the principles of green economy arose from the global necessity of the time, and in this regard the maximum improvement of the state policy and the structure of green economy building should be formed;*
- The policy of transfer of green technologies should be updated, waste-free technologies should be brought to the forefront, and in this connection environmental monitoring and evaluation of the existing production and service infrastructure in our country should be carried out;*
- In the Karabakh and East Zangezur economic regions it is necessary to deepen the study of the potential of green energy, to create a multifaceted infrastructure network in the direction of efficient*

use of energy and water resources, to restore the ecological balance in the region, to establish new forest massifs;

– In the processes of creating the structure of the green economy in our country, taking into account the factors of ecology and environmental protection, in the context of COP29, sustainable green economy areas should be organized under the condition of strengthening the ecological-economic system, and the activities of the tourism sector should be expanded in these processes, etc.

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**CURRENT PROBLEMS OF MARKETING IN THE MODERN MARKET ECONOMY****Mursalova Haqiqat Garibaga***master student of Faculty of Economics and Management  
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*In the article the actual problems of marketing in the conditions of the modern market economy were examined. It was noted that the mechanisms of the market economy have become more complicated in the conditions of global transformations. The importance of modernization of the existing mechanisms of international trade was pointed out. Methods of effective use of the role of marketing services for the effectiveness of sales channels were considered. The importance of marketing research in the study of economic problems arising from modern conditions is justified. The most urgent problems of marketing service are summarized. Recommendations and suggestions for improvement of modern mechanisms and tools of marketing service are made.*

**Keywords:** *market economy, modern times, marketing, current problems of marketing, marketing mechanisms, marketing concept, solutions of current problems of marketing.*

*Modern problems of marketing consist of studying, summarizing and preparing proposals for top management, making decisions on goods and services arising from global challenges, arising from economic transformations, arising from global threats and commodity markets. In order to understand these problems in depth, it is important to study the fundamentals of marketing in depth [1], in addition, the characteristics of marketing management should be studied and taken into account [2]. At the same time, the creation of a marketing mechanism and tools for the formation of marketing services at the professional level should be kept in mind [3]. In addition, let's note that marketing should objectively analyze and evaluate many factors in order to optimize the cost of goods and services in modern times: 1) Political factors - i.e. stability of the country. 2) Economic factors - i.e. macroeconomic and macro-financial stability. 3) External factors - i.e. the influence of the global world market. 4) Fluctuating prices of raw materials and supply problems. 5) Problems of placing goods on the market and strengthening them, etc.*

*The function of marketing means the following tasks related to its activity: 1) Conducting*

marketing research, i.e. consumer demand, consumer buying behavior, consumer selling behavior, market position, price, volume, etc. 2) Product range planning, i.e. what type, how many types or services to put on the market. 3) Distribution and sales of products in this case refers to the distribution of products to the market and sales. 4) Promotion and product sales stimulation (encouragement, motivation) through this function, it is intended to organize the delivery and sale of products and services to end consumers, in the buyer's network, in greater variety and at affordable prices. That is, the more sales or services, the more the profit of the company increases. 5) The principle of pricing and price formation. This principle of marketing research is one of the most difficult problems of modern marketing. Product cost optimization is a must. Otherwise, the price of the product will not be able to compete in the market. 6) Management of marketing management mechanism, in this case, a management system, i.e. structure, is formed for the organization of marketing services. In simple words, a marketing office, department, marketing service is created. The goal is to study marketing services and modern marketing problems in a planned way, to create the basis for making higher decisions.

It should be noted that due to the efficient organization of marketing services it is possible to study and evaluate the export opportunities of companies and enterprises [4; 5]. Besides, it is possible to increase the competitiveness of enterprises through marketing research, to create a network of enterprises that can strengthen the economic security of the country, and to increase the production of products [6; 7; 8]. In the modern conditions and times, the events take place rapidly. It is already the XXI century. The goals and tasks of enterprises and companies are changing rapidly [9]. New spheres of economy and directions of business activity are emerging. As a result, significant changes occur in the system of market relations: 1) New products appear on the market. 2) Most of the market transactions are carried out through digital applications. 3) Contacts between sellers and buyers are reduced to a minimum. 4) New features in the movement of goods and products are noticed. 5) Companies have different goals. One is trying to expand, the other is trying to protect its market. 6) There is a need for new marketing services and the development and application of a new methodology is inevitable. Due to these factors, today it seems difficult for any company to be successful in the market without resorting to marketing strategy [10; 11]. It is important to increase the role of marketing service for more successful establishment of goods and services in commodity markets in enterprises [12]. Such an approach will also create additional incentives to effectively use the opportunities of economic sectors, expand the structure of production, ensure the productive use of resources and apply better economic mechanisms in the activity processes [13; 14; 15].

Planning and conducting marketing research is directly related to the characteristics and development trends of the market, which is the main object of research [16]. Various new situations, especially in the activity of market participants, which are the main objects of marketing research, for example, in the political and practical activity of market subjects, should be taken into account [17]. Also, the products circulating in the market, newly completed works, goods and commodities should be based on their market cycle ups and downs. At the same time, the price factors, goods and product channels exchange forms and their characteristics faced by the buyer mass, i.e. consumers, including various service users, should be focused on [18]. In the present period, in view of the tasks of marketing and from the point of view of the formation of marketing research, 2 main forms of marketing research are used. The first direction is based on quantitative indicators of marketing research, and the second direction is based on qualitative indicators of marketing research, that is, as the name suggests, in the first case, mainly the quantitative indicator volume comes to the fore. In the second case, qualitative indicators play a key role [19]. Finding solutions to modern marketing problems requires a special approach. Thus, in the conditions of global transformations, the problems arising in the field of marketing are mainly new, and, of course, the reasons for their emergence are new problems, and new mechanisms, methodological styles and tools are required to solve them [20].

It should be noted that one of the modern tasks of marketing research is to conduct studies on increasing the competitiveness of enterprises, improving their financial strategy and identifying resources for wider use of innovative mechanisms [21; 22; 23; 24]. It should be noted that in modern conditions the borders and spaces of world trade have undergone drastic changes. The traditional channels and mechanisms of international trade have changed their trajectory and are also significantly different in terms of organization and regulation [25]. International sanctions, wars, civil wars, conflicts destroy national economies and create serious problems at the regional and international levels [26]. The movement of goods is limited and the security problems of trade channels have increased significantly. Delivery of goods and services to end users has become extremely expensive.

Taking into account the world experience and in the context of modern trends of world trade

development, it is possible to distinguish the following: 1) Each of the participants of foreign economic activity of the country and foreign trade subject specializing in international markets should have a strategic marketing concept. 2) Production, transportation, movement, ascent and descent, maneuverability of goods should be studied in a complex and systematic way. 3) According to the market situation and shocks, a mechanism for the survival of the goods in the market and a behavior plan for crisis conditions should be prepared and there should be a mechanism for its implementation. 4) The combination of sellers and buyers for each market segment should be worked out and its possible movement mechanisms should be developed. The limits and scope of the competitive environment in the market segment should be studied and the appropriate tactics of the company in this regard should be formed. Thus, in modern conditions, depending on the existing and newly emerging problems of international trade, the preparation and application of new mechanisms and tools of marketing concept for each market segment should be the special focus of companies and enterprises, subjects of international trade in general, as an important issue. The development of multifunctional economic mechanisms and innovations in the creation of a network of competitive enterprises should be prioritized, while increasing the efficiency of the measures taken [27; 28].

The modern market economy is a constantly changing and developing environment. Companies and enterprises operating in this environment use various marketing strategies to adapt to market demands, to be competitive, and to ensure customer satisfaction [29]. However, there are not only technical, but also theoretical and practical aspects of this process, which causes a number of real problems in front of marketing. In this article, the main problems of marketing in the modern market economy and their solutions are discussed [30]. In terms of competition and challenges caused by the market, the modern market economy is an environment where competition is intensified and various innovative products and services appear. Every day, companies with new ideas and approaches enter the market, making it difficult for existing companies to gain a foothold in the market. As competition increases, customer acquisition and retention require more sophisticated and customized marketing strategies. In this process, the role of social networks and the influence of online platforms stand out. Companies want to be closer to their customers not only through traditional advertising, but also through digital marketing, social media and other online tools. At the same time, one of the biggest changes in the modern market economy is the rapid transformation of customer behavior. The development of the Internet and digital technologies has changed the way customers access information, select products and make purchases. Customers now make decisions about products and services based on preliminary research and price comparisons. These changes require new approaches and strategic shifts in marketing. To achieve customer satisfaction, marketers need to build more transparent, reliable and interactive relationships and provide personalized offers to create customer value. The growing role of digital technologies and online marketing is coming to the fore. In recent years, digital technologies have become an integral part of marketing. Mobile apps, social media platforms, artificial intelligence, and data analytics enable companies to more accurately track and adapt to customer behavior. But they also bring new challenges, such as managing large data flows, protecting customer data, and preventing cybercrime. Companies need to strengthen their technology infrastructure and ensure data security to maximize the use of digital tools in marketing. The impact of social media and digital influencers is also noteworthy. Social media and digital influencers have become an important part of marketing in today's market economy. Many companies use influencers to promote their products and services because of the influence these individuals have over their audiences. However, this approach comes with its own challenges. The influence of influencer marketing is often unstable and can sometimes lead to unexpected results in terms of customer satisfaction. At the same time, the fast and ubiquitous nature of social media also allows for the spread of information that can potentially damage a brand's image. In addition, sustainable development and ethical marketing approaches are of particular importance. In the conditions of the modern market economy, environmental and social responsibility issues have become one of the most important marketing issues. Customers began to prefer more reliable and ethical companies. Sustainable products, environmentally friendly approaches, fair trade principles and socially responsible projects are important factors for success in the market. In this context, it is of great importance that marketing strategies are environmentally and socially responsible in line with customer expectations. Companies must not only make a profit, but also fulfill their social and environmental responsibilities. At the same time, the evolution of customer service and the factor of new communication channels should also be taken into account. Traditionally, customer service has been provided in-store or over the phone, but with the advancement of technology, customer service is now being provided through several new channels. Live chats, chatbots, mobile apps and social media

platforms are creating new ways to engage with customers. This requires new approaches to marketing. Companies need to improve the quality of customer service, respond quickly and effectively to customer questions, and ensure the same level of service across all communication channels.

The problem of adapting marketing to dynamic trends and technologies - in today's dynamic marketing landscape, the rapid development of new trends and technologies, changes in consumer behavior, and changes in the competitive environment require constant updating of marketing strategies. To stay informed and prepared for rapid changes and to keep your marketing strategy up-to-date, you need to track the latest trends and technology developments. Keeping up with trends is not easy for marketers. As technology evolves, it becomes increasingly difficult to predict, adapt, and implement the next big thing in marketing. It is not enough to be aware of these technologies in the field of marketing; their development, adoption and application will predict the future of consumer engagement. Therefore, marketers need to be flexible to effectively integrate these technologies and trends into their strategies. Being an early adopter of new trends and technologies such as artificial intelligence, augmented and virtual reality, or new social media platforms can provide a significant competitive advantage. Marketers should proactively monitor industry developments, attend conferences, participate in webinars, and network with thought leaders. However, additional training is also needed for team members who are not yet familiar with new marketing trends and ways to implement new technologies. A successful way to effectively integrate trends into your strategy is to conduct market research by identifying your target audience. When conducting market research, you can use analytical tools and trend forecasting services. As a result of these studies, marketing strategies should be modified and adapted to the current market. Staying on top of new technologies and trends is one of the most pressing issues in marketing. As we have already mentioned, taking into account modern trends and using the mechanisms of free economic zones in the development of industries can be more effective. Therefore, the possibility of using free economic zones should be taken into account when preparing proposals during marketing research [31; 32; 33].

Current problems of marketing in the modern market economy are influenced by various economic, technological and social factors. The actual problems of marketing in the conditions of market economy can be described as follows: 1. Change of the market in competitive conditions: 1) Competition has intensified with the growth of global markets, which requires companies to create unique value. 2) Difficulty in communicating the differentiating features of products and services. 3) Impact of digitalization. 2. Technological innovations: 1) The expansion of digital platforms and algorithms requires a rethinking of traditional marketing strategies. 2) Integration of online channels: Adopting a multichannel marketing approach and effectively managing these channels. 3) Big data and analytics: Analyzing customer behavior and the challenges of making the right decisions. 3. Economic instability: 1) Inflation. 2) Changes in currency values and economic crises reduce consumer spending. 3) Companies are forced to optimize their marketing budgets. 4. Changes in customer needs: 1) Customers demand a more personalized approach. 2) Increasing demand for socially responsible and environmentally sustainable products. 3) The new generation of consumers is more connected to technology and requires different marketing approaches. 5. Privacy and ethical issues: 1) Tightening legislation on customer privacy in digital marketing. 2) The need for an ethical approach to marketing. 6. Sustainability and social responsibility: 1) Companies are adopting "green marketing" strategies to reduce their environmental footprint and 2) Customers expect companies to be socially responsible, not just product driven.

It is known that the market economy is the most widespread economic system in the world. The market economy is comprehensive. It covers all areas of production, distribution, exchange and consumption. The market economy has its own foundations. The basis of this economic system is the production of goods. Money is created with the creation of commodity production. The market is created on the basis of commodity-money relations and connects all areas of the economy. Money and the financial-credit system play a special role in the market economy. The main task of the state in this sphere is to implement a correct credit policy and to regulate the circulation of money in the country. Marketers study the needs of producers and respond to these needs by producing products in accordance with these needs. There are a number of marketing problems in Azerbaijan, which include both general marketing problems and purely regional problems. Examples of these problems are: High distribution costs; High advertising costs; High price markups; Deceptive practices; High pressure selling, etc.

We believe that one of the modern activities of marketing in Azerbaijan is to ensure efficient use of resources of post-conflict territories. For example, the strategic role of marketing in the development of green economy in the liberated territories can be mentioned. This mechanism includes the strategic role of marketing in building a green economic structure in the liberated territories. It emphasizes the

importance of marketing strategies for successful implementation of the green economy model, promotion of local products, support of sustainable agriculture and development of tourism. The processes of revitalization of post-conflict areas are entering an intensive phase [34]. Marketing services can play an important role in addressing the real problems in these areas [35]. Recently, the need for attractive projects related to green energy resources has increased. Therefore, marketing analyses and justifications are needed [36].

It should be noted that the green economy is a concept that combines economic development with environmental sustainability. This model requires economic activity to be reconciled with environmental protection and ecological balance, taking into account the limitation of natural resources. 1) Green economy is based on the following basic principles: sustainable use of natural resources; protection and restoration of natural capital; energy efficiency and transition to clean energy sources; application of green technologies; more efficient management of natural resources; development of green economy in occupied territories. The development of a green economy in the liberated territories requires a comprehensive strategy that integrates economic recovery, ecological recovery and social development. The green economy model makes it possible to organize economic activities in these territories in a more sustainable and environmentally friendly way [37]. 2) The transition to a green economy is of strategic importance in the following directions Sustainable use of natural resources and protection of ecological balance; Application of ecological agricultural technologies in agriculture; Development of clean energy sources (solar energy, wind energy); Sustainable development of the tourism sector; Creation of new jobs through the application of green technologies; Analysis of the role of marketing in the development of the green economy; Marketing plays an important role in the development of the green economy. Promoting green products and services, creating sustainable production and consumption habits, increasing environmental awareness in society are the main functions of marketing. 3) Marketing strategies to support the development of the green economy in the liberated territories should include the following elements: Strong marketing campaigns (domestic and international) to promote local products and services; Formulation of a marketing strategy for the development of sustainable tourism; Advertising campaigns aimed at the public to raise environmental awareness; Innovative marketing initiatives to promote green technologies and sustainable energy sources; Marketing strategies that demonstrate the benefits of the green economy to local and international companies to attract investment [38]. At the same time, the role of banking infrastructure - accessible banking and financial services - in the implementation of green economy and energy projects is great [39]. In particular, the evaluation of the resource potential of the Karabakh economic region is one of the important conditions [40]. There is a need for systematic marketing studies in order to efficiently use the opportunities of the tourism and service sector of the city of Shusha, which is the center of Karabakh [41].

Therefore, we believe that a number of objective realities and influencing factors should be taken into account in modern marketing problems and their effective solution:

- First, in marketing research, adaptation and innovation, i.e. companies need to adapt to changing market conditions and develop innovative approaches;
- The use of digital technologies should be expanded, including the integration of technologies such as artificial intelligence, chatbots and augmented reality into marketing strategies;
- A complex and systematic study of marketing problems is required, so continuous market research is essential to better understand customer behavior;
- The application of dynamic trends is very important to stay relevant and competitive, because what is trendy in one month is easily forgotten in a few weeks, adapting to dynamic trends is not only about using technology, it is about creating an emotional bond with the customer, understanding them better and meeting their modern needs. is to provide appropriate products and services, each innovation should be adapted to the goals of the business entity and applied with an individual approach;
- In the modern market economy, marketing faces many innovations and challenges. The competitive environment, changes in customer behavior, the development of digital technologies and ethical issues play a key role in the formation of marketing strategies. Companies must not only respond to market demands, but also gain the trust of their customers through innovative and socially responsible approaches. This appears to be a necessary condition for long-term success and sustainable development. Companies can only gain a strong position in the market by offering flexible approaches and innovative solutions to the current problems of modern marketing;

– It is important to consider the strategic role of marketing in the successful development of the green economy. Marketing plays an important role in raising the environmental awareness of society, promoting sustainable products and services, attracting investment and ensuring overall economic growth;

– It creates important opportunities for the development of the green economy, ecological restoration, social development and economic recovery in the liberated territories. It is clear that marketing has an important role to play in this development process. A successful marketing strategy can contribute to the rapid and sustainable development of the green economy in these areas;

– Modern marketing strategies can make a number of contributions to the development of the green economy: Promotion and promotion of local products and services; Awareness campaigns for the formation of sustainable production and consumption habits; Promotion of green technologies, sustainable energy sources and organic agricultural products; Promotion and development of a sustainable tourism concept; Advertising and marketing campaigns to raise environmental awareness among consumers; Implementation of marketing strategies in the liberated territories, etc.

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## Jurisprudence

### THE LEGISLATIVE SYSTEM OF ASIAN COUNTRIES AND SALES CONTRACTS

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#### *Introduction*

##### *Relevance and Importance of the Topic*

In the modern era, the development of global trade, international cooperation, and the rapid spread of the digital economy have led to an interconnectedness of the legal systems of various countries. This is particularly evident in the legal regulation of sales contracts. Asian countries, with their rapidly growing economies and diverse legal systems, play a significant role in global trade. The legislative systems regulating their economic relations are of vital importance within the framework of international trade law.

A sales contract establishes the legal connection in the circulation of goods and provision of services, forming the foundation of economic relations. The regulation of these contracts in Asian countries requires different approaches due to the diversity of their legal systems. For example, the contract relations in China and Japan, which follow the continental legal system, differ significantly from those in India, which follows common law, or countries governed by Islamic law.

##### *Purpose of the Research*

The main aim of this study is to investigate the legal regulation of sales contracts within the legislative systems of Asian countries, identify the forms, requirements, and application mechanisms of these contracts. The research also aims to conduct a comparative analysis of international legal norms and the national legislation of Asian countries. In this context, the goal is to understand the principles and laws under which sales contracts are regulated in Asian countries and their role in international trade.

##### *Methodology of the Research*

The scientific research will employ various legal research methods. Initially, a comparative method will be used to compare the legislative systems of Asian countries, examining the impact of different legal systems on sales contracts. Furthermore, an analytical method will be used to analyze existing legislative acts and international legal documents. Practical legal examples will also be used to focus on the application of sales contracts in disputes.

##### *Key Concepts and Importance of the Topic.*

A sales contract is an agreement in which one party (the seller) undertakes to deliver goods or property to another party (the buyer), and the buyer agrees to pay a specified amount in return. This contract is widely applied both in domestic and international trade, and its legal regulation may differ from country to country.

This research will help in a better understanding of the regulation of sales contracts in Asian countries within the international realm. As the Asian region constitutes a significant part of the global economy, the legislative systems and approaches to sales contracts in these countries impact the efficiency of global trade. Therefore, the topic holds particular importance for international law and commerce.

## 2. SALES CONTRACT: CONCEPT AND LEGAL FOUNDATIONS

### 2.1. Concept of a Sales Contract

A sales contract is an essential contract type in legal systems, forming the foundation of goods circulation and economic relations. This contract is a legal agreement where one party (the seller) agrees to deliver a specified good or service to the other party (the buyer), who in turn agrees to pay a specified price for it. It can be concluded between individuals or legal entities, establishing the legal basis for economic relations.

The sales contract is a key component of commercial law and is widely applied in both domestic and international trade. This contract guarantees legal certainty in economic relations between the

parties and ensures the safety of trade. With the rise of electronic commerce, sales contracts have also seen wider application.

## 2.2. Historical Development of the Sales Contract

The legal history of the sales contract dates back to the early periods when economic activity was conducted through the exchange of goods. Historically, trade was carried out through a barter system, in which goods were exchanged directly. Over time, the introduction of monetary exchange and the determination of commodity value led to the development of sales contracts, which were then aligned with legal rules.

In Roman law, sales contracts were specifically regulated and considered one of the foundational principles of commercial law. During this period, the legal concept of a contract was formed, and legal relations between parties were more clearly defined. This principle has formed the basis of contract law in modern legal systems.

In the Middle Ages, the regulation of sales contracts in both Islamic law (Fiqh) and European continental legal systems was also a significant focus. Particularly in Islamic law, the regulation of such contracts was based on both ethical and legal norms. As a result, the sales contract became an essential legal institution in both Eastern and Western legal systems.

## 2.3. Legal Nature of the Sales Contract

The legal nature of a sales contract is characterized by the mutual allocation of rights and obligations between the parties. Upon concluding the contract, the seller undertakes to deliver a specified good or property to the buyer, and the buyer agrees to pay the agreed amount for it. This is a binding agreement, and failure to fulfill obligations by one of the parties results in a breach of contract and the corresponding legal consequences.

In international law, one of the key features of the sales contract is its widespread application in international trade relations. International sales contracts are regulated under the CISG (United Nations Convention on Contracts for the International Sale of Goods) and the UNIDROIT Principles. These legal documents establish common legal standards for the parties to sales contracts, enhancing the effectiveness of international trade.

## 2.4. Main Conditions and Form of the Sales Contract

For a sales contract to be legally effective, certain conditions must be met. First, there must be the mutual intention of the parties to form a contract, expressed through an agreement, and both parties must have a clear understanding of their rights and obligations. Second, the subject matter of the contract, i.e., the good or service, must be clearly specified, including the characteristics of the goods or property involved.

The form of the contract is also legally significant. In different countries, the form of the sales contract may vary. In some legal systems, the contract must be in writing, while in others, oral contracts may also be legally binding. With the development of electronic commerce, many countries have legalized electronic contracts, which represents a new approach in modern trade law.

## 2.5. Regulation of Sales Contracts in International Law

In international law, the sales contract is a widely used legal instrument. Key documents regulating trade relations at the international level include the CISG and the UNIDROIT Principles. These documents provide universal legal principles for sales contracts and ensure that these contracts are applied more uniformly on an international scale. The CISG plays a central role in the regulation of international sales contracts.

# 3. THE LEGISLATIVE SYSTEMS OF ASIAN COUNTRIES IN THE CONTEXT OF SALES CONTRACTS

The legislative systems of Asian countries have developed under various historical, cultural, and legal influences. There are different legal systems in the region, which has led to different approaches to the regulation of sales contracts. The legal systems of Asian countries can be divided into four main legal systems: civil law system, common law system, Sharia law, and mixed legal systems. This section will analyze these systems.

## 3.1. Common Law System: The Example of India

India's legal system is based on the common law system inherited from its British colonial past. Sales contracts are regulated by the Indian Contract Act (1872). This law outlines the essential terms for forming contracts, the rights and duties of the parties, and the rules regarding breach of contract.

In Indian legislation, the principle of freedom of contract plays a central role. Parties are free to determine the terms of their contract, but this freedom is restricted within certain legal boundaries. For example, contracts made for illegal or prohibited purposes are considered invalid. Judicial practice regarding breach of contract and its consequences also plays a significant role. Overall, the Indian legal

system aims to protect the rights of parties in contracts and promote fair commercial relationships.

India's position on international sales contracts is also notable. Although India is not a signatory to the CISG, it applies internationally accepted principles of commercial law within its national legal framework. This ensures the country's active participation in global trade.

### 3.2. Civil Law System: China and Japan

China and Japan are countries that apply the civil law system, based on European legal systems. In both countries, sales contracts are regulated by civil codes. In these systems, the written form of a contract is one of the main requirements, and the agreement of the parties is crucial for the contract to come into effect.

In China, sales contracts are regulated by the Civil Code, which came into effect in 2021. This law adopts the principle of freedom of contract in trade relations but also allows for state intervention in the economy. For example, state regulations in certain economic sectors may limit the terms of contracts. One of the main features of China's commercial law is strict judicial oversight of contract performance. A party that fails to adhere to the terms of the contract may be held liable through the courts and face significant fines.

Japan, on the other hand, bases its legal system on the Civil Code (1896), and here sales contracts are freely concluded between the parties. Japanese law emphasizes mutual trust between parties in contract law, and judicial practice places significant importance on the parties' agreements in cases of contract breaches. Japan has joined the CISG and regulates international trade contracts under this convention.

### 3.3. Sharia Law System: Saudi Arabia and Malaysia

In countries governed by Islamic law (Sharia), such as Saudi Arabia and Malaysia, the regulation of sales contracts is based on the principles of Islamic law. The rules for contracting and sales relationships are derived from the Quran and Sunnah. While the principle of freedom of contract is accepted in these countries, it is essential that every contract aligns with Islamic ethics.

In Saudi Arabia, sales contracts are governed by Fiqh rules, and the terms of the contract must comply with the principles outlined in the Quran. Key principles include the prohibition of interest (riba) and the emphasis on honesty in sales transactions. For example, it is essential to fully disclose the characteristics of the goods and provide clear information about the price and payment terms.

In Malaysia, both Sharia law and civil laws are applied. Malaysia has adapted Islamic law into its local legislation to regulate contracts. In this context, electronic sales contracts are also widely used, and such contracts can be concluded in digital form while complying with Sharia principles.

### 3.4. Mixed Legal Systems: Pakistan and Indonesia

Pakistan and Indonesia have mixed legal systems, where both Sharia law and civil law coexist. Sales contracts in these systems are regulated by both Islamic law and national legislation.

In Pakistan, sales contracts are governed by the principles of Islamic law, but the Indian Contract Act of 1872 still remains in force and is applied in civil commercial relations. This law primarily outlines the terms of the contract, the parties' agreements, and obligations. In Pakistan, strict adherence to the prohibition of interest and the principle of honesty is emphasized in sales contracts.

In Indonesia, civil laws and Sharia law are applied concurrently. Islamic banking and financial contracts based on Sharia principles are widely used, particularly in the banking and finance sectors. Electronic sales contracts are also common in Indonesia, and the government has developed legal frameworks for digital contracts.

### 3.5. North Korea

North Korea has an isolated legal system and operates under a socialist structure. Economic relations and sales contracts in North Korea are primarily controlled by the state and are aligned with the planned economy structure. The principle of freedom of contract is extremely limited, and sales relationships are regulated according to the state's economic interests. Contracts are primarily concluded between state bodies and state-owned enterprises.

Contracts are drafted according to terms set by the state, and the role of individual actors in this area is minimal. Trade and contractual relations in North Korea are mainly governed by internal economic regulations and state policies. International trade is heavily sanctioned, and foreign sales contracts are rare and strictly controlled by the state.

### 3.6. South Korea

South Korea is known for its developed legal system and active participation in international trade relations. Sales contracts in South Korea are regulated by the Civil Code, and the principle of freedom of contract is followed. In South Korea, the written form of contracts plays a crucial role, and digital

*contracts have also become widely accepted in line with modern economic conditions.*

*South Korea is a signatory to the CISG and follows the rules of this convention in regulating international trade contracts. The legal system places great importance on judicial decisions in contract enforcement and ensures the protection of parties' rights in sales contracts.*

### *3.7. Singapore*

*Singapore is a major trading hub in Southeast Asia and has a strong legal system. The country's legal system is based on the common law principle, and sales contracts are primarily regulated by the Contracts Act. In Singapore, the right to freedom of contract is highly protected, and parties are free to determine the terms of their contracts.*

*Singapore is also recognized as a global center for international trade contracts, and the enforcement of contracts follows international standards. Contracts regulated under the CISG and UNIDROIT principles are widely applied by Singaporean courts. Both local and foreign sales contracts are carried out with legal certainty and transparency in the country.*

### *3.8. Nepal*

*Nepal is one of the countries with a mixed legal system. Both the common law system and local legislation are applied together. Sales contracts in Nepal are regulated by the Civil Code, and the principle of freedom of contract is upheld. However, the country's level of economic development and some limitations in the legal framework may affect contractual relations.*

*In Nepal, the drafting of written contracts is a primary requirement, and there are laws that protect the rights of parties in sales transactions. Although judicial decisions on breaches of contracts are not widely prevalent in the country's legal system, the principles of international trade law have started to be implemented. Although Nepal is not a signatory to the CISG, it attempts to regulate international trade contracts within the framework of local legislation.*

### *3.9. Bhutan*

*The legal system of Bhutan is based on Hindu culture and Buddhist traditions. In this country, sales contracts are governed by Bhutan's Civil and Commercial Laws. Contract freedom is recognized as a legal principle in Bhutan, but certain restrictions may apply in accordance with national traditions and social norms.*

*The conclusion of sales contracts in written form plays an important role. Alongside some degree of government intervention in the economy, Bhutan tries to align its economic regulations with global standards. In international trade, Bhutan mainly cooperates with India and China, and international agreements are aligned with local laws.*

### *3.10. Myanmar*

*Myanmar's legal system has long been based on British colonial law. Sales contracts here are mainly regulated by British trade law principles and local laws. The role of the government in Myanmar's economic and legal system is significant, so the conclusion and enforcement of contracts are carried out in line with state policies.*

*The conclusion of written sales contracts is also one of the main conditions here. International trade contracts are regulated within a limited framework due to Myanmar's global economic isolation. However, reforms are being carried out in the country, and there is a noticeable trend toward aligning with international standards in trade law.*

### *3.11. Bangladesh*

*The legal system of Bangladesh is based on the British common law system. Sales contracts in Bangladesh are governed by the Civil Code and other related laws. The principle of freedom of contract is highly protected here, although certain regulations exist within the state's economy.*

*Although Bangladesh is not a signatory to the CISG, it applies principles of international trade law and seeks to align international contracts with national legislation. Written agreements are required in commercial contracts, and legal disputes between parties are resolved through courts or arbitration.*

### *3.12. Uzbekistan*

*After gaining independence, Uzbekistan began developing a post-Soviet legal system. Sales contracts in the country are mainly regulated by the Civil Code and other commercial laws. Although Uzbekistan's legal system is based on former Soviet law traditions, there is a tendency to move toward international trade law principles due to reforms.*

*The principle of contract freedom is recognized, and the alignment of international trade contracts with local legislation is envisioned. The judicial system in the country plays an active role in the enforcement of commercial contracts, and disputes between parties are resolved in courts or through arbitration.*

### 3.13. Turkmenistan

*Turkmenistan is also a country governed by a post-Soviet legal system, and sales contracts are regulated by the Civil Code. In Turkmenistan, contract freedom is limited, and the state exerts strong influence on the economy. The country's natural gas and energy sectors are strictly controlled by the state, which affects the conclusion of trade contracts.*

*Although international trade contracts are limited, Turkmenistan's national legislation is being adjusted to comply with certain principles of international law. Written contracts are also required here, and the enforcement of contracts is monitored by government agencies.*

### 3.14. Mongolia

*Mongolia has a legal system that is a mix of post-Soviet and national legal systems. After the collapse of the Soviet Union, Mongolia began to form its independent legal base, but the influence of former Soviet legal traditions is still felt. Economic and trade relations in Mongolia are regulated by the Civil Code, and special emphasis is placed on sales contracts.*

*Sales contracts in Mongolia are regulated by written agreements between the parties, and the principle of freedom of contract is recognized. However, due to the country's economy being largely based on natural resources and agriculture, trade relations in these sectors have specific regulations. Since the government plays a strong role in the main sectors of the economy, some sales contracts may be regulated by state intervention.*

*Mongolia also actively participates in international trade contracts. The country has joined the CISG, which plays an important role in regulating international trade contracts. Joining the CISG has allowed Mongolia to create a more transparent and competitive environment for international trade. In addition, judicial decisions and arbitration processes are widely applied in the enforcement of international agreements.*

### 3.15. Analysis and Comparison

*The legal systems of Asian countries show great diversity, and the regulation of sales contracts differs accordingly. This section will examine the general trends in contract law in countries with different legal systems:*

- *Freedom of Contract: In countries with a common law system (e.g., India, Singapore), freedom of contract is accepted as a fundamental legal principle. Parties are free to determine the terms of the contract, but this freedom can be limited in order to protect public interests. In countries with a civil law system (e.g., China, Japan), however, contract terms must align with state regulations and economic policies.*

- *Impact of Islamic Law: In countries where Sharia law is applied (e.g., Saudi Arabia, Malaysia), contracts must comply with the principles of the Qur'an and Islamic law. For example, interest-based transactions (riba) are prohibited, and justice and fairness are key principles in contract relations.*

- *International Trade Law: Countries involved in international contracts (e.g., Singapore, South Korea, Mongolia) operate in accordance with the principles of the CISG and UNIDROIT. This facilitates the transparent and reliable enforcement of international trade contracts. However, in some countries, such as North Korea and Turkmenistan, international trade is limited and conducted under state control.*

- *Reforms and Development: Post-Soviet countries (e.g., Uzbekistan, Turkmenistan, Mongolia) are undergoing a transition period and are working to align their economies with international standards through reforms. Legal reforms are ongoing in these countries, and the regulation of sales contracts is being updated accordingly.*

- *State Intervention: In countries like North Korea and Turkmenistan, where the economy is tightly controlled by the state, there is strict state supervision over sales contracts. In these countries, the freedom of contract is limited, and sales transactions are regulated in accordance with the state's economic policies. In contrast, in countries like Singapore and Japan, state intervention is minimal, and trade law is more liberal.*

## 4. COMPARATIVE ANALYSIS OF THE LEGAL REGULATION OF SALES CONTRACTS

*This section will compare the mechanisms of sales contract regulation in various Asian countries. Legal regulations are directly related to the nature of the economy, differences in legal systems, and state policies. The following analysis provides a comparative view across different countries:*

### 4.1. Freedom of Contract and State Control

*The key factor in regulating sales contracts is freedom of contract. In developed countries like Singapore, Japan, and South Korea, freedom of contract is strongly protected, with minimal state intervention in economic regulation. In these countries, legal systems are aligned with market economy requirements and play a significant role in international trade.*

*On the other hand, in countries like North Korea, Turkmenistan, and Myanmar, freedom of contract is severely restricted, and the state controls much of the economic processes. These countries have planned economies and state monopolies, which directly affect the regulation of sales contracts. State economic interests take precedence over freedom of contract, and contract terms are often set by state authorities.*

*In transition countries like Mongolia and Uzbekistan, both post-Soviet legal traditions and new reforms are observed. In these countries, freedom of contract is gradually increasing, but state control remains strong.*

#### *4.2. Legal Effect of Written and Oral Contracts*

*In most Asian countries, sales contracts must be in writing. In countries like Singapore, Bangladesh, and South Korea, written contracts play an essential role in resolving legal disputes and ensuring legal security between parties. In international trade relations, the enforcement of written contracts is especially important.*

*In countries with traditional legal systems (e.g., Bhutan, Nepal), oral contracts may have legal effect under certain conditions. However, written contracts have superior legal power and are primarily used in dispute resolution.*

*In North Korea and Turkmenistan, contracts are generally written and established under the conditions set by state authorities, and they are enforced under state control. In these countries, oral contracts do not have legal effect.*

#### *4.3. Application of International Trade Law*

*In countries open to international trade (e.g., Singapore, Japan, South Korea), international trade contracts are regulated in accordance with the principles of the CISG and UNIDROIT. In these countries, the integration of international legal norms with local legislation is highly ensured, and contracts are executed according to international standards.*

*In countries like Bangladesh, Mongolia, and Uzbekistan, the application of international trade law is increasing, although there are some limitations and shortcomings in local legislation. Legal reforms in these countries aim to further improve the regulation of international trade contracts.*

*In countries like North Korea, Turkmenistan, and Myanmar, the application of international trade law is minimal, and their economies function under conditions of isolation. Consequently, international sales contracts are almost nonexistent, and there is no adaptation to international legal norms.*

#### *4.4. Arbitration and Dispute Resolution*

*Most Asian countries widely apply arbitration mechanisms for resolving trade disputes outside the courts. Singapore, Japan, and South Korea are considered global leaders in arbitration, where it is recognized as a secure and swift solution for both domestic and international trade relations.*

*Bangladesh, Mongolia, and Uzbekistan also use arbitration for resolving trade disputes. However, the application of arbitration in these countries is not fully developed, and there may be some delays in the enforcement of court decisions.*

*In countries like North Korea and Turkmenistan, disputes are mainly resolved by state courts, and arbitration mechanisms are virtually unused.*

#### *Conclusion and Recommendations*

*The regulation of sales contracts in the legal systems of Asian countries shows significant diversity due to differences in legal systems, economic development, and state policies. Based on the results of this research, the following key conclusions and recommendations can be made:*

- Strengthening Contract Freedom: In developing and transition countries, the broader application of contract freedom and reducing state intervention will help liberalize trade relations.*
- Development of International Law: In countries like Bangladesh, Mongolia, and Uzbekistan, further development of international trade law and the broader application of CISG principles will increase the transparency and legal security of trade operations.*
- Application of Arbitration: Expanding the use of arbitration mechanisms for rapid and efficient resolution of trade disputes is crucial, especially for countries with overloaded judicial systems.*
- Reduction of State Control: In countries like North Korea, Turkmenistan, and Myanmar, reducing state intervention in economic relations and creating an environment conducive to private sector development will enhance the effective enforcement of trade contracts.*

*This research provides an extensive analysis of the legal regulation of sales contracts in the legislative systems of Asian countries. The study explored the legal principles applied in various countries, including freedom of contract, the legal effect of written and oral contracts, the application of international trade law, and mechanisms for resolving trade disputes.*

*The key findings indicate that there are different levels of development and regulatory mechanisms among the legal systems of Asian countries. In developed countries (e.g., Singapore, South Korea), contract freedom is broader, and international legal principles are widely applied. On the other hand, transition countries (e.g., Mongolia, Uzbekistan) are striving to align with international trade law through reforms. However, in countries like North Korea and Turkmenistan, state control over the economy has a significant impact on contract relations.*

*One of the main recommendations emerging from this research is the expansion of international trade law and the reduction of state intervention. Additionally, developing arbitration mechanisms and ensuring contract freedom could address the legal challenges in these regions.*

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**FACTORS FOR IMPROVING THE INTERPRETATION OF LEGAL NORMS IN THE PROCESS OF LAW ENFORCEMENT****Khovanska Mariia***higher education graduate at the master's level**Specialty "Law"**Alfred Nobel University, Dnipro***ФАКТОРИ ПОЛІПШЕННЯ ТЛУМАЧЕННЯ НОРМ ПРАВА В ПРОЦЕСІ ПРАВОЗАСТОСУВАННЯ****Хованська М.С.***здобувач вищої освіти магістерського рівня**Спеціальність «Право»**Університет імені Альфреда Нобеля, м. Дніпро*

Існування права неможливе без механізму його забезпечення, одним із таких механізмів є правозастосування. Правозастосування – це процес перетворення правових розпоряджень на реальні дії громадян, корпорацій, організацій, установ, підприємств, посадових осіб та інших учасників суспільних відносин. Роль і значення правозастосування у правовому та повсякденному житті настільки великі, що багато дослідників виділяють цю форму реалізації права як окрему та важливу сферу правової системи [1]. Важливість правозастосування особливо очевидна для юристів, таких як судді, прокурори та слідчі, а також державних службовців, які безпосередньо беруть участь у процесі правозастосування та потребують глибоких знань цього процесу для ефективної реалізації правових норм [2].

Для успішного функціонування та розвитку права необхідне правильне розуміння всіма членами суспільства змісту та призначення його норм. Тому в сучасній юридичній літературі значне місце займає проблема тлумачення правових норм, яке розглядається, як правило, в якості самостійної стадії правозастосування [3]. Між тим практика сучасного правового життя показує, що різні органи, посадові особи тлумачать чинне законодавство по-різному, що, в свою чергу, призводить до створення в суспільстві певного хаосу та соціальної напруги. Звідти призначення тлумачення полягає в забезпеченні правильного, точного і одноманітного розуміння і реалізації норм права всіма, хто має їх застосовувати чи безпосередньо реалізовувати [3].

Метою даної роботи є дослідження факторів поліпшення тлумачення правових норм, які визначені у новітньому українському законодавстві.

Тлумачення правових норм у загальній теорії права розглядається як інтелектуальна діяльність, спрямована на розуміння та роз'яснення змісту правових норм для їх правильного застосування. Український науковець М.Кравчук до тлумачення включає з'ясування та роз'яснення змісту норм, що є необхідним для їх реалізації [4]. У свою чергу, ряд дослідників підкреслюють, що тлумачення – це інтелектуальний процес, головною метою якого є підвищення ефективності правового регулювання [5].

Такі автори, як Н.Крестовська, Л.Матвєєва та Я.Тицька зазначають, що тлумачення правових норм може розглядатися у трьох аспектах:

- як інтелектуальний процес розуміння та пізнання правової норми;
- як діяльність суб'єктів (офіційне та неофіційне тлумачення) з різним ступенем обов'язковості для правозастосовувачів;
- як результат інтерпретації норми, виражений мовними засобами [6].

У свою чергу, ряд дослідників пропонує визначити тлумачення правової норми, як інтелектуальну діяльність, яка на меті має роз'яснення її змісту суб'єктами з метою забезпечення її правильного практичного застосування [7].

Наведені визначення дозволяють усвідомити органічну пов'язаність тлумачення правових норм з реальним процесом правозастосування.

Серед факторів, які мають забезпечити якісне і повноцінне тлумачення виділяють перш за все вдосконалення законодавства [8]. Ці проблеми визначені у новому спеціальному Законі України «Про правотворчу діяльність» [9], який отримав позитивний резонанс у юридичному середовищі нашої держави [10].

Закон визначає правові та організаційні засади правотворчої діяльності, принципи і порядок її здійснення, учасників правотворчої діяльності, правила техніки нормопроєктування, порядок здійснення обліку нормативно-правових актів, а також правила дії нормативно-правових актів, усунення прогалин, подолання колізій у нормативно-правових актах, та здійснення контролю за реалізацією нормативно-правових актів. З факторами поліпшення процесу тлумачення пов'язані статті 34 і 35 Закону.

Зокрема, у ст. 34 (Вимоги до змісту нормативно-правового акта) на законодавчому рівні визначені якості нормативних актів, які сприяють якісному тлумаченню:

- однозначність їх розуміння (ясність, точність, доступність для розуміння та реалізації);

- передбачуваність (прогнозованість) результатів їх реалізації;

- їх відповідність нормативно-правовим актам вищої юридичної сили та узгодженість з нормативно-правовими актами рівної юридичної сили;

- уніфікованість вжитої в них термінології;

- спорідненість та логічної послідовності їх викладення:

- а) до нормативно-правового акта включаються лише ті норми права, що стосуються його предмета регулювання;

- б) норми права викладаються, як правило, у хронологічній послідовності розвитку процесів у рамках відповідних суспільних відносин;

- в) норми права викладаються у нормативно-правовому акті послідовно та взаємоузгоджено (кожна наступна норма права повинна несутеречливо впливати з попередньої);

- г) послідовність викладення норм права здійснюється з дотриманням причинно-наслідкових зв'язків між структурними елементами нормативно-правового акта, у тому числі структурними елементами різних рівнів;

- д) норми права загального характеру викладаються раніше, ніж спеціальні норми права;

- е) винятки з правила викладаються після загального правила;

- ж) викладення норм права здійснюється з урахуванням коректного співвідношення цілого і його частини.

Спеціально зазначено, що «терміни та поняття, що вживаються у нормативно-правовому акті, мають бути уніфіковані впродовж усього його тексту (без використання синонімів та словосполучень, що мають подібне лексичне значення).

Мовні вимоги до нормативно-правових актів докладно викладені у ст. 35 Закону. Акцентовано, що терміни, що вживаються у тексті нормативно-правового акта, мають відповідати термінології Конституції України, цього Закону, інших законів, а також нормативно-правових актів вищої юридичної сили. Обмеженому використанню при формулюванні норм права підлягають: запозичені іншомовні слова у разі, якщо в українській мові існують рівнозначні відповідники, терміни, що позначають вузькоспеціальні поняття, застарілі терміни, іменники та займенники, що акцентують на гендерних відмінностях осіб, прислівникові та дієприслівникові звороти. Важливою новелою є положення про створення Єдиного глосарія правових термінів.

Серед властивостей нормативних актів, які обумовляють точне тлумачення, в коментованому Законі зафіксовані:

Нормативно-правовий акт має:

1. охоплювати всю необхідну сферу його дії;

2. не містити норм права, що не відповідають Конституції України та нормативно-правовим актам вищої юридичної сили та (або) не узгоджуються з нормами права нормативно-правових актів рівної юридичної сили (за винятком внесення змін до таких актів);

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## Mathematical sciences

### TEACHING TO SOLVE PRACTICAL CONTENT PROBLEMS RELATED TO FINDING AREA IN THE PROCESS OF TEACHING A GEOMETRY COURSE

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### ГЕОМЕТРИЯ КУРСЫН ОҚЫТУ ПРОЦЕСІНДЕ АУДАНЫ ТАБУҒА АРНАЛҒАН ПРАКТИКАЛЫҚ МАЗМҰНДЫ ЕСЕПТЕРДІ ШЕШУГЕ ҮЙРЕТУ

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#### **Abstract**

This article highlights the importance of teaching students to solve practical problems involving the calculation of areas in the geometry course. It explores strategies for developing students' critical thinking and enhancing their interest in the subject by linking theoretical knowledge to real-life experiences. The article discusses methods such as problem-based learning, the use of visualization tools, the integration of real-world tasks, and effective approaches to implementing interdisciplinary connections. Specific examples are provided, including land area calculations, determining the volume of construction materials, and completing design-related tasks. Emphasis is placed on the use of technology and the role of teamwork. The article offers recommendations for fostering students' logical thinking and enriching the learning process with practical applications.

#### **Аңдатпа**

Бұл мақалада геометрия курсын оқыту барысында фигуралардың ауданын табуға арналған практикалық мазмұнды есептерді шешуге үйретудің маңызы қарастырылады. Теориялық білімді өмірлік тәжірибемен байланыстыру арқылы оқушылардың сыни ойлау қабілетін дамыту және пәнге деген қызығушылығын арттыру жолдары талқыланады. Мақалада проблемалық оқыту әдістері, визуализация құралдарын қолдану, шынайы өмірге негізделген тапсырмаларды енгізу және пәнаралық байланысты жүзеге асырудың тиімді тәсілдері ұсынылады. Сондай-ақ, ауданға қатысты есептердің нақты мысалдары келтірілген, мысалы, жер телімдерін есептеу, құрылыс материалдарының көлемін анықтау немесе жобалау тапсырмаларын орындау. Технологияларды қолдану және топтық жұмыстардың рөлі ерекше атап өтіледі. Мақала оқушылардың логикалық ойлауын дамытуға және оқыту процесін практикалық тұрғыдан байытуға бағытталған ұсыныстар береді.

**Keywords:** geometry teaching, area calculation, problem-based learning, critical thinking, teaching methods, applied geometry

**Тірек сөздер:** Геометрияны оқыту, ауданды табу, проблемалық оқыту, сыни ойлау, оқыту әдістері, қолданбалы геометрия

#### **Kіріспе**

Геометрияны оқыту барысында фигуралардың ауданын табу ұғымы негізгі әрі маңызды тақырыптардың бірі. Аудан ұғымы тек теориялық біліммен шектелмей, оны шынайы өмірдегі мәселелерді шешуде қолдану арқылы өзектілігін арттырады. Ауыл шаруашылығындағы жер телімдерін өлшеу, құрылыс жобаларындағы аумақтарды есептеу немесе дизайн жасау секілді салаларда аудан табу маңызды орын алады. Оқушылардың геометриялық ұғымдарды меңгеруін жетілдіру үшін практикалық есептерді енгізу қажет. Бұл әдіс теорияны шынайы өмірмен байланыстырып, оқушылардың аналитикалық ойлау және кеңістіктік пайымдау қабілеттерін

дамытуға ықпал етеді. Сонымен қатар, практикалық тапсырмалар оқушылардың пәнге деген қызығушылығын арттырып, мотивациясын нығайтады. Бұл мақалада ауданға байланысты практикалық мазмұнды есептерді шешудің оқыту әдістері қарастырылады. Негізгі мақсат – оқушылардың сыни ойлауын дамытуға, геометрияны өмірлік маңызы бар пән ретінде қабылдауына мүмкіндік беретін тәсілдерді зерттеу және тиімді тәжірибелер ұсыну.

### Негізгі бөлім

#### 1. Практикалық есептердің маңызы

Геометрия пәнін оқыту барысында аудан ұғымы тек теориялық тұрғыдан ғана емес, сонымен қатар оның нақты өмірдегі қолданылуы маңызды рөл атқарады. Аудан есептерін шешу оқушыларға геометриялық фигуралардың қасиеттерін терең түсінуге, оларды шынайы мәселелерде қолдануға мүмкіндік береді. Мысалы, ауыл шаруашылығында жер учаскелерін өлшеу немесе құрылыс жобаларында аумақты есептеу жұмыстарында аудан табу қажеттілігі туындайды.

#### 2. Аудан табу дағдыларын дамыту үшін әдістер мен стратегиялар

Геометрияны оқытуда аудан тақырыбын тиімді меңгерту үшін бірнеше әдіс-тәсілдерді қолдану қажет. Біріншіден, проблемаға негізделген оқу (PBL) әдісін пайдалану тиімді. Бұл әдіс оқушыларды нақты өмірде кездесетін қиындықтарды шешуге бағыттап, олардың сыни ойлауын дамытуға ықпал етеді.

**Мысал 1:** “Фермер көмекшісіне үшбұрыш тәрізді егіс алқабын теңдей үш бөлікке бөліп, әр бөліктің ауданы қаншаға тең болатынын табу керектігін айтты. Бұл жұмысты қалай жүзеге асыруға болады?”

**Берілгені:** Үшбұрыш тәрізді егіс алқабының негізі 8 см, биіктігі 6 см. Егіс алқабының теңдей үш бөлікке бөлінгені белгілі болса, әр бөліктің ауданын табайық.

**Шешуі:** Үшбұрыштың ауданын табу формуласы төмендегідей:

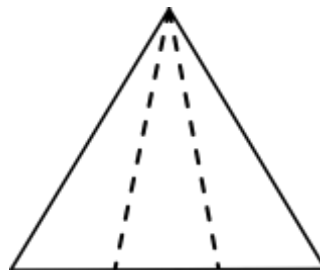
$$S = \frac{1}{2} \cdot a \cdot h_a$$

$$a = 8, h_a = 6$$

$$S = \frac{1}{2} \cdot 8 \cdot 6 = 24 \text{ см}^2$$

$$S_{\text{кіші}} = 24 \div 3 = 8 \text{ см}^2$$

**Жауабы:**  $S_{\text{кіші}} = 8 \text{ см}^2$



Екіншіден, визуализация және модельдеу әдістерін қолдану өте маңызды. Бұл оқушыларға фигураларды дұрыс көруге, олардың қасиеттерін түсінуге көмектеседі. Аудан табуға қатысты есептерді шешу барысында түрлі бағдарламалар мен қосымшаларды пайдалану оқушылардың білімін тереңдетуге ықпал етеді. Мысалы, GeoGebra мен Desmos сияқты құралдар екі және үш өлшемді геометриялық фигураларды визуализациялауға, сондай-ақ олардың ауданын оңай есептеуге мүмкіндік береді. Сонымен қатар, виртуалды шындық қосымшалары да нақты әлемде аудан есептерін шешуге көмектесетін тиімді құрал ретінде қарастырылады.

**Мысал 2:** Бөлменің еденіне плиткалар төсеу қажет. Егер бөлменің ұзындығы 5 м, ені 4 м болса, плиткалар үшін қажетті алаңды қалай есептеуге болады?”

#### Шешуі:

Бөлменің ауданын табу үшін:  $S = a \cdot b = 5 \cdot 4 = 20 \text{ м}^2$

**Визуализация:** Оқушыларға есепті шешуде бөлмені қадаммен модельдеу маңызды. Бұл үшін төмендегідей қадамдарды орындауға болады:

##### 1. Бөлмені модельдеу:

Бөлменің диаграммасын салу. Ұзындық пен енін белгілеу және плиткалармен бөлмені толтыру үшін торлы жүйе салу.

##### 2. Плиткалардың өлшемдері:

Әр плитканың өлшемі 0.5 м × 0.5 м болсын. Енді, қанша плитка қажет екенін есептейік.

• Бір плитканың ауданы:  $0.5 \text{ м} \times 0.5 \text{ м} = 0.25 \text{ м}^2$  • Қажетті плиткалардың саны:  $\frac{20 \text{ м}^2}{0.25 \text{ м}^2} =$

80 плитка

**Жауабы:** 80 плитка

Интерактивті элемент:

Оқушыларға GeoGebra немесе басқа құралдарды пайдалану арқылы плиткаларды тасымалдап, есепті шешуге мүмкіндік беруге болады. Сонымен қатар, бөлмені және плиткаларды түрлі түсті қағаздармен бейнелеп көрсетуге болады.

Мысал бейнесі:

Бөлменің плиткалармен толтырылған кішкене сызбасы (масштабқа сай емес, тек түсіндіру үшін):

```
+-----+
|oooooooooooo|
|oooooooooooo|
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|oooooooooooo|
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+-----+
```

Әрбір “о” плитканы білдіреді және торлы жүйе бөлменің ауданының қалай толтырылатынын көрсетеді. Бұл әдіс оқушыларға теориялық есептерді өмірдегі нақты жағдайларға байланысты түсінуге көмектеседі.

Бұл визуализация әдісі оқушылардың есепті түсінуге көмектеседі және оларды нақты өмірде қолдануға мүмкіндік береді. Мұндай тәсілдер геометрияны оқытуда өте тиімді болады.

### 3. Шынайы өмірлік тапсырмалар

Оқушылардың аудан табу дағдыларын дамыту үшін оларды шынайы өмірлік тапсырмалармен таныстыру өте маңызды. Мысалы, “Жолды жабуға қажетті плиткалардың санын есептеу” немесе “Саябақтағы алаңның ауданын есептеу” сияқты тапсырмалар оқушыларды практикалық тұрғыдан ойлауға үйретеді. Мұндай тапсырмаларды орындау арқылы оқушылар өздерінің геометриялық білімдерін күнделікті өмірде қолдануды үйренеді.

**Мысал 3:** Құрылыс алаңының формасы тікбұрышты призманың негізінде орналасқан. Үйдің алаңының ұзындығы 15 м, ені 10 м, ал қабырғасының биіктігі 8 м. Құрылыс алаңын жабу үшін қажет материалдың мөлшерін есептеңіз (материалдардың ауданын табыңыз).

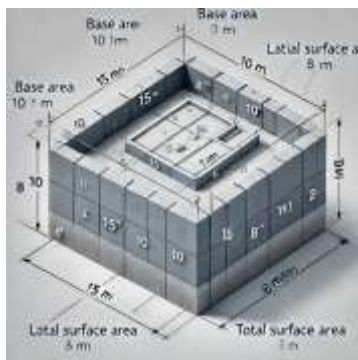
**Шешуі:**

1. Призманың табанының ауданын есептеу:

$$S = a \cdot b = 15 \cdot 10 = 150 \text{ м}^2$$

2. Бүйір беттердің ауданын есептеу:

Призманың бүйір беттерін табу үшін, алдымен әрбір бүйір бетінің ауданын есептейміз. Қабырғалардың екі жақты бетінің ауданын анықтау үшін периметрді биіктікте көбейтеміз.



Призманың периметрі:

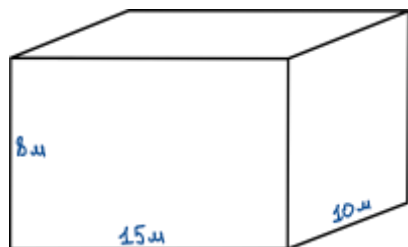
$$P_{\text{табаны}} = 2(15 + 10) = 50 \text{ м}$$

Бүйір беттерінің жалпы ауданы

$$S_{\text{бүйір}} = 50 \cdot 8 = 400 \text{ м}^2$$

3. Толық ауданын есептеу:

$$S_{\text{толық}} = 2 \cdot 150 + 400 = 700 \text{ м}^2$$



**Жауабы:** Құрылыс алаңын жабу үшін қажетті жалпы материалдың ауданы 700 м<sup>2</sup> болады.

### 4. Бағалау және кері байланыс

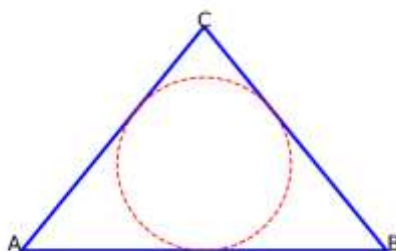
Геометриядағы аудан ұғымын оқыту барысында бағалау әдістері маңызды рөл атқарады. Оқушылардың теориялық білімін ғана емес, практикалық дағдыларын да тексеру қажет. Мұндай бағалау тапсырмаларына, мысалы, “Екі түрлі бөлмелердің ауданын салыстыру және

қайсысының кілем жамылғысы үшін тиімдірек екенін анықтау” немесе “Ойын алаңының жобасын құрып, қажетті аумақтарды есептеу” секілді тапсырмалар кіреді. Бұл тәсіл оқушыларға практикалық білімдерін жүйелі түрде дамытуға мүмкіндік береді.

**Мысал 4:**

Үшбұрыштың қабырғалары  $AB = 13$ ,  $AC = 14$ ,  $BC = 15$ . Ортақ іштей сызылған шеңбердің радиусын ( $r$ ) табыңыз. Үшбұрыштың ауданын пайдаланып, оның іштей сызылған шеңберінің ауданын табыңыз

Үшбұрыш және оның ішіне сызылған шеңбер



**ШЕШУІ:**

1. Үшбұрыштың ауданын табу (Герон формуласы):

Берілген қабырғалар:  $AB = 13$ ,  $AC = 14$ ,  $BC = 15$ .

Алдымен жарты периметрді ( $p$ ) табамыз:

$$p = (AB + AC + BC) / 2 = (13 + 14 + 15) / 2 = 21$$

Ауданы:

$$S = \sqrt{p(p - AB)(p - AC)(p - BC)}$$

$$S = \sqrt{21(21 - 13)(21 - 14)(21 - 15)}$$

$$S = \sqrt{21 \times 8 \times 7 \times 6} = \sqrt{7056} = 84$$

2. Іштей сызылған шеңбер радиусын табу:

Формула:  $r = S / p$

$$r = 84 / 21 = 4$$

3. Іштей сызылған шеңбердің ауданын табу:

Шеңбер ауданының формуласы:

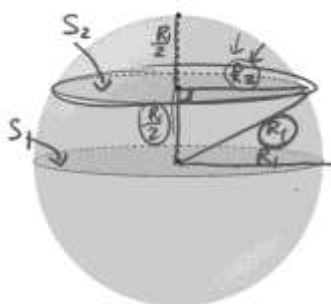
$$S = \pi r^2$$

$$S = \pi \times 4^2 = 16\pi \approx 50.24$$

**Жауабы:**  $r = 4$ ,  $S \approx 50.24$ .

**Мысал 5:** Шардың радиусының ортасы арқылы оған перпендикуляр жазықтық жүргізілген. Пайда болған қиманың ауданының үлкен дөңгелек ауданына қатынасын табыңыз.

**Шешуі:**



$$S = \pi R^2$$

$$R_2^2 + \left(\frac{R_1}{2}\right)^2 = R_1^2$$

$$\begin{aligned}
 R_2^2 &= R_1^2 - \frac{R_1^2}{4} \\
 R_2^2 &= \frac{3R_1^2}{4} \\
 R_2 &= \sqrt{\frac{3R_1^2}{4}} \\
 \frac{S_1}{S_2} &= \frac{\pi R_2^2}{\pi R_1^2} \\
 \frac{S_1}{S_2} &= \frac{\pi \frac{3R_1^2}{4}}{\pi R_1^2} \\
 \frac{S_1}{S_2} &= \frac{3}{4}
 \end{aligned}$$

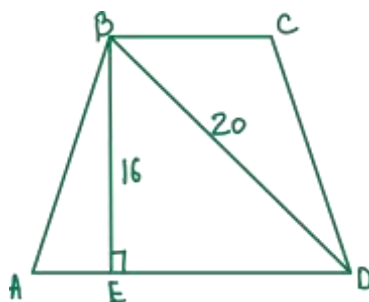
Жауабы: 3:4

**Мысал 6:** Егер тең бүйірлі трапецияның биіктігі 16-ға, ал диагонали 20-ға тең болса, оның ауданын табыңдар.

Берілгені: ABCD-тең бүйірлі трапеция AB//DC, DE=16, BD=20

Табу керек: S-?

Шешуі: AB=2x, DC=2y болсын, онда



$$S_{ABCD} = \frac{2x + 2y}{2} \cdot 16 = (x + y) \cdot 16$$

Сонда трапеция тең бүйірлі болғандықтан,  $AE = \frac{1}{2}(AB - DC) = \frac{1}{2}(2x - 2y) = x - y$

Олай болса,  $S_{ABCD} = 16 \cdot BE$ ,  $BE = \sqrt{20^2 - 16^2} = 12$

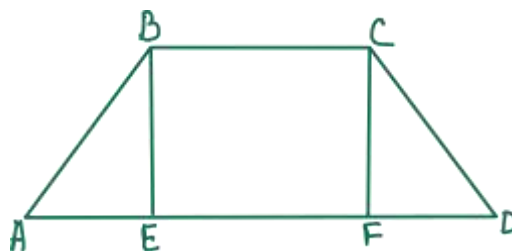
$$S_{ABCD} = 16 \cdot 12 = 192$$

Жауабы: Демек, трапецияның ауданы 192-ге тең.

**Мысал 7:** Берілгені: Параллель қабырғалары 60 см және 20см, ал параллель емес қабырғалары 13см және 7 см болатын трапецияның ауданын табыңдар.

Шешуі:

$$BC=EF \gg x+y=40 \gg x=40-y$$



Пифагор теоремасы бойынша  $\triangle ABE$  – нан:

$$h^2 = 37^2 - (40 - y)^2 \quad \triangle FCD \text{ – нан}$$

Пифагор теоремасы бойынша.  $h^2 = 169 - y^2$  Бұл табылған биіктіктері теңестіретін болсақ,  
 $169 - y^2 = 231 + 80y - y^2 \gg 80y = 169 + 231 \gg 80 \cdot y = 400 \gg y = 5$   
 $x = 40 - 5 = 35; h^2 = 169 - y^2 \gg h = 12$   
 $S_{ABCD} = \frac{BC + AD}{2} \cdot h = \frac{20 + 40}{2} \cdot 12 = 480 \text{ см}^2$

**Жауабы:** 480см<sup>2</sup>

### **Қорытынды**

Геометриядағы аудан ұғымын оқыту және оның практикалық есептермен байланысы оқушылардың пәнге деген қызығушылығын арттырып, олардың кеңістіктік ойлау қабілетін дамытады. Технологияны қолдану мен шынайы өмірлік тапсырмаларды енгізу оқушылардың геометриялық білімдерін өмірдегі түрлі жағдайларда қолдануға дайындайды. Оқу процесіне практикалық тапсырмаларды енгізу геометрияны нақты өмірмен байланыстыру арқылы тиімділікті арттырады және оқушылардың сыни ойлау дағдыларын қалыптастырады. Бұл мақалада келтірілген әдістер мен есептер оқу процесін тиімді етуге мүмкіндік береді. Мысалы, аудан табуда визуализацияны, технологияны (GeoGebra), топтық жұмыстарды пайдалану оқушылардың кеңістіктік ойлау қабілетін арттырады. Сонымен қатар, осындай тапсырмалар білімнің қолданбалы жағын ашуға көмектеседі, бұл өз кезегінде оқушылардың болашақ кәсіби қызметінде маңызды орын алады.

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**FORMATION OF SKILLS IN SOLVING COMBINATORICS PROBLEMS.****Baltabay Aibek Bauyrzhanuly**Abai Kazakh National Pedagogical University,  
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"7M01501-Mathematics", 2nd year master's studentScientific supervisor: **Nurbaeva Dilara Muratovna**  
PhD, Acting Associate Professor (Associate Professor)**КОМБИНАТОРИКА ЕСЕПТЕРІН ШЫҒАРУ ДАҒДЫЛАРЫН ҚАЛЫПТАСТЫРУ.****Балтабай Айбек Бауыржанұлы**Абай атындағы Қазақ ұлттық педагогикалық университеті,  
Математика, физика және информатика факультеті,  
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Ғылыми жетекші: **Нурбаева Дилара Муратовна**,  
PhD, қауымдастырылған профессор (доцент) м.а**Abstract**

In this scientific article, the basic concepts and principles of combinatorics were considered. The two main sample schemes – repeatable and non – repeatable sample schemes – were comprehensively analyzed and the methods of substitution, placement and typing were explained. A method for explaining the concepts of combinatorics in a light and understandable way was proposed, and the most common errors in solving specific problems were demonstrated using examples. The article introduces schemes and formulas related to combinatorics and determines their practical application. The work is intended mainly for students in grades 10-11, aimed at alleviating the difficulties that they face in mastering the topic.

**Аңдатпа**

Бұл ғылыми мақалада комбинаториканың негізгі ұғымдары мен принциптері қарастырылды. Екі басты таңдама схемасы – қайталанатын және қайталанбайтын таңдама схемалары – жан-жақты талданып, алмастыру, орналастыру және теру тәсілдері түсіндірілді. Комбинаторика ұғымдарын жеңіл әрі түсінікті етіп түсіндіру әдісі ұсынылып, нақты есептерді шығаруда жиі кездесетін қателер мысалдар арқылы көрсетілді. Мақалада комбинаторикаға қатысты схемалар мен формулалар енгізіліп, олардың практикалық қолданылуы айқындалды. Жұмыс негізінен 10-11 сынып оқушыларына арналған, оларды тақырыпты игеруде кездесетін қиындықтарды жеңілдетуге бағытталған.

**Keywords:** combinatorics, non-repeating (substitution, placement, typing) sample scheme, repeating (substitution, placement, typing) sample scheme, formulas.

**Кілт сөздер:** комбинаторика, қайталанбайтын (алмастыру, орналастыру, теру) таңдама схемасы, қайталанатын (алмастыру, орналастыру, теру) таңдама схемасы, формулалар.

Бұл мақала комбинаторика есептерін шешу дағдыларын қалыптастырудың әдістемелік негіздерін қарастыруға бағытталған. Зерттеудің негізгі мақсаты — оқушылардың комбинаторика элементтерін дұрыс түсініп оларды еркін түрде ажырата білу деңгейіне жеткізу. Есеп шығаруда комбинаториканы дұрыс пайдаланып қажетті нәтижеге қол жеткізуді үйрету.

Комбинаторика есептерін шешу білімі математикалық ойлаудың негіздерін қалыптастырады, ол көптеген ғылым салалары мен күнделікті өмірде маңызды. Бұл сала логика, ықтималдық теориясы, алгоритмдер және деректер құрылымы сияқты тақырыптарды меңгеруге дайындықты күшейтеді. Мақала оқушылардың аналитикалық және құрылымдық ойлау қабілетін дамытуға, сонымен қатар олардың проблемаларды шешу дағдыларын жетілдіруге көмектеседі. Зерттеу нәтижелері білім беру жүйесіне практикалық

үлес қосып, оқыту үдерісін жаңғыртуға ықпал етеді.

Комбинаторика есептерін шешуде, оны пайдалануда туындайтын бірнеше қиындықтар бар. Көптеген оқушылардың комбинаторика ұғымдарын бірден түсінбеуі, есептерді шешу барысында қиындықтарға тап болуы, әдістемелік құралдардың жеткіліксіздігі және тақырыптық ұғымдардың түсінікті тілде жеткізілмеуін қарастырсақ болады. Көп жағдайда комбинаториканың ықтималдық теориясымен, алгоритмдермен, статистикамен байланысын толық көрсетпейді. Осы мәселелерді шешу, оқушылардың логикалық ойлау қабілеті мен шығармашылық белсенділігін арттыруға көмектеседі.

Шектеулі жиын элементтерінен белгілі бір ережелерге сәйкес әртүрлі комбинациялар құру және олардың санын анықтау мәселелері комбинаторикалық есептер деп аталады. Мұндай есептерді зерттейтін математика саласы комбинаторика деп аталады.

**Қосу ережесі.** Егер қайсыбір  $a$  элементті  $n_1$  тәсілмен таңдап алуға болатын болса, ал  $b$  элементті  $n_2$  тәсілмен таңдап алуға болатын болса, бірақ бірінші және екінші тәсілдер қиылыспайтын болса, онда жоғарыдағы көрсетілген элементтердің кез келгенін ( $a$  немесе  $b$ ) берілген тәртіппен  $n_1 + n_2$  тәсілмен таңдап алуға болады.

**Мысал 1.** Оқушы математикадан практикалық жұмыс жасайды. Оған алгебрадан 15 тақырып және 11 тақырып геометриядан берілді. Оқушы бір тақырыпты неше тәсілмен таңдай алады?

**Шешуі.**  $15 + 11 = 26$  тәсіл.

**Көбейту ережесі.** Егер қайсыбір ақырлы жиыннан бірінші  $a$  элементті  $n_1$  тәсілмен таңдап алуға болатын болса, ал осы таңдамадан кейін екінші  $b$  элементті  $n_2$  тәсілмен таңдап алуға болатын болса, онда екі ( $a$  және  $b$ ) элементті берілген тәртіппен  $n_1 \cdot n_2$  тәсілмен таңдап алуға болады.

**Мысал 2.** Дүкенде алты түрлі кесе және төрт түрлі тәрелке бар және бес түрлі қасық сатылады. Кесе мен тәрелке және қасықтан тұратын топтаманы қанша тәсілмен таңдауға болады?

**Шешуі:**  $6 \cdot 4 \cdot 5 = 120$  тәсіл

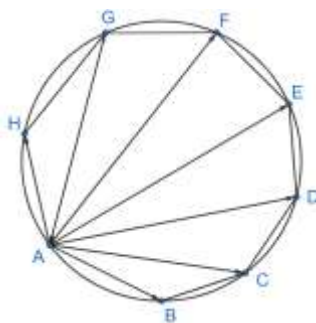
**Қайталанбайтын орналастыру.**

Әртүрлі  $n$  элементтен тұратын  $M = \{a_1, a_2, \dots, a_n\}$  жиыны берілсін.

**Анықтама.**  $n$  элементтен әрқайсысы  $k$ -дан ( $0 < k \leq n$ ) құрылған орналастыру деп кез келген  $M$  жиынның реттелген  $k$  элементінен тұратын жиынтықты айтады. Бұл орналастырулардың әрқайсысының бір-бірінен айырмашылығы құрамындағы элементтерінде немесе элементтерінің орналасу ретінде болады.  $n$  элементтен әрқайсысы  $k$  элементтен тұратын орналастырудың саны  $A_n^k$  символымен белгіленеді де, мына формуламен есептелінеді:

$$A_n^k = \frac{n!}{(n-k)!} \quad (1)$$

**Мысал 3.** Шеңбердің бойынан 8 нүкте белгіленді. Осы нүктелер арқылы неше вектор жүргізуге болатынын табыңдар.



1-сурет

**Шешуі.**  $\overrightarrow{AB}$  мен  $\overrightarrow{BA}$  түрлі векторлар екенін ескереміз, яғни элементтердің орналасу реті анықталады, орналастыру формуласымен шешуге болады.

$$A_8^2 = \frac{8!}{(8-2)!} = \frac{8!}{6!} = 7 \cdot 8 = 56$$

Қарапайым сөзбен жеткізуде қайталанатын орналастыру былай ажыратып алсақ болады. Бұл жерде мақтану болады, статус болады және орын маңызды. Мысалы: 20 оқушының ішінен 1 оқушыны староста, 1 оқушыны орынбасары етіп тағайындау керек. Оқушылардың

арасынан староста мен орынбасарын таңдаудың қанша нұсқасы бар. Бұл жерде статус әртүрлі, дәрежесі бойынша ерекшеленіп мақтана алады және орындары маңызды, яғни Арман староста Мақсат орынбасар, Мақсат староста Арман орынбасар.

**Шешуі.**

$$A_{20}^2 = \frac{20!}{(20-2)!} = \frac{20!}{18!} = 19 \cdot 20 = 380$$

**Қайталанбайтын алмастыру.**

**Анықтама.**  $n$  элементтен  $n$  элементі бойынша жасалған орналастыруларды  $n$  элементтен жасалған алмастыру деп атайды. Сонымен алмастыру  $k = n$  болғандағы орналастырудың дербес жағдайы. Алмастырудың бір-бірінен айырмашылығы тек элементтерінің орналысу ретінде ғана. Алмастырулар саны  $P_n$  символымен белгіленеді де, мына формуламен есептелінеді:

$$P_n = n! \quad (2)$$

**Мысал 4.** 3, 5, 7 сандарынан тұратын барлық алмастыруларды табыңдар.

**Шешуі.** 3,5,7; 3,7,5; 5,3,7; 5,7,3; 7,3,5; 7,5,3;

$$P_3 = 3! = 1 \cdot 2 \cdot 3 = 6$$

Қарапайым сөзбен жеткізуде қайталанатын алмастыруды былай ажыратып алсақ болады. Алмастыруға жатқызамыз, егер берілген заттың көлемін толығымен пайдаланатын болсақ. Алмастыру негізінен орналастырудың дербес жағдайы. Мысалы: Зийнаддин ағайдың 5 кітабы бар, ағай сол кітаптарды сөреге қанша тәсілмен орындарын алмастырып қоя алады.

**Шешуі.**

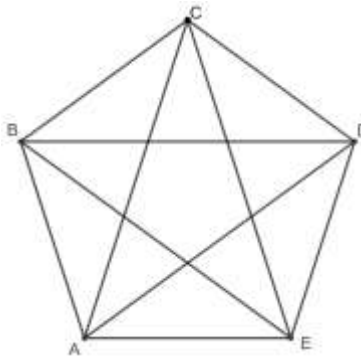
$$P_5 = 5! = 1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 = 120$$

**Қайталанбайтын теру.**

**Анықтама.** Айырмашылығы кемінде бір элементінде болатын орналастырулардың дербес түрін теру деп атайды.  $n$  элементтен әрқайсысы  $k$  элементтен құрылған терулер саны  $C_n^k$  символымен белгіленеді де, мына формуламен есептелінеді:

$$C_n^k = \frac{n!}{k!(n-k)!} \quad (3)$$

**Мысал 5.** Үстел басында отырған 5 адам бір-бірімен қол алысып амандасты. Барлығы қанша қол алысу болды?



2-сурет

**Шешуі.** Екі адамның бір-бірімен қол алысуы, бір ғана амандасуды білдіреді.

$$C_5^2 = \frac{5!}{2!(5-2)!} = \frac{5!}{2! \cdot 3!} = 10$$

Қарапайым сөзбен жеткізуде қайталанатын теруді былай ажыратып алсақ болады. Теруде мақтану болмайды, статус барлығында бірдей болады және орын маңызды емес. Мысалы: 20 оқушының ішінен 2 оқушы кезекшілікке тағайындаудың қанша нұсқа бар. Бұл жерде барлығында статус бір, ешкім ерекшеленіп мақтана алмайды және орындары маңызды емес, яғни Арман мен Мақсат, Мақсат пен Арман ол бір ғана нұсқа болып есептелінеді.

**Шешуі:**

$$C_{20}^2 = \frac{20!}{2!(20-2)!} = \frac{20!}{2! \cdot 18!} = 190$$

**Қайталанатын орналастыру.**

**Анықтама.** Егер  $n$  элементі бар  $k$  элементтен тұратын таңдама бастапқы жиынға қайтарылса және реттелсе, онда алынған таңдама қайталанатын орналастыру деп аталады. Қайталанатын орналастырудың бір-бірімен айырмашылығы не элементтерінде, не орналасу ретінде, немесе элементтерінің қайталану санында болады.  $n$  элементтен  $k$  элемент бойынша құрылған қайталанатын орналастырудың барлық саны  $\bar{A}_n^k$  символымен белгіленеді де, мына формуламен есептелінеді:

$$\bar{A}_n^k = n^k \quad (4)$$

**Мысал 6.** 5 түрлі орындықты қаптау үшін 7 рулон түрлі түсті мата сатып алынды. Орындықтарды қанша тәсілмен қаптауға болатынын анықтаңдар.

**Шешуі.**

$$\bar{A}_7^5 = 7^5 = 16807$$

**Қайталанатын теру.**

**Анықтама.** Егер  $n$  элементтен  $k$  элементпен алынған таңдама бастапқы жиынға қайтарылса және реттелмесе, ондай орналастыру қайталанатын теру деп аталады. Қайталанатын теру саны мына формуламен есептелінеді:

$$\bar{C}_n^k = C_{n+k-1}^k \quad (5)$$

**Мысал 7.** Дүкенде 5 түрлі гүл сатылады. 7 түрлі гүлді сатып алудың неше тәсілі бар?

**Шешуі.**

$$\bar{C}_5^7 = C_{5+7-1}^7 = C_{11}^7 = \frac{11!}{7! \cdot 4!} = 330$$

**Қайталанатын алмастыру.**

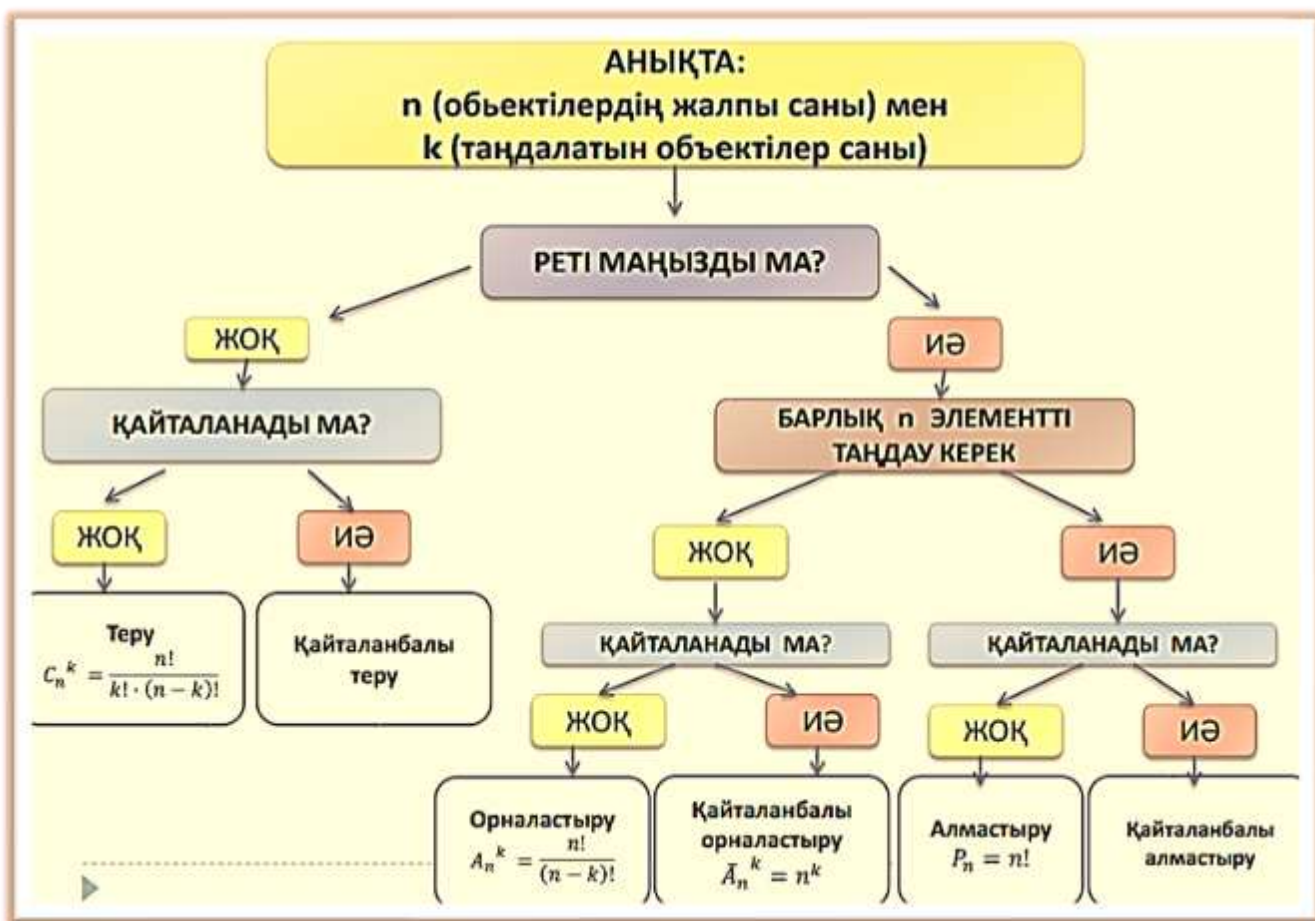
**Анықтама.**  $n$  элементі бар жиында  $k$  типті әртүрлі элементтер болсын, 1-тип  $n_1$  рет, 2-тип  $n_2$  рет, ...,  $k$ -тип  $n_k$  рет қайталансын,  $n_1 + n_2 + \dots + n_k = n$ . Осы жиынның  $n$  элементінен құрылған орын алмастырулар  $n$  элементпен қайталанатын алмастыру деп аталады.  $n$  элементпен қайталанатын алмастырулар саны  $P_n(n_1, n_2, \dots, n_k)$  символымен белгіленеді де, мына формуламен есептелінеді:

$$P_n(n_1, n_2, \dots, n_k) = \frac{n!}{n_1! n_2! \dots n_k!} \quad (6)$$

**Мысал 8.** 3, 3, 5, 5, 8 цифрлардан қанша әртүрлі бес мәнді сан құруға болады?

**Шешуі.** Жоғарыда көрсетілген формуланы пайлансақ  $n = 5, n_1 = 2, n_2 = 2, n_3 = 1$ . Сонымен 3, 5 және 8 цифрлардан тұратын бес мәнді сандар саны

$$P_5(2, 2, 1) = \frac{5!}{2! \cdot 2! \cdot 1!} = 30$$



3-сурет

Комбинаторика есептерін шығару кезінден байқалмайтын кейбір қателер туралы айта өтсек. Адамдарды дөңгелек үстел мен айналмалы әткеншекке(карусельге) орналастыру есебінде оқушылар шатасып қалуы мүмкін.

**Мысал 9.** 6 баланы дөңгелек үстелге неше әдіспен отырғызуға болады?

**Шешуі.**  $6! = 720$

**Мысал 10.** 6 баланы айналмалы әткеншекке(карусельге) неше әдіспен отырғызуға болады?

**Шешуі.**  $5! = 120$  немесе  $\frac{6!}{6} = 120$

**Мысал 11.** 8 см, 9 см, 1 см кесінділерден неше үшбұрыш құрастыруға болады?

**Шешуі:**  $\bar{C}_3^3 = C_{3+3-1}^3 = C_5^3 = \frac{5!}{3!2!} = 10$

Бұл жағдайда қате жауап алынады, себебі кесінділерден үшбұрыш құрау үшін олардың ұзындықтары «үшбұрыш теңсіздігін» қанағаттандыруы тиіс. 8 см, 9 см, 1 см кесінділердің кез келген үштігі «үшбұрыш теңсіздігін» қанағаттандырмайды, яғни ұзындықтары  $\{8, 9, 1\}$ ,  $\{8, 1, 1\}$ ,  $\{9, 1, 1\}$  болатын кесінділерден үшбұрыш құралмайды. Олай болса,  $10 - 3 = 7$  үшбұрыш қана құрауға болады.

**Мысал 12.** 5 кітапты 2 балаға қанша тәсілмен бөлуге болады?

**Шешуі.** Екі баланы (А және Б) деп алайық. Бірінші кітапты А алсын, екінші кітапты Б алсын, үшінші кітапты А немесе Б есімді бала алады. Сол себепті бұл жерде қайталанатын таңдама жағдайы орын алып тұр. Бұл жерде қайталанатын орналастыру формуласын қолданып есептің шешімін аламыз. Маңызды айта кететін жайт ешбір тілде 5 кітапқа 2 баланы үлестіреміз деп айтылмайды, миға қонымсыз болмас үшін 5 кітапты 2 балаға бөліп береміз деп есептің шартын құрастырады.

$$\bar{A}_5^2 = 5^2 = 25$$

Дәл осылай оқушылар шығарып кетуі мүмкін, бұл жерде 5 кітапқа 2 баланы үлестіру деп түсіне аламыз. Бұл қате шешім болып табылады.

$$\bar{A}_2^5 = 2^5 = 32$$

Соңғы жағдайда 5 кітапты 2 балаға үлестіреміз деп түсінеміз.

Қорытындылай келе, бұл мақала комбинаториканың негізін түсінуге бағытталған

маңызды материал ретінде 10-11 сынып оқушыларына пайдалы бола алады. Қайталанатын және қайталанбайтын таңдама схемаларын қарастыру арқылы оқушылар есептерді жүйелі түрде талдап, дұрыс шешім қабылдауды үйренеді. Есеп шығаруда байқалмайтын қателіктерді көрсету оқушылардың логикалық ойлау қабілетін дамытуға көмектеседі және формулаларды дұрыс қолдануға бағыттайды. Комбинаториканың күрделі ұғымдарын жеңілдетілген әдіспен түсіндіру, практикалық мысалдар мен схемаларды қолдану оқушылардың тақырыпқа деген қызығушылығын арттырады және математикалық дайындық деңгейін жақсартады.

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## Medical sciences

### **EFFICACY OF FACIAL MASSAGE IN IMPROVING SKIN CONDITION AND PREVENTING AGING**

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#### **Abstract**

*This article examines the efficacy of facial massage in enhancing skin condition and preventing age-related changes. Popular massage techniques, such as lymphatic drainage, sculptural, Japanese, and gua sha massages, are discussed. The physiological effects of massage, including improved blood circulation, stimulation of lymphatic flow, and increased skin elasticity, are analyzed. Contemporary research data confirming the positive effects of massage on microcirculation, collagen synthesis, and overall skin tone are presented. Regular facial massage has been found to slow aging processes and improve skin appearance, making it an effective and safe method in cosmetology.*

**Keywords:** *facial massage, lymphatic drainage massage, sculptural massage, Japanese massage, gua sha, blood circulation, lymphatic flow, skin elasticity, rejuvenation, aging prevention.*

#### **1. Introduction**

*Facial massage is a mechanical technique applied to the skin and underlying facial tissues to enhance skin condition and prevent aging. This skincare method has deep historical roots, with massage techniques being used in ancient China and India to improve energy circulation and maintain youthfulness. In recent years, facial massage has gained significant popularity in the beauty industry due to its accessibility, natural approach, and presumed anti-aging effects.*

*Today, facial massage encompasses various techniques, ranging from lymphatic drainage and sculptural to traditional Japanese massage and gua sha. These methods promise not only to enhance the skin's appearance but also to improve its health on a cellular level. However, despite the widespread popularity of these procedures, the scientific efficacy and mechanisms of their action remain topics of interest.*

*This study aims to evaluate the effectiveness of facial massage in improving skin condition and preventing aging, based on contemporary research data and expert opinions.*

#### **Types of Facial Massage**

*Facial massage, as a key skincare procedure, includes numerous techniques, each with unique features and targeted benefits. The most popular types of massage include lymphatic drainage, sculptural, Japanese massage, and gua sha.*

*Lymphatic Drainage Massage. Lymphatic drainage massage focuses on activating the lymphatic system. Its primary objective is to enhance lymphatic flow, eliminate fluid retention, and remove toxins from tissues. This technique is recommended for reducing puffiness, minimizing dark circles under the eyes, and restoring the skin's natural complexion. The method involves gentle, rhythmic movements along lymphatic lines, with particular attention to key areas such as the neck, chin, cheekbones, and forehead. Regular sessions can reduce inflammation, improve microcirculation, and enhance overall skin tone.*

*Sculptural Massage. Sculptural facial massage targets the deep muscles and tissues of the face. Its main goal is to create a well-defined facial contour, tighten the skin, and eliminate sagging. This technique involves intensive movements such as kneading, stretching, and pressing, which impact the facial muscular framework. Sculptural massage is recommended for preventing age-related changes, reducing nasolabial folds, and improving overall skin condition. The results are often compared to those of non-invasive facelift procedures but with fewer risks and no recovery time.*

*Japanese Massage. Japanese massage, also known as Asahi or Zogan, is an ancient technique aimed at restoring facial harmony through a combination of deep and superficial movements. The method includes pressing, rubbing, and light stroking along specific lines. This technique works with both the skin and muscles, relieving tension, enhancing lymphatic drainage, and eliminating toxins. Regular Japanese massage sessions result in reduced wrinkles, a more defined facial contour, and restored skin*

structure.

*Gua Sha Massage.* Gua sha massage, rooted in traditional Chinese medicine, uses a special tool—typically a stone plate made of jade or rose quartz. This technique involves slow, yet deep movements along the facial lines to stimulate blood circulation, enhance lymphatic drainage, and relieve tension. Gua sha helps reduce inflammation, improve skin texture, and promote a natural glow. By targeting energy points, gua sha also has a relaxing effect on the nervous system, making it both a cosmetic and therapeutic procedure.

Each technique offers unique advantages and can be tailored to an individual's skincare program based on specific goals and needs. The choice of massage type depends on skin condition, age, and desired results.

## **2. Literature Review**

*Historical Perspectives on Facial Massage.* Facial massage has been an integral part of traditional beauty and wellness practices across various cultures. Historical texts from Traditional Chinese Medicine (TCM) highlight the use of techniques like guasha and acupressure for maintaining skin vitality and promoting overall health. Similarly, Ayurvedic traditions emphasize the use of herbal oils combined with massage to enhance circulation and rejuvenate the skin (Marxen, 2023).

Research into the physiological benefits of facial massage has expanded significantly in recent years. A study by Hiroshi et al. (2021) explored the biochemical changes induced by facial massage, demonstrating a significant increase in the production of skin-benefiting proteins such as collagen and elastin. Furthermore, advancements in imaging techniques, such as high-resolution ultrasound and laser Doppler flowmetry, have allowed researchers to quantify the impact of massage on skin elasticity and blood flow dynamics (Tanaka et al., 2022). Several studies have compared the efficacy of different facial massage techniques. For instance, a randomized controlled trial by Lim et al. (2023) revealed that Japanese Zogan massage showed superior results in reducing periorbital puffiness compared to standard lymphatic massage. Similarly, the use of guasha tools has been associated with significant improvements in dermal thickness and reduced trans-epidermal water loss (TEWL) compared to manual massage (Chen & Li, 2021). Modern cosmetic science increasingly advocates for the integration of facial massage with topical treatments to enhance product absorption and efficacy. Studies by Kim et al. (2022) indicated that combining facial massage with antioxidant serums significantly amplified their dermal penetration, leading to improved outcomes in hyperpigmentation and fine lines. Beyond physiological effects, facial massage has been linked to psychological well-being. Evidence suggests that massage triggers the release of endorphins, reducing stress and improving mood (Walker et al., 2019). These findings underscore the dual cosmetic and therapeutic potential of facial massage as part of a holistic skincare routine. While substantial progress has been made, certain aspects remain underexplored. The long-term comparative effects of traditional versus modern facial massage tools, as well as the optimal frequency and duration of sessions for different age groups, require further investigation. Additionally, more robust randomized trials are needed to substantiate claims about the synergistic effects of facial massage with advanced cosmetic procedures.

## **3. Methodology**

*This chapter outlines the methodological framework utilized to evaluate the effectiveness of facial massage techniques for improving skin health and preventing aging. The approach combines both qualitative and quantitative research methods to provide a comprehensive understanding of the physiological and cosmetic impacts of facial massage.*

*Research Design.* The study employed a mixed-methods design, integrating experimental, observational, and survey-based approaches. This design was selected to capture both objective physiological changes and subjective user experiences associated with different facial massage techniques.

*Experimental Component.* A controlled experimental setup was used to assess physiological effects such as blood circulation, lymphatic drainage, and skin elasticity. Participants underwent standardized facial massage sessions using distinct techniques (lymphatic drainage, sculptural, Japanese, and gua sha).

*Observational Component.* Observations were conducted during the experimental sessions to record procedural adherence and participant responses. Expert estheticians monitored and ensured consistent application of massage protocols.

*Survey Component.* Post-treatment surveys collected qualitative data on participant perceptions of skin texture, tone, and overall appearance. Satisfaction ratings and anecdotal feedback were analyzed to complement quantitative findings.

*Participants.* The study recruited 50 healthy adult participants aged 25–50 years with varying skin

types and concerns. Participants were selected through purposive sampling to include individuals with both early signs of aging and relatively unaffected skin. Participants were divided into four groups, each assigned to a specific massage technique. A fifth group served as a control and received no intervention. Sessions were conducted twice weekly for six weeks, with each session lasting 30 minutes. Following the intervention period, participants underwent the same skin analysis as in the baseline assessment. Data were collected to evaluate changes in key parameters, including elasticity, hydration, and microcirculation. Participants completed structured surveys and participated in focus group discussions to share their subjective experiences, perceived outcomes, and satisfaction levels.

#### 4. Results and Discussion

##### **Physiological Effects of Facial Massage**

Facial massage exerts a comprehensive effect on the skin and underlying tissues, resulting in significant improvements in both appearance and overall skin health. The primary physiological effects include improved blood circulation, stimulation of lymphatic flow, and increased skin elasticity.

**Improved Blood Circulation.** Massage stimulates blood circulation in both superficial and deep layers of the skin. This increases oxygen and nutrient delivery to cells, accelerating tissue regeneration processes. The result is improved skin texture, an even complexion, and a healthy glow. Regular stimulation also strengthens blood vessel walls, reducing and preventing couperose manifestations. Enhanced blood flow to the skin's surface aids in toxin removal, improving the dermis' overall condition. Research [1] has shown that facial massage rollers positively affect facial skin blood flow and vascular reactivity. In a short-term study, participants massaged one cheek for 5 minutes, resulting in a significant increase in skin blood flow lasting at least 10 minutes post-procedure. A long-term study involved daily roller use for 5 weeks, leading to improved vascular dilation in response to thermal stimulation.

**Stimulation of Lymphatic Flow.** The lymphatic system plays a critical role in removing excess fluid and metabolic byproducts from the body. Gentle pressure and movements along lymphatic lines during massage activate lymph nodes and vessels, reducing puffiness and under-eye bags. This effect is particularly beneficial for individuals prone to fluid retention. Regular lymphatic drainage massage decreases inflammation, improves tissue drainage, and supports the skin's natural detoxification processes. However, additional research on the cosmetic outcomes of lymphatic drainage massage is necessary [3].

**Increased Skin Elasticity.** One of the most significant effects of massage is the stimulation of collagen and elastin synthesis—proteins responsible for skin firmness and resilience. Gentle yet deep manipulation during massage enhances microcirculation and cellular metabolism. Regular sessions reduce visible wrinkles, tighten facial contours, and increase skin density. The impact is especially pronounced in individuals with early signs of aging, as massage slows down elasticity loss and prevents further tissue sagging. A study [4] involving five healthy volunteers who performed facial self-massage twice daily for two weeks showed reductions in cheek thickness and cranial and horizontal shifts of the zygomatic bone. Improvements in the superficial musculoaponeurotic system (SMAS) height were also observed, correlating with the lifting effects of massage.

Another study published in *JAMA Dermatology* [5] demonstrated that a 20-week program of facial exercises significantly improved skin appearance in middle-aged women. Participants performed 32 facial muscle exercises for 30 minutes daily for 8 weeks, followed by every other day for the remainder of the study. Results included increased cheek volume and a reduction in perceived age.

#### 5. Conclusion

Facial massage, an ancient yet highly relevant practice, demonstrates significant efficacy as a skincare method and an anti-aging preventive measure. The variety of techniques—from lymphatic drainage to gua sha—allows for personalized care based on individual skin needs, health conditions, and age. The analyzed physiological effects, such as enhanced blood circulation, stimulated lymphatic flow, and increased skin elasticity, are supported by contemporary research. Massage's influence on microcirculation, toxin removal, and collagen synthesis makes it a powerful tool in combating age-related changes and maintaining overall skin health.

Despite its clear benefits, some aspects, such as the cosmetic outcomes of lymphatic drainage massage, require further investigation. Nevertheless, incorporating facial massage into a regular skincare routine is a reasonable approach for those seeking to improve their skin's appearance and prolong its youthfulness. To achieve maximum results, consistency, appropriate technique selection, and expert guidance are essential. Facial massage remains a universal and safe method, blending traditional knowledge with scientifically validated benefits.

**Limitations.** While the study design ensured a robust evaluation, certain limitations were noted:

*Relatively short intervention duration may not capture long-term effects. Small sample size limits generalizability. Potential placebo effects influencing participant-reported outcomes. Future research is recommended to address these limitations, expand sample diversity, and explore adjunctive benefits of facial massage combined with other skincare modalities.*

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## Pedagogical sciences

### THE EFFECTIVENESS OF USING VISUAL MATERIALS IN THE TEACHING OF GEOGRAPHY

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#### **Abstract**

*This article discusses instructional tools, particularly visual aids, their place and importance in the teaching process. In today's world, the abundance of sources and various directions that distract students from learning is a reality. In this regard, teaching should be carried out in a way that meets their interests and needs while avoiding being tiring and monotonous. Different teaching technologies, methods, techniques, and tools are used to capture students' attention in the lesson. The use of various instructional tools in the teaching process brings about significant changes. Therefore, it is important to study, explore, apply, and analyze the results they yield.*

**Keywords:** *education, visuality, visual, effectiveness, map, teaching tool*

*In a constantly changing world, as in all fields, there is a need for innovation and improvement in the field of education. To this end, a number of educational reforms are being implemented. One of the main goals of these reforms is to improve the quality and effectiveness of education. Of course, when we talk about the quality of education, we refer to a broader and more general concept. One of the steps to achieve this goal is to improve the quality of teaching in various branches of science. If we want the teaching process to be effective, we must first determine the ways to achieve this. To improve the quality of teaching any subject, it is necessary to choose the appropriate methods, techniques, technologies, teaching tools, and organizational forms. Here, we will particularly focus on teaching tools. Depending on the subject, teaching tools can vary, but it can be said that visual aids play a crucial role in teaching any subject. This concept was highlighted by the prominent Czech educator J.A. Comenius, who emphasized the importance of visual aids in teaching. However, today, teaching aids have been further improved and acquired new features. Among the subjects taught in schools, geography requires more visualization and provides extensive methodological opportunities for the application of these tools. Looking at the subject and object of geography, it is possible to determine the significance of visual aids in learning this subject. It would not be effective to study the content of this subject only through texts. The teaching of geography is better suited not only within the walls of the school but also in direct contact with nature. However, this is not always possible. The correct selection of teaching tools in the teaching process helps to overcome this problem. Teaching tools are understood to be the teaching equipment, didactic tools, instructional, and visual aids used in schools to equip students with systematic, deep knowledge and to ensure their comprehensive development and education. One of the most important tasks of teaching tools is to ensure the visualization of the learning process. In geography teaching, we encounter the explanation of objects and processes that cannot be perceived without directly seeing them (or indirectly, with the help of visual aids). Psychologists show that 20-30% of the knowledge students acquire in the classroom is gained through the use of teaching aids.*

*Geography teaching tools can be divided into four major groups:*

- Natural objects*
- Surface illustrative tools depicting geographical objects and events, three-dimensional models*
- Tools that depict geographical objects and events using symbolic signs*
- Devices and tools used for the demonstration and analysis of natural phenomena*

*Visual materials refer to various tools that represent information perceived through the sense of sight. In the teaching of geography, one of the most important tools in this category is maps, which are considered the second language of geography. In addition, graphs and diagrams, pictures, map schemes and tables, videos, animations, infographics, models, and 3D models, interactive maps, and applications, etc., play a significant role in ensuring visualization in classrooms.*

*Teaching maps are indispensable teaching tools for geography. Through maps, which are an important source of information, students can virtually travel the world, forming more complete ideas about the objects they read and hear about. To utilize the full potential of maps, a range of skills must*

*be developed in students. First, students must understand maps and then learn to read them. In the next stage, students must acquire knowledge by comparing various types of maps. By mastering these skills, students develop knowledge and abilities related to space, distance, the location of geographical objects, their interactions, the characteristics of objects, and the ability to identify cause-and-effect relationships between geographical events and processes. Students also gain the ability to perform various measurement and calculation tasks. Working with maps promotes analytical thinking, comparing regions and events on both local and global scales, analyzing various geographical problems and data, and supporting active learning. Contour maps are essential for students to apply what they have learned, further reinforcing their acquired knowledge. Organizing map-based games also makes learning more interesting and effective.*

*Maps play a crucial psychological and pedagogical role by helping organize thought, systematize knowledge, facilitate its acquisition, and improve memory retention. Today, in addition to wall, desk, and text maps, the use of interactive maps created through GIS, digital-mobile map applications, 3D maps and models, etc., enhances the effectiveness of learning.*

*In addition to maps, graphs and diagrams, geographical schemes, and tables, which present data visually, are also of great importance. These tools allow students to better perceive, systematize, compare, and more easily understand information. In some cases, it is impossible to understand the internal content of objects and processes examined in their natural state. Schemes and models help to track their internal relationships and features.*

*Natural disasters, population migration, ocean depths, desertified forest areas, and other events that cannot always be directly observed in many parts of the world can be presented indirectly through images, models, videos, and animations. This not only makes learning more engaging but also helps students understand the processes in greater depth. When students create models of geographical objects, it further accelerates and improves the quality of their learning.*

*When analyzing other visual teaching tools used in geography education separately, we come to similar conclusions. Therefore, let's consider the overall importance of visual teaching tools in the teaching process.*

*Initially, visual materials increase interest in the lesson and the topic. Looking at the modern approach, we see the importance of establishing motivation at the initial stage, which affects all subsequent stages, and in this regard, the use of visual materials is one of the primary methods. Additionally, visual tools such as interactive maps and games encourage students to be more active, to learn, and to apply what they have learned.*

*The learning of the material together with maps and other visual aids allows students to logically link topics and develop spatial concepts.*

*Learning tools are different depending on each individual's characteristics; some people learn better by listening, others by seeing, and so on. However, the human brain processes visual information faster and retains it better. If information is read, 10% is retained, 20% is retained when heard, 30% when seen, and 50% when both heard and seen. When the person says it themselves, 80% is retained, and when the information is learned through activity, 90% is retained. Therefore, we can say that students can achieve easier and longer-lasting memory retention by using visual aids, alongside reading and listening to information. As mentioned, applying theoretical knowledge through visual materials leads to better results in learning.*

*In the teaching of a broad and complex subject like geography, the use of various visual materials creates the conditions for presenting a large amount of information more quickly and comprehensively. It also ensures that students acquire knowledge more rapidly, thoroughly, and deeply.*

*The use of visual materials makes learning deeper, more interesting, entertaining, interactive, and effective. In the era of technological development and its application in education, the use of visual tools offers greater opportunities. Many developed countries utilize technology and interactive visual aids in their teaching processes. By focusing on the education systems of these countries, we can observe their progress.*

*As we mentioned, the use of visual tools is important in the teaching of all subjects, but it is impossible to teach geography without them. Without visual aids, teaching is based on mechanical memorization. In the past, research in this area was limited, but recently, specific studies have been conducted, and research shows that a student cannot form a proper understanding of an object they are studying without knowing or recognizing it, merely by reading or hearing descriptions. In the case of geography, where subjects such as the Earth, its spheres, mountains, rivers, etc., and the natural processes occurring within them, as well as the interactions and regularities between objects, are taught,*

visual aids play an irreplaceable role. Without them, rote memorization leads to a decrease in students' interest in learning, and the effectiveness of the teaching process is diminished.

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## **EDUCATIONAL ENVIRONMENT AS A WAY OF FORMING ECOLOGICAL CULTURE OF FUTURE TEACHERS IN STUDYING NATURAL SCIENCE DISCIPLINES**

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### **Abstract**

Currently, the problem of environmental culture is becoming generally recognized. The environmental direction in the system of higher professional education in the process of forming the environmental culture of future teachers is a noticeable factor, there is a need to systematize environmental and natural science pedagogical education: there is a change in axiological systems, cultural norms and values of the modern younger generation, the issues of forming an environmental culture in students of pedagogical universities are not fully considered. The state educational standard of higher professional pedagogical education emphasizes the primary task form a personality of a teacher with a high environmental culture, striving for harmonious interaction with the natural environment, a personality that is distinguished by the presence of attitudes, beliefs, the need for activities to preserve and improve nature. The dominant role and responsibility of future teachers in solving issues of forming an environmental culture in young people is indicated. In this regard, the need to increase attention to the issues of forming an environmental culture of students of pedagogical universities becomes significant at the social and pedagogical level. Environmental culture is not a specific type, but an integral part and level of human culture as a whole. The priority role in the formation of the ecological culture of students belongs to natural science disciplines, which form the foundation of the scientific worldview. At the stage of modern higher education, the ecological culture of young people develops on the principles of the unity of the historical relationship between the natural environment and society, the social conditioning of the individual's relationship to nature, and the desire to harmonize these relationships. The multifaceted nature of the interaction between society and nature determines the complexity of environmental education, its main principles: a transdisciplinary approach to the formation of environmental culture, systematic and continuous study of scientific material, the unity of mental and emotional-volitional principles in the activities of students to study and improve the natural environment; the relationship between global, local and regional environmental problems. This is emphasized by many scientists. The educational environment of the university plays a leading role in the formation of the environmental culture of future teachers.

**Keywords:** Internet space; Internet resources; ecology of the educational environment; integration; greening; competence; university; pedagogical technologies; students; concept;

True environmental education as the main component of general education is closely connected with mastering the scientific foundations of interaction between the natural environment and society. Its main task is to develop an environmental worldview, knowledge, skills, and beliefs aimed at forming an individual's responsibility for the future state of nature, realizing the need for mandatory care of it in all types of human activity, considering the environmental situation in the context of urbanization; analyzing the impact of various industrial facilities on the state of the environment.

These types of activities, as noted by L. Y. Zakirova [1], I. V. Mashkova [2], V. P. Solomin [3], provide an opportunity to involve students in solving environmental and biological problems, and will also contribute to the formation of a sense of consciousness and responsibility, awareness of the need to preserve and increase natural resources. In the modern world, the educational environment is one of the leading factors in the formation of the personality of students and provides an opportunity for young people to identify themselves in society, satisfy personal needs as a result of training and education, and recognize education as a personal asset. Improvement of the educational process of higher education is carried out in the context of modern educational trends, for example, the joint nature of the educational process and its continuity; orientation of education to the latest introductions; observation of the features of the future professional activity of a specialist. The actions of a modern teacher are aimed not only at mastering scientific theoretical knowledge, skills, and abilities, but also at adapting to the current

*conditions of future professional activity in society.*

*The orientation of the concept of higher pedagogical education towards the formation of professional competence of future teachers requires the development of an educational environment that encourages the implementation of the main goals and objectives of improving real education. A pedagogical university contributes to the formation of professional competence of university students as subjects of the educational environment who live in modern conditions of globalization and become balanced, creative individuals. The creation of an educational environment in pedagogical educational organizations is associated with the promotion of innovative modern technologies into practical activities, pedagogical technologies, designing the structure of education, choosing a future profession, increasing the volume of extracurricular independent work of bachelor students, conducting creative and problematic tasks, assignments, exercises, etc.*

*The essence of the concept of "educational environment" has been studied in sufficient detail in the works of B.S. Gershunsky [4; 5], E.S. Polat [6], A.V. Khutorskoy [7] and other researchers. Current scientists and researchers understand this term as a naturally and artificially developing socio-cultural environment of a person, which includes the structure and various means of education that ensure the effective activity of future teachers and orient the process of personality formation through the development of positive conditions for this. According to A. Savenkova, the educational environment should be considered a system of pedagogical, organizational and psychological conditions that create the opportunity to consider both the existing abilities and individual non-standard characteristics of the individual, as well as desires and interests that have not yet manifested themselves [8]. E.B. Laktionova writes that "the modern educational environment is becoming a psychological and pedagogical reality, containing consciously organized conditions for the formation of the individual, as well as opportunities for his development within the framework of the social and spatial-disciplinary world" [9].*

*V.A. Yasvin in his work "Educational Environment: From Modeling to Design" understands the educational environment as a system of influences and conditions for the formation of personality according to a given template, as well as opportunities for its development, which are contained in the social and spatial-subject environment [10]. In his dissertation research "Pedagogical characteristics of the educational environment in various types of educational institutions," G. Yu. Belyaev asserts that "the educational environment is a situation where a student independently develops an image for himself in the context of interaction with teachers, parents, and classmates who form his environment [11, p. 29]. V.B. Kalinin gives the following definition of the concept of the educational environment as an environment in which the focus is on the individual, an environment for the formation of the individual "I", the ability for personal career growth. The environment creates conditions that contribute to the self-realization of students, the development of their self-awareness, the improvement of the students' unique picture of the world, the desire for a sufficiently complete identification of individual abilities [12, p. 18].*

*V.A. Kozyrev, I.K. Shalaeva, A.A. Veryeva believe that "the educational environment is the activity of a certain educational institution, as a set of social conditions that are organized by the head of the educational institution, the entire teaching staff, subject to the mandatory participation of students in order to create favorable conditions for the purpose of comprehensive development of the personality of teachers and students" [13, pp. 48–49]. We believe that the basis of the above definitions of the concept of "educational environment" is the study by scientists of specific psychological and pedagogical conditions for ensuring the high-quality work of each individual in an educational institution.*

*The current educational environment of a pedagogical university becomes a factor in the formation of professional competence of future teachers, provided that the following conditions are met: for example, the structure and content of the training courses are oriented towards practical activities; technologies, techniques, means, forms and methods of work are scientifically substantiated with sufficient justification; the principles of democracy and developmental education and training dominate in the attitude of future teachers and lecturers; there are certain material and technical possibilities for the formation of a modern educational space. Improvement of the main educational and experimental sites, holding scientific, practical and methodological seminars, conferences of various levels (all-Russian, regional, etc.), collective round tables in which future teachers, university lecturers, comprehensive school teachers and students take an active part; organization of modern student research laboratories, pedagogical practices makes it possible to cover to a greater extent all components of the educational environment of the university.*

*Therefore, the following educational topics can be added to the curriculum: - subjective, individual attitude to the birth in preschool age; - individual attitude to the natural environment a favorable*

environment at primary school age; - individual attitude to the natural environment hostile environment during adolescence. In addition to psychological readiness, as a rule, pedagogical readiness for the implementation of bioecological education and training of future teachers is distinguished.

N.V. Banshchikova in her work "Internet space as one of the types of public communication" emphasizes that "Internet space is a special public sphere, which becomes a kind of platform for the development of virtual sociality, containing many special features, among which we can highlight the secrecy and unlimitedness of interaction. The most important property of the Internet as a space for the implementation of social communications is the interactivity of its environment, which ensures fairly fast feedback, as well as the absence of dependence on spatio-temporal characteristics" [14]. In the modern world, the existing Internet network is not only a means of teaching, in addition, it gives teachers and students maximum opportunities. The use of Internet technologies allows future teachers to use all the necessary tools, methods, techniques, means of studying the surrounding world, developing them into independent activities through the use of various types of educational activities, to implement the individualization and differentiation of the process of education and training through the introduction of the specifics of dialogue. As a result of studying natural science disciplines, future teachers can independently use the following: text editors, graphic editors, database management structure, special information programs, multimedia educational programs, test surveys, electronic textbooks for many courses, etc.

Domestic researchers M.Y. Bukharkina, M.V. Moiseeva, E.S. Polat believe that "Internet technologies are no longer a component of the future, and teachers must make certain efforts to become "literate" in their application in their professional activities" [15]. According to T.F. Zaglyadova and E.V. Savoshchikova, "the Internet is nothing more than a worldwide system for transmitting necessary information, a global "web" of computer systems and technologies, equipped with technical means and software" [16]. The selection of the necessary information in the Internet resources can occur for many reasons. For example, it is necessary to develop a thematic video ("The global ecological crisis – is it a myth or reality?" or "I am for a healthy lifestyle!" etc.) with musical accompaniment. Of course, on the one hand, this eliminates many problems, but on the other hand, problems with training arise [17]. One of the dominant tasks of a higher education teacher is the use of rational information technologies, methods, means and methods of training, which allow activating the educational activities of future specialists. The main mediator in solving new goals is information and communication technologies of training [18; 19].

In the educational process of higher education, a metasearch system can be used. This is necessary when determining the structure of such concepts as "experimental activity", "GEC", "global ecological catastrophe", "biosphere", "noosphere", "biota", etc. In addition, thanks to the Internet space, it is possible to analyze a given topic from the natural sciences - for example, "Laws of Social and Applied Ecology", "The Impact of the Natural Environment on the Human Body", "Human Impact on Nature", etc. Now there are many Internet resources. Among them are many that future teachers can use to increase the level of environmental culture: distance learning courses (for example, [itdrom.com](http://itdrom.com), [scholar.urfu.ac.ru](http://scholar.urfu.ac.ru)), retraining courses, programs and electronic textbooks that are intended for self-education (for example, [ntuit.ru](http://ntuit.ru), [runetica.com](http://runetica.com)), educational subject Olympiads, scientific quizzes, online and offline tests (for example, [certifications.ru](http://certifications.ru)), scientific associations, teleconferences, virtual libraries (for example, [www.gpntb.ru](http://www.gpntb.ru)), virtual consultation centers. And much more. Thus, the Internet space allows future specialists to use the rich toolkit provided by modern information computer technologies in the most productive way. The leading ways of using Internet resources are as follows: you can instantly obtain the necessary information and display it on a large screen (show a reproduction of a painting or organize an interactive tour of any museum in the world); work in real time with dictionaries and encyclopedias; be anywhere in the world. Future teachers get used to communicating, selecting and processing information using modern means, their sense of self-confidence increases, since it becomes possible to find an answer to almost any question [20].

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## USING TECHNOLOGY-ENHANCED IMMERSION TECHNIQUES TO DEVELOP FOREIGN LANGUAGE SPEECH SKILLS IN SCHOOLCHILDREN

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### Abstract

This article explores the theoretical foundations of using technology-enhanced immersion techniques (TEIT) to develop foreign language speech skills in schoolchildren. Focusing on the potential of Virtual Reality (VR), Augmented Reality (AR), and Artificial Intelligence (AI), the study examines how these tools create interactive and immersive learning environments. Drawing upon theories of language acquisition and emerging research, the article highlights the transformative impact of TEIT on language education while addressing implementation challenges in resource-limited settings like Kazakhstan. Recommendations for future research and practical frameworks are provided to guide the integration of TEIT into educational systems.

**Keywords:** Technology-enhanced immersion, virtual reality (VR), augmented reality (AR), artificial intelligence (AI), foreign language education, Kazakhstan, speech skills development.

### Introduction

Foreign language proficiency is an essential skill in the modern globalized world, particularly in regions like Kazakhstan, where multilingual education is a national priority. Multilingualism in Kazakhstan is not only a cultural necessity but also a key factor for economic development and global integration. However, despite the strategic emphasis on language learning, the development of effective foreign language speaking skills among schoolchildren remains a challenge. Traditional methods of teaching often emphasize grammar and vocabulary acquisition but fail to adequately address the practical application of language, particularly in speaking.

This article proposes a transformative solution through the use of technology-enhanced immersion techniques (TEIT). TEIT integrates advanced technologies like Virtual Reality (VR), Augmented Reality (AR), and Artificial Intelligence (AI) to create interactive, immersive, and contextually relevant language-learning environments. By using VR and AR, learners can practice language in simulated real-world environments, while AI offers personalized feedback to improve speaking skills in real-time. This paper aims to explore the theoretical foundations of TEIT, its practical applications in language education, and its potential for addressing the specific needs of Kazakhstani schools.

### The primary objectives of this article are as follows:

To examine the theoretical basis of TEIT in foreign language acquisition.

To explore the role of VR, AR, and AI in fostering immersive learning experiences.

To identify the advantages and limitations of using TEIT in school education.

To provide recommendations for incorporating TEIT into the Kazakhstani educational system.

To propose frameworks for further research and exploration of TEIT in language acquisition.

### Literature Review

Language acquisition theories provide the foundation for understanding how technology-enhanced immersion techniques can support speech skill development. A wide range of research has focused on how immersion in a second language (L2) environment fosters language skills. Stephen Krashen's Input Hypothesis (1982) has been a pivotal theory in this domain. It proposes that language learners acquire a second language most effectively when exposed to "comprehensible input" just above their current proficiency level, which can be facilitated through immersive contexts. TEIT methodologies, which simulate real-life situations, ensure that learners are constantly exposed to authentic language use in dynamic environments.

Lev Vygotsky's Sociocultural Theory (1978) also aligns with TEIT principles. According to Vygotsky, learning occurs through social interaction within the Zone of Proximal Development (ZPD), where learners are supported by more knowledgeable others. Virtual and augmented reality platforms, along

with AI-powered chatbots, act as virtual “teachers” that scaffold language learning. For instance, AI applications can engage students in conversation, provide corrective feedback, and gradually increase the complexity of language tasks as the learner’s proficiency grows.

Research on VR, AR, and AI in language learning is steadily increasing. A study by Slater (2009) on VR immersion in language learning highlighted the benefits of fully immersive environments in promoting language retention and speaking fluency. By placing students in VR scenarios that simulate interactions with native speakers, learners gain exposure to the language in a controlled yet realistic setting, allowing for more spontaneous and confident speech.

Augmented Reality (AR) adds another layer of interactivity by blending the digital and physical worlds. Through AR, learners can engage in language practice through object-based interactions, such as scanning real-world objects to hear their names or perform actions in the target language. For example, AR applications that overlay digital translations or voice recognition feedback on objects can significantly aid in vocabulary acquisition and pronunciation practice.

Artificial Intelligence (AI) has emerged as a game-changer in personalized language learning. AI systems can track student progress, assess pronunciation accuracy, and provide immediate corrective feedback. Systems like Google’s speech-to-text or AI-powered language learning apps such as Duolingo and Babbel employ machine learning algorithms to adapt learning pathways based on individual progress. AI-driven language tools ensure that learners can practice speaking in a low-pressure, judgment-free environment.

In a Kazakhstani context, these technological advancements have great potential. Kazakhstan’s commitment to multilingualism positions it as an ideal testing ground for integrating TEIT into the national curriculum. However, specific challenges and opportunities must be considered when implementing these technologies in schools.

### **Challenges in TEIT Implementation**

While TEIT holds promise, its implementation is fraught with challenges, particularly in a country like Kazakhstan, which faces infrastructural, financial, and pedagogical barriers.

1. **Cost and Infrastructure:** High initial costs for VR headsets, AR devices, and AI-powered language platforms remain significant obstacles. Schools in rural areas, where educational resources are already limited, may struggle to afford these technologies. Additionally, a lack of robust internet infrastructure may hinder the seamless integration of AI and VR into classrooms.

2. **Teacher Training and Professional Development:** The successful adoption of TEIT requires teachers to be proficient in using these technologies. Unfortunately, many educators in Kazakhstan may not be trained to integrate VR, AR, or AI tools into their teaching. Professional development programs will be essential to ensure teachers can effectively utilize these technologies to support language acquisition.

3. **Cultural and Language Barriers:** Though immersive technologies offer the potential for contextual language learning, they must be tailored to the unique cultural and linguistic context of Kazakhstan. Pre-existing content may not fully reflect the linguistic diversity or cultural nuances of Kazakh, Russian, and English. Creating localized content that accurately represents Kazakhstani society, customs, and language variations will be crucial for TEIT’s success.

4. **Over-reliance on Technology:** While technology enhances language learning, it should not replace real-life interaction and communication, which remain vital to language development. The risk of students becoming overly reliant on virtual environments may diminish opportunities for authentic conversational practice with native speakers, which is essential for developing fluency in real-world situations.

### **Theoretical Framework**

The integration of TEIT into language education can be understood through a blend of existing language acquisition theories and technology-enhanced learning principles. Several frameworks are particularly relevant:

1. **Constructivist Learning Theory:** TEIT aligns with constructivist principles, which emphasize active, experiential learning. Immersive technologies enable learners to construct knowledge through direct interaction with the target language in realistic settings. This allows students to build meaning based on real-world experiences rather than abstract instruction.

2. **Communicative Language Teaching (CLT):** The communicative approach prioritizes the development of speaking and listening skills through meaningful interaction. TEIT technologies, particularly VR and AI, provide opportunities for authentic communication in a variety of contexts. The ability to interact with virtual characters or AI-powered conversational agents allows students to

practice their speaking skills in dynamic, contextualized settings.

3. *Multiliteracies Framework*: This framework underscores the importance of integrating multiple modes of learning, including visual, auditory, and digital literacies. TEIT incorporates these modes to create holistic and engaging language learning experiences. Students can practice not only verbal skills but also gain proficiency in reading, listening, and digital navigation within a foreign language environment.

### **Discussion**

The integration of technology-enhanced immersion techniques (TEIT) into Kazakhstan's education system presents both immense opportunities and notable challenges. As outlined earlier, immersive technologies like VR, AR, and AI can revolutionize the way foreign languages are taught and learned. However, the successful implementation of TEIT requires a well-structured framework that accounts for the country's unique educational and technological context.

A proposed framework for TEIT implementation in Kazakhstan involves a phased approach, beginning with pilot projects and extending to nationwide integration. This framework, as detailed in Table 4, outlines key stages, action items, timelines, and stakeholders necessary to support the adoption of TEIT in schools. By addressing the specific needs of Kazakhstani schools, teachers, and students, this framework aims to ensure that TEIT becomes an effective and sustainable tool in language education.

**Table: Proposed Framework for TEIT Implementation in Kazakhstan**

| Stage                       | Action items                                                                         | Timeline  | Key Stakeholders                         |
|-----------------------------|--------------------------------------------------------------------------------------|-----------|------------------------------------------|
| <b>Pilot Phase</b>          | - Introduce VR and AR tools in a select number of schools.                           | 1-2 years | Ministry of Education, Local Schools     |
| <b>Teacher Training</b>     | - Provide professional development for teachers in using immersive technology.       | Ongoing   | Educational Institutions, Tech Providers |
| <b>Content Localization</b> | - Develop language learning content suited to Kazakh, Russian, and English contexts. | 1-2 years | Language Educators, Content Developers   |
| <b>Full Integration</b>     | - Roll out TEIT across schools nationwide, ensuring access to technology             | 3-5 years | Government, Schools, NGOs                |

By following this proposed framework, Kazakhstan can address the barriers to TEIT adoption, such as technology access, teacher training, and content localization, while ensuring that the integration process is gradual and manageable. This comprehensive approach will lay the foundation for a more inclusive and innovative language education system that benefits students across the country.

### **Conclusion**

Technology-enhanced immersion techniques (TEIT) represent a transformative and innovative approach to language education, offering unprecedented opportunities to improve foreign language speech skills among learners. By integrating technology into immersive learning environments, these techniques create dynamic and interactive experiences that cater to various learning styles, ultimately enhancing both motivation and proficiency. TEIT builds on strong theoretical foundations rooted in immersion-based language acquisition principles, demonstrating its potential to revolutionize how languages are taught and learned in the 21st century. However, challenges such as technological infrastructure, accessibility, cost, and teacher training must be carefully addressed to ensure the successful integration of TEIT into educational systems.

For Kazakhstan, where multilingual education is a national priority and linguistic diversity is a cultural hallmark, TEIT holds particular promise. The adoption of technology-enhanced immersion techniques can bridge existing gaps in foreign language education, equipping students with the speech skills necessary to compete in an increasingly globalized world. In a Kazakhstani context, TEIT can contribute to more equitable access to quality language instruction, empowering students from urban and rural areas alike to achieve their full linguistic potential.

Moreover, TEIT can enhance Kazakhstan's strategic goals for national development. As the country places greater emphasis on developing its global competitiveness, particularly in the fields of business, diplomacy, and international trade, students who are proficient in foreign languages will be better positioned to participate in global markets and foster international partnerships. The proficiency in English, Russian, and Kazakh, combined with high-level speech skills, will be crucial for shaping a highly skilled, multilingual workforce.

### **Recommendations for Future Research**

Future research should prioritize the development of localized frameworks for TEIT implementation that align with the unique educational, cultural, and technological landscape of

*Kazakhstan. This includes addressing the specific needs of Kazakhstani schools, students, and educators by exploring sustainable solutions for resource allocation, teacher training, and curriculum integration. By bridging the gap between theory and practice, TEIT can serve as a catalyst for a more inclusive, effective, and innovative language education system in Kazakhstan.*

*A critical area of future research lies in evaluating the long-term effectiveness of TEIT in developing language proficiency, particularly speaking skills. While existing studies have shown promising results in terms of engagement and motivation, there is a need for comprehensive longitudinal studies to assess how well these technologies enhance actual language acquisition over time. This could include measuring improvements in fluency, vocabulary, pronunciation, and the ability to communicate in real-world settings.*

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## THE IMPACT OF TASK-BASED LEARNING ON LEXICAL DEVELOPMENT

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### Abstract

*This article explores the impact of task-based learning on the development of lexical competence in English language learning. TBL is a learner-oriented approach that highlights the use of practical tasks to engage students in interactive learning. Through TBL, learners can enhance their vocabulary not only by remembering words but by applying them in meaningful contexts.*

*This study defines the theoretical foundation of TBL, discusses its benefits and problems, and offers practical tasks applied in a classroom environment. These tasks involve group activities and role-playing exercises that focus on real-life situations, such as traveling and airport scenarios, to show how TBL helps students actively use and employ new vocabulary. The results of experiments shows a 30% progress in students' lexical memory compared to traditional methods. Despite certain barriers, such as task complexity and student proficiency levels, the findings suggest that TBL is an effective method for improving lexical skills in English language acquisition.*

**Keywords:** Task-Based Learning, lexical skills, vocabulary acquisition, language teaching, contextual learning.

Recent studies (Nunan, 2004; Wu, Lowyck, Sercu, & Elen, 2013; Huang, 2022;) suggests that TBL has gained widespread popularity in language education all over the world. This method gives innovative alternatives for developing students' language abilities, especially in developing vocabulary skills. Vocabulary is essential to language acquisition; it includes not only the memorization of words but also understanding their usage in context. Due to this, TBL plays a vital role in fostering lexical development. This article focuses on examining the impact of TBL on vocabulary skills and explaining its efficacy illustrated with examples.

Task-based learning motivates language learners to apply their skills in real-life situations. It gives priority to communication through effective communications, allowing students to work collectively, share information, and convey ideas clearly. This method consists of three specific stages: a pre-task, a during-task, and a post-task (Ellis, 2006; Willis, D., & Willis, J., 2007; Huang, 2022).

In the pre-task stage, students prepare themselves for the new topic and are ready to perform the basic task. During the main task stage, the students exchange views and try to use lexical items in context. In the next stage, the students analyze the process of performing the task and reevaluate the words they have learned (Huang, 2022).

This approach helps students develop a clearer comprehension of the meaning of new words by using them in context. Therefore, the new vocabulary has a higher probability of being remembered and actively used over a long period of time.

Task-based learning method has been demonstrated to improve vocabulary acquisition by supplying participants with real, meaningful opportunities to interact with words. Research by Ellis (2003) and Skehan (1996) indicates that contextualized vocabulary instruction is one of the most effective methods for improving lexical acquisition. Furthermore, the task-based learning process supports the development of student's speaking abilities, as they apply new words in the course of exchanging ideas, collaborating, and engaging in role-play activities.

### Practical examples and tasks

Through the work, the effects of TBL on the lexical system were tested. For instance, group work was organized around the topic of "Travel". Students were given specific situations related to this topic and performed tasks using the words and phrases common in those situations. The goal was to teach students new travel-related vocabulary and have them use it in context.

**In Task 1**, Group work "Journey", the students were divided into three groups, each different travel scenarios, such as "Travel to a city", "Communication with a travel agency", and "Airport travel". Each

group had to utilize new words and phrases relevant to their assigned situation, such as tickets, hotels, excursions, routes, and passengers. At the end of the task, each group presented their work and explained the vocabulary they used during the assignment.

This task allowed students to become familiar with new words related to travel and practice using them in speech. The group work also encouraged students views and actively engage with the new vocabulary.

#### **Task 2, Role Play: "Situation at the Airport"**

The students were divided into two groups: one group played the role of airport employees, and the other group took on the roles of travelers. Each group was instructed to fulfill their respective roles, such as purchasing tickets at the airport, going through custom inspection, and boarding the plane. The airport staff directed the travelers and provided them with the necessary information. During the role-play, the students used new words and phrases, including "ticketing", "check the bag", "tickets for both directions", "hotel booking", and others. This task allowed students to use new words not only theoretically, but also in the course of specific actions. Each student got acquainted with the new words in the performance of their role, and mastered them by using them in a specific setting.

**The TBL method has several advantages.** It encourages active student participation, as learners use new words and phrases in a specific context, which expands their vocabulary. The method also allows for the development of speech and listening skills, as students employ a new lexicon when interacting with one another.

**However, the TBL method also has some potential drawbacks.** It requires both teachers and learners to thoroughly understand the tasks or the learning process may not be effective. For some students accustomed to traditional teaching methods, the TBL approach may be more challenging. Furthermore, the TBL method can be time-consuming and resource-intensive, as the teacher needs to plan the tasks carefully to ensure they are relevant and appropriate for the learning objectives.

#### **Findings and Conclusion**

To measure the impact of TBL method on lexical development, a classroom-based study was conducted over a 6-week period with 20 intermediate-level English learners. The students were divided into two groups:

1. Control Group (memorization and drills).
2. Experimental Group (travel scenarios and airport interactions).

The results are summarized in the table below:

| Group              | Lexical Retention (Pre-test) | Lexical Retention (Post-test) | Spontaneous Usage (Pre-test) | Spontaneous Usage (Post-test) |
|--------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|
| Control Group      | 52%                          | 65%                           | 48%                          | 58%                           |
| Experimental Group | 51%                          | 91%                           | 47%                          | 82%                           |

The findings demonstrate that the TBL method significantly improved students' lexical development compared to traditional methods:

- Lexical retention in the experimental group increased by 40% (from 51% to 91%).
- Spontaneous usage of new vocabulary improved by 35% (from 47% to 82%).

In contrast, the control group showed only modest improvements of 13% and 10%, respectively.

In addition, taking into account the advantages and disadvantages of the TBL method, it is important to select tasks according to the level of pupils and increase their activity in order to apply it effectively. Task-oriented learning is promising because it allows language skills.

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## THE METHODOLOGY OF TEACHING EMOTIONAL VOCABULARY USING ROLE-PLAYING GAMES AND SITUATIONAL METHOD IN ENGLISH LANGUAGE LESSONS

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### Abstract

The article is devoted to the methodology of teaching emotional vocabulary in English lessons using role-playing games and the situational method. The paper examines the theoretical aspects of the formation of emotional vocabulary, as well as analyzes the advantages and features of using these methods in teaching. Special attention is paid to how role-playing games and the situational method contribute not only to the assimilation of new words and phrases, but also to the development of communicative skills, as well as to increasing students' confidence in expressing emotions in a foreign language. The practical implementation of the technique is shown through examples of role-playing games aimed at using emotional vocabulary in the context of real life situations. The article is addressed to teachers of foreign languages and researchers in the field of teaching methods.

**Keywords:** emotional vocabulary, teaching English, role-playing games, situational method, teaching methods, communication skills, expression of emotions.

**Introduction.** Language skills are one of the key components of the overall competence of students necessary for successful mastery of a foreign language. In the context of English language teaching, it is important to highlight communicative competence, which encompasses the ability of students to effectively use the language in various communication situations. In the works of such authors as D.Bilal [1], A.Harchenko [2] and others, it is noted that communicative competence includes not only a grammatical and lexical component, but also the ability to understand and use language in real communication conditions, which makes it the most important goal of the educational process. The desire to develop students' communication skills determines the directions of modern methods of teaching foreign languages, where the main task is not only the transfer of knowledge, but also the development of the ability to actively and effectively use the language in various situations.

To achieve communicative competence, it is extremely important to master a wide vocabulary. Vocabulary is the basis for the formation of communication skills, and its richness determines the depth and variety of students' communicative abilities. According to research conducted by A.S.Hadi, proficiency in a variety of vocabulary significantly increases the level of communicative competence, as it allows not only to accurately express thoughts, but also to understand the subtleties of meaning in various contexts [3].

It is important to emphasize that vocabulary should not only be studied theoretically, but also actively used in the process of practical communication, which contributes to its consolidation and improvement. One of the most significant aspects of vocabulary, which often remains insufficiently studied in the traditional approach to learning, is emotional vocabulary. Emotional vocabulary plays an important role in the communication process, as it helps to convey not only facts and events, but also the inner experiences, feelings and attitudes of the speaker to the described phenomenon. In studies such as the works of M.Bulut [4] and R.Morente [5], it is emphasized that emotional vocabulary contributes to the creation of more lively, vivid and expressive speech acts. Mastering emotional vocabulary allows students not only to express their feelings more accurately, but also to better understand the emotions of other people, which is especially important in intercultural communication.

Emotional vocabulary occupies an important place in the vocabulary, as it affects the ability to perceive and express experiences and states. In modern language, emotional expressions are used not only in everyday communication, but also in professional contexts, where it is important to convey your emotions correctly and competently. Research such as the work of T.Rimehaug, confirm that emotions play a key role in social and communicative practice, and possession of emotional vocabulary becomes a necessary skill for effective communication [6].

Thus, the integration of emotional vocabulary into the English language learning process helps students not only develop lexical skills, but also increase the level of communicative competence.

Emotional vocabulary includes words and expressions that describe a person's feelings,

experiences, and emotional states. The importance of learning emotional vocabulary lies in the fact that it contributes to a more complete and accurate expression of thoughts and emotions in a foreign language. Emotions are an important part of interpersonal communication, and for full communication it is necessary to be able to adequately use words reflecting the emotional spectrum.

According to R. Morente's research, emotional vocabulary is an integral part of personal and social identity, since it allows you to express inner feelings and interact with others [5]. Emotional words have a universal nature, but their perception and use can vary greatly depending on cultural and linguistic characteristics.

One aspect of emotional vocabulary is that it is not limited to adjectives or verbs describing emotions. For example, in English there is a rich set of phrases and idioms that express emotional states (e.g., «to be over the moon», «to feel blue»), and their use requires knowledge not only of vocabulary, but also of context.

To effectively teach emotional vocabulary, it is necessary to develop special techniques that would focus on the use of emotion in the context of communication. Traditional teaching methods often do not take into account the importance of the emotional component of speech, which may limit the developing potential of students. In this regard, techniques aimed at mastering emotional vocabulary become necessary for the development of full-fledged communication skills. According to the researchers, such techniques contribute not only to the expansion of vocabulary, but also to the improvement of intercultural communication skills [6].

To successfully master emotional vocabulary, it is important to create an educational environment in which students will face real situations that require the expression of emotions.

Among the methods that contribute to the teaching of emotional vocabulary, role-playing games and the situational method are distinguished. These methods are actively used in teaching foreign languages, as they allow you to simulate real communicative situations and involve students in the active use of the language. Role-playing games, according to I.A. Vasilyeva, create a condition for the practical implementation of emotional vocabulary in the context of real social interactions, which contributes to a deeper assimilation of vocabulary [7]. The situational method, in turn, is focused on creating various contexts in which students can use the studied vocabulary to express emotions in real life circumstances [8]. Both approaches make it possible to create an interactive environment for learning emotional vocabulary, which significantly increases the effectiveness of learning and contributes to the development of students' communicative competence.

Thus, the use of role-playing games and situational method in teaching emotional vocabulary becomes an important step in improving the quality of English language education, providing students with the opportunity not only to master vocabulary, but also to develop key communication skills for effective communication in various life situations.

The main purpose of role-playing games for teaching emotional vocabulary is to create conditions for the practical use of lexical units reflecting emotional states. Emotional vocabulary includes both adjectives (for example, «happy», «angry», «nervous») and verbs (for example, «to feel», «to express», «to calm down»), as well as phrasal verbs and idioms («to lose one's temper», «to be in bad mood»). In role-playing games, these expressions can be used in real or hypothetical situations, which helps students not only memorize lexical units, but also learn how to apply them in different contexts.

An example of a role-playing game aimed at developing emotional vocabulary may be a game in which students act out a scene from life. For example, a conflict between friends, in which each of the participants must express their emotions. Students use appropriate emotional expressions such as «I am so upset with you!» or «I feel really happy about it!», which allows them to practice new words in a natural context [7].

Role-playing games have a number of advantages for teaching emotional vocabulary. Firstly, they contribute to an in-depth understanding of emotions, as students not only learn words, but also learn how to use them in the real context of communication. Secondly, they increase the motivation and involvement of students in the learning process. According to a study by R.L. Valladares, role-playing games stimulate students to actively participate, as they provide an opportunity for self-expression and creativity [9]. Thirdly, role-playing games help students develop confidence in the use of language, as they allow them to overcome the fear of mistakes and learn new material in a safe and supportive atmosphere. This aspect is important, especially when teaching emotional vocabulary, where expressing emotions in a foreign language requires some confidence.

In addition, role-playing games give students the opportunity to immerse themselves in the cultural peculiarities of the language. Emotional vocabulary often has specific features in different languages and

cultures, and role-playing games help students better understand these differences. For example, the expression «to lose one's temper» in English can mean «to get angry», while in Kazakh there is another expression for this. Role-playing games, therefore, contribute not only to language, but also to cultural learning, helping students learn how to perceive and use emotions in accordance with the cultural context.

Despite all the advantages, role-playing games have their limitations. One of the problems is the presence of cultural differences, which can complicate the perception of emotions and their expression. Emotions can be expressed in different ways in different cultures, and students should take these differences into account when learning. For example, in some cultures, the expression of emotions may be perceived as inappropriate or unacceptable, and the teacher must explain in advance how to use emotional vocabulary correctly in different contexts. Also, for the successful application of role-playing games, a certain level of training of students is necessary. For beginners, it can be difficult to use emotional vocabulary in complex contexts, so role-playing games for them should be simple and understandable.

Examples of role-playing games for teaching emotional vocabulary may include acting out conflict situations, congratulations on victories, or discussions of a bad mood. In one example, students can play out a conflict between friends, where one of the participants feels offended and the other feels guilty. In such a game, participants use phrases to describe emotions, such as «I'm angry with you» or «I feel really bad about it». In another example, students can act out a scene in which one of the participants wins a competition and his friends congratulate him. It uses emotional vocabulary expressing joy and surprise: «I'm so happy for you!» or «That's amazing!». In the third example, students discuss the bad mood of one of the participants using phrases like «I'm feeling down» or «I'm in a bad mood», while others try to support him with phrases like «Don't worry, it will get better».

Thus, role-playing games are a powerful tool for teaching emotional vocabulary, allowing students not only to learn new words, but also to learn how to apply them in various life situations.

The situational teaching method involves the use of real or simulated life situations in which students use a foreign language to solve practical problems. This method is actively used for the formation of emotional vocabulary, as it allows students to learn and use words and use words and expressions related to emotions in the context of everyday situations. For example, when acting out scenes where students discuss their experiences, joy or disappointment, they use appropriate words to express emotions, such as «I'm so happy», «I feel upset», «I'm angry at you». This allows students to learn how to adequately express their emotions in a foreign language, as well as to understand which phrases and words are suitable for different situations.

The situational method also helps students develop the ability to choose the right expressions depending on the context. Emotions often depend on the situation, and studying them in real communication contexts allows students to better understand how and when to use certain expressions. For example, the expressions «I'm so excited!» and «I'm thrilled!» can be used to express joy, but may vary depending on the situation and the level of formality. Students learn such nuances through situational exercises, where they can try on different roles and test how different emotions are expressed in different contexts.

Research such as the work of N.Hodovanets show that the situational method increases the motivation of students, as they feel a direct connection between the educational material and real life [8]. Emotional vocabulary used in situations close to real life allows students to quickly master not only words, but also the corresponding intonation and non-verbal aspects of communication.

The use of the situational method also helps to improve the skills of perception and interpretation of emotions in a foreign language. There are cultural differences in the expression of emotions in different languages, and the situational method helps students navigate these differences. For example, in English-speaking countries, specific phrases and idioms such as «feeling blue» may be used to describe sadness that need to be understood and mastered in context.

However, the situational method has its limitations. It requires careful preparation and the development of suitable situations that could accurately reflect real-life contexts. For entry-level students, this method can be difficult, as they may not have sufficient vocabulary and grammatical knowledge to fully participate in difficult situations.

In practice, the successful use of role-playing games and the situational method can significantly improve students' skills in using emotional vocabulary. For example, in one of the classes, students played out a conflict situation in a group of friends where one of the participants was not invited to the event. During the game, students used insults, discontent and forgiveness, such as «I feel really hurt», «I thought

we were friends», «I'm sorry I didn't include you, I didn't mean to hurt your feelings». This experience helped students not only to learn lexical units, but also to learn how to use them in real social situations.

The methodology of teaching emotional vocabulary using role-playing games and the situational method is a highly effective tool for developing students' skills of expressing emotions in a foreign language. These methods not only contribute to the active development of lexical units, but also ensure their practical application in the context of real or near-reality situations, which helps students overcome the language barrier and improve confidence in communication.

Role-playing games allow students not only to learn new words, but also to develop emotional and intercultural competence, as they actively use emotional vocabulary in various contexts reflecting real social situations. The situational method, in turn, helps students to choose and use emotional expressions correctly depending on the specific situation, which contributes to a deeper understanding of the language and improved communication skills. However, despite their effectiveness, the use of these methods requires proper training and consideration of the level of students, as well as attention to cultural differences in the expression of emotions. The teacher should create a comfortable atmosphere that will allow students to freely use the vocabulary they have learned and experiment with various forms of expression of emotions.

Thus, the introduction of role-playing games and situational method in the teaching of emotional vocabulary makes it possible to significantly improve the quality of education, stimulate the interest of students and promote their comprehensive language development, which makes these methods indispensable in modern teaching of foreign languages.

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## STYLISTIC MEANS OF PEDAGOGICAL COMMUNICATION: THE ROLE OF INTONATION AND NONVERBAL COMMUNICATION IN ENGLISH LANGUAGE CLASSROOMS

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### Abstract

Effective pedagogical communication in English language classrooms encompasses not only verbal expression but also stylistic means such as intonation and nonverbal communication. These tools play a pivotal role in engaging learners, clarifying meaning, and fostering an emotionally supportive learning environment. This paper investigates the influence of intonation and nonverbal cues on student engagement, comprehension, and motivation within English as a Foreign Language (EFL) classrooms. Drawing on the research of Betti (2021) on intonation and Ghafar and Ali (2020) on nonverbal communication, it explores how these elements shape classroom dynamics and enhance teaching effectiveness. Practical strategies for implementing these tools are also offered to improve teacher-student interactions and overall learning outcomes.

**Keywords:** Pedagogical communication, intonation, nonverbal communication, stylistic means, english as a foreign language (EFL), student engagement, classroom dynamics, teaching effectiveness, verbal and nonverbal cues, motivation in language learning.

### Introduction

Pedagogical communication serves as the cornerstone of effective teaching and learning, particularly in EFL classrooms, where linguistic and cultural barriers may hinder comprehension. In this context, stylistic means such as intonation and nonverbal communication become indispensable tools for teachers to establish a meaningful connection with their students. These elements not only enhance verbal communication but also convey emotional nuances and contextual cues that are essential for student understanding and engagement.

Intonation, as highlighted by Betti (2021), adds emotional depth, emphasizes key points, and signals expectations in verbal interactions. Similarly, Ghafar and Ali (2020) underscore the importance of nonverbal communication—gestures, facial expressions, and body language—in complementing spoken language and regulating classroom interactions. Together, these stylistic means create a more interactive, engaging, and inclusive learning environment.

This paper aims to explore the roles of intonation and nonverbal cues in pedagogical communication, their impact on student engagement and comprehension, and practical approaches for teachers to integrate these tools effectively.

### Intonation as a stylistic means of pedagogical communication

Intonation, a key suprasegmental feature of spoken language, refers to variations in pitch that signal meaning, emphasis, and emotional tone. Betti (2021) identifies intonation as a critical element in pedagogical communication, particularly in EFL settings where students may rely heavily on auditory cues to interpret meaning.

**Conveying meaning and emphasis:** teachers use intonation to clarify key concepts, differentiate between questions and statements, and emphasize important information. For example, rising intonation signals a question, while falling intonation indicates finality. This clarity helps students distinguish between instructional cues and content.

**Expressing emotion and attitude:** intonation conveys a teacher's attitude toward the material and students, creating a more dynamic and engaging learning environment. Enthusiastic and varied intonation can motivate students, while monotone delivery may lead to disinterest.

**Encouraging participation:** Betti (2021) emphasizes that intonation helps establish rapport and signals when student responses are expected. A teacher's encouraging tone fosters a sense of safety, prompting students to participate without fear of failure.

**Practical Applications in the Classroom:**

| <i>Intonation</i>         | <i>Example</i>                                       | <i>Impact on students</i>                    |
|---------------------------|------------------------------------------------------|----------------------------------------------|
| <i>Emphasis</i>           | <i>"The MOST important thing is..."</i>              | <i>Highlights key points for students</i>    |
| <i>Questioning</i>        | <i>"Can you explain this to me?" (tone raising)</i>  | <i>Signals a response is expected</i>        |
| <i>Emotion/engagement</i> | <i>"This is exciting!!"<br/>(Enthusiastic tone)</i>  | <i>Creates a dynamic learning atmosphere</i> |
| <i>Clarity</i>            | <i>"Let's review this part again" (tone falling)</i> | <i>Signals closure or transition.</i>        |

**Nonverbal communication: a key stylistic means in teaching**

Nonverbal communication encompasses gestures, facial expressions, body language, and eye contact, all of which play a critical role in supporting verbal messages, managing classroom behavior, and fostering an emotionally positive teacher-student rapport. According to Ghafar and Ali (2020), nonverbal cues not only clarify meaning but also establish emotional connections that are vital for effective teaching and learning, particularly in English as a Foreign Language (EFL) classrooms.

**Gestures and visual reinforcement:**

Gestures are powerful tools that help teachers illustrate abstract concepts, reinforce key ideas, and regulate classroom behavior. In language teaching, gestures serve as a bridge between verbal input and comprehension, providing visual cues that make it easier for students—especially EFL learners—to process and retain information. Illustrating concepts, for example, pointing at a word on the board, drawing shapes in the air, or mimicking actions (e.g., "jump," "swim," or "write") can help students visualize the meaning of unfamiliar vocabulary. Emphasizing key ideas by raising a hand to signal silence or waving to draw attention directs focus during crucial moments in the lesson. Behavior regulation with simple gestures, such as raising an eyebrow or holding up fingers to count steps in an instruction, can help maintain classroom order without interrupting the flow of communication. By combining verbal explanations with gestures, teachers create a multi-sensory experience that aids student understanding, particularly when language barriers exist.

**Facial expressions and emotional support:**

Facial expressions are key indicators of the teacher's attitude, mood, and emotional involvement in the lesson. Positive expressions not only foster a welcoming environment but also reduce anxiety, which is often experienced by EFL learners. Smiling at students, nodding in agreement, or maintaining eye contact conveys warmth and approachability. These cues signal to students that their contributions are valued and encourage active participation. Subtle cues like a reassuring smile or raised eyebrows when students struggle can offer emotional support, helping them feel comfortable taking risks in their language production. Teachers can use encouraging facial expressions—such as smiling when students answer correctly or showing understanding when they make mistakes—to build confidence and motivation. For students who are nervous about speaking or participating, a simple smile or nod from the teacher can make a significant difference in their willingness to engage.

**Body language and classroom dynamics:**

Body language, including posture, movement, and proximity, plays a significant role in shaping classroom dynamics and ensuring an inclusive, engaging learning atmosphere. Teachers' body language reflects their confidence, enthusiasm, and openness toward students, influencing how students perceive the lesson and their teacher. Standing with relaxed shoulders, facing the class, and avoiding closed-off gestures (e.g., crossed arms) conveys confidence and invites student interaction. Moving closer to students when explaining concepts or giving individual feedback demonstrates attentiveness and can increase feelings of teacher immediacy—defined by Ghafar and Ali (2020) as behaviors that reduce psychological distance between teacher and students. Walking around the room helps teachers interact with more students and monitor their understanding while maintaining an active, dynamic learning environment. A teacher moving closer to disengaged students can subtly encourage participation. By consciously managing their body language, teachers can create a classroom atmosphere that feels inclusive, supportive, and interactive.

**The combined role of intonation and nonverbal communication in pedagogical effectiveness**

The synergy between intonation and nonverbal communication enhances teaching effectiveness by creating multimodal messages that are both clear and engaging. When verbal and nonverbal cues align, they reinforce the teacher's intended message and ensure that students interpret it accurately. For example, raising intonation while gesturing toward a student signals an expectation for response, while a warm smile and soft tone provide encouragement.

*Enhancing Comprehension: Combining intonation with gestures can clarify complex instructions or abstract concepts, making lessons accessible for students with varying language proficiency levels.*

*Fostering Emotional Engagement: Nonverbal cues, such as facial expressions, complement intonation to convey enthusiasm, concern, or excitement, making lessons more emotionally engaging and memorable.*

*Improving Classroom Management: Nonverbal communication, paired with appropriate intonation, helps regulate behavior. For example, a firm tone combined with a serious facial expression can signal authority without escalating tension.*

### **Conclusion**

*The integration of intonation and nonverbal communication is essential for effective pedagogical communication in EFL classrooms. Intonation serves as a tool for emphasizing key points, conveying emotional tone, and fostering student engagement, while nonverbal cues such as gestures, facial expressions, and body language reinforce verbal messages and create an inclusive, supportive atmosphere.*

*Drawing on the research of Betti (2021) and Ghafar and Ali (2020), this paper highlights the critical role these stylistic means play in enhancing teaching effectiveness. Teachers who actively incorporate intonation and nonverbal communication strategies can improve student comprehension, motivation, and participation, ultimately creating a dynamic and interactive learning experience.*

*By recognizing and utilizing these tools, educators can overcome linguistic barriers and foster meaningful teacher-student connections, making EFL classrooms more effective and engaging.*

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## METHODS OF TEACHING ENGLISH FOR ORAL ARGUMENTATIVE COMMUNICATION BASED ON JOURNALISTIC TEXT

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### Abstract

Teaching English for oral argumentative communication using journalistic texts is an innovative approach that integrates critical thinking, language acquisition, and real-world contexts.

Journalistic texts, such as opinion pieces, editorials, or news reports, often present arguments, counterarguments, and evidence, making them ideal for teaching argumentative communication. They provide authentic, real-world material that helps students engage with current events and diverse perspective.

This article discusses several significant roles in language acquisition:

1. Exposure to Authentic Language.
2. Improving Critical Thinking and Argumentation.
3. Encouraging Cultural Awareness.
4. Enhancing Vocabulary and Pronunciation.
5. Developing Confidence and Fluency.

The dynamic nature of news and its relevance to current events make journalistic texts engaging. Students are more likely to participate actively in discussions, debates, and presentations when the topics are timely and interesting. However using journalistic texts to teach English speaking skills has its challenges: many journalistic texts use advanced vocabulary, idiomatic expressions, or industry-specific jargon that might be too difficult for lower-level learners. This can overwhelm students and hinder their speaking practice. Additionally, teachers need to put in extra effort to adapt these texts and create speaking activities that resonate with student's interests and language levels.

With careful planning, journalistic texts can serve as a powerful tool to boost students' confidence in speaking, deepen their understanding of the world, and make the learning experience more interactive and enjoyable. When balanced with other methods, this approach can enrich English language teaching and help students develop essential communication skills for real-life situations.

### Article

In the 1970s and 1980s, CLT emphasized real-world communication and the use of authentic materials, such as newspapers and news broadcasts, to develop speaking skills. This laid the groundwork for using journalistic texts in teaching oral communication.

Using journalistic texts to teach oral argumentative communication offers a unique and highly effective way to engage students in real-world discussions. One of the key strengths of this method is its connection to real-life situations. By working with articles that address current societal debates, students are able to practice speaking in ways that are both meaningful and directly applicable to their everyday lives. This approach helps them prepare for conversations in both professional and social settings, where being able to argue a point clearly and defend their position is crucial.

Moreover, the use of current news topics keeps students motivated and engaged. Unlike abstract language exercises, news stories are often interesting, relevant, and full of issues that students care about whether it's politics, climate change, or social justice. These topics keep the lessons dynamic and encourage students to participate actively in discussions, which in turn fosters a deeper connection to the language they're learning.

Another major benefit is the development of argumentative skills. Many journalistic texts present multiple perspectives on an issue, backed by evidence. As students analyze and discuss these texts, they learn how to structure their arguments, support their opinions with facts, and anticipate opposing views. These are essential skills for effective communication, whether in personal debates or professional discussions.

Engaging in debates or role-plays based on these texts also helps students improve their speaking fluency and build confidence. The more they practice articulating their thoughts in structured

*discussions, the more comfortable and confident they become in speaking English.*

*Lastly, working with journalistic texts helps students become more media literate. They learn to evaluate news sources critically, recognize biases, and distinguish credible information from misinformation. In today's world, where we are constantly surrounded by media, this skill is more important than ever for navigating the vast amount of information we encounter every day.*

*While using journalistic texts in teaching oral argumentative communication offers many benefits, there are also some challenges that teachers and students may face.*

*One of the biggest hurdles is the complexity of the language in many journalistic texts. News articles often contain advanced vocabulary, idiomatic expressions, and specialized terminology that might be overwhelming for students, particularly those at lower proficiency levels. Teachers may need to adapt or simplify these texts to make them more accessible, which can be time-consuming.*

*Cultural and contextual differences can also pose challenges, especially when students come from diverse backgrounds. News articles often reflect the culture, values, and societal norms of the place where they were written, which may be unfamiliar or even confusing to students. Discussing sensitive topics like politics or social issues can sometimes lead to misunderstandings or discomfort, so teachers must handle these discussions with care and respect for differing perspectives.*

*Another potential challenge is the risk of disengagement. While current news topics can be very engaging, not every student will be interested in every issue. If the news articles chosen don't align with the interests or experiences of the students, they may struggle to stay motivated or participate actively. It's important for teachers to carefully select topics that resonate with their students and to vary activities to keep the lessons dynamic.*

*Finally, overuse of journalistic texts can lead to monotony. While news stories provide great content for discussions and debates, relying on them too heavily can make the lessons feel repetitive. To keep students engaged, it's essential to balance these texts with other types of speaking activities and resources.*

*Despite these challenges, with thoughtful planning and adaptation, journalistic texts can still be a powerful tool for teaching oral communication. By carefully selecting materials, being sensitive to cultural differences, and diversifying lesson activities, teachers can overcome these obstacles and create an engaging, effective learning environment.*

*Using journalistic texts to teach oral argumentative communication is a powerful and engaging method that connects students with real-world issues and helps them develop critical language skills. It not only enhances their ability to express and defend opinions but also prepares them to participate in meaningful conversations in both personal and professional settings. The real-world relevance of news topics makes lessons dynamic, while the opportunity to engage with diverse perspectives promotes critical thinking and cultural awareness.*

*However, as with any teaching method, there are challenges to consider. The complexity of language, cultural differences, and the potential for disengagement are all factors that need to be managed thoughtfully. By selecting appropriate materials, adapting activities to suit students' needs, and balancing this method with other approaches, teachers can overcome these obstacles and create a supportive, engaging learning environment.*

*Ultimately, when used thoughtfully, journalistic texts can not only improve students' language proficiency but also empower them to think critically, communicate confidently, and engage with the world around them.*

## METHODS OF TEACHING IDIOMATIC DIALOGIC SPEECH AT ADVANCED STAGES OF TEACHING ENGLISH

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### **Abstract**

*This study explores methods for teaching idiomatic dialogic speech at advanced stages of English language learning, focusing on improving speaking skills and developing idiomatic competence through the use of idioms, collocations, and phrasal verbs. The research highlights the challenges that learners face in achieving fluency and confidence in speaking, which are essential for academic and professional success. To enhance contextual communication, the study emphasizes interdisciplinary approaches like English for Specific Purposes (ESP), Content and Language Integrated Learning (CLIL), and English as a Medium of Instruction (EMI). Effective teaching strategies, such as role-play, movie clips, authentic materials, and scenario-based learning, are identified as essential tools in advancing idiomatic dialogic competence. These interactive methods provide practical opportunities for students to internalize idiomatic expressions, making them applicable in real-world conversations. Activities that promote argumentation, questioning, and debate simulate real-life communication, allowing learners to develop their ability to express nuanced meanings fluently and culturally appropriately. The findings of the study emphasize the transformative potential of dialogic teaching when idiomatic instruction is included. Authentic, contextual tasks foster the development of both linguistic and cultural skills, boosting learners' fluency and confidence. The research also underscores the importance of tailoring teaching strategies to address the psychological and motivational needs of students, facilitating their language development. These personalized approaches support students' engagement and learning outcomes. By incorporating idioms, collocations, and phrasal verbs into dialogic teaching, educators can create a comprehensive learning environment aligned with real-world communication demands. This helps learners overcome challenges in self-expression, encouraging them to develop greater conversational versatility. Ultimately, immersive teaching strategies that emphasize idiomatic speech contribute significantly to enhancing learners' communicative competence.*

*Dialogic teaching has proven to be an effective methodology in advanced English classrooms, particularly in fostering the use of idiomatic expressions and nuanced communication. Research indicates its success in both content-based and language-focused education, demonstrating that dialogic approaches enhance learners' ability to engage in meaningful, collaborative dialogues while building language proficiency [1] (Adler et al., 2003; Mercer et al., 2009). In foreign language classrooms, dialogic teaching enables students to develop advanced language skills, including idiomatic speech, through peer interactions and group discussions, creating opportunities to practice language authentically [2] (Barekat & Mohammadi, 2014; Shea, 2018). By engaging learners in problem-solving and collaborative tasks, this method facilitates the integration of idiomatic language into students' everyday communication.*

*Despite its potential, dialogic teaching has not received recent analytical attention in applied linguistics, partly due to the rise of newer approaches, such as translanguaging and translangual practices, which emphasize similar theoretical underpinnings [3] (Cenoz & Gorter, 2020; Wei, 2018). Nevertheless, dialogic pedagogy remains a powerful tool for educators, allowing for active student participation, inquiry, and elaboration—elements crucial for mastering idiomatic expressions. The integration of interactive technologies, such as digital tools and whiteboards, further enhances this methodology by creating dynamic environments where learners can practice idiomatic speech and engage with authentic language use. These advancements align with research showing that dialogic teaching yields different outcomes depending on the classroom context and subject, including notable differences in the quality of educational dialogue. Studies conducted in various EFL contexts highlight the effectiveness of dialogic teaching in improving students' speaking skills and understanding of language nuances. For example, in Hong Kong, where English is a widely used but foreign language for many, teachers employed collaborative dialogues to reduce linguistic barriers and enhance students' vocabulary acquisition [4] (Lin & Luk, 2005). Similarly, in Korean university classrooms where English served as the medium of instruction, dialogic teaching fostered communicative competence by*

*encouraging students to engage with authentic questions in flexible, interactive environments. This approach helped students focus on meaning-making rather than their perceived linguistic limitations. In Iran, the application of 21 dialogic discourse rules in high school English classes led to significant improvements in students' speaking abilities, demonstrating the value of structured dialogic interactions. However, challenges such as organizing complex discussions and engaging reluctant speakers have been noted, as observed in advanced EFL classrooms in Japan, where students struggled to participate effectively at times [5] (Shea, 2018). Addressing these issues requires careful planning and the use of strategies to balance participation and linguistic challenges.*

*In contexts where English is not widely spoken in daily life but remains essential for future careers, such as Thailand, dialogic teaching complements task-based approaches by providing authentic opportunities to practice idiomatic speech. Classroom tasks should be designed to foster spontaneous and meaningful dialogue, equipping students with the skills to use idiomatic expressions in real-world contexts. Activities should emphasize collaborative problem-solving, encouraging learners to listen to diverse perspectives, consider alternative viewpoints, and co-construct knowledge [6] (Gillies, 2016). Collaborative dialogue enables students to solve language-related challenges together, helping them internalize idiomatic usage and build confidence in their communication skills. Through repeated exposure to the process of constructing knowledge, learners become more adept at applying idiomatic expressions in new situations beyond the classroom.*

*The emphasis on creating a variety of voices and perspectives in dialogic teaching is particularly valuable in advanced language classrooms. By encouraging students to engage with each other's ideas, question assumptions, and explore alternative interpretations, dialogic pedagogy fosters a deeper understanding of idiomatic language and its cultural contexts [7] (Lampert, 2001; Morson, 2004). Importantly, knowledge-sharing in such classrooms is not limited to the teacher or more proficient students; instead, insights can emerge from any participant, promoting a collaborative learning environment. This approach aligns with the concept of collaborative dialogue, defined as problem-solving and knowledge-building interactions where learners actively construct meaning together. Problem-solving tasks, particularly those involving real-world scenarios, can generate spontaneous use of idiomatic expressions, helping students transition from classroom practice to authentic language use. Dialogic teaching offers a robust framework for teaching idiomatic dialogic speech at advanced levels by creating environments where students can practice language authentically, collaborate with peers, and build confidence in using idiomatic expressions. The method's emphasis on inquiry, elaboration, and diverse perspectives ensures that learners not only acquire linguistic proficiency but also develop critical thinking and communication skills essential for success in real-world context*

*Teaching idiomatic dialogic speech at advanced stages of English learning benefits significantly from dialogic teaching methods, which challenge the traditional monologic approaches often found in standard language instruction. These conventional methods, where instructors act as authoritative figures transmitting fixed knowledge, are replaced in dialogic teaching by a more interactive and dynamic process. In this framework, knowledge is not presented as a single, unchanging truth but as a diverse and evolving set of understandings constructed through dialogue. The instructor's role shifts from a controller to a facilitator, engaging learners in collaborative and meaningful activities that foster deeper interaction and critical thinking. Dialogism, as described by Bakhtin, highlights that every utterance, whether spoken or written, involves multiple voices and perspectives. This concept is especially important in teaching idiomatic dialogic speech, as idiomatic expressions often carry cultural nuances and embedded ideologies. Dialogism moves beyond a simple exchange of sentences between two individuals; it encourages the exploration of multiple perspectives within communication, enabling learners to engage in internally persuasive discourse. Such discourse challenges students to critically examine meanings, investigate messages, and develop a richer understanding of idiomatic language through open and interactive conversations, rather than predictable and controlled exchanges.*

*Incorporating dialogic teaching into advanced English classrooms requires purposeful planning to create an environment that supports meaningful dialogue. [8] Alexander's principles of dialogic teaching offer a useful framework for structuring these interactions. First, a collective approach ensures that learners and instructors engage collaboratively, fostering group-based discussions that allow for shared exploration of idiomatic language. Reciprocity in the classroom encourages learners to share and reflect on different viewpoints, including idiomatic expressions and their varying uses in context. A supportive environment is crucial, as it enables students to experiment with idiomatic language without fear of making mistakes, creating a space where errors become opportunities for learning and growth. Cumulatively building on ideas is another essential aspect, where learners and instructors develop their*

*understanding of idiomatic speech by expanding on their own insights and those of their peers. This iterative process helps deepen learners' grasp of idiomatic expressions and their practical applications. Finally, dialogic teaching in this context must be purposeful, with instructors designing activities and discussions that explicitly aim to enhance learners' fluency in idiomatic dialogic speech. This involves tasks such as role-plays, debates, and discussions where idiomatic expressions are not only used but also analyzed and contextualized, helping learners integrate these expressions into their active language repertoire effectively. By fostering an environment that prioritizes interaction, critical thinking, and cultural understanding, dialogic teaching provides an effective methodology for mastering idiomatic dialogic speech at advanced stages of English learning.*

*Methods of teaching idiomatic dialogic speech at advanced stages of English instruction should incorporate the principles of dialogic teaching, which emphasize fostering critical thinking, creativity, and collaborative learning. In advanced English classrooms, teachers aim to equip students with more complex language skills, including the use of idiomatic expressions in authentic, conversational contexts. Unlike traditional monologic teaching, where the teacher dominates the conversation, dialogic teaching encourages two-way communication, promoting higher-level thinking and fluency. A dialogic approach engages students in discussions, requiring them to analyze, reflect, and actively contribute ideas. This method helps students incorporate idiomatic speech into their dialogues by expanding their vocabulary, reinforcing language use, and encouraging deeper interactions with peers. Advanced learners should be exposed to tasks that challenge them to use idioms naturally, not just as isolated phrases but in contextually meaningful ways. Teachers should balance structured activities with open-ended tasks, offering students the chance to use idiomatic expressions while fostering a dynamic classroom environment where students feel empowered to share their perspectives. By fostering these conditions, students' language abilities, including their command of idiomatic expressions, can be significantly enhanced. Dialogic teaching not only improves language proficiency but also encourages critical thinking and promotes the idea of shared knowledge, which is essential in mastering idiomatic speech at advanced stages. Through collaborative discussion and targeted use of idiomatic language, learners will be better equipped to communicate more fluently and naturally. Vocabulary plays a key role in helping learners achieve authentic and native-like communication. It is not limited to simply understanding the surface meanings of words but includes deeper, culturally embedded expressions. English, being rich in idiomatic language, is filled with phrases whose meanings are not directly tied to their literal definitions. These idioms, used regularly by native speakers, often reflect cultural values and norms. For non-native speakers, idioms can pose significant challenges due to their complex meanings and cultural roots. Without the necessary knowledge of idioms, learners may face breakdowns in communication, fail to express themselves fully, and encounter difficulties in intercultural exchanges, hindering their progress in mastering the language.*

*Idioms are widely recognized as a key component of advanced language proficiency. They enable concise communication, often replacing longer explanations with brief and impactful phrases. For example, "a hot potato" communicates a complex idea far more efficiently than a detailed description of a controversial topic. Idioms also add variety and richness to language use, making speech and writing more engaging. Their creative nature often captures learners' interest, encouraging curiosity and excitement. Learners who explore idioms often feel a sense of accomplishment when they understand their meanings, which can fuel motivation and deepen their engagement with the language. However, idioms are often neglected in English language instruction. Many learners are not given the tools to recognize, understand, or use idiomatic expressions effectively. This neglect may be due to the challenges of teaching idioms, which include their structural complexity and difficulty in translating their meanings into a learner's native language. In many cases, idioms are treated as isolated vocabulary items, disconnected from real-life usage. Learners rarely encounter idioms in authentic contexts, limiting their ability to use them naturally in conversations. This lack of exposure discourages learners from experimenting with idioms, further reducing their confidence and willingness to integrate them into their language use. To address these challenges, idioms must be taught in a way that highlights their relevance and applicability. Teaching methods should go beyond rote memorization and focus on practical application. For example, learners can benefit from role-playing scenarios, group discussions, and interactive exercises that incorporate idioms into real-world communication. These approaches allow learners to see how idioms function in context and encourage them to use idiomatic expressions more freely. Advanced learners, in particular, need opportunities to practice idioms in realistic situations where they can develop fluency and confidence. Idioms also play a critical role in developing pragmatic competence, which is essential for effective communication. Pragmatic competence involves*

understanding the implied meanings and cultural nuances of expressions, skills that are crucial for navigating both social and professional interactions. Without a strong grasp of idiomatic language, learners may struggle to interpret subtle meanings or respond appropriately in complex conversations. Teaching idioms helps bridge this gap, equipping learners with the tools to communicate more naturally and persuasively. Despite their importance, idioms remain underrepresented in many language curricula. Even in advanced English courses, idioms are often treated as secondary to grammar or general vocabulary. This lack of focus limits learners' ability to achieve full fluency and cultural awareness. To overcome this, idioms need to be integrated more systematically into advanced language instruction. Educators must address the semantic, syntactic, and pragmatic challenges that idioms present, using innovative teaching methods to help learners internalize these expressions. A systematic approach to teaching idioms can greatly enhance learners' language skills. By incorporating idiomatic expressions into regular instruction, educators can help learners expand their vocabulary, improve their communication abilities, and gain deeper insights into the cultural context of the language. For advanced learners, mastering idioms is not only a sign of proficiency but also a gateway to more authentic and meaningful interactions. Through consistent practice and exposure, learners can develop the confidence to use idioms effectively, enriching their overall language competence and preparing them for diverse communicative challenges.

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## THE ROLE OF MENTAL MODELING IN IMPROVING READING COMPREHENSION IN ENGLISH AS A FOREIGN LANGUAGE (EFL) LEARNERS

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### **Abstract**

*This article examines mental modeling as a strategy to enhance reading comprehension in English as a Foreign Language (EFL) learners. It highlights challenges such as limited vocabulary and cultural differences and explains how mental modeling integrates new information with prior knowledge for deeper understanding. Practical strategies like activating prior knowledge, visualization, summarization, and interactive techniques such as reciprocal teaching are discussed. The use of culturally relevant texts, teacher feedback, and digital tools is also emphasized. The article concludes that mental modeling fosters critical thinking, comprehension, and language development, offering practical solutions for EFL teachers.*

**Keywords:** *Mental modeling, reading comprehension, EFL learners, reciprocal teaching, language development, digital tools.*

### **Introduction**

*Reading comprehension is an essential skill for English as a Foreign Language (EFL) learners. It helps them understand different types of texts, think critically, and communicate more effectively. However, many learners face difficulties with reading comprehension. These challenges often include limited vocabulary, unfamiliar cultural ideas, and the lack of useful reading strategies. As a result, learners may only understand texts on a basic level, which prevents deeper engagement and learning.*

*Mental modeling is a cognitive process that can help solve these problems. It involves creating mental pictures or representations of the text while reading. By building these models, learners can connect what they already know with new information, imagine relationships between ideas, and predict what might happen next. This helps them understand texts more deeply.*

*This article discusses the theory behind mental modeling and how it can be applied in EFL learning. The first part explores how mental modeling works and why it is important. The second part presents strategies and activities that teachers can use to help students improve their reading skills. This article aims to show how mental modeling can make reading easier and more effective for EFL learners, improving their understanding and overall language ability.*

### **THEORETICAL CHAPTER: MENTAL MODELING AND READING COMPREHENSION IN EFL LEARNERS**

#### **Understanding Mental Modeling**

*Mental modeling refers to the reader's ability to form internal representations of information extracted from a text. These mental models enable users to structure and understand the relationships between concepts, experiences, and characters. This thinking ability is particularly important to enhance reading comprehension, especially for English as a Foreign Language (EFL) learners, whose experiences may include encountering new words, syntax structures and cultural references [8]. Mental models allow readers the ability to put new concepts together and to build on previously acquired knowledge, thereby deepening their understanding of the given text [9].*

#### **The Role of Mental Modeling in EFL Contexts**

*Mental modeling plays a significant role among EFL learners, since it can compensate for differences in both linguistics and culture. Evidence indicates that, when learners actively construct mental models, they are able to apply prior knowledge to the inference of new information more successfully, an outcome that may result in increased reading comprehension [9]. For instance, a student encountering a description of a culturally different event can apply their schema of similar events to form an internal representation that helps students grasp both the context and the level of detail in the text. In addition, visualization tactics and summary of learning points assist learners in developing more powerful mental representations, which enable a learnerised organ of maintenance and both understanding and retention of that information [3].*

*Reading comprehension is not only word recognition but also the process of synthesis of these*

words into a highly organized mental representation. Proficiency readers repeatedly revise their mental models whilst they read, making assumptions, disambiguating, and anticipating the future based on their text comprehension [2]. According to the Interactive-Compensatory Model of Reading, readers utilize a combination of bottom-up (decoding) and top-down (prior knowledge and expectations) processing to create mental models that reflect both textual details and inferences [2]. Processes like this are vital for EFL learners, because through such processes they can learn to process, in deeper, more profound terms, complex language structures and abstract ideas.

#### *Theoretical Frameworks and Research*

Mental modeling is grounded in several established cognitive and educational theories that explain how learners construct and refine their understanding of texts. These include:

*Schema Theory:* Introduced by Bartlett (1932), and further developed by Anderson (2019), schema theory states that people apply their past knowledge, or "schemas," to explain new information. In reading, mental models are generated using these schemas which are called into play in order to understand the text.

*Constructivist Model:* Vygotsky (1978) and Piaget (1970) have focused on the process whereby the learner actively constructs meaning through experiences and interactions. Mental modeling aligns with constructivist principles as learners build and modify their mental representations based on the content they read and their prior knowledge.

*Dual Coding Theory:* Paivio (2007) proposes that the integration of verbal and visual information will have a positive effect on cognitive processing. In the framework of reading and imagery-based visualization and mental imagery, these activities contribute to strengthen textual information and result in stronger mental representation and enhanced understanding. Recent research has also provided evidence that mental modelling has been beneficial to the process of reading comprehension. For instance, Tao and Zhang (2021) reported that students of EFL who used visualization and prediction strategies significantly enhanced performance in comprehension and retention [9]. In a similar vein, Gernsbacher (2017) showed that students actively engaged in mental model building score higher on reading comprehension tasks, especially on challenging texts [2].

### **PRACTICAL CHAPTER: STRATEGIES AND TECHNIQUES FOR ENHANCING READING COMPREHENSION THROUGH MENTAL MODELING**

#### *Strategies to Foster Mental Modeling in EFL Learners*

To foster mental modeling in EFL learners, teachers can utilize a range of strategies aimed at activating prior knowledge and supporting the construction of deeper understanding. One effective approach is activating learners' prior knowledge before reading a text. If the teacher discusses related topics, brainstorm, or relates the content to personal experiences, the teacher can use these strategies to activate related schemas, which can help to promote the absorption of new information [9]. For example, before reading a text *Old Festival Day*, learners can engage in a discussion comparing such events in other cultures around the world, which helps them to build links and a more cohesive mental model of the content discussed in the text. Another highly effective strategy is visualization, where learners create mental images of what they are reading. Visualization has been demonstrated to aid learners in structuring and retaining information through the provision they make to learners to construct representations of the scenes, events, or characters as described in the text [3]. Following the reading of a descriptive paragraph the teacher can ask students to sketch a picture or describe the scene with all the details they remember from reading, reinforcing the mental representation of the text. This method not only promotes understanding but also facilitates recall, which makes it easier for students to remember the content afterwards.

Summary is yet another effective method that helps to build a mental model. Requiring students to paraphrase the salient ideas of a text helps them to learn to choose and structure most important concepts, thereby strengthening learning [2]. When students participate in summarization tasks, they concentrate on the defining characteristics of the text and can, as a result, develop more definite mental models and more efficient memory of the material. This process also drives active reading of the text, which is a key factor in better overall reading understanding.

Interactive activities are also essential for improving not only mental modeling, but performing reading comprehension skills, as interactive activities can also contribute to a mostly autonomous reading comprehension process. For instance, reciprocal teaching has students, operating in a small group, taking turns to paraphrase, ask, clarify, and anticipate while reading. This interdisciplinary collaborative approach enables learners to better refine their mental models through exposure of the text from multidisciplinary viewpoints [4]. Through this process, students are encouraged to make

*inferences, resolve ambiguities, and update their mental models, leading to deeper comprehension and more accurate understanding.*

*Similarly, the Question-Answer Relationship (QAR) strategy distinguishes questions between high and low cognitive expenditure. These questions - in particular literal, inferential and experience based questions [5]. This framework facilitates the learners to read texts critically and gain deeper understanding of the same. Through prompting students to reflect on the connections among ideas in the text, QAR encourages the building of more precise and integrated mental models. Examples include the application of think-aloud protocols, in which students give voice to their thinking as they read through the text. This technique helps learners become more aware of how they create and refine their mental models. Teachers can instill this activity by reading aloud and "telling the thinking" of the text, as they read through it, including making predictions, asking questions, and handling uncertainty. Next, students can have personal experience of doing think-alouds, which involves talking about the ways in which they visualize scenes, draw inferences, and articulate their knowledge and all these will help them internalize the useful mental modeling strategies [4].*

#### *Techniques for Teachers to Support Mental Modeling*

*Teachers are also key in working with students to construct their mental models. Scaffolding is one of the most significant techniques offering structured assistance to enable learners to overcome tasks they feel are beyond their reach alone. In reading, this could involve offering prompts or guiding students through complex sections of a text by asking targeted questions or breaking the text into smaller parts. Scaffolding in reading helps students approach the skill of independently generating mental models one step at a time and therefore leads to an overall reading comprehension gain [7]. Another approach that seems to contribute to mental modeling in learners of English as a Foreign Language (EFL) is the use of culturally relevant texts. If students come across material that is relevant to them on a personal or cultural level, they generalize the new information better to the existing knowledge. Grabe (2018) suggests that texts that describe learners' own culture or interests attract them with a higher degree of immersion, which facilitates the establishment of realistic mental models. Teachers are able to use a multitude of the authentic materials (articles, short stories, etc. that students live and have experienced, prompting them to make connections between the new learning and what they know before (background knowledge).*

*Feedback is also a critical component in enabling development of mental models. Having students interact with a text and then going on to give and receive feedback guide students in the refinement of their knowledge and in the acquisition of better reading comprehension. This feedback may pertain to prompting students to draw better inferences, to structure their thoughts more logically, or better imagine the text. By providing detailed feedback, teachers can help students identify gaps in their mental models and work on strengthening their comprehension skills [2].*

#### *Integrating Technology and Tools*

*Technology also offers opportunities to enhance mental modeling and reading comprehension. Digital tools, including graphic organizers or mind-mapping software applications, allow students to graphically represent the connections between ideas in an ingested text. These tools aid students in the representation of their ideas and in the finding of the central ideas, allowing them to construct integrated, mental models [8]. Teachers can employ those tools to direct students to structure their thoughts and organize connections between chapters of the text, in a way that facilitates their mental model process.*

*Moreover, adaptive learning systems such as Duolingo or ReadTheory can be used to still strengthen learners' capacity of creating mental models through targeted readers' experiences. These platforms vary any reading material difficulty according to the student's progress and provide customized support that can be used to refine mental models at a personalized rate [3]. The immediate feedback given by these platforms also validates comprehension abilities, and empowers students to adjust their mental models in real time.*

#### **Conclusion**

*This article explored the significant role of mental modeling in improving reading comprehension for EFL learners. Through the theoretical and practical chapters, it became evident that mental models—internal representations of information that help individuals make sense of and integrate new knowledge—are critical for effective reading comprehension. Using a mix of strategies, i.e., activating existing knowledge, visualizations, summaries both, and some interactive approaches, teachers can enable students to develop more precise conceptual models of their texts and, in doing so, acquire a better learning of what they read. Moreover, the practical strategies discussed, including reciprocal*

teaching, think-aloud protocols, and the use of technology, provide EFL teachers with diverse tools to support students in developing their mental models. These approaches not only enhance comprehension but also encourage critical thinking, encouraging learners to analyze texts from different viewpoints and identify relationships between different bits of information. Through the implementation of these approaches in the classroom, teachers can foster an instructional environment in which learners are actively engaged in the process of building meaning from text. This deep cognitive involvement in the learning process guarantees the students have the required cognitive learning capabilities for advanced reading comprehension, which has in turn the knock on effect of their overall language learning. In conclusion, mental modeling offers a powerful framework for understanding how learners process and comprehend written texts.

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## THE ACTUALITY OF PEER COLLABORATION IN EDUCATION

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### **Abstract**

*This article discusses the growing significance of peer collaboration in education, emphasizing how it enhances learning outcomes and fosters student engagement. The research investigates the role of peer collaboration in promoting critical thinking, problem-solving skills, and deeper understanding of academic content. Peer collaboration, a valuable pedagogical approach in contemporary classrooms, involves students working together to achieve common learning goals.*

*The article provides an overview of peer collaboration's benefits, which include improved academic performance, increased student motivation, and the development of social and communication skills. By engaging in collaborative activities, students are not only able to reinforce their own understanding of the subject matter but also help their peers grasp difficult concepts. This reciprocal learning process makes education more interactive and participatory, enabling students to learn from each other's strengths and perspectives. The research also highlights how peer collaboration caters to diverse learning styles, ensuring that all students, regardless of their academic abilities, benefit from the shared learning experience.*

*In addition, the article highlights how peer collaboration promotes teamwork and creates a sense of community within the classroom. Through these interactions, students develop essential life skills such as empathy, negotiation, and conflict resolution—skills that extend beyond the classroom and into the professional world. The study contrasts peer collaboration with traditional teaching methods, asserting that collaborative learning offers a more dynamic, student-centered approach, leading to deeper, more personal engagement with the material.*

*However, the article also discusses potential challenges when implementing peer collaboration. Unequal participation can occur, with some students dominating the discussions while others remain passive, thus reducing the effectiveness of the collaborative process. Additionally, without clear guidance and structure, peer collaborations may become unproductive, with students struggling to manage conflicts or stay on task. The research emphasizes the importance of teacher involvement in facilitating group dynamics and ensuring that all students contribute meaningfully to the learning process.*

*The article affirms that peer collaboration is a powerful educational tool that enhances learning outcomes and prepares students for the collaborative nature of the modern workforce. It advocates for the integration of peer collaboration in classrooms while stressing the need for careful planning and guidance to overcome potential challenges associated with group work.*

### **The actuality of peer collaboration in education**

*Peer collaboration, first introduced in the US in the 1970s, involves group members working together to achieve shared goals and build individual knowledge and it also promotes second language (L2) learning and is a key component of effective classroom instruction. There is more to peer collaboration than just sharing a seat or taking shifts. Students who collaborate with one another learn from each other by sharing resources, ideas, and information as well as by working together to make decisions that are all directed toward the same objective. According to Cui [1], genuine and cordial peer interaction and communication have produced environments for the enhancement of students' overall proficiency during the collaborative learning process.*

*The actuality of peer collaboration in education is a crucial topic that showcases the significance of collaborative learning approaches in today's educational landscape. Peer collaboration refers to students working together in various capacities to achieve common learning goals, share knowledge, and enhance their understanding of academic content. This method of learning promotes social interaction, critical thinking, communication skills, and teamwork among students, significantly impacting their academic performance and personal growth.*

*Students who collaborate and work on assignments and projects together not only exchange knowledge but also acquire critical problem-solving and social skills. To put it simply, promoting active student participation is about creating well-rounded people who can work together, communicate, and*

*think critically in a world that is constantly changing. Learning experiences will become more effective and meaningful as a result of this fundamental shift away from traditional teaching methods and toward more interactive, student-centered approaches. This pedagogical strategy encourages students to work together harmoniously and work toward a common goal. Learners who are formed as a unified whole are motivated to engage in collaborative pursuits, and their connection is strengthened through mutual aid and support.*

*Cooperative work improves reading, listening and writing skills, besides speaking ability of foreign language learners. Students add their own thoughts while accomplishing the activities, communicate and negotiate with one another. For instance, Ingrid (2019) [2] examined the learning effectiveness through in the context of teaching English oral communication proficiency in the MICE (Meetings, Incentives, Conferences, and Exhibitions) industry to HTU (Al Hussein Technical University) students. According to the findings PCBL (Peer Collaboration-Based Learning) raised student enthusiasm and positive view - PCBL improved student incentive towards learning English - Experimental group showed significant enhancement in oral communication skills compared to the control group. As a result, Ingrid (2019) [2] emphasized that importance of cooperation in the MICE industry. It contributed the critical role of cooperation in the MICE industry and also discusses the optimal group size in collaborative learning environments.*

### ***The role of peer collaboration in education***

*Peer collaboration in education plays an important role in student development, contributing not only to improved academic performance, but also to the development of social and communication skills. It is a process in which students work together to achieve common educational goals, actively sharing knowledge and experience.*

*Peer collaboration is effective in diverse settings such as:*

#### ***1. Academically***

*Peer collaboration enhances knowledge construction and application. Students learn by explaining concepts to peers, challenging assumptions, and refining their understanding through discussion and debate. This active engagement is often more effective than passive listening or individual study, leading to deeper comprehension and retention. Collaboration also develops crucial skills like critical thinking, problem-solving, and communication. Students learn to analyze information, formulate arguments, and express their ideas clearly and persuasively in a collaborative environment. Sharing different perspectives enriches the learning process for all participants.*

#### ***2. Socially and emotionally***

*Collaboration builds crucial social skills such as teamwork, empathy, and conflict resolution. Students learn to work effectively in diverse groups, appreciating differing viewpoints and perspectives, which promotes tolerance and respect. Interacting with peers can boost self-esteem and confidence. The process of supporting and encouraging each other fosters a positive learning environment, reducing feelings of isolation or intimidation that can hinder individual progress.*

#### ***3. Metacognitively***

*Through collaboration, students develop metacognitive awareness. Explaining concepts to others forces students to reflect on their own understanding, identify gaps in knowledge, and refine their learning strategies. Students learn to assess their peers' understanding and adjust their explanations accordingly, promoting a deeper understanding of both the subject matter and the learning process itself. This ability to monitor and regulate their own learning processes is a crucial skill for academic success and lifelong learning.*

#### ***4. Contextually***

*The role of peer collaboration isn't static; its impact varies depending on the specific context. Effective collaboration requires careful task design, clear communication protocols, and appropriate support structures. Teachers play a critical role in facilitating collaborative activities, ensuring equitable participation, and guiding students toward productive outcomes. The choice of collaborative activities should be aligned with the specific learning objectives and the particular needs of the learners. Technology can also enhance the reach and effectiveness of peer collaboration in diverse learning environments, enabling cross-cultural interactions and expanding access to diverse perspectives.*

*Peer collaboration is an essential teaching method that fosters metacognitive abilities, social-emotional growth, and deep learning; it is not merely an extracurricular activity. Teachers can encourage a more dynamic and captivating learning environment by empowering students to take an active role in their own education through the intentional integration of peer collaboration within the curriculum.*

*Mutuality is the primary "ingredient" of collaboration, according to earlier studies, and it has a*

greater effect on creating learning chances than equality (Chen, 2017, 2020) [3] [4]. This is mostly due to the fact that when mutuality is developed, students are more likely to share accountability for completing tasks, support one another, give feedback, adjust their language use, and experiment with negotiation and communication techniques (Chen, 2020) [4]. They also have a higher chance of settling disputes (Chen, 2020) [4]. Mutuality can be seen in a conversation when students listen to one another, show interest in what each other are saying, support one another, or even give each other praise. Establishing mutuality increases the possibility that students will use their language resources to solve problems more effectively and perform better (Chen, 2017) [3].

#### **Advantages of peer collaboration**

##### **1. Enhanced learning and knowledge retention**

When students collaborate with peers, they engage in discussions, share ideas, and teach each other. This interaction reinforces their understanding and improves memory retention. Teaching or explaining concepts to others helps students solidify their knowledge, as it requires them to process and articulate the material in their own words.

##### **2. Development of critical thinking and problem-solving skills**

Collaborative work often involves brainstorming, debating, and critically evaluating different viewpoints. This process sharpens students' critical thinking abilities and encourages creative problem-solving. It allows them to approach issues from various angles, leading to deeper insights.

##### **3. Improved communication skills**

Peer collaboration encourages active listening and the clear expression of ideas. Students learn how to present their thoughts effectively while also considering and responding to the perspectives of others. This enhances both verbal and written communication skills, which are vital in both academic and professional settings.

##### **4. Social and emotional growth**

Working in groups helps students develop key social skills such as teamwork, empathy, and conflict resolution. They learn how to work with others from diverse backgrounds, appreciate differing opinions, and navigate disagreements respectfully. This fosters a positive classroom atmosphere and encourages a sense of community.

##### **5. Inclusive learning environment**

Peer collaboration can support diverse learning needs, as students help one another based on their individual strengths. For instance, students who grasp certain concepts quickly can assist those who need more time, creating an inclusive environment where everyone can succeed at their own pace.

#### **Challenges of implementing peer collaboration**

##### **1. Unequal participation**

Certain students might control the conversations in such cooperative groups, while others would not participate as much. Members of the group may become frustrated as a result of this imbalance, which could also make the collaboration less successful. Additionally, some students could start to depend on others to complete their tasks, becoming passive participants.

##### **2. Conflict and disagreements**

When students work closely together, various perspectives and working methods can cause friction. Without competent leadership, these disagreements can derail the group's progress and lower the quality of the learning experience. Resolving these issues often requires careful mediation and facilitation by the teacher.

##### **3. Lack of accountability**

In peer collaboration, it can be challenging to ensure that every student takes responsibility for their learning and contribution. Some students may rely too heavily on others, while others may not put in the effort required to complete the group task. Teachers need to monitor group dynamics to ensure fairness and accountability.

##### **4. Time management issues**

Collaborative projects often require careful planning and time management. If students are not able to coordinate their efforts effectively, deadlines may be missed, or the quality of the work may suffer. Effective collaboration requires good organizational skills, which not all students may have developed.

##### **5. Inconsistent group dynamics**

The success of peer collaboration depends on the group's ability to work well together. If the group is not compatible in terms of working styles, it can hinder the learning process. Some students may prefer a more independent learning approach and find collaboration challenging, leading to disengagement.

*Peer cooperation in education has many benefits, including better communication, increased learning, and social development, but it also has drawbacks, including concerns with accountability, unequal participation, and conflict. In collaborative learning, the role of the English teachers is very important, and they must carefully plan cooperative activities, give clear instructions, and actively assist students in acquiring the skills needed for productive teamwork if they want to optimize the advantages. Additionally, they must take on the role of facilitators rather than teachers. At every stage, the teachers must monitor the progress of their groups and encourage all members to participate in the assigned tasks. The assigned tasks will be completed quickly and in a learner-friendly atmosphere when the students share their responsibilities. Even average learners can contribute significantly and do well in group activities when they participate in collaborative learning. As a result, English language instructors must be more engaged in their classes as students complete their assignments and constantly inspire and encourage them to do so in a friendly and orderly environment. Then, in a more engaging and amiable classroom setting, the primary objective of teaching and learning the language skills will be accomplished.*

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**PROJECT-BASED LEARNING AS A TOOL FOR DEVELOPING CREATIVITY IN TEACHING ENGLISH****Kydyrali Zhanna Nurlankyzy***Master degree's student of university named after O.Zhanibekov  
Kazakhstan, S***Abstract**

*Project-Based Learning (PBL) has gained recognition as an innovative pedagogical approach that fosters creativity and engagement in education. This study explores the application of PBL in teaching English as a foreign language, focusing on its role in developing students' creative abilities and enhancing their linguistic proficiency. The research aims to identify effective methods for integrating PBL into English curricula, analyze its impact on creativity development, and provide practical recommendations for educators.*

*A qualitative methodology was employed, including a review of recent studies (2019–2024) and case analyses of PBL implementations in diverse educational settings. Data collection involved analyzing published research on the effectiveness of PBL in fostering creativity, as well as examining practical applications such as collaborative storytelling, digital content creation, and interdisciplinary projects.*

*The findings demonstrate that PBL significantly contributes to creativity development by engaging students in authentic, real-world tasks that promote problem-solving, critical thinking, and collaboration. Examples such as research article writing, drama-based activities, and multimedia projects highlight the versatility of PBL in enhancing language skills and fostering innovation. Despite its benefits, the study identifies challenges such as resource limitations, time constraints, and difficulties in assessing creative outcomes. These limitations suggest the need for further research on scalable PBL models, robust assessment frameworks, and teacher training programs.*

*This study contributes to the ongoing discourse on PBL by providing actionable insights for educators and researchers. Its practical value lies in offering strategies for implementing PBL effectively, even in resource-constrained environments, and emphasizing its role in preparing students for the demands of the 21st-century knowledge economy. Future research should focus on addressing the identified challenges and exploring the long-term impact of PBL on students' creativity and academic success.*

**Keywords:** *Project-Based Learning, Creativity Development, English Language Teaching, Innovative Pedagogies, 21st-Century Skills.*

**Introduction.** *In modern educational contexts, creativity has become a cornerstone of effective teaching, particularly in English as a foreign language. Creative thinking not only enables students to solve complex problems and adapt to new situations but also fosters innovation and deeper engagement with learning materials. Moreover, in a globalized world where language skills are essential, the ability to think creatively enhances communicative competence and cultural understanding, which are vital for personal and professional growth. Consequently, integrating creativity into English language teaching is not only desirable but also necessary to meet the evolving demands of 21st-century education.*

*Among various pedagogical approaches, Project-Based Learning (PBL) has been widely recognized for its capacity to promote creativity and active learning. By involving students in authentic tasks that require collaboration, critical thinking, and problem-solving, PBL shifts the focus from traditional teacher-centered methods to a more dynamic, learner-centered environment. This methodology encourages students to apply their language skills in real-world contexts while simultaneously developing their creative potential. Furthermore, PBL aligns with contemporary educational priorities by fostering adaptability, teamwork, and the ability to tackle complex challenges.*

*A growing body of research highlights the effectiveness of PBL in fostering creativity and improving language skills. For instance, Kreutner (2024) investigates how creative tasks, such as screenplay writing and collaborative film projects, enhance students' engagement and creativity in English literature classes. The study emphasizes the importance of integrating arts and performance into language teaching to stimulate imagination and innovation. Similarly, Efriza and Fauzan (2024) explore the development of PBL-based teaching materials for non-English major students, demonstrating how*

tailored projects encourage learners to use the English language creatively while addressing real-life issues. Their findings underline the practicality of PBL in diverse educational settings [1].

In addition, Sintia (2024) examines the perceptions of teachers and students regarding the implementation of PBL in rural schools. Her research reveals that PBL significantly improves both creativity and critical thinking skills in English as a Foreign Language (EFL) classrooms. This is further supported by Marwa et al. (2024), who assess the role of PBL in enhancing creativity through research article writing projects. Their findings illustrate how creative writing tasks in PBL not only improve linguistic proficiency but also cultivate higher-order thinking skills [2].

Moreover, Mortini et al. (2024) emphasize the interdisciplinary potential of PBL by demonstrating how it enhances critical and creative thinking through problem-solving tasks embedded in language instruction. These findings are complemented by the work of Sintia (2024), which highlights the adaptability of PBL for varying educational environments, ensuring that its benefits are accessible even in resource-limited contexts [3].

This article seeks to examine the role of Project-Based Learning as a transformative tool for fostering creativity in English language teaching. It aims to identify effective strategies and methods that educators can employ to integrate PBL into their curricula. Additionally, the article will review recent studies to analyze the impact of PBL on creativity development and propose practical recommendations for educators and researchers. By focusing on contemporary research and innovative practices, this study aims to contribute to the ongoing discourse on the intersection of creativity and language education, highlighting PBL's potential to redefine teaching methodologies in a globalized, knowledge-driven era.

**Main Body.** A growing body of literature highlights the significance of Project-Based Learning (PBL) in developing creativity in educational settings, particularly in teaching English as a foreign language. Recent studies underscore the role of PBL in fostering active student engagement and encouraging the application of language skills in meaningful, real-world contexts. Kreutner (2024) demonstrates how creative tasks, such as collaborative film projects and screenplay writing, enable students to explore innovative ways of expressing ideas in English, enhancing both their linguistic and creative competencies. Similarly, Efriza and Fauzan (2024) argue that PBL-based teaching materials tailored for non-English major students help learners apply the language practically, promoting critical thinking and originality [4].

The adaptability of PBL to different educational contexts is also evident. Sintia (2024) highlights how rural schools benefit from PBL by significantly improving students' creativity and critical thinking, despite resource limitations. Marwa et al. (2024) focus on how research article writing projects enhance students' creative writing abilities, providing an example of PBL's versatility in academic settings. Furthermore, Mortini et al. (2024) emphasize the interdisciplinary potential of PBL, showing its effectiveness in combining problem-solving with language learning to build creativity and collaboration skills [5].

These studies collectively highlight a range of approaches to fostering creativity through PBL. Some emphasize integrating artistic and performance elements into language learning, such as drama or film production, while others focus on academic or research-based projects. Despite differences in application, a common theme emerges: PBL encourages learners to think beyond traditional boundaries, enabling them to apply their creativity in diverse and meaningful ways.

Project-Based Learning is a learner-centered pedagogical approach that emphasizes active participation, problem-solving, and collaboration. Rooted in constructivist theory, PBL encourages students to construct knowledge through hands-on, real-world projects. Unlike traditional teaching methods, which often prioritize rote memorization, PBL requires students to engage in inquiry-driven learning processes. Key characteristics of PBL include:

- **Authenticity:** Projects are grounded in real-world problems, making learning relevant and practical.
- **Collaboration:** Students work in teams to achieve common goals, fostering communication and teamwork.
- **Inquiry-Based Learning:** Learners explore questions and challenges, which stimulates critical thinking and problem-solving.
- **Reflection:** Continuous evaluation and self-assessment enable learners to refine their approaches and improve outcomes.

These elements create an environment where students are motivated to actively engage in their learning, thereby developing both academic and non-academic skills.

The development of creativity in education is underpinned by several theoretical frameworks.

Creativity is often defined as the ability to generate novel and useful ideas or products. According to Guilford's (1950) theory, creativity involves divergent thinking, where individuals explore multiple possible solutions to a given problem. Torrance (1988) further elaborates on this by emphasizing the importance of originality, fluency, flexibility, and elaboration in creative thought processes [6].

In the context of PBL, creativity is cultivated through tasks that require students to approach problems innovatively and collaboratively. By engaging in projects that have open-ended outcomes, students are encouraged to think beyond conventional solutions, thereby enhancing their creative potential. Integrating these theoretical principles into PBL ensures that creativity is not only a byproduct but a central goal of the educational process.

Table 1

*Methods and applications of project-based learning in english language teaching*

| Aspect                      | Description                                                                                                              | Examples of Implementation                                                                                                             |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Methodology</b>          |                                                                                                                          |                                                                                                                                        |
| Research Design             | Qualitative research analyzing case studies of Project-Based Learning in English teaching settings.                      | Interviews with teachers and students, observation of PBL sessions, and analysis of student projects.                                  |
| Data Collection             | Combination of surveys, structured interviews, and project assessments.                                                  | Teachers' perceptions of PBL effectiveness and students' self-reports on creativity enhancement.                                       |
| Data Analysis               | Thematic analysis of qualitative data to identify trends in creativity development and project outcomes.                 | Evaluation of how students demonstrate creative problem-solving and language skills in completed projects.                             |
| <b>Application Examples</b> |                                                                                                                          |                                                                                                                                        |
| Drama and Role-Playing      | Incorporating creative drama into English lessons to enhance speaking and collaborative skills.                          | Students collaboratively write and perform a play based on a chosen theme, using English for dialogue and narration.                   |
| Research Article Writing    | Guiding students to write academic articles through PBL to improve writing skills and critical thinking.                 | Projects involving literature review and collaborative academic paper writing, such as exploring cultural topics using English.        |
| Digital Storytelling        | Using multimedia tools to create digital stories as part of English assignments.                                         | Students create a short film or a podcast series, integrating storytelling techniques with creative use of language.                   |
| Interdisciplinary Projects  | Combining English with subjects like history, science, or art to create multifaceted learning experiences.               | Projects like designing a museum exhibition in English on historical topics or creating a science project presentation in English.     |
| Community-Based Learning    | Engaging students in real-world problems and community interaction to practice English meaningfully.                     | Organizing environmental campaigns or writing newsletters in English to address local community issues.                                |
| Integration of Technology   | Leveraging digital tools to facilitate innovative learning experiences and creative outputs.                             | Students use tools like Canva for visual storytelling, Google Sites for project presentations, or video-editing software for projects. |
| Evaluation of Creativity    | Developing rubrics to assess creativity in student projects, focusing on originality, problem-solving, and language use. | Grading based on criteria like innovative ideas, effective collaboration, and the quality of English used in projects.                 |

While Project-Based Learning (PBL) has demonstrated significant potential in fostering creativity and improving language skills, its implementation in English language teaching is not without challenges. One of the primary difficulties lies in the constraints of time. PBL requires a considerable amount of planning, execution, and evaluation, which can conflict with the rigid schedules of standardized curricula. Teachers often struggle to balance project work with the need to cover all required content, leading to a potential compromise in either the depth of the project or the breadth of the curriculum.

Another critical challenge is the level of teacher preparedness. Not all educators possess the necessary training or experience to design and manage effective PBL activities. This can result in poorly structured projects that fail to engage students or meet learning objectives. Additionally, the shift from traditional teacher-centered approaches to a more student-driven model demands a significant adjustment in teaching methods, which some educators may find difficult.

Student readiness also presents a significant barrier. Learners who are accustomed to traditional lecture-based teaching may find the autonomy, collaboration, and active participation required in PBL overwhelming. This is particularly true for students with limited self-motivation or confidence, who may struggle to contribute meaningfully to projects. Furthermore, disparities in language proficiency among students in the same group can create additional challenges, as weaker students may feel excluded or unable to keep pace with their peers.

Resource limitations pose another obstacle, especially in underfunded or rural schools where access to technology, materials, and external resources may be restricted. PBL often relies on tools such

as digital platforms, multimedia equipment, and access to research databases, which may not be available in all educational settings. These constraints can limit the scope and quality of the projects that students can undertake.

Finally, assessing the outcomes of PBL remains a complex issue. Traditional assessment methods are often inadequate for evaluating the creativity, collaboration, and problem-solving skills that PBL seeks to develop. Teachers may struggle to create fair and consistent evaluation criteria, leading to subjective or inconsistent assessments. This challenge is compounded by the need to align PBL outcomes with standardized testing requirements, which frequently prioritize rote memorization over critical and creative thinking.

Given these challenges, further research is needed to explore strategies for overcoming these limitations. Studies could focus on developing scalable PBL models that accommodate curriculum constraints, provide effective teacher training programs, and establish robust assessment frameworks tailored to the unique demands of PBL. Additionally, investigating ways to adapt PBL for resource-limited environments and diverse student populations could significantly enhance its accessibility and impact. By addressing these issues, PBL can become a more effective and widely adopted approach in English language teaching.

**Conclusion.** Project-Based Learning (PBL) significantly contributes to the development of creativity by fostering active student engagement, critical thinking, and problem-solving. By requiring students to work on authentic, real-world tasks, PBL encourages them to think innovatively and apply their language skills creatively. Studies reviewed in this article demonstrate that PBL enhances not only linguistic proficiency but also essential soft skills such as teamwork, adaptability, and originality. For example, research shows that tasks like collaborative storytelling, digital content creation, and interdisciplinary projects motivate students to explore new perspectives and generate unique solutions. These outcomes confirm the effectiveness of PBL as a method that seamlessly integrates language learning with creative skill development.

The findings of this study offer valuable insights for educators aiming to implement PBL in their English language teaching practices. Teachers can use PBL to design curriculum components that go beyond traditional rote learning, allowing students to engage in meaningful, hands-on experiences. Examples include integrating multimedia projects, such as video production or podcast creation, into language courses, or encouraging students to write and publish research articles on real-world topics. These approaches not only enhance students' engagement and creativity but also provide them with practical skills that are transferable to professional contexts. Furthermore, educators can use the results to adapt PBL for diverse learning environments, including resource-constrained settings, by prioritizing collaboration and problem-solving tasks that rely on minimal materials.

Despite its demonstrated benefits, PBL raises several questions that warrant further investigation. One of the key areas for future research is the development of robust, standardized assessment frameworks that accurately capture the creative and collaborative outcomes of PBL. Additionally, exploring ways to adapt PBL for resource-limited environments, particularly in rural or underfunded schools, could help make this approach more accessible. Further studies could also examine the long-term impact of PBL on students' creativity and language skills, as well as its effectiveness across different cultural and educational contexts. Finally, research into teacher training programs that focus on equipping educators with the skills to design and implement PBL effectively could address one of the major barriers to its adoption. By addressing these open questions, future work can contribute to refining and expanding the use of PBL in English language teaching.

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## FEATURES OF THE FORMATION OF PROFESSIONAL COMPETENCIES OF FUTURE TEACHERS-PSYCHOLOGISTS IN THE CONDITIONS OF HIGHER EDUCATION

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### **Abstract**

*This article reveals important aspects of the formation of professorial competencies of future educational psychologists. The authors consider the features and stages of the formation of professorial competencies among students during their studies at the university.*

*The article begins with the disclosure of the concept of professional competence, offering an extensive understanding of the features of the formation and improvement of professional competence of future educational psychologists.*

*One of the strengths of the article is the study of ways and means of organizing the educational process for a more successful formation of these competencies.*

**Keywords:** competence, professional competencies, professional training, professional orientation.

***The main provisions.** The formation of the readiness of future teachers for professional activity is one of the most important tasks of professional training. Readiness is considered as an integrative professionally significant personality trait that ensures a developing transition from the system of university training to the system of professional activity. It includes a set of professional knowledge, practical skills, personal experience, and professionally significant personal qualities.*

*Today, the requirements for the professional training of teachers-psychologists are changing in connection with changes in society, the main areas include: inclusive education, the problem of bullying in modern schools, information overload, gadget addiction, the quality of interpersonal communication and psychological safety in the educational environment. Therefore, there is a need to update the content of the educational program of the specialty, taking into account the requirements of the modern labor market and the professional standard of the teacher.*

*The requirements of a high level of theoretical and methodological training are imposed on a modern teacher-psychologist. Future educational psychologists should have a high level of knowledge in pedagogy, the basics of psychological correction and diagnosis of personality, age characteristics of children, have the ability to predict and solve emerging pedagogical problems at a high level of professionalism. This level includes mastery of new pedagogical technologies.*

*The main attention is paid to the key and general competencies necessary for successful professional activity. The use of psychological and pedagogical technologies that contribute to the development of these competencies in the process of studying at universities, as well as in the course of practical activities and postgraduate training. Attention is also focused on the importance of personal and professional characteristics in the context of training specialists, which allows them to effectively adapt to modern requirements in educational and psychological practice.*

*The main purpose of the activity of a teacher-psychologist according to the professional standard of a teacher in 2022 is to provide psychological assistance and support in identifying and diagnosing difficulties of participants in the educational process, education and organizational and methodological activities. A teacher-psychologist should have such qualities as: pedagogical intuition, observation, sociability, balance, stress resistance, tolerance, understanding, professionalism, readiness for self-development, critical thinking, optimistic forecasting.*

**Conduction.** *The problem of training future teachers is widely considered in psychology and pedagogy:*

➤ *The formation of students' readiness for professional activity and the structuring of a model of self-development through further continuing education is considered in the works of C.I. Arkhangelsky [1], A.A. Verbitsky [2], V. A. Slastenin [3], etc.);*

➤ *Psychological and pedagogical foundations of the process of professional training of a specialist, the essence of the profession, specific features and functions and the provision of scientific*

and methodological orientation related to the self-improvement of independent knowledge in the works of Y. K. Babansky [4], N.V. Kuzmina [5], V. V. Serikov [6], N.D. Khmel [7], etc.);

➤ Types of cognitive, communicative activity of students and the problems of their activation in the works of A. R. Ermentaeva [8], K. B. Zharykbaev [9], S. M. Zhakupova [10], N. B. Zhienbayeva [11], M. A. Perlenbetova [12], and others.);

➤ Formation of creative potential, professional competence of future teachers in the works of A.A. Absatova M.A. [13], J. I. Namazbaeva [14], Turgunbaeva B. A. [15], etc.);

➤ Theoretical and practical aspects of the formation of students' professional competencies in the works of B. T. Kenzhebekov [16], K. S. Kudaibergenova [17], B. R. Kaskataeva [18], Sh. Kh. Kurmanalina [19], G. J. Menlibekova [20], M. V. Semenova [21], S. I. Ferkho [22], and others).

These works consider the features of professional training of future teachers-psychologists for professional activity, but today the relevance of the study is due to the need to improve the quality of training of future teachers in the context of changes in education.

In recent years, there has been an increase in interest in psychology in the educational environment, which is associated with the need to create a comfortable and safe educational environment for students. In a rapidly changing world, where the requirements for specialists are constantly growing, it is important not only to prepare students for professional activity, but also to assess their readiness for it. And there is also a need to develop and implement effective diagnostic methods and technologies that will identify the strengths and weaknesses of future educational psychologists, as well as identify areas for their further professional growth.

The object of the study: the formation of professional competencies among future teachers-psychologists

The subject of the study: features of the formation of professional competencies among future teachers-psychologists

The purpose of the study: to study the features of the formation of professional competencies among future teachers-psychologists in the conditions of higher education.

**Materials and methods of research.** The term «competence» was introduced in the middle of the XX century by N. Chomsky, who initially gave the concept of abilities necessary to perform a specific language activity in his native language [23]. Competence in the philosophical encyclopedic dictionary - French (competence- competent, knowledgeable), Latin (competentia - fair, correct conclusion; competere - means achievement, conformity, proximity), is a universal term. It can be considered that a person armed with knowledge and qualifications in accordance with his field has competencies in a particular field, which can form the main idea and act effectively [24].

In the Kazakh National Encyclopedia, «competence» is indicated as a set of legally established powers, rights and duties of a particular body or official [25].

A specific approach to the definition of the concept of «competence» can be traced back to N.K. Kabardov and E.V. Artsishevskaya. This approach is fixed in an attempt to compare the concepts of «competence» and «ability». These authors, concluding that competence is a description of behavior, personality activity, and the formation of necessary skills, emphasize that «competence» is defined as the stage of assimilation and the result of learning [26].

Proponents of the competent approach as one of the foundations of the renewal of education form the concept of expected results. In his work M.V. Ryzhkov outlined this point of view:

➤ The concept of «competence» includes not only cognitive (cognitive) and technological components, but also motivational, social and behavioral, that is, learning outcomes (knowledge, skills), value orientation systems;

➤ Competence is the ability to mobilize acquired knowledge, skills, experience, behavioral techniques in a specific situation, in specific conditions of activity;

➤ Integration of the content of knowledge generated from the «result» into the concept of competence;

➤ Competencies are formed not only in the process of studying in educational institutions, that is, in conditions of traditional and non-traditional education [27].

Thomas Durand considers the levels of competence of a person in a new society: abilities, information, knowledge, skills, know-how, competence, experience. These levels, in turn, model the stages of competence formation [28] (table 1).

Table 1

*The levels of competence defined by T. Duran.*

| <b>Level</b>        | <b>Interpretation</b>                                                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Data                | <i>I have access to external information</i>                                                                                                      |
| Information         | <i>I know, I learned, I found out</i>                                                                                                             |
| Knowledge           | <i>I have structured the information and integrated it with the database. I can explain it to someone else.</i>                                   |
| Skills              | <i>I can do it.</i>                                                                                                                               |
| Know-how            | <i>I know how to do it, I can do it, and I can show someone else how to do it.</i>                                                                |
| Competence          | <i>I am better able than others to explain what to do and how to do it (knowledge), and I am also better able than others to do it (know-how)</i> |
| Experience (wisdom) | <i>I am an expert in how to do this, as well as in understanding what to do and why it should be done, as well as in explaining how to do it</i>  |

The concept of «competence» is sufficiently considered in the framework of pedagogical research. For example, in the work of K. S. Kudaibergenov «the nature of competence in personal self-development, «competence" means the ability to authoritatively solve any issues, considering the meaning of «competence» - comprehensively aware, knowledgeable in a certain area» [29], - points out the famous teacher B.A. Turgunbayeva in the work «development of the creative potential of teachers in conditions of increasing qualifications» «.. the ability to apply the acquired knowledge in solving their life problems through their practical activities, we call competencies»[30].

In her research work, G.J. Niyazova considered the concept of "competence" as «a set of semantic orientations, knowledge, skills and experience of a student in relation to a clearly defined range of objects necessary for the implementation of his personal and social activities» [31]. G. Zh. Menlibekova attaches great importance to the formation of this quality, considering the social competence of a future teacher as the integration of a person's understanding of social reality as a value, specific social knowledge in managing activities, subjective abilities in self-determination, qualifications for the implementation of social technologies [32].

G.M. Kocaaspirova, A.Yu. Kocaaspirov, the term competence is understood as «general cultural competence-the level of knowledge necessary for self-improvement and independent solution of emerging cognitive problems and determination of one's point of view; competence of a professionally skilled teacher-the ability of a teacher to form in pedagogical activity, pedagogical communication and transfer of a certain value, ideal, pedagogical consciousness mastering the necessary a set of knowledge, skills and abilities as a person» [33].

The construction of a model for the formation of professional competence of educational psychologists was based on the concept of creating and developing a psychological service, training and retraining of psychologists, developed by A.G. Asmolov, I.V. Dubrovina, Yu.M. Zabrodin, V.V. Rubtsov, etc., as well as scientific provisions on the development of the personality of a psychologist in professional activity (A.A. Bodalev, E.D. Bozhovich, I.V. Dubrovina). Important ideas for building professional, personality-oriented learning activities are contained in the concept of a personality-based (I.A. Ryzhkov, A.A. Leontiev, D. M. Mallaev) and personality-oriented (E.V. Bondarevskaya, I.S. Yakimanskaya) approach to learning.

Professional competence of a specialist is a complex and multifaceted category. This is the case in philosophy, psychology, pedagogy, sociology, theory and methodology of vocational education, acmeology, andragogy, labor psychology, etc. Since our research work represents the professional competence of a future teacher working in the conditions of new Kazakhstan, we will further delve into this problem.

«Professional competence» is the most important component of professionalism and an indicator of its high level. Professional competence is manifested in the successful solution of professional tasks of a certain direction, which are based on these types of competencies [34].

By involving professionalism in various areas of specialist development, the following types of professional competence are determined: special, social, individual.

Special or official professional competence is characterized by mastering activities at a high professional level and not only acquiring special knowledge, but also the ability to apply them in practice.

Social professional competence is characterized by mastering the techniques of professional communication adopted in the professional community, methods of joint professional activity and partnership.

Individual professional competence methods of self-expression and self-development are characterized by professionalism.

*Under the leadership of D.M. Grishin, the concept of professional competence was introduced as the basic concept of the qualification characteristics of future teachers. In his opinion, professional competence is a set of communicative, constructive, organizational abilities of teachers. A teacher, as a subject of pedagogical activity, has the opportunity to experimentally apply this ability in pedagogical activity [35].*

*At the preparatory stage, the structural components of the professional competence of the future teacher-psychologist were determined. Taking into account the results of scientific research by the above-mentioned authors, taking into account the content of the professional activity of a teacher-psychologist, taking into account the requirements for the qualification characteristics and job responsibilities of a teacher-psychologist, we have identified the following structural components of the professional competence of a teacher-psychologist: cognitive, activity, emotional and motivational. Based on this structure of professional competence of future teachers-psychologists, we have identified the following criteria for its formation: the formation of theoretical knowledge necessary for the implementation of professional activities; readiness to implement professional tasks and organize professional activities of the psychological and pedagogical direction; the formation of motivation and professionally important personality qualities.*

*In the context of the modern educational process, which requires specialists not only deep knowledge, but also high professional and personal qualities, it becomes especially important to identify and assess students' readiness to fulfill their future responsibilities. Educational psychologists play a key role in the educational system, as they not only teach, but also form a psychological environment conducive to the development of students' personality. Therefore, the diagnosis of the readiness of future specialists in this field is a prerequisite for ensuring the quality of education and the success of their professional activities.*

*The main attention is paid to the introduction of a competence-based approach, which involves the purposeful development of both general cultural and professional competencies. Key tasks are considered, such as the development of educational programs, interaction between teachers and employers, as well as the introduction of interactive teaching methods, which contributes to the integration of theory and practice. Various levels of students' competencies and their self-determination in the process of professional training are evaluated, which is extremely important for future specialists. The importance of psychological diagnostics and methods of evaluating results will be emphasized, which allows us to identify the strengths and weaknesses of students. This comprehensive approach to training helps to prepare competitive specialists who are able to work successfully in their field.*

*The organization of the educational process for the formation of competencies of future teachers-psychologists may include the following aspects: Taking into account the individual typological characteristics of students in educational activities. Pedagogical diagnostics of the peculiarities of students' self-educational activity.*

*Using a model of self-educational activity of a future teacher-psychologist. It includes the purpose, objectives, structure, program, tools, methods and forms of work. The use of personality-oriented methods in the process of forming professional competence.*

*The implementation of a system of tasks within the framework of academic disciplines of the psychological cycle. They can be aimed at the development of various components of competence, for example, emotional-value attitude, operational-activity, personal and conative.*

**Results and discussion.** *Preparation for professional activity requires not only theoretical knowledge, but also the development of certain personal qualities and motivation. Diagnostics is aimed at identifying three levels of readiness: theoretical, technological and personal. We will consider the main parameters and components of psychological readiness, as well as the methods used to diagnose it. This research is aimed at deepening the understanding of the structure of readiness and its impact on the effectiveness of specialists in the field of psychology and pedagogy.*

*To select diagnostic tools for assessing the level of professional competence formation among future teachers-psychologists at the preparatory stage of the ascertaining experiment, we used a Test questionnaire to determine the level of professional orientation of students.*

*The study was conducted on the basis of Pavlodar Pedagogical University named after Alkey Margulan. The study involved students of 2-4 courses of the Educational program pedagogy and psychology in the number of 30 people.*

*In this article, we give the results of the ascertaining stage only.*

*According to the questionnaire test to determine the level of professional orientation of 2-4 year students, the results are shown in Figure 1-2.*

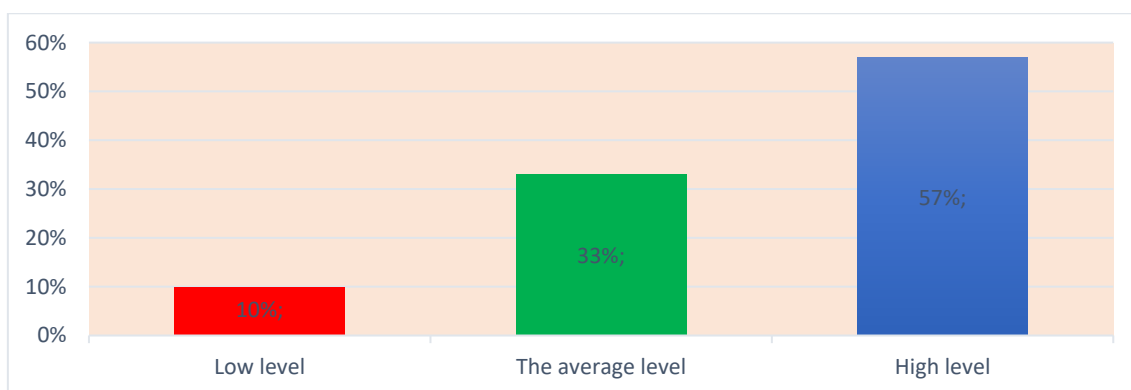


Figure 1 - The results of the research on the questionnaire test to determine the level of professional orientation of 2nd year students.

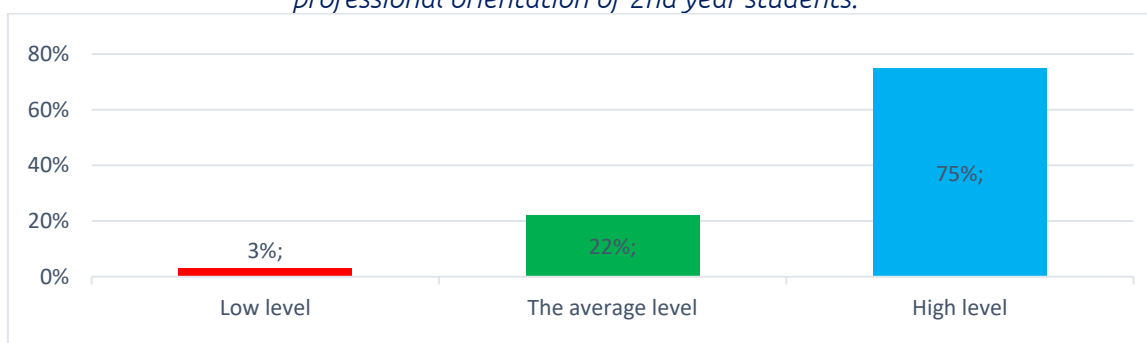


Figure 2 - The results of the research on the questionnaire test to determine the level of professional orientation of 4th year students.

The results of testing using a questionnaire test to determine the level of professional orientation of 2-4 year students showed that a low level of professional orientation is observed in 10% of 2nd year students and 3% of 4th year students, an average level is observed in 33% of 2nd year students and 22% of 4th year students, a high level of professional orientation 57% of 2nd year students and 75% of 4th year students.

The analysis of the test results allows us to draw the following conclusions: 2nd year students have a high level of professional orientation, which indicates that they are actively involved in choosing a profession and have certain career goals. In the 4th year, the percentage of students with a high level increases significantly, which indicates that by the end of the educational process, students become more confident in their professional choice. 10% of students with a low level indicate that they have not yet decided on their future profession and are experiencing some difficulties in this matter. In the 4th year, this indicator decreases, which indicates that in the learning process, students increase their self-confidence and readiness to carry out professional activities.

When analyzing the results using this technique, we found that the study participants, in general, have positive dynamics in the process of studying at the university. This may be due to various factors: in-depth study of the specialty, practical experience, career counseling and other forms of support from the university.

But at the same time, there is a need for continuous improvement of the educational process in order to increase the professional competencies necessary to work in modern educational institutions.

**Conclusion:** The formation of professional competencies of educational psychologists in the process of studying at the university is a key aspect of their preparation for professional activity. According to research, we see that an integrated approach including theoretical training, the formation of practical skills and personal development contribute to a deeper integration of knowledge and skills.

It should be noted the importance of using active teaching methods in the educational process, which increases the level of student engagement, contributing to the development of critical thinking and creativity. The development of professional competencies is also influenced by the interaction of students with experienced practitioners. To date, the university has experience in including practical teachers in the educational process.

Thus, the process of forming professional competencies of future teachers-psychologists requires

*an integrated approach, including diverse teaching methods, interaction with practical teachers and consideration of individual characteristics of students. The implementation of these principles in the learning process will contribute to the training of qualified specialists who are ready to solve psychological and pedagogical problems*

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## **BETWEEN PRE-SCHOOL AND SCHOOL FORM AND METHODS OF EXPECTATION OF INHERITANCE**

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### **Abstract**

A number of studies have been conducted on the succession between preschool and school. From the analysis of those studies, it is concluded that the application of new approaches to preschool education gives us the basis to build the future and find ways to solve it, and in this regard, it is appropriate to organize a developmental environment that protects and strengthens children's health. The criterion of a child's readiness for school is a certain level of his physiological, mental processes, emotional-social development. Such reasoning allows to separate the criteria, the development of physiological and mental processes, especially the characteristics of thinking, imagination, and emotional-social maturity. The criteria we have listed are of the same essence and importance in the process of adaptation of a child who first steps into school.

### **Introduction**

Admission of children to school takes place in the process of children's adaptation to new conditions on the basis of their comprehensive formation at the school preparatory stage. The process of children's adaptation to school is multifaceted, it includes adaptation to the working regime of the school and the student body, organizational forms of education, and the traditions and values of the primary class.

The issues of physical, mental, cognitive and social development of children have been defined in modern preschool educational institutions. The main goal of using games that ensure children's cognitive and social development is to prepare children for school education.

The question of succession between preschool education and primary school is one of the main issues of modern education. Thus, the most important problem faced by the educational process in preschool educational institutions and primary school is the problem of succession between these two levels of education. The primary class is based on the educational work of school preparation and builds its work on it. Here, children's development needs to be done properly and systematically.

The primary goal of preschool and primary education is the formation of a child as a personality and its comprehensive development. In addition, the individualization and differentiation of education in today's era is necessary to create a developmental environment that allows each child to develop.

Organization of a developmental environment in kindergarten and primary education stages is one of the important issues. The developmental environment created in the kindergarten is of great importance in the comprehensive development of the child, in strengthening his physical and mental health, in cooperating and working together with his friends, in creating a desire to study in him and preparing him for school.

The conditions created in both stages provide every need of the child, which includes his spiritual, social needs - cognitive, aesthetic, etc. must answer.

Let's take a look at the developmental environment created in the kindergarten:

- conditions created for children's physical and mental development;
- environment organized for children's social-emotional development;
- the environment created for the professionalism of teaching staff;
- creating conditions for parents' cooperation, etc.

It is advisable that the organization of material, technical and sanitary-hygienic conditions in the kindergarten should be in accordance with the normative documents:

- that the furniture in the building is suitable for the children's ages;
- the age appropriateness and comfort of the bedrooms;
- hygiene of the footpath;
- provision of heat;
- layout of the game room;
- the presence of a hall for celebrations and events;
- the presence of kiosks in the yard;

- creation of conditions for ensuring normal food and sleep;
- correct adherence to the regimen;
- creation of conditions for training;
- organization of activity centers in the group room;
- morning reception and arrangements for parents.

The developmental environment organized in this way, aimed at the child's personality-oriented development, affects the development of integrative qualities such as initiative, independence, curiosity, sociability and creativity. The developmental educational environment, which is organized taking into account the individualization of the child's life space, stands out for its dynamism. Children feel competent, responsible and try to use their abilities and skills to the maximum. The joint activity of educators-teachers, children and parents is also very important in creating a developmental learning environment.

In order to ensure continuity in the development of children's practical skills and creative abilities, it is reasonable to expect succession between the work system of preschool educational institutions and primary school. In this direction, a consistent, systematic work system plays an important role in the development of pedagogical theory and practice. New approaches in this field show that the succession between preschool and primary school will improve the development of children's practical skills and creative abilities: the child's competence (communicative, intellectual, physical), creativity, initiative, independence and responsibility, self-awareness and self-esteem.

In general, inheritance is a human law of society. In this regard, each generation tries to protect the good aspects of the previous generation - their parents and great-grandfathers, refers to customs and traditions, and develops them by giving them new life.

Therefore, the succession between preschool and school involves the following tasks:

1. To prepare children for school as future students who can meet the requirements of modern education and have a high level of general development and education.
2. To develop the knowledge, skills, and habits already acquired in the preschool period.
3. To actively use the acquired knowledge, skills and habits for further comprehensive development of students.

Succession between the kindergarten and the school is carried out both in terms of the content of education and methods, techniques and organizational forms of education.

For the adaptation of children, the preschool educational institution should know well the requirements applied to children in the first grade and should systematically prepare children for education accordingly.

"The vast majority of children who have passed the preschool stage come to school fully prepared. Based on the preschool program, children's speech develops and they pronounce speech sounds correctly, express their thoughts, communicate, cooperate with their friends, narrate the content of a story, write a printed image of capital letters, 10 to calculate and so on. they can" [30,3-9].

Entering school is an important event in a child's life. It radically changes the social situation of development and determines the perspective of personality development. This period is the period of the emergence of a new role of replacing the leading activity - the role of a student.

The result is that the child's readiness for school is determined by four areas of development:

- social;
- psychological;
- intellectual;
- physical.

This is also called personal preparation. It is the child's ability to build new social relationships, communicate and interact with teachers and peers. Social readiness refers to the ability to ask for help and ask if something is unclear. Child psychologists advise parents to intensively develop this skill in children at least one year before they go to school.

Social preparation is better developed among children in kindergarten. Because everything depends on the level of the preschool educational institution, the educational program. The process of socialization cannot take place only within the framework of a preschool institution: if a child goes to sports and creative departments, walks a lot and communicates with others and actively learns about the world, he can become socially mature by the age of six.

The formed inner position of the future student also speaks about the child's readiness for school. This is not a desire for external things (a beautiful pencil case, a fashionable dress or a new bag), but a desire for new knowledge and curiosity.

*Psychological preparation is the degree of development of higher mental functions: thinking, speech, writing, counting, memory, voluntary actions, perceptual processes. In recent years, this category also includes the development of soft skills, or flexible skills, that is, the ability to control the child's behavior and emotions, and the level of independence. A certain level of self-confidence in a child indicates his psychological readiness for school. Thus, normal and high self-esteem testifies to the psychological stability of the future student. But since it can be quite difficult for a child to start learning on his own, he needs more time to adapt to the new environment.*

*Intellectual readiness refers to the skills that children typically develop during preparatory activities. This means that the child can think, ask questions, independently find cause-and-effect relationships. This is more important preparation - these are the criteria that show that the child is intellectually ready for school.*

*Often, when a child goes to school, the main focus is on intellectual preparation. In many educational institutions, during admission, children are asked to tell famous stories and use other methods to assess their level of development.*

*Sometimes children's physical fitness is also checked. The elements of physical training also include the development of spatial and visual-motor coordination, the ability to maintain a posture while sitting for a long time.*

*In addition, teachers should pay attention to the development of the level of neurodynamic regulation: Ability to sit still, concentrate and focus on specific tasks during a 30-40 minute lesson.*

*Aside from the content and form of education, the technologies, methods and principles applied in it, the formation of the first part of this process takes place in preschool institutions. The initial part of the training process begins with reference to the preparation of the six-year-old. A child's preparation for school is a certain level of development of mental processes, emotional-volitional sphere and social maturity. This reasoning allows to distinguish the criteria of the child's readiness for school, morphophysiological maturity, development of mental processes, especially the feature of the imagination of the integral psychological characteristic, emotional-volitional circle and social maturity. All these criteria are equally important in the process of the child's adaptation to the primary school, but the teacher's main attention should be focused on the indicators characterizing the child's health. The health of the majority of children deteriorates by the end of primary school [4, 47-50].*

*An environment for comprehensive development of children should be created in the succession stage between preschool institutions and school, it is necessary to use new training methods and technologies. Succession also requires systematic work, especially with young parents. It is appropriate for the educator-teacher to explain to young parents how to establish a proper regime in the family and to teach the child with which intellectual preparation he should go to school. A parent should know how to develop a child's memory, attention, ability, ability to compare, generalize, and draw conclusions. In this regard, since the psychological preparation of the parent depends on the cooperation of the educator-teacher with the parent, but it is appropriate to carry out a number of tasks.*

*Observations show that for children a creative, healthy and developing environment should be created. The created developmental environment should be properly organized so that the child comes to kindergarten and the student to school willingly. The creation of a creative, healthy and developing environment leads to the education of students who love their homeland, land, people, reading, learning, school, teacher, and parents, as well as knowledgeable, world-viewing students, and it is at this time that it is possible to form a comprehensively developed personality.*

*The correct organization of preparation for school training means the creation of prerequisites for successful mastering of the primary school program and entry into the student body. This is a long and complex process, the goal of which is the comprehensive development of preschool children.*

*The normal organization of a child's physical development often depends on the correctness of his regime. Before going to school, a child who has learned this regime should be gradually accustomed to the regime corresponding to the school's regime, so that the child's adaptation to the school team is accelerated.*

*From the observations, it is also clear that due to the large number of students in the corridor, the children communicate with the children they have known before or with their classmates for a long time. Children who are active in kindergarten become somewhat passive in school, some become withdrawn. It is appropriate for the educator-teacher to determine what type of activity the children are interested in and with which children they should communicate.*

*As children who have just entered school find it difficult to find their place in the classroom and collective, starting from kindergarten, they should be taught the rules of behavior, how to behave on the*

*street, and how to follow the teacher's instructions.*

*To ensure succession between kindergarten and school, it is necessary to know the developmental characteristics of children's psyche. In the school, conditions should be created for the child to freely express his attitude, make judgments, and express independent opinions.*

*The needs and interests of children should be taken into account when organizing a developmental environment. Because it creates psychological comfort in the child.*

*In pre-school education, the goal is to develop children physically and mentally, and to protect their health.*

*Starting from pre-school age, children should be given simple scientific knowledge, moral and moral qualities should be formed in them.*

*The great Swedish educator I.H. According to Pestalozzi, children should be taken from nature and given to man while they are still in the cradle. In this case, children can understand the elements of the laws of nature and society. For this, children learn the shape, quantity, and words that are the unit of speech. Children encounter a new fact, word, object and event every day, and they are eager to learn the cause-and-effect relationships between things and events.*

*In preschool groups, children already partially understand the essence of the events happening in the surrounding world and understand the events happening in nature and society.*

*The development of the society also imposes appropriate demands on the training and education organized in preschool and primary education. Thus, the main goal of education is to cultivate a personality with creative ability and a broad outlook. For this purpose, mother tongue and speech development are taught in kindergarten, and mother tongue subject is taught in primary school.*

*In this regard, he is a tutor-teacher without studying the individual characteristics of children in depth, it is not possible to establish their education at the appropriate level. The more thoroughly the individual characteristics of children are studied, the easier it will be to choose methods and ways for their education.*

*Special attention should be paid to the idea of "teaching to learn" in preschool educational institutions. For this, the educator-teacher must study the child in detail, i.e. penetrate into his inner world, be able to determine his mood, interest and inclination, desire and desire, what is going on in his heart, what he is capable of, his skills and activities.*

*The educational process of children is organized based on the principle of age. In all these processes, integration into the world education system is the basis, and it is important to wait for succession in both pre-school and primary school for its effective outcome, because it is necessary to wait for succession to achieve a successful result. Between these two levels of education, the educational process and educational programs should be organized in accordance with the requirements of the time from the pedagogical and methodological side.*

*Preparing children for school training is the main task of preschool educational institutions. It should be followed in the content and form of all organized exercises. At the end of the preschool age, the child is ready to accept a new social role for him as a schoolboy, to master new (educational) activities and a system of special and generalized knowledge. Otherwise, it develops psychological and personal preparation for systematic education. It should be emphasized that these changes in the child's psyche, which are important for further development, do not happen by themselves, but are the result of purposeful pedagogical influence. It has been observed for a long time that if the necessary conditions are not created in the family, the so-called "organized" children lag behind their peers who go to kindergartens.*

*Many parents are worried that sending their children to school will not fully develop their abilities. There are many preschools that offer a variety of activities to prepare children for school. It is useful for parents to understand each of them in order to choose the most interesting and effective option for their child.*

*It is appropriate for the primary school teacher to be familiar with the knowledge, skills and habits that students have acquired in kindergarten and to continue their education based on this.*

*Previously acquired knowledge rests on the general development of succession. It is clear from this that the development in inheritance depends very much on the quality of the knowledge given earlier. It is known that the strength of the foundation is very important for the building being erected, as well as the assimilation of the new knowledge depends on the quality preparation stage. In this regard, it is one of the main issues to properly prepare the child for school education before going to primary school.*

*Scientists identify the following foundations of continuity that provide general psychological and*

creative preparation for school (they are prospective guidelines for preschool and primary school education):

- 1) development of interest in preschool children as the basis of cognitive activity of the future student;
- 2) formation of creative imagination as a direction for intellectual and personal development of the child;
- 3) development of mental and artistic abilities that ensure success in various activities;
- 4) development of communication skills, the ability to communicate with adults and peers.

AA Lyublinskaya [64] wrote about the need to establish not superficial, but deep, consistent connections in the formation of creative abilities of the next (school) and previous (preschool) levels of education:

"- the unity of the goals and tasks of the educational work, which determines the direction, content and methods of the teacher's work with them at all stages of children's development;

- it is appropriate for educators-teachers and primary school teachers to have a common understanding of the following aspects:

- the laws of child development in the upbringing and education process;
- development indicators of students;
- psychophysiological and age characteristics and potential of children."

The child's transition from preschool education to primary school environment is a period of transition of his/her to a different cultural space, different age category and social development. Ensuring the success of this transition period depends heavily on the staff working there.

Today, the concept of succession is understood as a continuous process of education and the education of a child with general and specific goals for each age period. At the same time, the training organized in preschool educational institutions ensures the child's development. Primary school helps the development of the child's abilities and socialization using the experience of the kindergarten. Succession between kindergarten and school includes both the content of training and education, as well as methods, techniques, and forms of educational work.

The educational system of preschool and elementary school is related to each other. Successful education at school largely depends on the quality of knowledge and skills formed in preschool educational institutions. This includes the development of the child's cognitive interests and cognitive activity. The succession between pre-school and primary education can be traced as follows:

- single structural and organizational approach;
- implementation of standard, structural and content components;
- educational program, training results;
- unified psychological and pedagogical methodological approach;
- reliance on the actual development zone and orientation to the child's proximal development zone;

- the concept of universal training activities;
- take age orientation into account;
- consideration of psychophysiological and individual characteristics of children;
- the general principle of organizing inclusive education, which should reflect:
- minimum regulation of the education of children with disabilities.

In modern times, the requirements of state standards form the basis of educational programs:

- children's intellectual development and the formation of moral and moral culture in them;
- work social development of whites;
- being able to relate to others;
- behaving in accordance with the rules of family and society;
- development of creative abilities, initiative;
- protection and strengthening of children's health;

The essence of the implementation of the succession between the kindergarten and the school includes the following:

- to make the preschool child get used to the new way of life and accelerate his adaptation to the new regime;

- to develop the emotional-volitional and intellectual abilities of the child;
- to increase the opportunity to acquire an improved, extensive educational program, etc.

The content of preschool education includes:

1. To be armed with knowledge, skills, habits and acquire different types of activities in the

educational process.

2. To develop learning activities and listening skills.

3. To finish any work started, accept criticism, etc.

To develop the characteristics of motivation (desire to read, learn, desire to go to school, etc.):

- development of small and large motor skills, hearing and visual perception, speaking ability;

- setting goals;

- formation of adequate behavior;

- independence and personal development;

- responsibility for actions;

- development of cooperation skills, etc.

The content of primary education includes:

1. Learning outcomes (knowledge, skills, abilities).

2. Subjects.

Reorganization of the educational process in the preschool educational institution:

- replacement of educational block with educational areas;

- increase in the volume of joint activities of adults and children;

- changing the content of joint activities of adults and children;

- change in the scope and content of educational activities.

The joint cooperation of the preschool educational institution and the school (educator, teacher, students and parents) plays an important role in ensuring the succession between preschool and primary education.

To reorganize the educational process in a preschool educational institution, it is appropriate to consider the following:

- replacement of educational block with educational areas;

- increase in the joint activity of adults and children;

- changing the content of joint activities of adults and children;

- change in the scope and content of education.

In pre-school institutions, children and school students freely express their opinions, make judgments, and make independent decisions. The formation of skills, initiative, independence, creativity, and cognitive skills of children and future students is the basis for the effective implementation of the task set before the succession.

The interest, memory, attention, and thinking of a preschool-aged child are developed in kindergarten through various means. This is observed both by exercise and coordination of different types of activities - entertainment, games. In kindergarten, children learn to observe, explain the results obtained, compare, make hypotheses, check whether they are correct, generalize and suggest cause-and-effect relationships. Building such skills and thinking in a child helps him develop further in elementary school.

Education plays the role of coordination of interaction between teaching staff. In this regard, the elements of educational activity in preschool children should be formed:

- the ability to act according to the model;

- ability to listen and follow instructions;

- the ability to work with concentration and complete the task to the end;

- ability to ask and answer questions;

- the ability to evaluate both own work and the work of other children

Thus, psychological preparation for school is formed in children.

Preparing children for school is a complex, multifaceted task that involves all areas. The presence of knowledge is more important as it determines the success of training in itself. The main thing is that the child is able to acquire and apply them independently.

The requirements of the standard for the results of the educational program are presented in the form of goals for preschool education. Considering the social and psychological characteristics of the child is an indicator of the achieved achievements. Preschool completion and succession are currently being highlighted as important issues.

Prerequisites for educational activity in preschool children try to form its elements. Let's look at the components of the training activity:

1) Motives;

2) Learning objective;

3) Learning task;

- 4) Training activities and operations;
- 5) Work skills that ensure independence;
- 6) Acquisition of new knowledge;
- 7) Formation of skills, including the organization of this process.

The functions of the training activity are as follows:

- ensuring the child's ability to independently perform activities;
  - to define trainings and training goals;
  - looking for and applying the necessary tools and ways;
  - monitor and evaluate achievements, activity process, results;
  - creation of conditions for the harmonious development of personality and self-realization
- water;
- preparation for continuing education;
  - successful assimilation of knowledge, formation of skills and ensure the acquisition of habits.

To organize groups for the formation of skills in any field let's pay attention to:

- personal;
- regulator;
- sociable;
- cognitive.

Zaitsev's methodology, aimed at the development of 3-5-year-old children, suggests teaching a child to read quickly using special cubes of different sizes and colors. An adult gives an interesting task, and the child completes it with the help of cubes. At the same time, the baby has significant freedom, and he remembers auditory information, as well as develops visual memory.

QVHegel's [53] methodology focused on preschool development offers a number of interesting logical tasks based on the child's interaction with adults. Together, they must come up with ways to solve puzzles with the help of cubes, cards and constructors. The method develops the child's figurative thinking and logic well.

The Doman method also prepares the child for school. Children are offered all kinds of cards with pictures, letters and words that need to be memorized and pronounced, as well as a large number of other interesting logical tasks. The method stimulates the activity of the nervous system well and effectively develops the perception of new information.

The Montessori method is a special systematic development activity for preschool children. These include a large number of different games using all kinds of geometric figures, colors, textures, which well develop the child's sense of touch, motor skills, memory and imaginative thinking.

The right and left hemispheres make up the human brain. The right hemisphere forms the thinking of the imagination, the sense of touch, the sense of touch. The left hemisphere is logic, analysis, human speech. When both hemispheres work effectively at the same time, a person has every reason to be a real genius in any field of knowledge. Only 5% of people on Earth have developed both hemispheres of the brain at the same time.

One of the most urgent problems in education is the problem of continuity between preschool education and school education. The main point in the implementation of inheritance is determining the child's readiness to study at school.

The play environment is a natural optimal environment where there is no coercion and where every child has the opportunity to find his place, to show initiative and independence, to realize his abilities and educational needs.

Preparing a child for school is one of the most important tasks of education. Education of preschool children, its solution in unity with other tasks of preschool education allows to ensure comprehensive harmonious development of children of this age. A child's education begins in the network of preschool educational institutions, whose most important task is preparation for school. The main components of preparation for school: physical, mental, motivational, emotional-voluntary, preparation for communication. Two aspects of psychological and pedagogical preparation are also distinguished: personal (motivation) and intellectual preparation.

As experience shows, the formation and objective assessment of the required level of school preparation, motivation and intellectual preparation is impossible without the active participation of teachers and parents of preschool educational institutions. Preschool educates the child and advises parents on parenting issues.

*It must be admitted that today intensive preparation for mental development is taking place in the preschool educational institution, that is, within the state requirements for the development of preschool children, the child is taught to write, count, and also have knowledge.*

*In addition, the diagnostic methodology of the child's readiness for school, developed in the republic, is primarily focused on the study of the cognitive sphere. Therefore, the problem of interaction between the preschool educational institution and the family remains relevant today as an important factor in the emotional and voluntary preparation of children for school.*

*Thus, it is clear that in preschool educational institutions, as we mentioned above, such consistency should be continued and systematicity and continuity should be expected.*

### **Conclusion**

*Ensuring and guiding the development of children, who are the future of our society, is one of the most pressing issues today. This should be started from pre-school institutions.*

*The continuity of preschool and school ensures, on the one hand, that children are transferred to a school with a general level of development and upbringing that meets the requirements of school education, and on the other hand, it ensures a general level of development and upbringing that meets the requirements of preschool education.*

*Knowledge, skills, qualities already acquired by preschool children ensure that students will actively use them at school in the future.*

*In order to prepare young children for school life, the educator-teacher must cooperate with primary school teachers and prepare children for school life together with them.*

*By working together, they can learn more deeply about the individual and developmental, psychological and physiological characteristics of children. This makes it easier for the classroom teacher to work with children.*

*At this time, in accordance with the requirements of the succession principle, the teacher gives the children new knowledge and skills based on what they have learned and achieves effective results.*

*It is not appropriate to transfer the knowledge acquired during the preschool period back to primary school. In this regard, it is one of the main issues for the teacher to continue training with children based on the principle of succession.*

*In order for them to adapt to the school faster, excursions to the school near the kindergarten building are organized with the children, and children's participation in school holidays is ensured.*

*Training and education are taken in harmony with each other, consistency is maintained.*

*Succession between programs is expected.*

*Children's knowledge develops as a result of learning about the environment. A developmental environment is created for the development and formation of children's thinking and learning skills. So, the adults who surround the children are also responsible here.*

*Since the purpose of implementing the connection between kindergarten and school is to prepare children for school life, child bConsistency creates conditions for the transition to school. In this regard, tutors-teachers are always in contact with class teachers and cooperate together.*

*From our observations, we also see that sometimes parents are not very knowledgeable about the developmental environment and toys.*

*When the lessons held in the classroom or other lessons are organized, maximum attention is paid to the cooperation of children with their friends. The teacher follows them to form the necessary skills in the children.*

*Activity arises in children when the tutor-teacher starts the exercises with motivation in the training process.*

*It is appropriate for the educator-teacher to connect the educational process in the kindergarten with school education.*

*In kindergarten, children are prepared for school life, which is important for their proper use of motivation in school.*

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**FORMS OF SCHOOL COMMUNICATION WITH PRE-SCHOOL EDUCATIONAL INSTITUTIONS****Rahimova Gariba Vahid***Azerbaijan State Pedagogical University  
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*The main goal of preschool education is comprehensive general creative development of the child according to his potential. It is during the pre-school age that the child's development (personal, intellectual, physical) and special preparation for school are ensured. In elementary school, the goal of education should be to continue the comprehensive creative development of children, along with the development of the most important learning skills in reading, writing, and mathematics. The main goal of the educational process in both preschool and primary school should be focused on the formation of the child's personality.*

*A turning point in a child's life is going to school. A new stage in the child's development begins, which is the acquisition of new types of activities, the emergence of cooperation with peers and adults, and the child's physiological development. In order to make these processes easier for the child, attention is being paid to the importance of establishing a connection between the kindergarten and the school.*

*It is clear from the observations that there is often no consistency in the work of the teacher and tutor. The teacher should pay attention to the information prepared in the school preparation of the child in order to reveal the child's ability to study at school, intellectual ability, speech and social development characteristics. Without this information, the effectiveness of the teacher's pedagogical influence on the child is impossible. From this point of view, the goal-oriented work of the teacher together with the tutor means that children with all-round preparation and a high level of development feel comfortable at school.*

*Also, the inheritance of the relationship style between the tutor and the teacher is of great importance for creating children's self-confidence, enthusiasm for reading and learning with joy.*

*One of the main conditions of education, which has not yet been fully resolved, is the continuity of pre-school and primary education. For many years, scientists, educators, specialists, teachers and parents have been discussing this issue. There are various answers to the following questions:*

- When should a child be prepared for school?*
- What is the best way to do this?*
- What and how to teach a child and in what form?*

*In general, some educators say that the preschool does not teach the child, but develops it. The educational process is only the main activity of the child. A 5-6-year-old child gets new information about the world and people through game activities.*

*There is no single way for the development of all children and there cannot be: one should talk more, another should listen more, the third should run and jump, the fourth should be taught to sit and work carefully. One thing is clear, it is necessary to prepare a child for school, and the most important thing that a child is taught is what he learns, which will always help him succeed in school.*

*Some recommendations should be used to prepare the child for school. How the first school year will pass is also reflected in the child's further education. A lot depends on this. A first-grader cannot be deprived of the joy of life.*

*The continuity of the child's education should be ensured, taking into account the individual characteristics of the child, the needs of the family and society. The main condition for the continuity of education is continuity, which consists in establishing a single line of personality development at these two levels of education.*

*The problem of continuity between preschool and primary school education in the formation of children's creative abilities is divided into many aspects (content, methods, techniques of education and upbringing, organizational forms of educational work, etc.). The most important of them, in our opinion, are the following:*

- 1. Inheritance in the content of education and upbringing process.*

*Development programs for children's educational institutions and primary schools should be established in the same context as the child's creative development. The existence of many changing programs significantly complicates the situation of continuity, since new programs in the field of preschool and primary school education are often inconsistent in content, but also psychologically mutually exclusive. The content of any training should include opportunities for the formation of the*

child's creative abilities. To date, certain educational and training technologies have been developed and applied based on the principle of succession in creative development. Examples of these are "Development", "Childhood", "From childhood to adolescence", "School", etc. can be shown.

Preschool educational institutions must ensure "the full development of the child's personality, talent, mental and physical abilities." These issues are also reflected in the Convention on the Rights of the Child. These issues are determined by the tasks of realizing children's opportunities during preschool childhood.

Currently, important changes are being made in preschool and school education. As a rule, when talking about the continuity of preschool and general secondary education, the problem of children's school preparation comes to the fore.

The main goal of preschool education is the comprehensive development of the child's personality in accordance with his age and individual capabilities, abilities and needs, the formation of his moral norms, and his acquisition of social experience. However, this goal can often be seen to be superseded by rather narrowly understood learning tasks - teaching reading, writing and counting.

## 2. Succession in teaching methods and organizational forms.

Anticipation of succession in preschools and primary school. When working with children of the preschool group and the first grade of the school, many common methods and methods are used to teach children: oral methods (conversation, story, explanation, retelling, etc.), visual (observation, demonstration, etc.), practical (primary experiences etc.). Two interrelated aspects can be distinguished in the continuity of forms of cooperation between kindergarten and school:

Educational and practical. First, mutual familiarization of teachers and tutors with the tasks of educational work at the senior preschool age (teachers) and junior school age (educators), study of the content of programs of large groups of kindergarten. For this purpose, the participation of teachers and educators in joint pedagogical councils on the problem of children's school preparation, mutual discussions, etc. contact forms like this are created.

The second - practical aspect is expressed, on the one hand, in the initial acquaintance of teachers with future students in kindergarten, and on the other hand, in the supervision of former students by tutors-teachers. The forms of implementation of this content are: systematic visits of teachers of preschool groups in kindergarten to get acquainted with future students, monitor their activities, get acquainted with the characteristics and results of children's diagnostics.

3. General understanding by educators and primary school teachers of psychophysiological, age characteristics and potential of children in related parts of the education system.

4. Continuity of pedagogical conditions for the development of students, which will ensure the integrity of the creative development of the personality.

The first is based on the experience of shaping the pace of the child's development and consists in direct adaptation of the tasks of the preschool educational institution to the requirements and features of school education. At the same time, the preschool child's special forms of activity are either suppressed in kindergarten or excessively didactic.

The second is based on the tactics of pre-development of knowledge and skills of preschool children in primary school. In our opinion, this direction is better than the first one, although it is not universal. Succession should ensure a "smooth" and maximally painless transition of the child to a new level of education, in fact, to a new social environment. When determining the leading ideas during the implementation of continuity, taking into account the current situation, it is necessary to give priority to the content of education at each stage of the child's age development, and to prevent repetition of the content of subsequent education.

The tasks of preschool education can be defined as follows:

- introducing children to a healthy lifestyle;
- to ensure the emotional well-being of each child, to create conditions for various activities;
- to develop initiative, interest, creative self-expression skills, attitude to the world, people, and oneself;
- to include children in various forms of cooperation with adults and peers;
- form knowledge about the surrounding world;
- stimulating children's cognitive and game activities in various activities.

Duties of primary school:

- to form the conscious acceptance of healthy lifestyle values and the regulation of behavior in accordance with it;
- to develop readiness for active interaction with the environment;

- to form the desire and ability to learn, readiness for education and self-education at school;
- to develop initiative, independence, cooperation skills in various activities.

Content components of the sequence:

-Emotional - taking into account the characteristics of the emotional sphere of the preschooler's personality, provides emotional comfort for both the student and the child in the learning process. The priority of positive emotions, building a learning process based on humanistic pedagogy.

-Activity - based on the components that are relevant for a certain period of activity, ensuring connections between the leading activities of subsequent periods, creating conditions for the formation of preconditions for the leading activity of the next age period.

-Content – creating the correct connection between direct educational activities, perspectives in content and education from preschool to primary school for mastering the fields of "Physical development", "Social-spiritual and personal development", "Cognitive development", "Speech development", "Aesthetic development".

-Communicative - taking into account the communication skills of children in preschool and elementary school to create conditions for socialization, ensuring cooperation and communication between them.

- Pedagogical - to place the child in the center of the educational process, to monitor the individual nature of the relationship between him and the outside world (child and society, nature and child, child and other people, etc.), his education and upbringing.

Directions for the implementation of inheritance:

1. Organizational-methodical provision, work with tutor-teacher staff.
2. Working with children.
3. Work with parents.

Organizational and methodical support, work with the teaching staff may include the following:

- establishment of business cooperation between tutors-teachers working in pre-school and primary school teachers;

- familiarization with the tasks of joint education work of preschool education and primary school;

- joint pedagogical councils on succession issues;

- joint meetings of methodological associations on the effectiveness of the work of educators-teachers of preschool educational institutions in preparing children for school;

-mutual participation in classes in pre-school preparation groups and classes in primary classes (with discussion afterwards);

-psychological-pedagogical consultation based on the results of the study of social-pedagogical adaptation of first graders;

- the study of the experience of using variable forms, methods and methods of work in the practice of teachers and educators.

It is advisable that the work to be done during training and non-training time should include the following:

-organization of adaptation lessons with a large group of children within the framework of the future first grader's school;

- organization of school excursions, trips;

- development trainings on motivational preparation for school;

-conducting intermediate and final diagnostics with preschool children aimed at studying the cognitive and motivational qualities of the individual;

- parties organized together, sports events.

Forms of interaction between teachers and parents may include:

- joint parent-teacher meetings;

- holding open door days at the school on the theme "Let's get to know each other";

- organization of open classes with the participation of parents;

-consultations of education workers, primary school teachers;

- Involvement of parents in the organization of children's holidays and sports competitions.

It is more effective to include various forms of work in cooperation with parents: "How to prepare a child for school", "How to assess the educational readiness of future first-graders", "The student of the future", "Entry to school is an important event in family life", "Components of psychological preparation for learning at school", "Daily routine of a first grader" etc.

Teachers, in turn, acquire ideas about how to refer to the knowledge and skills acquired by the children in the kindergarten, think about how to build their work, analyze the idea, conduct research,

and approach their future activities creatively.

Thus, the following forms of communication between pedagogical collectives were envisaged:

1) determination of the succession between the programs of the first grade and school preparation group;

2) revealing problems in terms of succession in the programs of the first grade and pre-school groups;

3) tutors-teachers should familiarize themselves with the knowledge and skills acquired by children in the school preparatory group;

4) participation of teachers in the pedagogical council dedicated to the results of the work in the preschool group in the kindergarten;

5) educators-teachers observing how children adapt to school and what difficulties they encounter;

6) joint discussion of new approaches to preschool and primary education;

9) study of advanced practice related to the preschool institution and the first grade of the school. It is advisable to combine the listed forms of contact into three forms.

1. Educative: participation of tutors and teachers in pedagogical councils and seminars together.

2. Methodical form: making observations together in the educational process in kindergarten and school.

3. Practical form: teachers' acquaintance with future students in kindergartens, educators' monitoring of their children's learning process at school.

Thus, it is appropriate to move to new forms of work that ensure succession in the training process.

In order to organize succession between kindergartens and schools, holding individual and joint conversations between them, participation of teachers in exercises in kindergartens, and tutors in lessons organized in schools are among the main issues. One of the main issues is to discuss the exercises and lessons that have been listened to and take into account the age and individual characteristics of the children in the discussion. All this should have a developmental purpose.

The components of indicators of intellectual readiness for school education are as follows:

Image component:

- multiple properties of the signs of the object;
- visual memory based on imagery;
- the ability to perceive, generalize the ideas one has about an object or event;
- the development of mental operations such as analogy, comparison, synthesis; involves heuristic thinking.

In modern times, an important factor of self-development of personality is education. We should not forget such a fact, which requires wide dissemination of the psychological and pedagogical foundations of inheritance in education. Succession, which is the basis of the management of human life and ensures its successful functioning, is not only a preparation for the new, but also, more importantly, to protect and develop the appropriate old. In this regard, succession should be studied by everyone in all areas of life, and its direction should be determined correctly.

It follows that succession is the basis of the development process, the connection between the new and the old, and its opposite is perspective.

It is important to consider the relationship between preschool education and school, the fact that these two stages have a scientific-practical basis, a foundation, as one of the conditions for the implementation of the succession principle. Each subsequent level consolidates and compounds the knowledge, skills and habits acquired in previous levels.

Inheritance, which is a two-way process, preserves the value of childhood at that age, on the one hand, being a preschool stage, the joy that serves his successful education at school, and forms positive and personal qualities in the child. On the other hand, the school also studies the achievements of the preschool child in his activities and develops his potential opportunities. The problem of succession can be solved if a close interaction between the kindergarten and the school is created.

Schooling requires more excellence from the child and aims to ensure succession by focusing on:

- getting the child used to training;
- prepare the child to understand and understand the given tasks;
- effective use of knowledge, skills and habits in solving tasks;
- evaluation and analysis of the child's activity;
- to develop the child's creative imagination;
- to create a connection between the school and the kindergarten;
- formation of cognitive-cognitive activity;

- formation of training motives, etc.

Our observations show that the school preparation of five-six-year-old children, which is often aimed at facilitating the adaptation period in the first grade, is replaced by going through a part of the first grade program. In practice, systematic training is started earlier. The education of preschool children should not be aimed at accelerating intellectual development, but at enriching and optimally using those unique conditions for the formation of general creative abilities created during preschool childhood.

Of course, children should be prepared for some degree of systematic education, but care must be taken.

We see the reasons for the revealed uneven development in the fact that most of the day is devoted to the lesson, children do not have time for games, free independent and artistic-practical activities. In these groups, creative tasks and problem situations are not used enough in the teaching process, informational and reproductive methods prevail, which negatively affects the development of children's creative abilities.

The lack of stable cognitive interests among some preschool children, in our opinion, can be attributed to the following real factor. Currently, school education starts at the age of 6. Preschool education is carried out up to 5-6 years. Almost all innovative programs ("School"; "Success", "Rainbow", "Torch", etc.) require a graduation group for children of the sixth year of life. As a result, part of the children of the sixth year of life, who join the large group of kindergarten, go to school with insufficiently formed motivation for educational activities, unrealized potential.

Another reason for the unsatisfactory implementation of continuity between preschool and primary school education in the formation of creative abilities is the improper use of methods and technologies that ensure the necessary level of this development.

Thus, it is concluded that achieving a certain level of development of imagination in preschool children is a necessary condition for the formation of a full-fledged structure of educational activity. The presence of tendencies in children to be involved in educational activities and the ability to establish meaningful business cooperation with adults as the bearer of a standard of competence in a certain field, that is, the level of development of imagination. Taking into account creative abilities, the scientist assigns a priority place to school education in the structure of intellectual preparation.

The creative thinking of a young schoolboy is a kind of new qualitative segment in the single line of development of human creative abilities. What should be the basis of continuity in the development of creative abilities between preschool and elementary levels of the educational system?

Continuity between pre-school and primary education levels should be ensured and necessary conditions should be created for this.

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## Philological sciences

### AZERBAIJANI LITERATURE IN THE 20TH CENTURY

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#### **Abstract**

The 20th century is a new stage for our people not only politically, but also literary, cultural and cultural. An outside view of the completed century shows that the path taken by literature is as rich in form, content, ideas, and images as it is contradictory. In this century, the literature of the 1920s and 1950s constitutes a separate stage. Among the literary examples of the last century, the most criticized are the literary products of this period. The main reason for this is that many literary and artistic examples of the period became the mouthpiece of the Soviet or communist ideology, and the other reason is that the literature of the period was studied only in the presentation of Soviet literary criticism and evaluated with a political lens. It is known that Soviet literary criticism and literary studies for a long time (mainly, 20-50 years) applied only social realism literary-criticism methodology to our literature and evaluated literary examples from this perspective. However, over time, both these literary examples and the works that go beyond the framework of social realism (the literary criticism of the time expressed its opinion about them!) have the opportunity to enter the literary circulation again today. This means that it is not correct to consider all of these works as expressions of communist ideology, and this is a manifestation of incorrect approach to the history of our literature. It is not possible that the literary way of thinking of a people, a nation has turned into a mouthpiece of an ideology. Therefore, it is necessary to re-examine and methodologically evaluate the literary and artistic thought of that period. If we take into account that up to half a century has passed since the academic publication of our literary history, then it is possible to clearly see the need to re-examine and evaluate the literature of the complex social realism period.

**Keywords:** literature, Soviet era, language, alphabet

Although the 20th century has ended, social realism has long since ended its life, the study of literary and artistic thought continues; In the past, the discovery of new versions of previously unpublished works from a large number of archives, the writing of new scientific researches - articles, monographs - show that this process is underway. Researches related to the personality, life, and creativity of many writers who wrote and created in this period have already started to form independent fields of science. At the same time, the literary studies of each era looks at the past, refines and refines the scientific-theoretical propositions of previous literary criticism, and enriches it by reworking it. Fiction and the literary process of the time as the main subject of literary studies necessitates revision. One of the factors that give rise to this necessity is the solution of the problems facing modern literary studies. Thus, our contemporary literary studies has not yet developed the methodology of approach, assessment and evaluation of the literature of the period of social realism. The most urgent issue is to include works written from the perspective of the era in the textbooks of higher schools. When we say this, we do not reduce the importance of the literature of the period at all, we simply ensure the modernity of the approach to the included works with new criteria according to the principles of existing literary studies. It is clear that our literary critics should not abandon the literary product of a great era that went down in history as "Soviet literature" (such cases are given more space in some press pages), but should reevaluate it. Drawing a line over "Soviet literature" as a whole is the result of improper study of the literature of the time and an unbiased assessment. Because when the social structure is changing, it is not the right way to give up the literary product of that period, the best way depends on which literary thought the new generations accept and to what extent that work plays a role in shaping the artistic taste of new thinking people.

We can abandon the Soviet Union, the expressions of "Soviet literature" and "socialist realism" (these are already a thing of the past), but we must involve in research all examples of the period that arose outside of education and serve only art, and examine it with new criteria. In this sense, it cannot

be said that our science of literary studies has fundamentally studied the current scientific and theoretical problems of the time, and has completely created the methodological and theoretical base for the creation of literary history. Today, there is a gap in this field of our literary studies. There are no previous scientific-methodological criteria (it is called Marxism-Leninism methodology and was involved in all studies in the form of a stencil). However, new methodological references that replace these criteria have not yet been formed. However, we have the opportunity to study and present the literature of the 20th century as a single literary process. Because the writing of the history of literature involves a complete reflection of the literary process. In the textbook, we aimed to objectively investigate the socio-political, historical, and literary conditions of the period, clarify the characteristics of individual stages, and express a new view of these literary products. On the one hand, analyzing the events that took place in the literary process (even if these events are obstacles to the development of literature, because only in this case it is possible to objectively learn what obstacles our literature has overcome), a new attitude is presented to it, and on the other hand, a writer, poet and we focus extensively on the works of playwrights that influence the literary process. It is possible that among these works there will not be works of the author that were very popular at the time, but another work that is consistent with modern scientific theoretical and methodological criteria that reveals his creative features should be widely emphasized.

XX centuryThe repression of the 1930s began in the first months of the establishment of Soviet power. His first intellectual victim was the director of the Kazakh Teachers' Seminary, an outstanding scientist and literary critic, the author of the first multi-volume history of Azerbaijani literature, a great intellectual, Firidun Bey Kocherli (1863-1920), who was shot by the Armenian Dashnaks in Ganja prison. In general, repression forms the blood-soaked black pages of the history of the Soviet era of Azerbaijani literature. At that time, there were many innocent workers and peasants among those who were subjected to unreasonable persecution. However, intellectuals suffered the most from Bolshevik-Dashnak persecutions. The reason for this was clear. The Stalinists wanted to destroy the intellectual children of the Azerbaijani people, or by rotting them in prisons and exiles, to hinder the nation's self-awareness process, to separate it from its moral roots, and to turn it into a blind executor of communist doctrines. Scientists who know the history, philosophy, language, alphabet, culture, psychology and mentality of the people well, who researched and propagated them among their countrymen, writers, poets and dramatists who prevented the death of national thinking with their artistic works written in their native language and in forms close to the spirit of the people, creative intellectuals as a whole are the most feared, and therefore the most brutally treated, of those who carry out strict and ruthless "special" tasks given from "above" they were our compatriots.

At the beginning of the 20th centuryamong the repressed artists there were very prominent representatives of Azerbaijani literature and art, literary studies and linguistics: the great playwright H. Javid, the brilliantly talented poet M. Mushfiq, the outstanding prose writer and literary critic S. Huseyn, the author of the first (and last) anthem of the Republic of Azerbaijan famous poet A. Javad, prolific writer and scientist YVChamanzaminli, professor of philology, polyglot scientist B. Chobanzade, Baku State University rector, writer T. Sh. Simurgh, Khadija Khayibova, who opened the first Eastern Conservatory in Baku, prominent theologian-scientist, Baku veteran Mir Mahammad Kazim aga, folklorist-scientist H. Zeynalli, the most prominent performers of tragic roles on our stage AM Sharifzade, U. Rajab and dozens others... All these creative intellectuals, except for YVChamanzaminli and H.Javid, who died in exile and in prison was shot. Murderers hurriedly tried and executed their victims, regardless of their age. Baku veteran Mir Mohammad Kazim, one of the first translators of the Holy Quran into Azerbaijani, was shot at the age of 83, and M. Mushfiqi was shot at the age of 29. Mikayil Mushfiq (1908-1937) wrote national poetry in the conditions of complex and contradictory social structure "Oxu, tar!" enriched with immortal works of his kind. The poet was lucky enough to write and create in the shortest time (only 10 years) in the experience of world poetry. However, the works he published in this short time left an indelible mark in the literature. Excited feelings and emotions, romantic poetry that defies its time, smooth and playful language are the creative features that ensure the artistic value and longevity of Mushfiq's art.

Due to the global events of the first decades of the 20th century and social upheavals in the region, especially after the overthrow of the GDR, as well as during the repressions of the 1930s, the creative intellectuals of Azerbaijan were repeatedly subjected to political persecution, and in order to escape and continue their literary activities, they turned to emigration as a last resort. they had turned away. Those who found refuge abroad after the war because they were taken prisoner in the war against German fascism, or their children live far away from our country - in the continents of Asia, Africa, Europe,

America, even Australia.

Our emigrant intellectuals have always been united by one aspect: they tirelessly protected, represented and propagated Azerbaijani national literary and cultural mentality and ideals of Azerbaijaniism in the countries where they lived, and always worked hard to keep the pain and suffering of Azerbaijan in the center of attention of the ruling circles and the public. Azerbaijani emigrants, some of whom continue their creative activities even today, have a very wide, rich literary, scientific-philological, publicist heritage. Among these authors are Alibey Huseynzade, Ahmadbey Agaoglu, Muhammad Amin Rasulzade, Mirza Bala Mahammadzade, Alimardanbey Topchubashov, Jeyhun Hajibeyli, Samad Agaoglu, Ahmed Jafaroglu, Abdulvahab Yurdsevar, Almas Ildirim, Benin (Ummulbanu), Nagi Sheykhzamanli, Mammad Sadiq Aran, Huseyn Jamal Yanar., Teymur Ateshli, Musa There are Zayam, Ibrahim Arslan, Ali Azertekin and dozens of others. After Azerbaijan gained its state independence, Ummulbanu's novel "Caucasus Days", A. Yildirim's collection of poems "Black Epic", A. Huseynzade's "Politics-business", M. A. Rasulzade's monographs "Azerbaijani poet Nizami", J. Hajibeyli's stories, Publicistics of MB Mehmedzadeh were published in separate books in Baku with respect and honor to their authors.

The dependence of literature on strict directives, the repeated violation of freedom of speech, the subjection of literature to state policy, etc. negative circumstances caused certain disappointment, discouragement and stagnation in the literary and cultural life for many years. But in this period, artists such as J. Jabbarli, M. Mushfiq, S. Vurgun, O. Sarivalli, R. Rza, who were highly talented and often influenced the ideological frameworks with the language of Aesop, emerged, which in itself was a result of the socio-political conditions of literature as a whole. It was a fact that worked against the extreme theories of absolute dependence. Suleyman Rustam (1906-1989), who started working as a Komsomol poet under the ideology of the "Golden Pens" union, wrote a series of "southern poems" in the spirit of true patriotism, the poem "Mother and the postman", and ghazals dedicated to the praise of pure feelings of love. In those years when the ghazal was considered an outdated and limited genre in official circles, it was the people's love for the elegant ghazals of the outstanding poet Aliagha Vahid (1895-1965), which were rich in deep meanings.

During this period, MS Ordubadi (1872-1950) was one of the well-known artists who developed the novel genre of Azerbaijani literature, especially the historical novel genre. His novels "Sword and Pen" written about the Atabay state of Azerbaijan and our greatest artist Nizami Ganjavi, as well as "Dumanli Tabriz" dedicated to the freedom movement in the south, have not lost their historical and aesthetic significance even today. Suleyman Rahimov (1900-1983), the author of novels such as "Between Two Fires" ("Blood in the Blood"), "Girls' Fountain" in the prose of approximately the same period, author of the epic "Shamo" and the novel "Hairy", author of the novel "Open Book" and laconic story writer Mir Jalal (1908-1978), the epic "Fortress of Friendship" and "Yokushlar" The special services of Abulhasan Alekbarzade (1904-1986), the author of the novels, and Mirza Ibrahimov (1911-1993), the author of the novels "The Future" and "Parvana" should be noted.

Soviet era dramaturgy Huseyn Javid, Suleyman Sani Akhundov, Jafar Jabbarli, Mirza Ibrahimov, Samad Vurgun, Sabit Rahman, Anvar Mammadkhanli, Ilyas Efendiyev, Shikhali Gurbanov and others. is closely related to the name. Huseyn Javid (1882-1941) is a powerful dramatist and poet who enriched Azerbaijani literature both in terms of genre and content with his 30-year-long work. With his works, the world of topics of our literature has been greatly expanded, human conflicts and brilliant characters with deep thoughts, sensitive hearts, and great passion have come to our dramaturgy. With the plays "Mother", "Sheikh Sanan" and "Iblis", we have laid the foundation of the verse tragedy genre in our dramaturgical literature. During the Soviet period, the writer's dramaturgical works were the plays "Prophet" (1922), "Topal Teymur" (1925), "Prince" (1929), "Sayavush" (1933), "Khayyam" (1935), "The Devil's Revenge" (1936), He became richer with the poem "Azer" (1923-1932). Jafar Jabbarli (1899-1934) was not only the successor and follower of the national dramaturgy founded by MFA Khundzade, but at the same time enriched it with problems and heroes in the works "Ogtay Eloglu", "Bride of Fire", "Sevil", "Almas".

Samad Vurgun (1906-1956) is one of the most prominent poet-playwrights who grew up in the Soviet era. The main features of his poems are to grasp the wonderful beauties of the nature of Azerbaijan, the heroic history of our people, and our humanistic values with philosophical depth and to interpret them romantically. Azerbaijani poetry of the last century owes its originality, harmony, and imagery to the work of S. Vurgun, especially to his poem "Azerbaijan", epic poems such as "Aygün", "Mugan", verse dramas "Vaqif", "Insan". Despite all the pressures of the Soviet regime, the role played by "Vagif" in the process of national self-awareness of the Azerbaijani people can only be compared with

the great role of the genius Uzeyir Hajibeyov's opera "Koroglu" in this field.

Poems and poems written by Rasul Rza (1910-1981), mainly in free verse, had a great role in the development of Azerbaijani poetic thought during the Soviet period. R. Rza's poetry, an innovative poet, is distinguished by its philosophical lyricism, vividness of thoughts and emotions, and original poetic images. His philosophical poems from the "Colors" series, "Fuzuli", "If it wasn't for the rose" and others. lyrical poems are among the best examples of Azerbaijani poetry.

One of the main characteristics of Soviet-era Azerbaijani literature was that it was regularly controlled by ideological bodies, and literary activity was guided by directives. The most important of them are the resolution of the Central Committee of the RK(b)P "On the policy of the Party in the field of fiction" (1925), "On the reconstruction of literary and artistic organizations" (1932) the decision of the Central Committee of the Central Committee of the Ukrainian Communist Party (b)P, "Zvezda" and "Leningrad" magazines" (1948) decision of the Central Committee of the Communist Party of Azerbaijan "On the state of Azerbaijani Soviet literature and measures to improve it" (1948) The decision of the MK "On Literary-Artistic Criticism" (1972) and a number of other political directives can be cited. In particular, the socialist realism artistic method defined by the First All-Union Congress of Soviet Writers held in 1934 binds the hands of creative artists. forced to write within the framework of "Zvezda" and "Leningrad" magazines, allegedly distorting the Soviet way of life, flaws in public life. after the criticism of its promotion, along with the literature of other nations of the USSR, literary examples based on "non-conflict" began to emerge in the literature of Azerbaijan.

Ilyas Efendiyev (1914-1996) had great creative services in the enrichment of Azerbaijani prose with lively, fresh, artistic images and artistic means of description, in the development of lyrical-psychological style in our drama. In the performances based on 15 of his plays ("You are always with me", "Destroyed diaries", "The song remained in the mountains", "Bullur sarayda", "Khurshidbanu Natavan", etc.) generation matured, "Ilyas Efendiyev Theater" was established. Ali Valiyev, Huseyn Ibrahimov, Huseyn Abbaszadeh, Bayram Bayramov, Jamil Alibeyov, Vidadı Babanlı, Alaviya Babayeva, Suleyman Valiyev, Aziza Ahmadova, Afgan Asgarov, Gulhuseyn Huseynoglu, Alibala Hajizadeh and others also contributed to the enrichment of Azerbaijani prose with new themes and heroes.

Starting from the 60s, as a result of a slight warming of the global socio-political atmosphere and the weakening of ideological shackles in the USSR, young talents who came to the field of artistic creativity began to create works that criticized the existing political structure. Among them there are prose writers and poets such as Isa Huseynov, Mammad Araz, Sabir Ahmadov, Anar, Akram Aylisli, Elchin, Sabir Rustamkhanli, Alakbar Salahzade, Farman Karimzade. Ismayil Shikhli (1919-1994), who entered artistic creativity a little earlier, and his novel "Crazy Kur" should be specially mentioned. Of course, these artists, like their predecessors, used symbols and Aesop's language in many cases. However, this process itself had already taken an irreversible direction and could be considered as "the beginning of the end". The transition to the 1960s began and continued with the participation of the generation that came to literature in the 1940s and 1950s and even earlier. From this point of view, many works of the innovative artist Rasul Rza (1910-1981), especially the famous series of poems under the common title "Gizilgul omlayydi" and "Colors", works such as "Yellow Cow", "Kefli Iskander", "I am Land" should be counted among the first examples. Mehdi Huseyn's (1909-1965) novel "Underground Rivers Flow to the Sea" by Mehdi Huseyn (1909-1965), who is famous as an outstanding prose writer, playwright and critic, is based on the same poet's convincing description of the fates of life-like characters. However, the most important literary event of the 1960s and 1990s was the arrival of the "60s" in the world of creativity. It was after this arrival that literature turned into a real spiritual opposition to the total military regime with its spirit and essence and took an active part in the moral preparation of the national independence and democracy movement of today.

First of all, it should be noted that the "60s" view of man and his spiritual world deepened. Man has always been the basis of literature, and it is no coincidence that literature is called "anthropology" in a high sense. However, the most important point that draws attention is that the "60s" fundamentally reintroduced the topic of "man" into the literature of that time as a new topic, a new problem. In their works, the artistic interest was focused on the personality, the individual, the spiritual and psychological world of the simplest, ordinary members of society, depth, inside. Especially in their narratives and stories, the period, spiritual reality was perceived not as a "social system and structure", but before that as a conscientious, ethical realm, as a criterion of morality and spirituality, and became the subject of artistic analysis. The thoughts and ideas of the hero type in these works did not correspond in any way to the concept and dogma of the "Soviet man" in literature. The most popular heroes of the literature of the 60s were the pure-hearted truth-seekers, whose strangeness was sometimes regarded as madness,

the extraordinary people who did not find their place in life, and for that reason sometimes wandered, but were still amazed by real people and human feelings. Novels and short stories written on historical topics often refer to the history of statehood and the heroic past of the people who were condemned to distance themselves from their national roots and traditions of statehood under the socialist grip, and their aspirations and dreams of freedom and freedom were reflected.

This movement, which began in literature for the sake of freedom of speech and thought, political thought, pluralism, national independence, and social justice, was continued in the 70s and 90s, and finally achieved its prospective goals with the acquisition of political sovereignty and state independence of Azerbaijan.

In harmony with what has been said, the instructive pages of folk history and lyrical-psychological experiences prevail in the poetry and dramaturgy of artists such as Bakhtiyar Vahabzadeh (1925), Nabi Khazri (1924), Nariman Hasanzadeh (1931). The poems of these poets, as well as those of Gabil (1926), which are always distinguished by their relevance, the poem "Nasimi", many works of Adil Babayev, Islam Safarli, Huseyn Arif, Gasim Gasimzadeh, Aliaga Kurchayli are valuable examples of our literature.

In the literature of this stage, Imran Gasimov, Magsud Ibrahimbeyov, Rustam Ibrahimbeyov, Chingiz Abdullayev, Chingiz Huseynov, Vladimir Gafarov, Natig Rasolzade, Alla Akhundova, etc., who wrote and created the continuation of an ancient tradition - the tradition of creating a national culture in another language, in Russian. we see in the activity of writers. Their works published repeatedly in Baku, Moscow and European countries are valuable examples that enrich our national culture and expand the scope of interest in it.

Ali Karim (1931-1969), Khalil Reza (1932-1994), Jabir Novruz (1933-2002), Mammad Araz (1933-2004), Fikret are among those who prepared the artistic ground for the new stage of Azerbaijani literature and who themselves actively participated in this process. Goja (1935), Fikret Sadiq (1930), Alakbar Salahzadeh (1941), Isa Ismailzade (1941), Sabir Rustamkhanli (1946), Famil Mehdi (1934-2002), Tofiq Bayram (1934-1991), Arif Abdullazade (1940-2002), Huseyn Kurdoglu (1934-2003), Ilyas Tapdig (1934), Musa Yagub (1937), Chingiz Alioglu (1944), Nusrat Kasamanli (1946-2001), Zalimkhan Yagub (1950), Ramiz Rovshan (1946) and others. poets are chosen. Akram Aylisli (1937) is one of the first writers who realized the search for new images of national prose in the 60s. We witness a sincere approach to real life and people in his works such as the story "My singer aunt" (1966), "The forests of Kur kiragyn", "The tale of the crystal ashtray", which he wrote with a lyrical voice.

One of the talented representatives of New Azerbaijani prose is Anar (1938). One of the first original and successful examples of Anar's prose is the narrative "Ağ liman" (1967). Anar is also known as a prominent playwright and screenwriter.

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## VALUE AS AN OBJECT OF SCIENTIFIC RESEARCH

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## ЦЕННОСТЬ КАК ОБЪЕКТ НАУЧНЫХ ИССЛЕДОВАНИЙ

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*It is well known that spiritual, moral, ethical, socio-cultural and other values of the people, on the basis of which their world outlook is formed, are objectified in the national language. In today's globalising world, the study of national values acquires special relevance due to the probable threat of their loss. This is evidenced by the emergence of a new branch of linguistics - linguo-axiology, the central unit of study of which is linguo-axiologems - linguistic expressions of cultural, ethical and social values that permeate speech, texts and discourses. It is well known that there is a distinction between universal and culturally determined national values. The subject of our article is the systematisation of linguo-axiological studies devoted to the problem of value.*

**Аннотация**

*Как известно, духовно-нравственные, морально-этические, социокультурные и другие ценности народа, на основе которых формируются его мировоззренческие установки, объективируются в национальном языке. В современном глобализирующемся мире изучение национальных ценностей приобретает особую актуальность в связи с вероятной угрозой их утраты. Об этом свидетельствует и возникновение новой отрасли лингвистики – лингвоаксиологии, центральной единицей изучения которой являются лингвоаксиологемы — языковые выражения культурных, этических и социальных ценностей, которые пронизывают речь, тексты и дискурсы. Общеизвестно, что различают универсальные и культурно обусловленные национальные ценности. Предмет нашей статьи – систематизация лингвоаксиологических исследований, посвященных проблеме ценности.*

**Keywords:** *Axiological linguistics, value, culture, language, cultural picture of the world.*

**Ключевые слова:** *Аксиологическая лингвистика, ценность, культура, язык, культурная картина мира.*

*В современном глобализирующемся мире наблюдаются ярко выраженные центробежные и центростремительные тенденции, связанные, с одной стороны, стремящиеся к интеграции культур, с другой – к сохранению национальных культур во избежание ее потери. В этих условиях ценность как особая субстанция приобретает все большую значимость. В рамках триады человек – язык – культура на первый план выходят веками выработанные народом духовно-нравственные и морально-этические ценности. В этой связи в Казахстане с 2017 года на государственном уровне активно реализуется Программа модернизации общественного сознания «Рухани жаңғыру» (Духовное возрождение), направленное на изучение традиционных*

ценностей. Эта программа является многоаспектной, требующей исследования с различных позиций: философской, культурологической, лингвокогнитивной, этнолингвистической, исторической, литературоведческой и мн. др.

Наше обращение к данной проблеме обосновано необходимостью в перспективе выявления способов и средств языковой объективации данного процесса. Понятие духовность мы рассматриваем как аксиологему – центральную единицу лингвоаксиологии. На первом этапе с целью систематизации необходимо обратиться к истории вопроса, т.е. к мониторингу и анализу лингвоаксиологических исследований, посвященных данной проблеме.

Изучение проблемы ценностей уходит корнями вглубь истории, с античных времен по сей день она не теряет своей актуальности. В каждый период истории человечества вносились новые коррективы в дефиницию данного понятия. Так, еще в Древней Греции и Риме данная проблема рассматривалась с философских позиций. В трудах Платона, Демокрита, Гераклита, ценность рассматривалась как высшее благо, дарованное людям. В Средневековье Августин отмечал необходимость противопоставления высших (божественных) и мирских ценностей. В эпоху Возрождения Дунс Скот, У. Оккам считали высшими ценности, произвольно установленные Богом, где доминирует гуманистическая составляющая. В эпоху рационализма Ф. Бэкон, Р. Декарт, Б. Спиноза, Г.В. Лейбниц, Т. Гоббс провозглашают новые ценности, разграничивая их на объективные и субъективные, в которых доминируют разум, свобода воли, практическая польза, наука, прогресс. В период романтизма А. Шлегели отмечал неразрывность ценности с понятием прекрасного, призванного служить счастьем человека; Д. Юм считал альтруистические, социальные чувства (благожелательность, милосердие и т.д.) важными ценностями жизни и культуры. В немецкой классической философии И. Кант («Основы метафизики нравственности»), дифференцировал ценности как абсолютные и относительные, высшей ценностью и формой культуры считал моральное совершенство человека и человечества, эта категория абсолютна и устанавливается разумом в качестве всеобщих нравственных законов; по Гегелю абсолютной ценностью является культура, выступающая «имманентным моментом» абсолютного; Баденская школа (Р.Г. Лотце, Г. Риккерт, В. Виндельбанд и др.) рассматривает ценность как самостоятельную философскую категорию. Понимание аксиологии формируется в глубинах античной науки, однако ее выделение как отдельной отрасли философского знания произошло благодаря трудам немецких философов: И. Канта, Г. Гегеля, Р.Г. Лотце и др. Свое дальнейшее развитие аксиология как неотъемлемая часть языка получит в XX веке.

В начале XX века (1902 г.) французским философом П. Лапи в научный обиход введен термин аксиология, вытеснивший конкурентный термин тимология, введенный в то же время представителем австрийской психологической школы И. Крейбигом. В 1904 году Э. фон Гартман для именованя раздела философии, исследующего ценности использовал термин аксиология [25]. Таким образом, аксиология изучает природу ценностей, их характеристики, их место в реальности, структуру и иерархию ценностного мира, способы его познания и его онтологический статус, а также природу и специфику ценностных суждений [2, с. 731].

XXI век ознаменован утверждением интегративного подхода в изучении системы ценностей, которая отличается мультипарадигмальным характером и, соответственно, исследуется не только в рамках философии, а становится объектом изучения психологии, экономики, политологии, педагогики, лингвистики, а также целого ряда других социально-гуманитарных дисциплин. Об экспансии аксиологии в лингвистику можно судить по дефиниции из словаря новых иностранных слов, где помимо философской трактовки, приводится и лингвистическая: «А. – раздел социологии языка, изучающий систему оценок естественных языков и их элементов» [26, с. 4]. Многочисленные исследования лингвистов убедительно показывают, что ценности имеют свойство объективироваться в языке.

Одним из первых ученых-языковедов, обративших внимание на аксиологический аспект был Ш. Балли, интуитивно понимавший, какую жизненно важную роль играет способность человека оценивать (положительно или отрицательно) для функционирования языка. Ш. Балли выявил тесную взаимосвязь между оценочными суждениями и выражением эмоций, так как, по его мнению, ценностные суждения отличаются от логических, потому что в некоторой степени они всегда эмоциональны и никогда не являются полностью интеллектуальными продуктами. Ш. Балли ввел понятия мелиоративной и пейоративной оценки [27].

В 1962 г. британский лингвист С. Ульман в своей работе «Semantics: An Introduction to the Science of Meaning» указал на различие между оценочной коннотацией и денотацией. В его

понимании некоторые слова могут содержать оценочную характеристику, которая доминирует над их основным значением. Вместе с тем существуют слова, основная функция которых – выразить оценочное суждение или вызвать эмоции. Это относится к таким прилагательным, как *хороший, храбрый, забавный, глупый, ужасный* и их антонимам. Эмоциональный элемент выступает одновременно как слой, проходящий через смысл и является семантическим ядром [28].

Бернар Потье, занимающийся общей семантикой, полагает, что аксиологический фактор как специфическая модальность может быть включен в ряд основных семантико-грамматических категорий, таких как (время, вид, модальность и т.д.) [29].

Связь между когнитивной теорией и аксиологией исследована в работах зарубежных ученых, в частности *Krzeszowski, Kieltyka, Hart, Felices Lago* и *Cortés de los Ríos, Pauwels* и *Simon-Vanderbergen, Fornalczyk, Biela-Wolonciej* и др.

Когнитивно-аксиологическое лингвистическое исследование иницировано и разработано в трудах польского ученого *Krzeszowski*, в дальнейшем его идеи развиваются бельгийскими учеными *Pauwels* и *Simon-Vanderbergen*. Лингвист приводит доказательства того, что аксиологический параметр играет гораздо более важную роль в структуре значения, нежели это признавалось ранее. *T. Krzeszowski* не только представил ключевые принципы этой новой точки зрения, но также указал на доминирующую функцию, которую ценности выполняют в структуре понятий. Согласно его подходу, большая часть понятий относится к миру нематериального, соответственно, они являются продуктом когнитивных процессов человеческой концептуализации. Такие концепты как *любовь, дружба, традиция, материнство* и многие другие, включая собственно ценностные, не могут существовать вне опыта человека и зависимы от осмысления их человеком [30, с. 24].

Согласно аксиологическому принципу *Krzeszowski*, слова имеют свойство быть аксиологически наполненными «хорошими» или «плохими» коннотациями в соответствии со степенью участия человеческого фактора, имеющего отношение к ним [31, с. 150]. Для ученого многие лексические элементы имеют большой аксиологический вес, и этот вес семантически релевантен. Здесь особую важность представляет уровень опыта человека, который служит первым шагом в построении иерархии ценностей и влияет на то, как ситуации оцениваются людьми.

Концепция «семантического дифференциала» *Osgood, Suci* и *Tannenbaum* демонстрирует то, что ценности могут выполнять доминирующую функцию в структуре понятий [32]. По мнению *Sucheski*, эмоции являются основными факторами, определяющими информацию [33, с. 83-110]. Однако это фундаментальное открытие когнитивной психологии было проигнорировано предыдущими поколениями лингвистов [30, с. 24]. Лингвисты, начиная с сосюрговских традиций, выступали с некоторыми формальными заявлениями о денотативной роли аксиологического компонента во многих лексических единицах языка, однако никакой конкретной теории в тот период не было сформулировано.

В XX веке с развитием антропоцентрической парадигмы происходит эволюция языковедческих воззрений, что предопределило появление новой научной лингвистической парадигмы – аксиологической лингвистики. Разумеется, ее возникновение было подготовлено рядом предпосылок и фоновыми знаниями в форме постулатов, вопросов и идей, отраженных в работах известных классиков и основоположников теоретического языкознания, таких как *G. Lascoff* и *M. Johnson*, *Ch. Morris*, *Н.Д. Арутюнова*, *Е.М. Вольф*, *В.Н. Телия*, *В.И. Карасик*, *Т.В. Маркелова*, *З.К. Темиргазина* и др. Исследователи не использовали в своих трудах само понятие «аксиологическая лингвистика» в его современной трактовке, однако их вклад в формирование рассматриваемого направления нельзя недооценить в плане лингвистического анализа категорий «ценность» и «оценка».

По определению *Ж.А. Джамбаевой*, аксиологическая лингвистика – сфера междисциплинарного знания, предметом которой является воплощение ценностей в языковом сознании и коммуникативном поведении реципиентов [1, с. 30]. Предметом изучения аксиологической лингвистики является репрезентация ценностей, а целью – их изучение сквозь призму языка. По мнению *Е.Ф. Серебренниковой* и др., важнейшей исследовательской задачей аксиологически ориентированной лингвистики является определение методологии и технологии в изучении содержания внутреннего мира языковой (дискурсивной) личности, ценностных ориентаций личности общества по данным языка, что представляется возможным в рамках парадигмы *Человек – Язык – Мир* [34, с. 19].

Предпосылками для развития аксиологической лингвистики в Казахстане послужили труды казахстанских языковедов З.К. Темиргазиной, З.Х. Ибадильдиной, Л.Ю. Мирзоевой, Ж.А. Джамбаевой, К.О. Есеновой, Г.Е. Дюсембиной и др. В обзорной статье М.Ш. Мусатаевой, А.С. Кожяхметовой обозначены основные достижения аксиологической лингвистики в Казахстане [35].

Весомый вклад в становление и развитие аксиологической лингвистики в Казахстане внесли работы профессора З.К. Темиргазиной: в первую очередь диссертационное исследование и одноименная монография «Оценочные высказывания в русском языке» [36] и ряд других изданий [14; 37; 38]. Одной из главных особенностей концепции З.К. Темиргазиной является определение категории оценочности как смысловой основы субъективной модальности. В работах З.К. Темиргазиной большое внимание уделяется описанию оценочных предложений с точки зрения синтаксического подхода. Л.Ю. Мирзоева в своих ранних работах также обращается к синтаксическим единицам, выражающим персуазивную оценку, позже Л.Ю. Мирзоева в своем диссертационном исследовании проводит исторический экскурс в диахроническую эволюцию категории оценки с XVII до XX века, рассматривая ее как отражение трансформации языковой картины мира [39].

В ряду исследований нового периода следует выделить учебное пособие Қ.Ө. Есеновой «Лингвоаксиология (қазақ баспасөз материалдары негізінде)» [15], которое посвящено анализу основных концептов политического текста на материале казахской периодической печати. Репрезентация аксиологической семантики в казахстанском социуме на материале казахстанской прессы также освещается в работе М.Ш. Мусатаевой [40].

В настоящее время аксиологическая лингвистика в Казахстане представлена разнообразной палитрой научных проблем, описанных в работах ученых по следующим аспектам:

а) оценочный аспект (З.К. Темиргазина, Л.Ю. Мирзоева, Д.Б. Токтамысова, Ф.З. Жақсыбаева, М.Ж. Аренова, Г.А. Тусипбекова, Г.Е. Дюсембина и др.);

б) лингвокогнитивный подход (М.Ш. Мусатаева, М.Ж. Аренова, Г.М. Далабаева, Ж.А. Джамбаева, А.И. Скрипникова, Г.Е. Дюсембина и др.). Актуальные вопросы лингвокогнитологии и лингвокультурологии представлены в работе З.К. Ахметжановой и М.Ш. Мусатаевой [41].

в) сопоставительный подход на материале следующих языков: 1) русского и казахского: А.А. Кияшева З.Х., Ибадильдина, М.К. Каирова; 2) русского и английского: И.А. Мячина; 3) русского и немецкого: Г.О. Азылбекова; 4) французского и казахского: А.Т. Бақытов; 5) английского, казахского и русского: С.Б. Изакова; А.И. Скрипникова в своей диссертационной работе рассматривает аксиологический компонент, который имплицитно реализуется при вербализации концептов на газетном материале русского, казахского и английского языков [51].

г) функционально-прагматический аспект (Б.С. Жумагулова, К.С. Сарышова, А.А. Мұсабекова, Б.С. Жонкешов, Д.Б. Токтамысова, М.Б. Амалбекова и др.). Публицистические тексты, содержащие элементы аксиологического наполнения, рассмотрены в статьях Г.Е. Абдикеримовой, А.С. Кожяхметовой;

д) лингводидактический аспект (М.Ш. Мусатаева, А.С. Кожяхметова, А.С. Нусупбекова, Г.А. Куатова и др.). М.Ш. Мусатаева предлагает авторскую методику изучения языковых средств и текстов, содержащих в своей семантике аксиологический компонент, с опорой на таксономию Блума, включающую органично связанные между собой уровни: знание, понимание, применение, анализ, синтез и оценка [60].

Проведенный обзор работ казахстанских лингвистов по проблемам изучения оценки выявил, что в казахстанском языкознании преобладают исследования, проведенные в сопоставительном аспекте. Возможно, такая отличительная черта обусловлена многокультурной средой в Республике. Примечательно, что, работы, выполненные на казахском языке, охватывают материал только одного языка (казахского).

Аксиологический аспект исследования языка предполагает выяснение того, что является ценным для человека и как эти ценности находят свое отражение в лексической системе языка. Это обстоятельство порождает востребованность нового типа словаря – аксиологического. Подобные словари дадут возможность современной лексикографии расширить свои границы за счет формирования аксиологической лексикографии, занимающейся словарным описанием ценностей и антиценностей.

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## THE IMAGE OF A DOCTOR: COMPONENTS OF PROFESSIONAL SUCCESS AND PATIENT TRUST

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## ІМІДЖ ЛІКАРЯ: СКЛАДОВІ ПРОФЕСІЙНОГО УСПІХУ ТА ДОВІРИ ПАЦІЄНТІВ

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У сучасному суспільстві образ лікаря має багатогранне значення, що виходить за рамки його професійної компетентності. Він є ключовим чинником, який впливає на формування довіри між лікарем і пацієнтом, а також на ефективність взаємодії в процесі лікування. Люди очікують від медичних працівників не лише високого рівня знань та навичок, але й людяності, емпатії, здатності зрозуміти їхній стан і підтримати у складні моменти. У часи стрімких змін та цифровізації суспільства роль лікаря як морального авторитета й надійного професіонала набуває ще більшого значення. Це зумовлено не лише потребою пацієнтів у кваліфікованій медичній допомозі, але й необхідністю відчувати психологічну безпеку та підтримку у взаємодії з лікарем. Сучасні виклики вимагають від медиків адаптивності, готовності до постійного навчання і здатності орієнтуватися в інформаційних потоках, зберігаючи при цьому високу якість надання допомоги та етичність у своїй діяльності.

Імідж лікаря базується передусім на його **професійних якостях**, які є фундаментом для побудови довіри з боку пацієнтів. Глибокі знання, багатий досвід і здатність оперативно приймати зважені рішення у критичних ситуаціях формують відчуття впевненості у пацієнта, що він у надійних руках. Адже саме ці риси дозволяють лікарю правильно оцінити стан пацієнта, діагностувати проблему та знайти оптимальне лікувальне рішення навіть у складних або нетипових обставинах.

Проте професійної компетентності недостатньо для створення позитивного образу лікаря. **Особиста комунікація з пацієнтом** відіграє вирішальну роль у цьому процесі. Лікар, який виявляє емпатію, уважно вислуховує скарги та звертає увагу на деталі, демонструє пацієнту, що його проблеми не залишаються поза увагою. Це створює важливий емоційний зв'язок між пацієнтом і лікарем, де останній сприймається не лише як професіонал, але і як людина, яка справді турбується про здоров'я та благополуччя іншого.

Довіра пацієнтів до лікаря значною мірою залежить від рівня його **психологічного розуміння**. Пацієнт, особливо в умовах стресу, хвороби чи невизначеності, часто перебуває у вразливому стані. Вміння лікаря вчасно розпізнати емоційний стан людини, знайти потрібні слова підтримки чи заспокоїти страхи, є невіддільною частиною успішного лікування. Наприклад, пацієнт, який відчуває, що його тривоги чи побоювання почуті й враховані, набагато охочіше дотримується рекомендацій лікаря, довіряє запропонованим методам лікування і позитивніше ставиться до результатів медичної допомоги.

Крім того, рівень комунікативних навичок лікаря впливає не лише на сам процес лікування, але й на **загальне враження пацієнта про медичну систему загалом**. Уміння лікаря пояснити складну інформацію простою мовою, враховуючи емоційний стан пацієнта, формує у людини відчуття безпеки та розуміння. Пацієнт, який почувається зрозумілим і почутим, готовий співпрацювати, слідувати інструкціям і довіряти фахівцю.

Таким чином, професійні якості лікаря, збагачені емпатією та психологічним розумінням, створюють міцну основу для довіри пацієнтів. Саме через ці аспекти формується не лише ефективність лікування, але й позитивний образ лікаря як надійного партнера у збереженні здоров'я та якості життя.

Другим важливим елементом є **зовнішній вигляд лікаря**, який є одним із ключових елементів, що формують його імідж та впливають на ставлення пацієнтів. Перший контакт із лікарем зазвичай починається з візуального враження, і воно здатне або зміцнити, або підірвати довіру ще до початку спілкування. Охайність, доглянутість і відповідність професійному дрес-коду створюють образ компетентного фахівця, який серйозно ставиться до своєї роботи. Ці деталі не просто доповнюють професійність лікаря, але й сигналізують про його повагу до пацієнта та готовність забезпечити високий рівень медичної допомоги.

Одним із найпоширеніших символів медичного працівника є **білий халат**. Його історично асоціюють із чистотою, стерильністю та професіоналізмом. Лікар у білому халаті автоматично викликає асоціацію з надійністю та високими стандартами медичного обслуговування. Проте зовнішній вигляд лікаря не обмежується лише халатом. Загальна презентабельність, яка включає охайну зачіску, чисте взуття, відсутність надмірностей у прикрасах чи макіяжі, також відіграє важливу роль. Пацієнт підсвідомо сприймає такі деталі як відображення не лише зовнішньої дисципліни, але й внутрішньої організованості та відповідальності.

Крім того, **зовнішній вигляд лікаря може створювати певний емоційний фон** у спілкуванні з пацієнтом. Наприклад, спокійні кольори одягу, які використовуються в медичному середовищі, або приємний запах парфумів, що не є надто інтенсивним, сприяють формуванню довіри й створюють атмосферу комфорту. Одночасно неохайність чи недбалість у зовнішньому вигляді можуть викликати сумніви у професіоналізмі лікаря, навіть якщо його кваліфікація є бездоганною.

Особливого значення зовнішній вигляд набуває в умовах, коли пацієнт перебуває в емоційно напруженому стані. Наприклад, діти, люди похилого віку або пацієнти з високим рівнем тривожності часто звертають увагу на візуальні деталі, які допомагають їм почуватися спокійніше. Доглянутий і впевнений у собі лікар здатен своєю зовнішністю не лише створити позитивне враження, але й стати джерелом емоційної підтримки для пацієнта.

Отже, зовнішній вигляд лікаря — це більше, ніж просто дотримання стандартів дрес-коду. Це важливий аспект професійного іміджу, який має безпосередній вплив на формування довіри пацієнтів, їхнє ставлення до лікування та загальний емоційний клімат взаємодії з медичним працівником.

Не можна ігнорувати **роль медіа та соціальних мереж у формуванні суспільного сприйняття лікарів**. Сьогодні публічність медичних працівників може стати як потужним інструментом для популяризації здорового способу життя, так і викликом через можливість поширення недостовірної інформації. У цьому контексті важливим завданням є забезпечення прозорості, дотримання етичних норм і використання соціальних платформ для поширення достовірної медичної інформації.

**Сучасні реалії, такі як пандемії та надзвичайні ситуації**, додають нових викликів до формування образу лікаря. У кризові часи суспільство очікує від медиків не лише професійної майстерності, але й готовності до самопожертви, психологічної стійкості та співчуття. Такі ситуації значною мірою впливають на суспільне ставлення до лікарів, підкреслюючи їхню ключову роль у збереженні життя і здоров'я.

**Таким чином**, імідж лікаря є багатогранним явищем, що охоплює професійні, особистісні, етичні та соціальні аспекти. Його значення виходить далеко за межі індивідуального сприйняття, впливаючи на рівень довіри до всієї медичної системи. Саме тому робота над створенням і підтриманням позитивного образу лікаря є важливим завданням не лише для медичних працівників, але й для суспільства загалом.

## EFFECTIVE FOREIGN LANGUAGE LESSON PLANNING THROUGH LEARNING STYLES IN HIGHER EDUCATION

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### **Abstract**

*In higher education, the effectiveness of foreign language teaching hinges on well-structured lesson planning that accommodates the diverse learning styles of students. With the growing emphasis on student-centered education, recognizing and addressing individual learning preferences has become essential. This article delves into the methodological aspects of lesson planning tailored to distinct learning styles, including visual, auditory, kinesthetic, and read-write, and evaluates their impact on foreign language instruction. By aligning teaching strategies with students' preferred learning modes, educators can foster increased motivation, engagement, and improved linguistic outcomes.*

*Research by Fleming (2014) and Dunn & Griggs (2015) highlights the critical role of differentiated instruction in supporting diverse learners. Integrating pedagogical frameworks such as task-based learning, blended learning, and the use of technological tools offers practical approaches to incorporating learning styles into lesson design. Additionally, theoretical foundations such as Vygotsky's sociocultural theory emphasize the importance of social interaction in language learning, while Gardner's theory of multiple intelligences provides a robust basis for understanding and addressing individual differences among students.*

*This paper also draws on findings from surveys conducted in university settings, which demonstrate that lessons tailored to students' unique learning preferences result in higher levels of satisfaction, motivation, and language proficiency. Practical strategies discussed include the use of multimedia resources for visual and auditory learners, interactive activities for kinesthetic learners, and structured reading and writing exercises for read-write learners.*

*Overall, this study underscores the need for educators to adopt a flexible and inclusive approach to lesson planning. By implementing methodologies that address diverse learning styles, teachers can create engaging, student-centered learning environments that optimize outcomes in foreign language education within higher education contexts. This approach not only enhances linguistic performance but also supports the holistic development of learners.*

### **Body**

#### **1. Introduction**

*The individual style of activity is a key aspect of personal development and individualization in higher education. A well-developed learning style indicates a student's ability to adapt to the structure of academic activities while showcasing their unique abilities and individuality.*

*Educational activity itself is a complex, multifaceted process that incorporates cognitive, communicative, organizational, and practical components. These elements create the internal framework of the learning process and enable students to reach their full potential when they work in harmony.*

*Communication holds a special place in this structure, serving as a tool that shapes a student's personality and academic progress. In higher education, communication becomes a dynamic system of socio-psychological interactions between students, teachers, and peers. It facilitates the exchange of ideas, the development of relationships, and the effective delivery of educational content.*

*Developing an individual learning style requires creating conditions that allow students to express themselves and find approaches that align with their abilities and preferences. Individual learning styles are influenced by key psychological and cognitive factors, such as:*

- Perception: whether students process information holistically, fractionally, or categorically;*
- Attention: whether their focus tends to be sensual (based on sensory input) or intellectual;*
- Memory: the preference for verbal-logical or associative memory processes;*
- Thinking: including theoretical, practical, or creative approaches.*

*Additionally, psychologists and educators emphasize the role of individual psychological traits in shaping learning outcomes, such as:*

- 1. Intelligence: the ability to acquire, process, and apply knowledge effectively;*

2. Creativity: the ability to generate original ideas and develop new knowledge independently;

3. Motivation: a strong internal drive to achieve educational goals and derive satisfaction from success;

4. Self-esteem: confidence in one's abilities, which influences aspirations and achievements.

In foreign language learning, certain specific abilities play a significant role. These include sensory abilities, such as phonemic awareness (the ability to differentiate sounds), motor skills (such as clear articulation), and imaginative abilities (the capacity to visualize and apply language structures). By understanding these individual characteristics, instructors can tailor lessons to support the unique learning styles of students.

The development of an individual learning style in higher education depends on the collaboration between teachers and students. Teachers must create a supportive psychological and pedagogical environment that encourages students to develop their own approaches to learning tasks.

For effective development, learning tasks should allow for flexibility in methods and techniques. Tasks that require rigid, step-by-step solutions often limit students' ability to explore and express their individuality. Instead, tasks that offer multiple pathways to success encourage students to experiment, compare methods, and choose those that align with their personal strengths.

The teacher's role is to guide students in identifying and adopting methods that are both effective for achieving academic goals and suited to their unique learning styles. This can only happen if students are actively involved in evaluating different approaches, testing them, and understanding which methods work best for their cognitive and psychological makeup.

By fostering such conditions, higher education can support students in developing their individuality and achieving deeper, more meaningful learning outcomes.

In recent years, the push for student-centered education has transformed the way foreign languages are taught in higher education. Effective lesson planning begins with recognizing and integrating the varied learning styles of students, as first explored by Fleming (2014) through his widely accepted VARK model [1]. These learning styles—visual, auditory, kinesthetic, and reading/writing—provide a framework that ensures lessons are interactive and inclusive. According to Smith (2017), failing to address these preferences can lead to decreased engagement and stagnant language acquisition [2]. For example, students with visual learning tendencies often struggle in traditional auditory-based classrooms, while kinesthetic learners thrive when provided with active, task-oriented activities [3].

## **2. Theoretical Foundations**

The theoretical basis for incorporating learning styles into lesson planning is grounded in two key frameworks: Gardner's theory of Multiple Intelligences and Vygotsky's Sociocultural Theory. Gardner (2014) highlighted the existence of multiple intelligences, such as linguistic, spatial, and bodily-kinesthetic, arguing that traditional teaching often fails to harness these intelligences effectively [4]. I can strongly agree with the theoretical foundations presented here, as they resonate deeply with what I experience in the classroom. Gardner's Multiple Intelligences theory is particularly insightful because students indeed exhibit a wide variety of strengths and preferences. For example, I've observed how some students grasp vocabulary faster through visuals (spatial intelligence), while others excel in discussions (linguistic or interpersonal intelligences). Relying solely on traditional teaching methods often alienates these different intelligences.

Meanwhile, Vygotsky (2015) emphasized that learning is a socially mediated process, where students construct knowledge through scaffolding and peer interaction [5]. Vygotsky's Sociocultural Theory is equally relevant. I have seen firsthand that peer collaboration and scaffolding activities, such as group tasks or guided speaking exercises, foster better understanding and confidence among English language learners. Students who initially struggle to construct sentences independently often flourish when given support from their peers or instructor. This aligns with the idea of learning as a socially mediated process. Combining these theories gives me a rationale to diversify my instructional strategies, making the classroom more inclusive and productive for all learners.

These theories provide educators with a rationale for diversifying instructional strategies. As Garcia et al. (2018) observed, students who experience teaching aligned with their learning preferences report higher satisfaction and improved outcomes [6].

## **3. Practical Implementation of Learning Styles**

Implementing diverse learning strategies into foreign language instruction requires thoughtful planning. For instance:

**Visual Learning:** Visual learners benefit from charts, infographics, videos, and flashcards. Miller (2016) demonstrated that students exposed to visual aids retained 45% more vocabulary and grammar

concepts than those taught through traditional lectures [3]. A blended approach, where visual tools complement auditory explanations, has been shown to enhance comprehension further (Smith, 2017) [2].

**Auditory Learning:** Auditory learners excel with listening exercises, dialogues, and group discussions. In one study by Thompson et al. (2015), auditory-focused activities improved students' listening comprehension scores by over 30% [4]. Incorporating podcasts or real-time language immersion exercises aligns well with these learners' needs.

**Kinesthetic Learning:** Kinesthetic learners engage most effectively through movement-based activities such as role-plays, task-based learning, and Total Physical Response (TPR). Johnson (2014) noted that using kinesthetic methods resulted in stronger language retention, particularly in grammar practice, where activities connected physical actions with verbal cues [5].

**Reading/Writing Approaches:** Students who favor reading and writing as their dominant style benefit from structured tasks like essays, note-taking, and vocabulary journals. According to Garcia et al. (2018), assigning reflective writing exercises can bridge the gap between theoretical understanding and practical language use [6].

The practical implementation strategies discussed here reflect many of the tools I use in my English classroom, and I can attest to their effectiveness:

**Visual Learning:** I've often integrated videos, flashcards, and infographics into lessons, particularly for vocabulary or grammar explanations. For instance, when teaching the past perfect tense, showing a timeline or animation makes it clearer for visual learners. I agree with Miller (2016)—students respond well to visual aids and seem to retain information better than through lectures alone.

**Auditory Learning:** I completely agree that auditory learners benefit from listening exercises, real-world dialogues, and group discussions. In my experience, activities like listening to podcasts or engaging in listening comprehension quizzes help students internalize pronunciation, rhythm, and intonation. Discussions, in particular, allow auditory learners to process language through active participation.

**Kinesthetic Learning:** Kinesthetic strategies are a game-changer, especially for younger learners or those who struggle with traditional learning. I often implement Total Physical Response (TPR) to connect physical actions with English commands—"stand up," "open your book"—and it's remarkable how quickly students learn. Additionally, role-plays and real-life scenarios bring a dynamic energy to grammar practice and sentence construction.

**Reading/Writing Approaches:** Writing is central to mastering English, and I've seen students greatly benefit from structured tasks such as reflective journals, essays, or word maps. These exercises bridge theory and practical use, encouraging students to apply new vocabulary and grammar creatively.

Blended learning environments have emerged as a particularly effective way to integrate multiple learning styles. Smith (2017) found that combining traditional instruction with technological tools, such as Learning Management Systems (LMS), enhances flexibility and individualization [2]. For example, visual learners might use video resources, while auditory learners access language podcasts on the same platform.

I also agree that blended learning environments are effective. Platforms like Learning Management Systems (LMS) allow me to create individualized resources for different learning preferences without overburdening myself. For example, I might share videos for visual learners and podcasts for auditory learners simultaneously. This flexibility makes a significant difference in students' engagement and understanding.

#### **4. Surveys and Case Studies**

Surveys in higher education institutions support the value of differentiated instruction. A study conducted by Garcia et al. (2018) across three universities revealed that 70% of students experienced greater satisfaction and improved language performance when lessons incorporated multiple learning styles [6]. The findings from surveys and case studies strongly align with my observations. Garcia et al. (2018)'s results, showing that 70% of students report greater satisfaction when multiple learning styles are incorporated, reflect what I see in my own classroom. Differentiated instruction often leads to more active participation, especially among kinesthetic and visual learners, who are traditionally underserved in conventional lessons.

In another case study, instructors who applied Gardner's theory of intelligences observed a 25% increase in participation among kinesthetic and visual learners [4]. Notably, Thompson et al. (2015) highlight the importance of periodic assessments, such as Fleming's VARK questionnaire, to adapt lesson plans to evolving student needs [1]. I find periodic assessments, such as the VARK questionnaire mentioned by Thompson et al. (2015), invaluable. In my practice, I have used simple surveys at the

beginning of a term to understand students' preferred learning styles. For example, discovering that a group includes many auditory learners allows me to emphasize listening tasks or group discussions. It also allows students to feel more seen and understood, leading to a boost in motivation and effort.

### **5. Challenges and Recommendations**

While integrating learning styles into lesson planning is beneficial, it comes with challenges. Time constraints, large class sizes, and a lack of resources often prevent instructors from fully personalizing their lessons. I completely agree that all the challenges that mentioned are major barriers to fully personalizing lessons. In larger classes, it's nearly impossible to cater to every student's preferred style through traditional teaching methods alone. For instance, while I might want to implement both visual and kinesthetic activities, I often have to prioritize due to time limitations.

Johnson (2014) suggests leveraging technology to streamline differentiated instruction, allowing teachers to address multiple learning preferences simultaneously [5]. However, I believe Johnson's recommendation is practical and increasingly necessary. Digital platforms allow me to create interactive resources that address multiple learning preferences. For example, tools like Kahoot! (for quizzes) or Google Classroom (for shared materials) enable me to distribute varied resources quickly. Technology also reduces my workload by allowing me to repurpose materials and differentiate instruction effectively. For instance, digital platforms enable educators to design interactive tasks that cater to diverse student needs without requiring significant additional effort.

In the future, I'd like to explore more digital tools that allow for simultaneous engagement of multiple learning styles. Despite the challenges, I remain convinced that integrating diverse learning strategies is worth the effort because it ultimately leads to better student engagement, satisfaction, and learning outcomes.

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## INTEGRATING LANGUAGE AND CULTURE IN FOREIGN LANGUAGE TEACHING FOR HOLISTIC LEARNING

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### **Abstract**

*Integrating language and culture in foreign language teaching has become a critical approach in modern education, addressing the need for learners to develop both linguistic proficiency and intercultural competence. Language and culture are inherently interconnected, with each shaping the other in meaningful ways. Teaching language without considering its cultural context can lead to gaps in learners' ability to communicate effectively in real-world situations. This study examines the integration of language and culture in foreign language education, highlighting effective strategies, benefits, and challenges.*

*The research employs a systematic literature review and thematic analysis to explore best practices and theoretical foundations. Key strategies identified include the use of authentic materials, task-based learning, project-based learning, and Content and Language Integrated Learning (CLIL). Authentic materials, such as films, music, and literature, expose learners to real-world language use and cultural nuances. Task-based and project-based learning engage learners in activities that simulate real-life intercultural communication, fostering practical skills and critical thinking. CLIL integrates language instruction with culturally relevant content, offering meaningful contexts for both linguistic and cultural learning.*

*The findings reveal that integrating cultural elements significantly enhances learners' understanding of vocabulary, idiomatic expressions, and pragmatic communication. It also improves their ability to navigate diverse cultural interactions and increases motivation by connecting language learning with real-world applications. However, challenges such as limited teacher training, resource constraints, and traditional curriculum structures hinder effective implementation. Addressing these barriers is essential to fully realize the potential of this approach.*

*This study underscores the importance of integrating language and culture in foreign language teaching to prepare learners for global communication. It emphasizes the need for teacher training programs focused on cultural pedagogy, curricula that balance linguistic and cultural objectives, and investment in resources to support culturally integrated instruction. Future research should explore long-term impacts, cross-cultural applications, and the role of technology in enhancing cultural immersion. By advancing these efforts, educators can create inclusive and effective learning environments that foster not only language skills but also intercultural understanding.*

**Keywords:** *intercultural competence, cultural pedagogy, authentic materials, task-based learning, cultural immersion, CLIL approach, pragmatic communication*

**Introduction.** *In an increasingly globalized world, foreign language teaching has evolved to include not only linguistic competence but also cultural awareness and understanding. Language and culture are deeply intertwined, with culture shaping language use and language serving as a medium for cultural expression. As such, integrating language and culture in foreign language education is crucial for fostering learners' intercultural communication skills and preparing them for authentic real-world interactions. This holistic approach allows learners to develop not only the ability to speak and comprehend a language but also the sensitivity to navigate diverse cultural contexts effectively.*

*The relevance of this topic lies in addressing the gap between traditional language instruction, which often focuses solely on grammar and vocabulary, and the practical demands of modern communication, which require intercultural competence. Many language learners struggle to communicate effectively in real-life situations due to a lack of cultural understanding, which can lead to misunderstandings and communication breakdowns. By integrating cultural elements into language teaching, educators can provide learners with the tools to interpret and respond to cultural cues, fostering meaningful and successful communication.*

*The primary objective of this study is to explore the integration of language and culture in foreign language teaching, highlighting effective strategies, benefits, and challenges. Specifically, the research aims to:*

- 1. Examine the theoretical foundations of language and culture integration in education.*
- 2. Identify pedagogical approaches that effectively combine linguistic and cultural instruction.*
- 3. Evaluate the impact of cultural integration on learners' language proficiency and intercultural competence.*
- 4. Provide practical recommendations for educators and curriculum designers to implement language and culture integration effectively.*

*By addressing these objectives, the study seeks to contribute to the development of innovative and inclusive teaching methodologies that enhance both linguistic and cultural competencies. This approach not only aligns with the principles of communicative language teaching but also prepares learners for the complexities of intercultural communication in an interconnected world.*

**Theoretical background.** *Integrating language and culture in foreign language teaching is grounded in the understanding that language and culture are interdependent. Language serves as a means of expressing cultural norms, values, and practices, while culture shapes the way language is used in different social contexts. The relationship between language and culture has been widely recognized in linguistic and pedagogical research. According to Sapir and Whorf, language is both influenced by and influences the cultural context in which it is used. This interplay emphasizes the need for teaching language not merely as a set of grammatical rules and vocabulary but as a dynamic tool for cultural expression and understanding. In foreign language education, this approach allows learners to comprehend not only the literal meaning of words but also their sociocultural connotations [1].*

*Several theoretical models highlight the importance of integrating language and culture in teaching. Intercultural Communicative Competence (ICC), proposed by Byram, emphasizes the ability to interact effectively and appropriately with people from different cultural backgrounds. It includes linguistic competence, sociolinguistic awareness, and cultural knowledge. Content and Language Integrated Learning (CLIL) combines language and content instruction, providing opportunities for learners to engage with cultural content through the target language. Hofstede's Cultural Dimensions Framework offers a lens for understanding how cultural differences influence communication and behavior, making it a valuable resource for language teaching [2].*

*Effective integration of language and culture requires pedagogical strategies that connect linguistic and cultural elements meaningfully. Authentic materials, such as films, music, literature, and advertisements, expose learners to real-world language use and cultural practices. Task-based learning, including tasks that simulate real-life intercultural communication, enables learners to practice language in culturally relevant contexts. Project-based learning fosters deeper engagement with cultural themes through collaborative activities, such as researching and presenting on cultural traditions [3].*

*Research indicates that integrating cultural elements into language teaching offers several benefits. Cultural context enriches learners' understanding of vocabulary, idioms, and pragmatic use of language, enhancing language proficiency. Exposure to cultural norms and values fosters learners' ability to navigate diverse social interactions, improving intercultural competence. Additionally, culturally rich content often resonates with learners, making language learning more meaningful and enjoyable.*

*Despite its advantages, integrating language and culture presents challenges. Many educators lack training in cultural pedagogy, making it difficult to incorporate cultural elements effectively. Traditional curricula often prioritize linguistic accuracy over cultural competence, leaving limited room for cultural content. Furthermore, access to authentic and diverse cultural materials can be a barrier, particularly in resource-constrained settings. [4]*

*The integration of language and culture has significant implications for teaching practices and curriculum design. It requires a shift from traditional, grammar-focused instruction to a holistic approach that values cultural knowledge as an essential component of communicative competence [5]. By adopting strategies such as CLIL, task-based learning, and project-based activities, educators can create a learning environment that fosters both linguistic and intercultural skills. In conclusion, the integration of language and culture in foreign language teaching provides a comprehensive framework for preparing learners to engage effectively in global communication. This approach not only enhances language proficiency but also cultivates intercultural understanding, making it an indispensable component of modern language education.*

Table 1

*Strategies for integrating language and culture in foreign language teaching*

| <b>Strategy</b>                                        | <b>Description</b>                                                                         | <b>Benefits</b>                                                                                        | <b>Challenges</b>                                                                                               |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Authentic Materials</b>                             | Using cultural artifacts such as films, music, literature, and advertisements.             | Exposes learners to real-world language use and cultural practices.                                    | Limited access to diverse and contextually relevant materials, especially in resource-constrained environments. |
| <b>Task-Based Learning</b>                             | Engaging learners in activities that simulate real-life intercultural communication.       | Encourages active use of language in culturally relevant contexts, enhancing communicative competence. | Requires creative and contextually appropriate task design by teachers.                                         |
| <b>Project-Based Learning</b>                          | Collaborative activities like researching and presenting on cultural traditions.           | Fosters deeper engagement with cultural themes and promotes teamwork and critical thinking.            | Time-intensive and may require additional resources and planning.                                               |
| <b>CLIL (Content and Language Integrated Learning)</b> | Teaching language through culturally rich content, such as history or geography.           | Integrates language learning with cultural education, providing meaningful context.                    | Demands advanced planning and may overwhelm learners with dual cognitive loads.                                 |
| <b>Role-Playing Activities</b>                         | Simulating real-life social interactions to practice culturally appropriate communication. | Builds learners' confidence and pragmatic competence in diverse settings.                              | Learners may initially feel self-conscious or hesitant to participate actively.                                 |

**Methodology.** This study employs a systematic approach to literature selection and thematic analysis to explore the integration of language and culture in foreign language teaching. The methodology ensures the inclusion of high-quality studies and the synthesis of relevant insights to address the research objectives. The literature selection process involved several key steps. Major academic databases, including Google Scholar, ERIC, Scopus, and PubMed, were used to locate peer-reviewed articles, book chapters, and conference papers. Keywords such as "language and culture integration," "cultural competence in language teaching," "intercultural communication," and "foreign language education" were combined with Boolean operators to refine search results. Inclusion criteria required studies to address the integration of language and culture in teaching, focus on practical applications, theoretical frameworks, or empirical evidence, and be published in English or have accessible English translations. Exclusion criteria eliminated articles that focused exclusively on linguistic or cultural aspects without addressing their integration, lacked methodological rigor or detailed findings, or were not peer-reviewed or lacked academic credibility. Titles and abstracts of identified studies were screened for relevance, and duplicates were removed. A full-text review was conducted for the shortlisted articles to ensure alignment with the research focus. The final dataset included studies spanning diverse contexts, methodologies, and teaching approaches.

Thematic analysis was used to identify and synthesize recurring patterns, concepts, and themes within the selected studies. Each study was systematically reviewed, and key concepts were assigned codes, such as "intercultural competence," "pedagogical strategies," "authentic materials," and "teacher preparedness." Codes were grouped into broader categories, leading to the identification of primary themes, including theoretical foundations of language and culture integration, effective teaching strategies and practices, benefits of cultural integration in foreign language teaching, and challenges and barriers to implementation. Themes were analyzed to extract insights on how cultural integration enhances language teaching and the practical implications for educators and curriculum designers.

To ensure the reliability and validity of the findings, the methodology involved cross-referencing key studies to validate themes, including diverse sources to ensure a comprehensive perspective, and clearly documenting the process for replicability. By employing a rigorous and systematic approach to literature selection and thematic analysis, this study provides a robust framework for understanding the integration of language and culture in foreign language education. The findings contribute to the development of effective teaching methodologies that enhance both linguistic and cultural competencies.

**Findings and Discussion.** The literature review highlights the pivotal role of integrating language and culture in foreign language teaching. The findings reveal key themes, effective practices, and significant challenges in this approach, emphasizing its contribution to fostering both linguistic proficiency and intercultural competence. The analysis identified several effective strategies for

*integrating cultural elements into language education. Studies confirm that using authentic materials such as films, music, literature, and advertisements exposes learners to real-world language use and cultural practices. This approach not only enhances vocabulary acquisition but also deepens learners' understanding of cultural norms and values. Tasks simulating real-life intercultural communication, such as role-playing or collaborative problem-solving, promote active engagement with both linguistic and cultural content. Learners develop practical skills for navigating diverse communicative contexts. Collaborative projects focused on cultural themes, such as researching traditions or exploring cultural comparisons, encourage critical thinking, teamwork, and a deeper appreciation of cultural diversity. Content and Language Integrated Learning (CLIL) integrates cultural topics into subject-based instruction through the target language, providing meaningful contexts for language use while simultaneously fostering cultural knowledge. These strategies significantly improve learners' language proficiency, cultural awareness, and ability to communicate effectively across cultural boundaries.*

*The integration of cultural elements into language teaching offers numerous benefits. Cultural context enriches learners' understanding of vocabulary, idiomatic expressions, and pragmatic language use, leading to more accurate and contextually appropriate communication. Exposure to diverse cultural norms and practices prepares learners to navigate social interactions in multicultural environments effectively. Additionally, culturally rich content resonates with learners' interests and experiences, making language learning more meaningful and enjoyable. Despite its advantages, integrating language and culture faces notable challenges. Many educators lack sufficient training in cultural pedagogy, making it difficult to incorporate cultural elements effectively. Traditional curricula often prioritize linguistic accuracy over cultural competence, limiting opportunities for cultural integration. Furthermore, access to authentic and diverse cultural materials can be a barrier, particularly in resource-constrained settings.*

*The findings underscore the transformative potential of integrating language and culture in foreign language teaching. This approach enhances not only linguistic proficiency but also intercultural competence, preparing learners to engage in meaningful communication in global contexts. The implications for educators and curriculum designers are significant. Professional development programs should equip teachers with the skills and resources to incorporate cultural content into their teaching effectively. Curricula should prioritize the integration of cultural themes alongside linguistic objectives, creating a holistic framework for language education. Addressing challenges such as resource availability and teacher preparedness is essential to fully realize the benefits of language and culture integration. In conclusion, integrating language and culture into foreign language teaching is an essential component of modern education, fostering learners' ability to communicate effectively across cultural boundaries while enriching their language learning experience.*

**Conclusion.** *The integration of language and culture in foreign language teaching is a transformative approach that addresses both linguistic proficiency and intercultural competence. This review highlights that incorporating cultural elements into language education enriches learners' understanding of vocabulary, idiomatic expressions, and pragmatic communication while fostering their ability to navigate diverse cultural contexts. Strategies such as the use of authentic materials, task-based learning, project-based learning, and Content and Language Integrated Learning (CLIL) have proven effective in creating meaningful and engaging learning experiences. These approaches not only enhance learners' communication skills but also motivate them by connecting language learning with real-world cultural relevance.*

*Despite these benefits, challenges such as limited teacher training, resource availability, and traditional curriculum structures remain barriers to effective implementation. Addressing these challenges is crucial for maximizing the potential of integrating language and culture in education. Teacher training programs need to emphasize cultural pedagogy, equipping educators with the skills and resources required to design and deliver culturally integrated lessons. Furthermore, educational institutions must invest in developing curricula that balance linguistic and cultural objectives, ensuring a holistic approach to language teaching.*

*Suggestions for future research:*

- 1. Longitudinal Studies: Investigate the long-term impacts of integrating language and culture on learners' linguistic proficiency and intercultural competence.*
- 2. Cross-Cultural Perspectives: Explore how cultural integration practices vary across different linguistic and cultural contexts to identify universally effective strategies and localized adaptations.*

3. *Technology Integration: Examine the role of emerging technologies, such as virtual reality and artificial intelligence, in facilitating cultural immersion and enhancing language learning experiences.*
4. *Teacher Training Models: Develop and evaluate professional development programs focused on cultural pedagogy to empower educators with effective teaching techniques.*
5. *Assessment Frameworks: Research methods for assessing learners' intercultural competence alongside linguistic abilities, providing a comprehensive evaluation of learning outcomes.*
6. *Equity and Access: Investigate strategies to overcome resource constraints and ensure equitable access to authentic cultural materials in under-resourced educational settings.*

By addressing these research areas, future studies can contribute to refining teaching practices and expanding the integration of language and culture in foreign language education. This holistic approach not only prepares learners for meaningful communication in a globalized world but also fosters mutual understanding and cultural appreciation, making it an indispensable component of modern language education.

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## ARTIFICIAL INTELLIGENCE APPLICATIONS IN ENHANCING ENGLISH LANGUAGE ACQUISITION FOR NON-NATIVE LEARNERS

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### Abstract

*This article examines the transformative role of Artificial Intelligence (AI) in English language learning, highlighting its potential to address longstanding challenges faced by non-native speakers. AI technologies, such as Natural Language Processing (NLP), speech recognition, and adaptive algorithms, enable personalized learning, offering real-time feedback and tailored instruction to meet the diverse needs of learners. By democratizing access to high-quality language education, particularly in underserved regions, AI bridges gaps in accessibility and fosters inclusivity. Additionally, tools like gamified platforms, conversational AI, and immersive technologies such as Augmented Reality (AR) and Virtual Reality (VR) sustain engagement and enhance practical language application in culturally rich contexts. Despite its advantages, the integration of AI presents challenges that must be addressed to maximize its impact. Issues such as the digital divide, cultural insensitivity, data privacy, and algorithmic bias underscore the limitations of current systems. Moreover, while AI excels in scalability and efficiency, it cannot replicate the emotional intelligence and nuanced guidance provided by human educators. Hybrid models, which combine AI tools with teacher-led instruction, offer a promising solution, leveraging the strengths of both technology and human expertise to create a balanced learning environment. Future advancements in AI, including culturally adaptive systems and tools for diverse learner groups, promise to further redefine language education. However, collaboration among educators, developers, and policymakers is essential to ensure ethical practices, equitable access, and sustainable implementation. This article argues that the thoughtful integration of AI can revolutionize English language learning, fostering linguistic proficiency, cultural competence, and global connectivity for millions of learners.*

**Keywords:** Artificial Intelligence, personalized learning, hybrid learning models, cultural adaptation, gamification, immersive technologies, real-time feedback, digital divide, accessibility

### Introduction

*In today's interconnected and globalized world, English has firmly established itself as the dominant lingua franca, functioning as a unifying medium that bridges individuals, communities, and nations across borders. The influence of English extends far beyond its original geographical and cultural boundaries, permeating almost every aspect of modern life, from international business transactions and academic research collaborations to tourism and digital communication. Its role as the global language has elevated its status to an essential tool for success, transforming it into a gateway to personal and professional advancement. For millions of non-native speakers, the ability to master English represents not only the opportunity to participate in a globalized economy but also a means of accessing higher education, pursuing prestigious careers, engaging in meaningful cross-cultural exchanges, and fostering individual growth. However, despite its evident importance, the process of acquiring fluency in English continues to pose significant challenges for learners worldwide. This difficulty stems not only from the linguistic complexities of the language itself but also from the limitations of traditional teaching methods and the sociocultural barriers that hinder equitable access to quality education and practice opportunities.*

*The challenges that non-native learners face when attempting to master English are deeply rooted in the structure of the language as well as in the systemic inadequacies of language education. Linguistically, English is marked by irregularities and inconsistencies that make it notoriously difficult to learn. Unlike many other languages with relatively uniform phonetic and grammatical systems, English's*

evolution as a language borrowed from multiple linguistic sources has created a series of idiosyncrasies that often bewilder learners. One prominent challenge lies in pronunciation, which, for many non-native speakers, is a persistent source of frustration and confusion. The irregular relationship between spelling and sound means that learners cannot rely on rules alone to predict pronunciation. Words that look similar may be pronounced completely differently—for example, “though,” “through,” and “tough”—causing learners to second-guess themselves and struggle with articulating words accurately. Pronunciation difficulties are further compounded by the presence of sounds in English that do not exist in other languages. Learners from linguistic backgrounds where certain phonemes are absent often face challenges in replicating sounds like the English “th,” leading to mispronunciations that not only affect comprehension but also undermine the learner’s confidence in speaking. The lack of exposure to natural conversational environments exacerbates this issue, particularly for learners residing in regions with limited interaction with native speakers.

In addition to pronunciation, vocabulary acquisition presents another formidable hurdle for non-native learners. The vast lexicon of the English language, which includes more than a million words, reflects centuries of linguistic borrowing and adaptation. While this richness allows for a high degree of precision and nuance in expression, it also poses considerable challenges for those attempting to learn and retain new vocabulary. English words often have multiple meanings that shift depending on context, making it difficult for learners to discern how and when to use them appropriately. Traditional methods of vocabulary learning, such as rote memorization, frequently prove ineffective because they fail to provide learners with the practical context needed to understand the nuances of a word. Without active exposure to words in real-life conversations, written texts, or immersive settings, learners often struggle to move beyond superficial recognition of vocabulary to deeper mastery and effective usage. This problem is further magnified for learners in regions where English is not commonly spoken, as opportunities to practice and reinforce new words are limited, causing rapid forgetting and stagnant growth.

Grammar, too, presents a significant challenge, as English grammar is neither rigidly systematic nor intuitively predictable. While languages with fixed grammatical rules allow learners to approach sentence construction with a degree of confidence, English’s numerous exceptions and idiosyncrasies make it far more difficult to master. Learners must navigate the intricacies of tense usage, prepositional phrases, and word order, all of which require a combination of memorization and contextual application. For instance, English verbs often appear in forms that vary depending on subtle contextual clues, such as the difference between “I have eaten” and “I ate,” which learners frequently find confusing. Prepositions like “in,” “on,” and “at” introduce further challenges, as their usage often depends on abstract or idiomatic conventions rather than clear rules. Similarly, sentence structure requires learners to adapt their thinking when transitioning from languages that follow different syntactic orders. Languages such as Hindi or Japanese, which follow a subject-object-verb structure, contrast sharply with English’s subject-verb-object order, leading to frequent grammatical errors. This challenge is particularly pronounced when learners attempt to construct sentences in real time, as the cognitive load required to reconcile these structural differences can slow down both comprehension and production.

The struggle to achieve fluency in English is not merely a linguistic issue but also a reflection of systemic inequalities that affect language education. The quality of instruction available to non-native learners varies significantly across regions, creating a divide between those who have access to skilled teachers and modern resources and those who do not. In many rural and underdeveloped areas, learners face significant obstacles due to the scarcity of qualified educators, overcrowded classrooms, and outdated teaching methods. Teachers in such settings may themselves lack proficiency in English or rely on traditional approaches that fail to address the diverse needs of learners. Language learning, particularly for beginners, requires personalized instruction, targeted feedback, and opportunities for active engagement. However, the reality of underfunded educational systems and overcrowded classrooms leaves learners with limited support, causing them to fall behind or abandon their studies altogether. For learners in underserved regions, the absence of digital infrastructure and reliable internet connectivity further limits their access to modern learning tools such as interactive platforms, multimedia resources, and AI-powered applications that could otherwise enhance their learning experience.

Beyond pedagogical challenges, socioeconomic and cultural factors play a crucial role in shaping learners’ experiences with the English language. Economic disparities prevent many individuals from accessing supplementary learning resources such as private tutors, language courses, or digital applications that offer personalized instruction. Learners from low-income backgrounds may find

themselves excluded from opportunities to engage with English through technology, which has become increasingly integral to language acquisition. In some communities, cultural perceptions of English as an elitist or foreign language contribute to a lack of motivation or societal support for learning it. Learners may feel discouraged from practicing English openly, fearing judgment or ridicule for their accents or mistakes. This psychological barrier, combined with the already existing challenges of fluency, vocabulary, and grammar, reinforces a cycle of stagnation in language learning.

The challenges surrounding English language acquisition for non-native learners reflect a confluence of linguistic, educational, socioeconomic, and cultural factors that require innovative solutions. Traditional teaching methods, while still prevalent, are insufficient for addressing the complexities of the language or meeting the needs of diverse learners at scale. In this context, the advent of Artificial Intelligence (AI) represents a transformative opportunity to revolutionize English learning by providing accessible, personalized, and interactive learning tools. AI-powered technologies, equipped with adaptive algorithms, natural language processing, and machine learning, have the potential to address the limitations of conventional methods, offering learners an effective and scalable path toward English proficiency. The following sections will explore how these cutting-edge solutions are reshaping the language learning landscape, overcoming barriers, and democratizing access to quality education for learners across the globe.

### **How AI Supports English Language Acquisition**

The emergence of Artificial Intelligence (AI) has marked a transformative shift in the domain of English language learning, offering innovative solutions to the longstanding challenges faced by non-native speakers. By harnessing advanced technologies such as Natural Language Processing (NLP), speech recognition, machine learning, and adaptive algorithms, AI has enabled the development of interactive, dynamic, and personalized learning environments. These tools not only cater to individual learning needs but also address systemic shortcomings in traditional language education, such as limited access to qualified teachers, ineffective feedback mechanisms, and a lack of immersive practice opportunities. This section explores the primary applications of AI in English language acquisition, emphasizing their transformative impact on learners worldwide and highlighting their role in democratizing access to quality education.

Central to AI-powered language tools is Natural Language Processing (NLP), a technology that enables machines to process, understand, and generate human language. NLP has revolutionized the way learners engage with English by offering tools that enhance grammar proficiency, vocabulary comprehension, and overall communication skills. Applications such as Grammarly, Google Translate, and Microsoft Editor are prime examples of how NLP can identify and correct language errors while providing context-sensitive feedback. For instance, tools like Grammarly analyze sentence structures to identify grammatical inconsistencies, punctuation mistakes, and stylistic redundancies, offering detailed suggestions for improvement. A learner struggling with subject-verb agreement may receive corrections such as "She do" replaced with "She does," accompanied by explanatory notes that reinforce grammatical concepts. Such feedback not only ensures accuracy but also fosters a deeper understanding of English grammar, which is often elusive in traditional classroom settings. Similarly, tools like Google Translate facilitate contextual translation by interpreting idiomatic expressions rather than offering literal equivalents. A phrase such as "It's raining cats and dogs" is rendered into a culturally appropriate equivalent, enabling learners to grasp English nuances that might otherwise be confusing. By embedding real-world examples into their feedback, NLP-powered tools bridge the gap between abstract rules and practical language use. AI-powered systems create personalized pathways for learners, as highlighted by Lee, Kim, and Sung (2023), who explored adaptive systems for context-based learning [1, p.640].

Speech recognition technology represents another significant breakthrough, particularly in addressing pronunciation challenges that are common among non-native learners. AI-driven applications such as ELSA Speak and Google Assistant leverage speech recognition algorithms to analyze spoken input, identify inaccuracies, and provide tailored guidance for improvement. For learners, pronunciation is often a stumbling block due to the irregular phonetic rules of English, compounded by the influence of their native linguistic systems. Tools like ELSA Speak provide real-time pronunciation feedback, enabling users to refine their articulation of specific sounds, syllables, and intonation patterns. For instance, if a learner mispronounces "schedule," the application detects the error and offers corrective guidance, breaking the word into manageable phonetic components. This systematic approach not only improves accuracy but also reduces fossilized pronunciation errors over time. Furthermore, AI-powered tools assist in accent neutralization, helping learners achieve clarity in their spoken communication. By analyzing acoustic patterns, these tools suggest modifications that bring speech closer to a neutral, globally intelligible

standard, ensuring effective comprehension in professional or academic settings. Repeated practice, often facilitated through gamified exercises or progress trackers, builds fluency and confidence, particularly for learners who lack access to native speakers or immersive environments.

The integration of conversational AI has transformed language learning by simulating real-world dialogues, creating opportunities for learners to practice speaking, listening, and writing in a judgment-free, low-pressure environment. AI chatbots, such as Duolingo's chatbot, Replika, and ChatGPT, are designed to mimic natural conversations, allowing learners to engage in diverse linguistic scenarios ranging from casual discussions to formal exchanges. These tools emulate interactive conversations where learners practice functional English, such as ordering food, asking for directions, or conducting professional meetings. For example, when a learner types, "Can you recommend a café nearby?" the chatbot generates an appropriate and context-specific response. The immediacy of this feedback is particularly valuable for reinforcing correct grammar, vocabulary, and syntax. In contrast to traditional classrooms, where learners may hesitate to speak due to fear of errors or social judgment, conversational AI offers a safe space for experimentation. Mistakes are addressed in real time without stigma, allowing learners to improve progressively and build confidence. Such tools exemplify AI's capacity to provide tailored practice environments that are both engaging and non-threatening, fostering consistent use of the language.

AI has also reshaped the learning experience through gamification, incorporating elements of game design to enhance motivation and engagement. Platforms such as Duolingo, Babbel, and LingQ use AI algorithms to create adaptive learning pathways that respond to learners' unique needs and progress. These platforms analyze user performance to identify areas of difficulty and prioritize lessons accordingly. For example, if a learner repeatedly struggles with past tense verbs, the system adjusts the curriculum to emphasize related exercises until mastery is achieved. Gamification integrates rewards, such as streak counters, experience points, and badges, which incentivize regular practice and celebrate milestones, such as completing vocabulary goals or achieving consistent daily learning. This interactive and visually appealing approach mitigates the monotony often associated with traditional language instruction while maintaining learners' long-term engagement. Furthermore, AI-powered platforms foster social learning by incorporating leaderboards or collaborative challenges, encouraging friendly competition and a sense of community among learners. This dynamic learning experience leverages human motivation while ensuring measurable progress toward language fluency [2, p. 108].

In the domain of writing and composition, AI-driven tools such as ProWritingAid, Quillbot, and Grammarly have transformed how learners approach English writing. These tools extend beyond basic grammar correction to analyze coherence, tone, and stylistic clarity. For example, advanced AI systems evaluate the logical flow of a learner's essay, identifying weak transitions or redundant arguments and offering constructive alternatives to strengthen the text. Similarly, tools enable learners to adjust the tone of their writing based on the intended audience or purpose. When drafting a formal document, for instance, an AI writing assistant might suggest replacing informal contractions with professional language, ensuring the composition aligns with academic or professional standards. Additionally, features such as plagiarism detection ensure originality by scanning for unintentional similarities with existing content. By providing actionable insights and explanations, AI tools empower learners to produce polished, articulate, and contextually appropriate written work.

### **Benefits of AI in English Language Learning**

AI has revolutionized assessment and progress tracking, offering learners real-time feedback and performance analytics. Platforms such as Quizlet, Kahoot!, and Socrative employ AI to create adaptive quizzes that target knowledge gaps and reinforce learning through spaced repetition techniques. These systems monitor learner performance to identify recurring weaknesses, enabling targeted practice that maximizes retention. For instance, a learner who consistently confuses "their" and "there" may receive customized exercises designed to reinforce correct usage. Real-time analytics dashboards provide learners with detailed progress reports, highlighting improvements and areas requiring further attention. By integrating these adaptive technologies, AI ensures that learners focus on their specific challenges, leading to more efficient and personalized outcomes.

AI technologies have fundamentally redefined the landscape of English language acquisition, addressing the limitations of traditional methods by offering scalable, accessible, and highly personalized learning solutions. From tools that improve grammar, pronunciation, and writing to gamified platforms that sustain motivation, AI empowers learners to overcome barriers and achieve measurable progress. By simulating real-world practice, providing immediate feedback, and adapting to individual learning needs, AI serves as a powerful enabler of language proficiency, democratizing access to quality education for

learners across the globe. As these technologies continue to evolve, they hold the potential to bridge linguistic divides and unlock new opportunities for communication, connection, and collaboration. The integration of generative AI into educational settings fosters self-regulated learning by aligning instructional strategies with learner autonomy (Chiu, 2024) [2, p.2406].

Artificial Intelligence (AI) has revolutionized English language learning, not just by introducing innovative tools but by fundamentally altering how individuals approach language acquisition. Its transformative impact is rooted in its ability to tailor learning experiences to the unique needs of each learner, extend educational opportunities to underserved populations, and sustain motivation through engaging, interactive methods. By combining advanced algorithms with user-centric design, AI bridges the gap between traditional limitations and modern expectations, creating a learning ecosystem that is both effective and accessible. This section delves into how AI reshapes the key dimensions of English language learning—personalization, accessibility, engagement, and efficiency—emphasizing its broader implications for learners and educational systems worldwide.

Personalization has long been the hallmark of effective education, yet traditional approaches to English language learning often fail to provide individualized attention. AI-powered platforms address this gap by offering dynamically adaptive learning paths that cater to the strengths, weaknesses, and preferences of each learner. Unlike standardized classroom instruction, which often progresses at a uniform pace, AI tools analyze granular data from user interactions to identify areas that require additional focus. For example, a learner struggling with verb conjugations might be presented with targeted exercises and contextual examples that reinforce those concepts. Over time, this tailored approach ensures that learners not only grasp challenging material but also consolidate their understanding through incremental progress. Additionally, AI platforms enable learners to engage with content in ways that resonate with their unique cognitive styles. For instance, visual learners might benefit from multimedia-rich lessons, while auditory learners can access pronunciation drills and spoken exercises. By aligning instructional content with individual learning preferences, AI maximizes the efficiency and effectiveness of the educational process, ensuring that no learner is left behind.

Accessibility is another critical dimension where AI has made significant strides, democratizing English language learning for populations that have historically faced barriers to education. Traditional methods often demand significant financial and logistical resources, such as enrolling in language courses or hiring private tutors—options that are out of reach for many learners in low-income or remote regions. AI tools, however, bypass these constraints by delivering high-quality education at minimal cost. Mobile applications like Duolingo and Babbel, many of which offer free or affordable subscription models, allow learners to access comprehensive language instruction with just a smartphone and an internet connection. This affordability transforms language learning from a privilege into a universally attainable goal, empowering individuals across diverse socioeconomic backgrounds. Furthermore, AI tools break down geographic barriers by providing flexible, on-demand learning opportunities. Learners in rural villages, who might lack access to qualified educators or well-equipped schools, can now practice English at their convenience, often in immersive and engaging formats. For populations with specific needs, such as individuals with disabilities, AI offers tailored solutions that enhance inclusivity. Speech recognition software, text-to-speech applications, and closed captioning tools make learning materials accessible to visually or hearing-impaired users, ensuring that education is not only widespread but also equitable.

The sustained engagement of learners is one of the most pressing challenges in language education, as traditional methods often struggle to maintain interest over time. AI tackles this issue by incorporating elements of gamification, interactivity, and immersion into the learning process. Gamified platforms like Duolingo use rewards, leaderboards, and daily streaks to transform mundane tasks into enjoyable challenges, fostering a sense of achievement that motivates consistent participation. This integration of play and learning not only sustains enthusiasm but also creates a habit-forming environment that encourages long-term commitment. Beyond gamification, emerging AI technologies leverage immersive experiences, such as virtual reality (VR) and augmented reality (AR), to provide learners with realistic simulations of real-world scenarios. For instance, an AI-powered VR application might place a learner in a virtual café, prompting them to order food or engage in conversation with virtual characters. These experiential learning opportunities mimic authentic interactions, enhancing both confidence and practical proficiency. Moreover, conversational AI tools, such as chatbots and virtual tutors, enable learners to practice English in low-pressure environments. These tools simulate natural dialogues, offering instant feedback on grammar, syntax, and vocabulary usage, thereby addressing common learner anxieties such as the fear of making mistakes.

Efficiency, another hallmark of AI-driven learning, ensures that learners achieve their language

goals in less time and with greater precision. Traditional classrooms often rely on fixed schedules and limited teacher availability, which can slow progress, especially for learners who require additional support. AI-powered tools eliminate these bottlenecks by providing instant feedback and automating repetitive tasks, such as grammar drills and vocabulary reviews. For example, applications like Grammarly not only detect errors in real time but also offer detailed explanations that reinforce underlying grammatical rules. This immediacy accelerates the learning process, allowing users to correct mistakes and internalize concepts more effectively. Additionally, AI tools employ sophisticated algorithms, such as spaced repetition, to optimize memory retention. By revisiting material at scientifically determined intervals, platforms like Quizlet ensure that learners reinforce their knowledge precisely when they are most likely to forget it. This targeted approach enhances long-term retention, reducing the need for redundant study and allowing learners to focus on more complex skills, such as conversational fluency or creative writing. Furthermore, AI's ability to scale its services means that millions of learners can access personalized and high-quality instruction simultaneously, a feat that traditional systems cannot achieve.

The transformative potential of AI in English language learning extends beyond individual outcomes to influence broader educational paradigms. By addressing core challenges such as personalization, accessibility, engagement, and efficiency, AI tools not only improve learning outcomes but also redefine what is possible in language education. They empower learners from diverse backgrounds to overcome traditional barriers, making English acquisition more equitable and inclusive. As these technologies continue to evolve, they hold the promise of reshaping global communication dynamics, enabling individuals to participate more fully in a connected world. For educators, policymakers, and learners alike, the integration of AI into language education represents a critical step toward bridging linguistic divides and fostering a more collaborative and inclusive global society. In this new era, English is no longer just a language; it is a skill, a tool, and a bridge—and AI is its most powerful enabler.

### **Limitations and Challenges of AI in Language Learning**

While Artificial Intelligence (AI) has undeniably transformed the landscape of English language learning, enabling unprecedented access and personalization, it is not without its limitations. Despite its scalability, adaptability, and efficiency, AI tools encounter significant barriers that highlight the complex interplay between technology and education. These challenges, which span technological, cultural, and ethical dimensions, underscore the need for a balanced approach to integrating AI into language instruction. Equally important are the implications for educators, whose roles and responsibilities must evolve alongside technological advancements. This section explores the limitations of AI-powered language learning tools in detail, addressing their impact on accessibility, cultural adaptability, ethical considerations, and the role of human interaction in education. Only by understanding and addressing these challenges can AI fulfill its potential as a tool for equitable, effective, and inclusive language education.

One of the most pressing issues confronting AI in language learning is the digital divide, a persistent gap in access to the infrastructure and technology necessary for leveraging AI-powered tools. While the proliferation of smartphones and internet connectivity has made educational resources more accessible than ever, significant disparities remain, particularly in rural and underserved communities. Robust digital infrastructure—characterized by stable, high-speed internet and affordable access to devices—is a prerequisite for AI tools to function effectively. However, this infrastructure is unevenly distributed, leaving millions of learners unable to participate in this technological revolution. For example, many AI-driven platforms, such as Duolingo or ELSA Speak, require consistent internet connectivity to deliver features like real-time feedback, multimedia lessons, and live interactions. In regions where internet connections are slow, intermittent, or prohibitively expensive, these tools become impractical, further marginalizing learners who might benefit the most from AI-enhanced education.

The cost of devices also exacerbates the digital divide, as smartphones, tablets, and computers remain out of reach for many low-income families. While AI platforms are often marketed as affordable or even free alternatives to traditional language instruction, their accessibility hinges on access to modern devices capable of running sophisticated applications. For learners in economically disadvantaged regions, the inability to afford such devices perpetuates educational inequality, denying them the opportunity to engage with cutting-edge resources that could accelerate their language acquisition. Furthermore, even when devices and internet connectivity are available, a lack of digital literacy can pose significant barriers. Elderly learners, individuals with limited exposure to technology, and those from non-digital backgrounds may struggle to navigate AI platforms effectively. This inability

*to interact with digital tools diminishes their potential impact, reducing them to underutilized resources in otherwise resource-constrained environments.*

*Another significant limitation of AI in language learning lies in its inability to fully adapt to cultural and linguistic diversity. English, as a global language, is far from homogenous; its pronunciation, idiomatic expressions, and usage vary widely across regions. However, many AI models are predominantly trained on standardized versions of English, such as American or British English, which do not account for regional dialects or cultural nuances. This lack of contextual adaptation creates a disconnect between learners' goals and the instruction provided by AI tools. For instance, a learner preparing to work in India might not encounter Indian English phrases such as "prepone" (to reschedule earlier) or "pass out" (to graduate), which are widely used in that context. Similarly, idiomatic expressions specific to particular regions are often overlooked by AI-driven tools, leaving learners ill-equipped to navigate real-world conversations in diverse cultural settings. Research has shown that generative AI technologies can empower educators and learners alike, providing tools for inclusive learning environments (Evmenova et al., 2024) [4, p.815].*

*Pronunciation training, one of the hallmark features of AI-powered tools, is similarly constrained by these cultural and linguistic gaps. Speech recognition systems often perform poorly when faced with regional accents or non-standard pronunciations, leading to inaccuracies that can discourage learners. For example, a speaker with a strong South Asian or African accent might find that their pronunciation is consistently flagged as incorrect, even when it is intelligible within their cultural context. These inaccuracies reinforce a one-size-fits-all approach, which fails to acknowledge the legitimacy of linguistic variation and alienates learners from diverse backgrounds. Additionally, visual and textual examples embedded in AI exercises may inadvertently reflect cultural biases, using references or scenarios that are unfamiliar or irrelevant to certain learner groups. This lack of inclusivity can lead to disengagement, undermining the effectiveness of even the most sophisticated AI tools.*

*The ethical concerns surrounding AI integration in education present another critical challenge, particularly in the areas of data privacy, algorithmic bias, and transparency. AI platforms rely on extensive user data to deliver personalized learning experiences, collecting information such as performance metrics, location data, and voice recordings. While this data is essential for refining algorithms and enhancing user experience, it also poses significant risks if mishandled. Data breaches, unauthorized use of personal information, and inadequate security protocols can compromise learner privacy, eroding trust in AI systems. For instance, if third-party companies gain access to sensitive data, learners may unwittingly become targets for marketing or other profit-driven activities. Algorithmic bias compounds these ethical concerns, as AI systems are only as objective as the data on which they are trained. If training datasets predominantly represent certain demographics—such as American English speakers—tools may unintentionally marginalize learners from underrepresented groups. For example, an AI system trained to prioritize American spelling conventions might overcorrect non-American spellings, perpetuating cultural hegemony rather than fostering inclusivity.*

*Compounding these challenges is the resistance among educators to the adoption of AI tools, fueled by concerns about job displacement and the erosion of traditional teaching roles. Many teachers fear that the automation of tasks such as grading, feedback, and lesson planning could render their expertise obsolete, particularly in regions where job security is already precarious. Additionally, the integration of AI requires technical proficiency, which many educators lack due to insufficient training and professional development opportunities. Without a clear understanding of how AI can complement their teaching, educators may view these tools with skepticism or outright resistance, hindering their adoption in classroom settings. However, the evolving role of teachers in an AI-driven environment underscores the need for a paradigm shift in education. While AI excels at automating repetitive tasks and providing immediate feedback, it cannot replicate the empathy, creativity, and cultural understanding that human educators bring to the learning experience. Teachers remain indispensable for fostering critical thinking, guiding learners through complex concepts, and addressing the emotional and motivational aspects of language acquisition.*

*Finally, over-reliance on AI tools risks undermining the inherently social and interactive nature of language learning. Language is not merely a system of rules and structures but a medium for human connection, requiring practice, feedback, and cultural exchange. While AI offers valuable simulations and interactive features, it cannot replicate the richness of real-world interactions with peers, teachers, or native speakers. For example, conversational AI tools, while effective for practicing dialogue, lack the emotional intelligence to recognize when a learner is struggling with confidence or motivation. Similarly, AI platforms often prioritize measurable outcomes, such as grammar accuracy or vocabulary acquisition,*

at the expense of broader learning goals, such as cultural appreciation, creative expression, and the ability to navigate ambiguous or nuanced conversations.

To address these limitations, a multi-faceted approach is required—one that combines technological innovation with systemic reforms in education. Bridging the digital divide necessitates investments in affordable devices, widespread internet access, and digital literacy programs to ensure that learners from all backgrounds can benefit from AI-powered tools. Developers must also work to create culturally sensitive AI systems by collaborating with linguists, educators, and cultural experts to incorporate regional variations and contextual understanding. Ethical safeguards, such as strict data privacy regulations and transparent algorithmic practices, are essential to build trust and mitigate risks. Furthermore, empowering educators through professional development programs will enable them to integrate AI into their teaching practices effectively, ensuring that these tools serve as a complement rather than a replacement. Finally, hybrid learning models that combine the strengths of AI with the irreplaceable value of human interaction offer the most promising path forward, balancing the efficiency of technology with the depth and empathy of human connection [5, p.215].

While AI holds immense promise for revolutionizing English language learning, its limitations serve as a reminder that technology alone cannot address the complex, multifaceted nature of education. By acknowledging and addressing these challenges, stakeholders can ensure that AI becomes a tool for inclusion and empowerment rather than a source of division, enabling learners to navigate the globalized world with confidence and competence.

### **Future Prospects for AI in Language Learning**

The integration of Artificial Intelligence (AI) into English language learning represents an ongoing revolution, with advancements in technology continually reshaping how learners acquire language skills. As AI continues to evolve, emerging trends such as the incorporation of Augmented Reality (AR) and Virtual Reality (VR), the development of culturally aware systems, hybrid learning models, and tailored solutions for specific learner groups signal a transformative future. These innovations are poised to address existing challenges while redefining the educational experience for non-native English speakers. By embracing these advancements, educators, developers, and policymakers can work together to create a more inclusive, effective, and engaging landscape for language learning.

The convergence of AI with Augmented Reality (AR) and Virtual Reality (VR) has the potential to transform English language learning by creating immersive and interactive environments. These technologies allow learners to engage with English in lifelike scenarios, bridging the gap between theoretical knowledge and practical application. Unlike traditional methods that often rely on static exercises, AR and VR enable learners to practice in simulated real-world settings, such as a bustling café, an international airport, or a corporate meeting room. For instance, a VR application might allow a learner to virtually navigate a grocery store, practicing phrases like "Where can I find the milk?" while interacting with AI-powered avatars. This hands-on approach not only enhances vocabulary retention and conversational fluency but also builds learners' confidence in using English in diverse contexts. Furthermore, these virtual environments can incorporate culturally rich elements, such as regional accents, idiomatic expressions, and customs unique to specific English-speaking areas. For example, a learner might participate in a virtual business meeting set in London or a street market in New York, gaining exposure to the linguistic and cultural nuances that define effective communication in these settings. Such experiences foster a deeper understanding of English as a dynamic, context-dependent language.

The accessibility of AR technology further broadens its potential impact. Unlike VR, which often requires costly headsets, AR applications can be deployed through smartphones or tablets, making immersive language learning more affordable and widely available. Mobile AR tools can overlay digital content onto real-world settings, enabling learners to practice English in their everyday environments. For instance, a learner might use an AR app to receive language prompts while navigating their local neighborhood, transforming mundane tasks into opportunities for practice. By integrating AI, these applications can provide real-time feedback and adapt exercises to the learner's progress, ensuring a personalized and engaging experience. Gamified AR activities, such as treasure hunts or role-playing games, add another layer of interactivity, making language acquisition enjoyable and motivating.

As AI technology advances, the development of culturally aware and inclusive systems will become increasingly important in addressing the diverse needs of learners. Current AI tools often focus on standardized English variants, such as American or British English, overlooking the regional dialects, accents, and cultural contexts that define the language's global identity. Future AI models will likely incorporate more diverse datasets, enabling them to recognize and adapt to regional variations. For

example, an AI-powered learning platform might provide targeted training for learners aiming to master Australian English or Indian English, offering pronunciation guides, idiomatic expressions, and cultural insights specific to these contexts. Additionally, culturally aware AI systems will address the socio-cultural dimensions of communication, teaching learners when and how to use formal or informal speech depending on the audience or setting. This holistic approach ensures that learners are not only linguistically proficient but also culturally competent, equipping them to navigate real-world interactions with ease and confidence.

Inclusivity will also extend to multilingual learners, with AI systems bridging the gap between their native languages and English. By integrating multilingual support, these tools can explain complex grammar rules, vocabulary, and usage patterns in the learner's first language, facilitating a smoother transition to English. For instance, a Spanish-speaking learner might receive explanations of English tense structures in Spanish, making abstract concepts more accessible and relatable. Such features are particularly valuable in regions where English is taught as a second or third language, as they reduce cognitive load and enhance comprehension. Inclusive AI systems will also prioritize diverse cultural representations in their content, ensuring that exercises and examples resonate with learners from varied backgrounds.

The future of language learning lies in hybrid models that combine the strengths of AI-powered tools with the expertise and empathy of human educators. In these models, AI serves as a valuable teaching assistant, automating repetitive tasks such as grading, generating quizzes, and tracking progress. This frees up educators to focus on higher-order skills, such as fostering critical thinking, encouraging creative expression, and providing emotional support. For example, an AI system might identify a learner's difficulty with irregular verbs and generate targeted practice exercises, allowing the teacher to address broader challenges, such as building the learner's confidence or improving their conversational skills. Collaborative platforms that integrate AI analytics with teacher insights can further enhance this dynamic, enabling educators to tailor their instruction based on detailed performance data. Such models promote a seamless integration of online and offline learning, where learners complete AI-guided exercises at home and engage in interactive group activities or discussions in the classroom. This balanced approach ensures that learners benefit from the efficiency of AI and the human connection provided by teachers.

AI also holds immense potential for special learner groups, including children, individuals with disabilities, and adult learners with specific goals. For young learners, AI-powered systems can incorporate playful, interactive elements such as animated characters, storytelling, and gamified exercises to sustain their engagement. These tools not only make learning enjoyable but also help children develop foundational language skills through exploration and discovery. For learners with disabilities, advancements in accessibility features, such as speech-to-text and text-to-speech functionalities, will ensure that high-quality language education is available to all. For instance, visually impaired learners might use AI-driven audio lessons, while hearing-impaired learners could benefit from captioned video content or visual prompts. Adult learners, who often require practical, goal-oriented training, will benefit from tailored programs that address their specific needs, such as English for business negotiations, academic writing, or travel. These tools will prioritize efficiency and relevance, enabling learners to achieve fluency within a shorter timeframe.

Looking ahead, continuous advancements in AI technology promise to further enhance language learning. Real-time translation and interpretation tools could enable seamless cross-linguistic communication, allowing learners to practice English in real-world scenarios without language barriers. Sentiment analysis features, capable of evaluating tone and emotion, will refine learners' ability to convey intent and feelings, elevating their communication skills beyond accuracy to include emotional nuance. AI-driven virtual tutors, equipped with advanced conversational capabilities, will simulate nuanced human interactions, providing learners with personalized feedback and guidance on professional communication or cultural norms.

The success of these innovations will depend heavily on collaboration among educators, developers, and policymakers. Ongoing research into the long-term impact of AI tools on language proficiency, retention, and motivation will provide valuable insights for optimizing their use. Partnerships between AI developers and language instructors will ensure that tools align with pedagogical best practices and address real-world learner challenges. Meanwhile, governments and organizations must establish policies to address ethical concerns, such as data privacy, algorithmic bias, and equitable access, fostering trust and ensuring that AI serves as a force for inclusion.

The future of AI in English language learning is both promising and transformative. By integrating

technologies like AR and VR, developing culturally aware systems, embracing hybrid learning models, and creating tailored solutions for diverse learners, AI will continue to redefine how language education is delivered and experienced. Addressing current limitations while fostering collaboration among stakeholders will ensure that these advancements create a more inclusive, effective, and engaging learning environment for non-native English speakers, empowering them to thrive in an increasingly interconnected world.

### **Conclusion**

The integration of Artificial Intelligence (AI) into English language learning represents a transformative milestone in the field of education, offering unprecedented opportunities to address the complex challenges faced by non-native speakers. By introducing tools that provide personalized learning pathways, instant feedback, immersive experiences, and culturally adaptive support, AI has redefined traditional approaches to language acquisition. It has successfully bridged gaps in accessibility by extending high-quality educational resources to learners in underserved regions, democratizing opportunities for linguistic proficiency that were previously reserved for the privileged few. Furthermore, AI's ability to analyze vast datasets and adapt lessons to the needs of individual learners has made it possible to accelerate the learning process in ways that were unimaginable only a decade ago. These advancements allow learners to navigate language acquisition with greater efficiency, confidence, and motivation, empowering them to meet their academic, professional, and personal aspirations in an increasingly globalized world.

However, this remarkable progress does not come without its challenges. While AI offers innovative solutions, its limitations must be addressed to ensure that its benefits are equitable and far-reaching. The digital divide, exacerbated by disparities in internet connectivity, access to modern devices, and varying levels of digital literacy, continues to prevent millions of learners—particularly those in economically disadvantaged or rural areas—from fully leveraging AI's potential. Furthermore, the current generation of AI tools often lacks cultural sensitivity, relying on standardized English norms that fail to account for the rich diversity of regional accents, idiomatic expressions, and cultural contexts. This limitation risks alienating learners and reinforces a one-size-fits-all model that contradicts the very essence of personalization that AI seeks to deliver. Ethical considerations, such as data privacy, algorithmic bias, and the transparency of AI systems, present additional challenges that must be addressed to foster trust and inclusivity. Without robust safeguards and clear policies, AI runs the risk of perpetuating inequalities rather than alleviating them.

In addition to technological and ethical limitations, the evolving role of educators within this AI-driven landscape must be carefully considered. While AI excels at automating repetitive tasks, delivering tailored feedback, and scaling instruction, it cannot replicate the emotional intelligence, creativity, and cultural awareness that human educators bring to the learning experience. Language acquisition is inherently social and deeply rooted in human interaction; learners need encouragement, empathy, and nuanced guidance to develop not only their technical language skills but also their confidence, critical thinking, and cultural understanding. Hybrid learning models, which combine the strengths of AI with the expertise of human teachers, offer a promising path forward. In these models, AI serves as a powerful assistant that enhances instructional efficiency, while educators provide the mentorship and interpersonal support that are critical to a learner's long-term success. By fostering collaboration between technology and teaching, hybrid approaches ensure that AI functions as a complement rather than a replacement, creating a balanced and holistic learning environment.

The future of AI in English language learning holds immense promise, driven by ongoing advancements that will further enhance its capabilities. Emerging technologies like Augmented Reality (AR) and Virtual Reality (VR) will enable learners to engage with English in fully immersive, lifelike scenarios that replicate real-world interactions, strengthening their fluency and cultural competence. Similarly, the development of culturally aware AI systems will address linguistic diversity by incorporating regional accents, dialects, and socio-cultural nuances, ensuring that learners receive instruction that aligns with their specific goals and environments. Tailored solutions for diverse learner groups, such as children, adult professionals, and individuals with disabilities, will make language learning more inclusive and adaptable to varied needs. Moreover, AI innovations in real-time translation, sentiment analysis, and virtual tutoring will continue to push the boundaries of what is possible, equipping learners with the skills to thrive in both professional and social contexts.

Achieving the full potential of AI in language education will require multi-stakeholder collaboration. Educators, developers, policymakers, and researchers must work together to address existing limitations and create systems that are equitable, ethical, and effective. Governments and

*institutions must prioritize investments in digital infrastructure, ensuring that access to AI-powered tools is not determined by geography or socioeconomic status. Policymakers must establish clear guidelines for data privacy, ethical AI use, and transparency to build trust among learners and educators. AI developers, in turn, must focus on creating culturally sensitive and inclusive tools that reflect the needs of a global and diverse learner population. Simultaneously, teacher training programs must evolve to equip educators with the skills and confidence needed to integrate AI effectively into their instructional practices, ensuring that technology enhances rather than replaces the human aspects of learning.*

*In conclusion, the integration of AI into English language learning is more than a technological advancement; it is a catalyst for meaningful change that can empower millions of learners worldwide. By combining AI's efficiency, scalability, and adaptability with the emotional intelligence, cultural awareness, and mentorship provided by human educators, the future of language learning can be both innovative and inclusive. AI has the power not just to teach English as a language but to foster deeper connections, open doors to opportunity, and create pathways for personal and professional growth. As we stand on the cusp of this transformation, it is essential to harness AI ethically, responsibly, and collaboratively to ensure that its promise becomes a reality for all. In doing so, we can create an educational ecosystem that transcends boundaries, celebrates diversity, and equips individuals with the linguistic and cultural skills needed to thrive in an interconnected and dynamic world.*

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## Philosophical sciences

### RENAISSANCE NATURAL PHILOSOPHY AND ITS CONTRIBUTION TO THE SCIENTIFIC REVOLUTION

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#### **Abstract**

The Renaissance marked a pivotal period in the history of science, transitioning from medieval scholasticism to a more empirical and experimental approach to understanding the natural world. This intellectual awakening fostered a renewed interest in the study of nature, leading to significant developments in natural philosophy, which laid the foundations for the Scientific Revolution. Central to this transformation was the shift from reliance on theological interpretations and Aristotelian frameworks to a focus on observation, experimentation, and mathematical reasoning. Renaissance thinkers such as Nicolaus Copernicus, Galileo Galilei, Johannes Kepler, and Francis Bacon played instrumental roles in this period of transformation. Copernicus proposed the heliocentric model, challenging the long-held geocentric view of the universe. Galileo's telescopic observations provided empirical evidence that further questioned traditional cosmology, while Kepler's laws of planetary motion demonstrated the power of mathematical principles in explaining natural phenomena. Francis Bacon, often regarded as a pioneer of modern scientific methodology, advocated for inductive reasoning as a foundation for acquiring knowledge, emphasizing the importance of systematic observation and experimentation. This article delves into the contributions of Renaissance natural philosophy to the Scientific Revolution, highlighting how the works of these figures collectively reshaped the intellectual landscape. It examines the profound influence of classical antiquity, particularly the revival of texts by Greek and Roman thinkers such as Ptolemy, Archimedes, and Plato, which Renaissance scholars meticulously studied and integrated into their frameworks. Furthermore, the period saw the rise of new empirical methods and technological advancements, such as the printing press, which facilitated the dissemination of knowledge across Europe and enabled the collaboration of scholars. The article also explores the establishment of scientific institutions, such as academies and societies, which emerged in the wake of the Renaissance. These institutions provided structured environments for conducting research and exchanging ideas, thus formalizing the pursuit of science as a collective endeavor. Ultimately, the Renaissance's natural philosophy provided the intellectual framework that propelled the development of modern science. By challenging traditional dogmas and emphasizing a systematic approach to inquiry, Renaissance thinkers laid the groundwork for the methodologies and principles that continue to define scientific investigation today.

**Keywords:** Renaissance, natural philosophy, Scientific Revolution, empirical methods, heliocentrism, scientific method, classical antiquity, mathematical reasoning, physics, modern science.

#### **Introduction**

The Renaissance, a cultural and intellectual movement that spanned roughly from the 14th to the 17th centuries, represents a pivotal period in the history of science. As thinkers rediscovered classical texts and advanced new ideas, the foundations of modern science were laid. One of the key intellectual developments of the Renaissance was the evolution of natural philosophy, which sought to understand

the workings of the natural world. Natural philosophy, the precursor to modern science, played a significant role in the Scientific Revolution that followed. During the Renaissance, thinkers began to challenge the old Aristotelian and Ptolemaic systems of thought, leading to new ways of understanding the universe. This article explores how Renaissance natural philosophy contributed to the broader transformations of the Scientific Revolution, laying the groundwork for modern scientific inquiry.

### **The Role of Natural Philosophy in the Renaissance**

Natural philosophy in the Renaissance was characterized by a renewed interest in the natural world and an increasing reliance on empirical observation, logic, and mathematics to explain natural phenomena. During this period, scholars began to break away from the medieval scholastic tradition, which had been dominated by the teachings of Aristotle and other ancient authorities.

The primary aim of Renaissance natural philosophers was to understand nature not through abstract reasoning alone but through careful observation and experimentation. This approach marked a clear departure from the more metaphysical and theological concerns of medieval scholasticism. As historian Edward Grant (2001) points out, the shift from medieval scholasticism to Renaissance natural philosophy was instrumental in the development of the modern scientific worldview.

Key figures of the Renaissance, such as Nicolaus Copernicus, Johannes Kepler, and Galileo Galilei, initiated groundbreaking changes that would later be considered foundational to the Scientific Revolution. Their work transformed astronomy, physics, and the understanding of the natural world.

### **The Influence of Classical Antiquity on Renaissance Natural Philosophy**

The Renaissance was fundamentally a revival of interest in the classical knowledge of ancient Greece and Rome. The works of Plato, Aristotle, Ptolemy, and others were rediscovered and studied with new attention to detail. However, Renaissance thinkers did not merely accept these classical ideas uncritically. They examined them with the critical tools of their time, questioning longstanding assumptions and proposing new models based on empirical evidence.

Copernicus's heliocentric theory, for instance, was inspired by the ancient Greek philosopher Aristarchus of Samos, who had posited a Sun-centered universe long before Copernicus (Westman, 1975). While Copernicus was influenced by classical ideas, he made his own observations, including studying the movement of celestial bodies and using mathematics to create a more accurate model of the cosmos. His work, *De revolutionibus orbium coelestium* (1543), rejected the Earth-centered model proposed by Ptolemy and laid the groundwork for later astronomers, such as Galileo and Kepler, to refine and expand upon.

In the study of mechanics and motion, Galileo Galilei (1564–1642) sought to apply experimental techniques and mathematics to challenge the ideas of Aristotle, whose theories had dominated European thought for centuries. Galileo's work in physics, particularly his studies on the motion of objects and the law of inertia, led to important discoveries that contributed to the eventual development of classical mechanics (Lindberg, 1992).

### **Key Figures in Renaissance Natural Philosophy and Their Contributions**

Nicolaus Copernicus is one of the most significant figures in Renaissance natural philosophy. His heliocentric theory, which posited that the Sun, not the Earth, was the center of the universe, fundamentally challenged the Ptolemaic, Earth-centered model that had been accepted for over a thousand years. Copernicus's work was pivotal in shifting scientific thought from a theological worldview to one based on observation and mathematics. His publication *De revolutionibus orbium coelestium* (On the Revolutions of the Celestial Spheres) in 1543 is often considered the beginning of the Scientific Revolution (Lindberg, 1992).

Galileo, often regarded as the father of modern science, played a crucial role in advancing the empirical methods of the Renaissance. By using the newly invented telescope, Galileo made astronomical discoveries that provided evidence for the heliocentric model. He observed the moons of Jupiter, the phases of Venus, and the uneven surface of the Moon, all of which contradicted the traditional Aristotelian view of a perfect, unchanging cosmos (Galilei, 1610). Galileo's application of the scientific method in physics also contributed significantly to the development of modern science. His work on the laws of motion laid the foundation for Isaac Newton's later developments in classical mechanics.

Johannes Kepler, a German astronomer and mathematician, is best known for his laws of planetary motion. Kepler's three laws, which describe the elliptical orbits of planets and the relationship between their orbital periods and distances from the Sun, were groundbreaking contributions to the field of astronomy. Building on the Copernican model, Kepler used precise astronomical data collected by Tycho Brahe to derive his laws, further solidifying the heliocentric theory and improving the understanding of planetary motion (Kuhn, 1957).

Although not a natural philosopher in the traditional sense, Francis Bacon played a crucial role in shaping the intellectual climate of the Renaissance. As a philosopher, Bacon advocated for the empirical method and the systematic collection of data through observation and experimentation, which he believed would lead to the advancement of knowledge. In his work *Novum Organum* (1620), Bacon criticized the reliance on ancient authorities and argued that science should be based on inductive reasoning. Bacon's ideas influenced the development of the scientific method and inspired later thinkers, including René Descartes and Isaac Newton (Gaukroger, 1995).

### **The Emergence of Empirical Methods and the Scientific Revolution**

The increasing emphasis on empirical methods during the Renaissance was a key factor in the emergence of the Scientific Revolution. Scholars began to reject speculative reasoning in favor of a more hands-on approach to understanding nature. This shift was largely influenced by the works of Copernicus, Galileo, Kepler, and Bacon, who all promoted the use of observation, experimentation, and mathematical reasoning as central to the scientific process.

As historian Peter Dear (1995) argues, the Renaissance was a time of intellectual ferment that set the stage for the later triumph of the scientific method. The practice of science during this period was characterized by a desire to understand nature through evidence rather than through established dogmas. This change in methodology, which would culminate in the development of modern science, was one of the most significant contributions of Renaissance natural philosophy.

### **The Legacy of Renaissance Natural Philosophy in the Scientific Revolution**

Renaissance natural philosophy had a profound impact on the Scientific Revolution, which is generally regarded as the period of intellectual transformation in the 17th century. The empirical methods and mathematical models developed during the Renaissance laid the groundwork for the scientific advancements of figures like Isaac Newton, Robert Hooke, and Christiaan Huygens. Newton's work, particularly his laws of motion and universal gravitation, unified the celestial and terrestrial realms of physics and established the foundations of classical mechanics.

The Renaissance focus on observation and experimentation also contributed to the rise of scientific institutions, such as the Royal Society in England and the Académie des Sciences in France, which became central to the development and dissemination of scientific knowledge during the Scientific Revolution.

Renaissance natural philosophy was crucial in setting the intellectual and methodological foundations for the Scientific Revolution. By challenging long-standing assumptions, embracing empirical observation, and emphasizing the role of mathematics, Renaissance thinkers began to transform how humanity understood the natural world. The work of Copernicus, Galileo, Kepler, and Bacon marked the beginning of a new era in science, one characterized by critical inquiry, experimentation, and the application of the scientific method. The legacy of Renaissance natural philosophy continues to shape modern scientific thought and serves as a reminder of the enduring importance of observation, reasoning, and empirical evidence in the pursuit of knowledge.

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## HEGEL AND MODERNITY

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### **Abstract**

Georg Wilhelm Friedrich Hegel (1770–1831), a prominent representative of German classical philosophy, belongs to the constellation of thinkers who have both opponents and supporters, in the broadest sense of the word. On the one hand, he is referred to as a proponent of epochal thinking; on the other hand, as a precursor and apologist of fascism and anti-Semitism. Fackenheim, who "remained with Hegel for ten years with great enthusiasm," evaluates his work as an "act of resistance" to Hitler and his regime.

In any evaluation, "everything depended on how the 'absolute' was represented, or not represented, in Nazi Berlin." This approach even opens the possibility of recognizing that : "Hegelianism was difficult," according to Anthony Quinton's fair assessment.

We rely on the idea that Hegel's doctrine provides all the prerequisites for modern political-legal thought to find solid ground for a dignified human life. It allows for the overview of the dangerous messages of "unfortunate consciousness," rejection of what is unacceptable, while shedding light on and realizing rational truths. "Hegel's lifelong aspiration was to find the absolute not outside the world, but within the world, where people suffer and work, are desperate and hopeful, destroy and create, die and believe."

The absolute, presented in world history, as the unity of soul and nature, thought and being, with the aim of the renewal of man in the world, immortalizes Hegel's name.

**Keywords:** absolute, freedom, necessity, experience of freedom, law.

### **The Essence of Hegel's Phenomenology**

Hegel views freedom as the existence of the World Spirit and declares it the creative force of history. He considers the natural and human worlds as an uninterrupted process of the self-realization of the eternal spirit, where the free spirit finds its own existence.

I.G. Neshatayev (1889-1971) (researcher of Hegel's philosophy) rightly writes: "Hegel develops phenomenology as the experience of freeing thought from all external coercion. In the 'science of the experience of consciousness,' there is a tendency characteristic of new European metaphysics: to liberate consciousness from all limitations in order to reveal it as the freedom of absolute knowledge, which is achieved when the subject is freed from any relationship with the object." [5]

Hegel evaluates freedom, as the process of self-realization of the spirit's substance, in two directions. The historical development of freedom occurs, on the one hand, in the consistent changes of empires, and as a result, the awareness of freedom ascends to a higher level. On the other hand, along the historical paths of the realization of freedom, "peoples and empires sink into the whirlpool of oblivion," "sacrificed by the overarching process of the development of the World Spirit."

### **The Concept of the Freedom of the Soul**

At the positive stage of development of spirit, the basis of creation is the spirit of freedom. It has limitless possibilities to embody itself in new realities; to develop a rational mechanism of self-knowledge and self-determination with its inner forces, in order to realize knowledge about its own essence; but not only to realize it, but also to master it. This is the consciousness of freedom that also defines existence. In the first stage of development, in the experience of knowledge of truth (one's nature), consciousness is isolated and alienated from itself, becoming the victim of the "real" phenomena of truth.

Consciousness, without inner unity and rationality, cannot rise to self-consciousness. It achieves knowledge through absolute rationality. The experience of consciousness, in the direction of the realization of the absolute spirit, is shaped within the system of absolute knowledge as the reality of the spirit. The process of the absolute's self-liberation is an act of finding itself. "Such a finding is realized through an approximation of consciousness to the essence of the object and, at the same time, to its own nature. Each new recognition of the object reveals a deeper nature of objectivity, the overcoming of

which requires the appropriate subjectivity, a higher level of consciousness, mind, and self-consciousness." [2. 11] This is the path of freedom leading to the Absolute, the primary and ultimate goal of Hegel's work.

The question of the recognition and resolution of objectivity in subjectivity, the recognition of necessity in freedom, on the basis of the unity of existence and consciousness, is possible within German philosophy.

In this field of consciousness, the subject succeeds in liberating itself from other realities, from external limitations. At this stage of knowledge, the spirit freely creates itself. This is the essence of its freedom. And to the extent that, in its own experience, it is given the possibility of existence, it determines its own truth and nature. It is in unity with itself, as truth.

#### **The Path of Self-Consciousness**

Hegel defines the existence of the free spirit, directed toward absolute self-consciousness as "I," with three necessary principles: 1. Consciousness is the concept; 2. Consciousness has its own measure of evaluation - self-determination; 3. The self-examination of consciousness occurs in its own experience."

Similar requirements apply to both the individual and to the nation, country, and state. As Kendziuro Janagida (1893-1983) rightly points out: "Hegel's achievement in explaining the concept of freedom is that, although he was an idealist, he did not limit freedom within the framework of the subjective, but placed it in connection with objective reality." [5]

Hegel affirms the idea that the existence of contradictions between spirit and nature, subject and object, freedom and necessity, is an essential path and mechanism for consciousness to reach self-consciousness. Similarly, consciousness's presence with itself is revealed in opposition to "the other." However, (according to his explanation), on the same level, the necessity of overcoming this opposition also becomes apparent. The subject's (in the broadest sense of the word) transition of itself into "the other," "returning home," and "forgetting itself in the other" is equivalent to "finding" itself. Human existence in "another" is directed towards again being with itself and overcoming self-alienation.

"Opposites establish themselves in their 'being-for-the-other,' and only in this way does true freedom become realized, because freedom is my identity with the other. I am truly free only when the other is free as well, and I recognize that the other is free. This freedom – of the one in the other – unites people internally, while needs and hardships, on the other hand, only connect them externally. Therefore, people must try to find themselves in one another," [4. 682] - that's how Hegel explains the essence of true freedom. This is the aspect of the issue we are interested in.

The freedom of thought is a moral law for humans. Based on this, the consciousness of individuals comes into harmony with the interests of the universal. In the state, individual freedom comes into unity with the interests of society. The universal will of people is legally ensured by law.

#### **The Essence of Law**

Law is one of the most important forms of objective spirit, and the unconditional power of law's enforcement is the state.

The philosopher states the idea that, on the political level, where the state is seen as an artificial form of regulating social relations, certain "necessities" of freeing law from omnipotence also emerge, which is natural. Otherwise, there would be no room for social changes. In such a reality, the main question arises: Can law, or to what extent can it, ensure freedom in the broadest sense of the word?

German philosopher confirms that law has a dual significance. On the one hand, law limits the freedom of human interactions and confines them within certain legal boundaries. Law, in this sense, has a binding force. On the other hand, law appears as the universal scale of individual freedom and equality. The law is recognized as a necessary step for humanity on the path to achieving true freedom, which implies the self-regulation of relationships between individuals, between individuals and society, and between nature and society at the higher stage of moral development. This is the purpose of law in Hegel's perspective as a legal force of freedom. Law plays a crucial role in the formation of the state, as the most important institution of social life, and it serves as the cornerstone for the maintenance of state order. Just law provides the foundation for the fair governance of public life.

The relationships between states are also determined by law. However, the question arises (particularly from the perspective of the development of political-legal thought) - whether the legal-political interests of states are compatible with each other. That is, how or to what extent the political-legal will of an individual state or assembled states adheres to the demands of international law, both internally and externally.

Law holds both moral and legal significance at the domestic and international levels. However, in every historical context, there remains a real doubt as to how closely the moral of the idea of law aligns

with politics. The events of the 20th and 21st centuries, including the two world wars and ongoing conflicts, have already provided substantial answers to this question. Nevertheless, the issue of the moral necessity of law remains a subject of great debate and discussion today.

We will confirm our attitude toward him from Hegel's perspective. He writes: "The determination, by which the individual's interest and right are established, as a passing moment, is simultaneously positive, namely, not accidental and variable for him, but the individuality that is in and for itself. Therefore, this relationship and its recognition is a substantial duty of this individuality – a duty, by sacrificing property and life, by exposing oneself to danger, and moreover, at the cost of one's own opinion and everything that is within the realm of life, to preserve this substantial individuality, independence, and sovereignty in the state." [SP-584]

### **Hegel's Doctrine and the European Future of Georgia**

**P.S.** The substantial foundations of Georgia (country) are sought in its ancient past. It has a history of three thousand years. During this time, the Georgian people, as subjects of historical law, have constantly faced the most difficult contradictions of history and, as a small nation, have always been under great risks. We hope that it will still be able to struggle with the ongoing natural and artificial difficulties of history. We believe that, on this path, where many dangerous forces stand before it, the main hopeful force for Georgia is its integration into European culture. In our firm belief, this is the only way the Georgian state can protect itself from dangerous influences and maintain its path of development. This was true in the past, it is true now, and it will be true in the future.

Hegel's doctrine, on this hopeful path, is a kind of lamp. It enables, through the grandeur of the idea of freedom, to illuminate the way for any civilized nation in the darkness of the labyrinths of historical processes. In this sense, he holds universal significance and power for human consciousness; Among them, for Georgian national consciousness as well.

Hegel's work, on the infinite paths of the search for truths, is not only a scientific-theoretical source for the human intellectual mind but also a powerful mental mechanism for realizing historical truths. His work, with this approach, is contemporary.

### **Conclusion**

The article raises and discusses the following issues: based on Hegel's doctrine, the issue of the freedom of consciousness is reviewed. The challenges accompanying the process of realizing freedom throughout history are examined. The issue of freedom is analyzed both from the perspective of the individual and the political-legal freedom of the state. Just law is recognized as the legal force that regulates legal-political relations between states.

### **Summary**

In Hegel's doctrine, the free spirit moving toward absolute self-consciousness is based on three main principles:

1. Consciousness is a concept.
2. Consciousness has its own measure of evaluation – self-determination.
3. The self-examination of consciousness occurs in its own experience.

In history, the highest form of the consciousness of freedom is law.

Law is the universal form, unified scale, and measure of human relationships, the subject, and the freedom of sovereign states.

With these approaches, Hegel's work is both viable and contemporary.

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## Physical sciences

### APPLICATION OF NANOTECHNOLOGY IN MEDICINE

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### ПРИМЕНЕНИЕ НАНОТЕХНОЛОГИЙ В МЕДИЦИНЕ

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#### **Abstract**

The article comprehensively examines the role of nanotechnology in medicine. The applications and advantages of nanotechnology in early disease detection, targeted drug delivery, cancer treatment, and gene therapy are thoroughly analyzed. Furthermore, the future development prospects, safety concerns, and ethical issues surrounding nanotechnology are discussed. This study highlights the role of modern innovations in medicine and emphasizes the contribution of nanotechnology to improving human health.

#### **Аңдатпа**

Мақалада нанотехнологияның медицинадағы рөлі жан-жақты қарастырылады. Ауруларды ерте анықтау, дәрілік заттарды нысаналы жеткізу, қатерлі ісіктерді емдеу және генетикалық терапия салаларында нанотехнологияның қолданылуы мен оның артықшылықтары кеңінен талданады. Сонымен қатар, нанотехнологияның болашақтағы даму перспективалары, қауіпсіздік және этикалық мәселелері талқыланады. Бұл зерттеу медицина саласындағы заманауи инновациялардың рөлін аша отырып, нанотехнологияның адамзат денсаулығын жақсартуға қосатын үлесін көрсетеді.

#### **Аннотация**

В статье всесторонне рассматривается роль нанотехнологий в медицине. Подробно анализируются применение и преимущества нанотехнологий в ранней диагностике заболеваний, целевой доставке лекарственных препаратов, лечении онкологических заболеваний и генетической терапии. Также обсуждаются перспективы развития нано-

технологий, вопросы безопасности и этические аспекты. Это исследование подчеркивает значение современных инноваций в медицине и демонстрирует вклад нанотехнологий в улучшение здоровья человечества.

**Keywords:** Nanotechnology, medicine, diagnostics, drug delivery, cancer, gene therapy, nanomaterials, biomedicine.

**Түйін сөздер:** Нанотехнология, медицина, диагностика, дәрілік заттарды жеткізу, қатерлі ісік, генетикалық терапия, наноматериалдар, биомедицина.

**Ключевые слова:** нанотехнология, медицина, диагностика, доставка лекарственных препаратов, онкология, генетическая терапия, наноматериалы, биомедицина.

Қазақстан Республикасының 17 тұрақты даму мақсаттарына жетудің бір жолы физика ғылымының интеграциясын және қазіргі заманғы ғылыммен технологияны жаңа деңгейге көтеруде. Бұл екі саланың үйлесуі жаһандық мәселелерді шешуге, соның ішінде тұрақты даму мақсаттарына (ТДМ) жетуге мүмкіндік береді.

Нанотехнология – бұл заттардың өлшемдері 1-100 нанометр аралығында болатын материалдар мен құрылғыларды зерттеу, құру және қолдану әдістерін қамтитын ғылым.

Нанотехнология — соңғы онжылдықта ғылыми және медициналық салада үлкен өзгерістерге алып келген инновациялық бағыттардың бірі. Бұл ғылым нанометрлік деңгейдегі материалдарды зерттеу мен оларды басқаруға негізделген. Нанотехнологияның негізгі ерекшелігі –заттардың қасиеттерін атомдар мен молекулалар деңгейінде өзгерту арқылы оларды медицина, электроника, энергетика және тағы басқа салаларда тиімді пайдалану.

Медицинада нанотехнологияның қолданылуы денсаулық сақтау саласының тиімділігін арттырып, ауруларды диагностикалау және емдеу әдістерін жетілдіруге мүмкіндік берді. Атап айтқанда, нанобөлшектер мен наноматериалдар ауруларды ерте анықтауда, дәрілік заттарды жеткізу жүйелерінде және қатерлі ісіктерді емдеуде ерекше рөл атқаруда. Бұл мақалада нанотехнологияның медицинадағы негізгі қолдану бағыттары, олардың артықшылықтары мен болашағы кеңінен қарастырылады.

#### **Нанотехнологияның даму тарихы және медицинаға әсері**

Нанотехнологияның дамуы 20-ғасырдың ортасынан бастау алады. 1959 жылы Ричард Фейнман алғаш рет "Төменде көп нәрсе бар" атты баяндамасында заттардың қасиеттерін атомдық деңгейде басқару мүмкіндігін айтты. 1947 жылы жапон ғалымы Норио Танигучи "нанотехнология" терминін енгізді.

Медицина саласында нанотехнология 1990-жылдардан бастап кеңінен қолданыла бастады. Оның негізгі себебі — молекулалық деңгейде әрекет ететін құрылғылар мен материалдардың пайда болуы. Наноматериалдардың жасушалар мен молекулалар деңгейінде әрекет ету қабілеті ғалымдарды жаңа емдеу әдістерін әзірлеуге шабыттандырды. Наноматериалдардың ерекше қасиеттері, олардың биологиялық жүйелермен өзара әрекеттесуі медицинада жаңа емдеу әдістерін енгізуге жол ашты.

#### **Нанотехнологияның диагностикадағы рөлі**

Медицинадағы маңызды бағыттардың бірі – ауруларды ерте диагностикалау. Нанобөлшектер ағзадағы биологиялық өзгерістерді жоғары дәлдікпен анықтай алады. Медицинада ауруларды ерте анықтау емдеу тиімділігін арттырып, пациенттердің өмір сапасын жақсартуға мүмкіндік береді. Нанотехнология бұл бағытта бірқатар жетістіктерге қол жеткізді.

Биомаркерлерді анықтау: нанобөлшектер аурулардың биомаркерлерін өте аз мөлшерде анықтай алады. Бұл қатерлі ісік, жүрек-қан тамырлары аурулары және неврологиялық бұзылыстарды ерте кезеңде диагностикалауға мүмкіндік береді.

Наносенсорлар: аурудың нақты белгілерін анықтап, биологиялық сұйықтықтардағы патологиялық өзгерістерді өлшеуге арналған құрылғылар. Олардың жоғары сезімталдығы мен жылдамдығы ауруды алғашқы кезеңдерде анықтауға мүмкіндік береді.

Молекулалық бейнелеу: нанотехнология арқылы молекулалық бейнелеу әдістері дамып, бұл диагностикалық құралдарды дәлірек әрі қолжетімді етеді.

Жылдамдық пен дәлдік: Қалыпты зертханалық әдістерге қарағанда, наносенсорлар нәтижені жылдамырақ береді.

#### **Дәрілік заттарды жеткізу жүйелері**

Дәрілік заттарды қажетті аймаққа жеткізу – емдеу тиімділігін арттырудағы басты мәселе. Нанотехнология дәрілерді нысаналы түрде жеткізу арқылы бұл мәселені шешуде ерекше рөл атқарады.

Нанобөлшектердің ерекшелігі - нанобөлшектер дәрілік заттарды қоршап, оларды қоршаған орта әсерінен қорғап, қажетті жерге жеткізеді. Бұл тәсіл дәрінің тиімділігін арттырып, оның жанама әсерлерін азайтады. Липосомалар мен нанокапсулалар: бұл жүйелер дәрілерді ағзадағы қажетті жерге дәл жеткізіп, олардың әсерін ұзақ уақытқа сақтауға мүмкіндік береді.

Нанотехнология арқылы дәрілік заттар тек ауру ошақтарына жеткізіліп, сау тіндерге зиян тигізбейді. Бұл әсіресе химиотерапия сияқты емдеу әдістерінде маңызды. Және нанотехнология қатерлі ісіктерді емдеу әдістерін жетілдіруде маңызды рөл атқарады.

#### **Қатерлі ісіктерді емдеудегі нанотехнологиялар**

Қатерлі ісіктерді емдеуде нанотехнологиялар ерекше маңызға ие. Олар ісіктерді анықтау және емдеу процесін жақсартуда қолданылады:

##### **1. Нанобөлшектер арқылы нысаналы емдеу**

Нанобөлшектер дәрілік заттарды қатерлі ісік жасушаларына ғана бағыттап, сау тіндерді сақтайды.

##### **2. Фототермиялық терапия**

Бұл әдісте нанобөлшектер инфрақызыл сәулелерді сіңіріп, ісік жасушаларын қыздырып жояды.

##### **3. Радиотерапияны жақсарту**

Наноматериалдар сәулелік терапияның дәлдігін арттырып, оның тиімділігін күшейтеді.

##### **4. Химиотерапияның жақсаруы**

Химиотерапиялық препараттардың нысаналы жеткізілуі улы әсерлерді азайтады және науқастың өмір сапасын арттырады.

#### **Болашақтағы перспективалары**

Нанотехнология медицинада көптеген мүмкіндіктерді ашады:

Генетикалық терапия және жасушалық терапия -генетикалық терапияда нанотехнологияны қолдану тұқым қуалайтын және генетикалық ауруларды емдеуде жаңа мүмкіндіктер ашады.

- Гендерді түзету - нанобөлшектер арқылы ауру гендерді өзгерту немесе оларды сау гендермен алмастыру жүзеге асырылады.

- Биоматериалдар - жасанды тіндер мен органдар жасауда наноматериалдар пайдаланылады. Олар ағзамен үйлесімділігі жоғары болғандықтан, трансплантацияға жаңа мүмкіндіктер береді.

- Жасушалық терапия - нанотехнология зақымдалған жасушаларды қалпына келтіруге арналған жаңа әдістерді ұсынады. Бұл әдістер жарақаттар мен созылмалы ауруларды емдеуде тиімді.

Нанотехнология медицина саласында бірнеше артықшылық береді:

1. Ауруларды ерте диагностикалау емдеу тиімділігін арттырады.

2. Наноматериалдар арқылы дәрілердің нысаналы жеткізілуі жанама әсерлерді азайтады.

3. Қатерлі ісіктерді емдеуде инновациялық әдістердің пайда болуына ықпал етеді.

4. Генетикалық және жасушалық терапия жаңа перспективаларды ашады.

Сонымен қатар, нанотехнологияның дамуы ғылыми-зерттеу жұмыстарын қажет етеді. Бұл технологияны қолдану барысында этика және қауіпсіздік мәселелері де назарда болуы тиіс. Этика және қауіпсіздік - нанотехнологияны медицинада қолдану барысында этикалық және қауіпсіздік мәселелерін шешу маңызды. Бұл оның тиімділігі мен қауіпсіздігін қамтамасыз ету үшін қажет.

Менің мақаламның артықшылығына тоқталатын болсам, мақалада нанотехнологияның барлық негізгі аспектілері жан-жақты талданған. Тақырыптың заманауи болуы, нанотехнологияның медицинадағы инновациялық рөлі зерттелген. Құрылымның айқын болуы және мақала бөлімдерге бөлініп, логикалық түрде жазылған. Осы зерттеу арқылы студенттерге нанотехнологияның қазіргі медициналық ғылымда қандай үлкен рөл атқаратынын, оның потенциалын және болашақта медицина саласын қалай өзгертуі мүмкін екенін көрсету мақсатында ғылыми негізделген ақпарат берілді.

Зерттеу жұмысымның маңыздылығын студенттер арасында сауалнама жүргізу арқылы дәлелдегім келді. Сауалнама Google Forms платформасы арқылы дайындалып, физика

мамандығының студенттері арасында өткізілді (<https://forms.gle/DFWwH9MfQC8H1uWV6>). Мақсатым – нанотехнологияның медицинадағы қолданылуы тақырыбының олардың көзқарасына қаншалықты әсер еткенін анықтау, сондай-ақ осы тақырыптың оқу процесіндегі рөлін бағалау.

Сауалнамаға қатысқан студенттердің басым бөлігі нанотехнология туралы негізгі түсініктерге ие екендігін көрсетті. Нанотехнологияның медицинада қолданылуы туралы білімдері әртүрлі деңгейде, бұл тақырыптың кейбіреулер үшін әлі де жаңалық екенін анықтады. Студенттердің көпшілігі бұл тақырыпқа қызығушылық танытты. Әсіресе, оның медициналық диагностика мен емдеу саласындағы маңыздылығы ерекше назар аударды.

Сауалнама сұрақтары келесідей бағыттарды қамтыды:

1. Нанотехнология туралы түсініктеріңіз бар ма?

• Бұл сұрақ бойынша студенттердің 70%-ы нанотехнология ұғымымен таныс екенін, ал қалған 30%-ы оның тек жалпы түсінігін ғана білетінін атап өтті.

• Бұл көрсеткіш нанотехнологияның білім беру бағдарламасында көбірек қамтылуы қажет екенін көрсетеді.

2. Бұл тақырыптың медицина саласында қолданылуы сіз үшін қаншалықты қызықты?

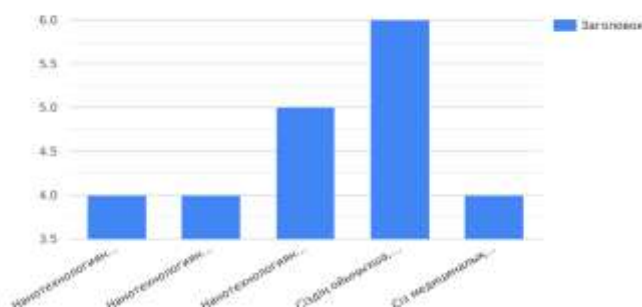
• Студенттердің басым бөлігі (80%) нанотехнологияның медицинада қолданылуын қызықты және өзекті деп бағалады.

• Әсіресе, оның дәрілік заттарды жеткізу және қатерлі ісіктерді емдеудегі рөлі ерекше назарға алынған.

3. Сіздің пікіріңізше, нанотехнологияның болашағы медицинада қандай болады?

• Респонденттердің 75%-ы нанотехнология медицинада революциялық өзгерістер жасайтынына сенімді.

• Ал 25%-ы бұл технологияның тиімділігі мен қауіпсіздігін толық зерттеу қажеттігін атап өтті.



1-сурет.

График арқылы нәтижелерді талдай отырып, келесідей тұжырым жасауға болады:

Сауалнама нәтижелері бойынша студенттердің көпшілігі нанотехнологияның медицинадағы қолданылуын қызықты әрі болашағы зор тақырып ретінде бағалады. Студенттер үшін бұл тақырыпты оқытуда физика, медицина және педагогика салаларын байланыстырудың маңызы зор. Осыған сүйене отырып, "Нанотехнология" тақырыбын оқу бағдарламасына қосу немесе семинарлар ұйымдастыру олардың қызығушылығын арттырып, білімдерін кеңейтуге мүмкіндік береді.

#### Қорытынды

Нанотехнология медицинада жаңа мүмкіндіктер ашып, ауруларды емдеу мен диагностикалауда революциялық әдістер ұсынады. Бұл технологияның көмегімен ауруларды ерте анықтау, дәрілік заттарды нысаналы жеткізу және генетикалық деңгейде емдеу мүмкіндіктері артады. Дегенмен, бұл саладағы ғылыми зерттеулерді жалғастыру және этикалық сұрақтарды шешу қажет.

Мақалада айтылған нанотехнологияның медициналық диагностикадағы, дәрілік заттарды жеткізудегі және ісікке қарсы емдеудегі тиімділігін түсіндіре отырып, студенттерге бұл технологияның болашағын, оның адам денсаулығы мен өмір сапасына ықпалы жөніндегі маңыздылығы түсіндірілген. Бұл зерттеу ғылыми қауымдастықтың, медициналық зерттеушілер мен студенттердің нанотехнологияны қалай қолдану керектігін түсінуіне көмектеседі.

Қорыта келе, менің зерттеуімнің негізгі мақсаты – студенттерге нанотехнологияның

медицинадағы орны мен болашақтағы маңыздылығын таныстыру болып табылады. Осының арқасында олар жаңа технологиялар мен инновациялық шешімдерге қызығушылық танытып, болашақта осы салада өздерінің ғылыми зерттеулерін жүргізуге ынталануы мүмкін.

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## Psychological sciences

### PSYCHOLOGICAL CHARACTERISTICS OF THE ATTITUDE TO MONEY OF AN ADULT PERSONALITY

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### ПСИХОЛОГІЧНІ ОСОБИСТОСТІ СТАВЛЕННЯ ДО ГРОШЕЙ ДОРОСЛОЇ ОСОБИСТОСТІ

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#### **Abstract**

The psycho-economic approach to financial behaviour explores the relationship between economic conditions and psychological aspects that influence financial decision-making, the formation of economic culture and personal identity. Particular attention is paid to factors such as financial literacy, motivation, cognitive biases and psychological characteristics that determine behavioural patterns and economic thinking. This approach allows for a better understanding of the psychological mechanisms of financial management and helps to develop strategies to adapt to changes in the economic environment.

#### **Анотація**

Психоекономічний підхід до фінансової поведінки досліджує взаємозв'язок між економічними умовами та психологічними аспектами, що впливають на ухвалення фінансових рішень, формування економічної культури та ідентичності особистості. Особлива увага приділяється таким чинникам, як фінансова грамотність, мотивація, когнітивні упередження та психологічні характеристики, які визначають поведінкові моделі й економічне мислення. Цей підхід дозволяє краще зрозуміти психологічні механізми управління фінансами та сприяє розробці стратегій для адаптації до змін в економічному середовищі.

**Keywords:** financial behaviour, financial literacy, psycho-economic approach, economic culture, economic identity, cognitive biases, motivation, psychological factors

**Ключові слова:** фінансова поведінка, фінансова грамотність, психоекономічний підхід, економічна культура, економічна ідентичність, когнітивні упередження, мотивація, психологічні чинники

Психоекономічний підхід до фінансової поведінки акцентує увагу на взаємодії між економічними умовами та психологічними аспектами прийняття рішень. Цей підхід допомагає зрозуміти, як думки, емоції та поведінкові моделі впливають на фінансові цілі людини, її готовність до ризику та здатність заощаджувати. Науковці визначають економічну культуру як сукупність психолого-економічних властивостей особистості, які формуються через економічну соціалізацію (Васютинський та ін., 2016).

Важливим аспектом цього підходу є економічна ідентичність особистості, її визначають психологічні детермінанти (Васютинський та ін., 2016). Економічна мотивація базується на різноманітних факторах і залежить від соціальних змін.

Фінансова грамотність є ключовим елементом ефективного управління ресурсами. На думку Н. Захарової, С. Осипенка та С. Павленка (2023), фінансова грамотність сприяє формуванню економічного мислення та допомагає ухвалювати обґрунтовані рішення. Успішність особистості в управлінні фінансами, за дослідженням О. Матеюк (2012), залежить

від здатності балансувати між ризиком і стабільністю. Підкреслена важливість формування фінансово-грамотної особистості, яка має необхідні знання та навички для прийняття оптимальних рішень.

Психологічні аспекти фінансової поведінки також охоплюють ставлення до грошей. Наприклад, О. Нікітіна, Т. Хомуленко та А. Іванченко (2020) розглядають мотивацію до заощаджень, інвестицій та контролю витрат. М. Сімків (2015) вказує, що гроші є не лише економічним інструментом, а й соціально-психологічним феноменом, який впливає на поведінкові моделі.

Крім того, дослідження Л. Опаєць (2022) демонструє зв'язок між ставленням до грошей і психологічними характеристиками, такими як рівень тривожності та здатність контролювати фінансові рішення. Л. Карамушка, О. Креденцер і О. Паршак (2020) наголошують на важливості дослідження психології грошей у контексті національних і міжнародних тенденцій.

Психоекономічний підхід дозволяє зрозуміти, як когнітивні упередження, емоції та рівень самоконтролю впливають на фінансові рішення. Наприклад, Jia-peng et al. (2019) зазначають, що страх втрат чи надмірна впевненість можуть стати причиною неправильних інвестиційних рішень. Це підтверджує важливість розвитку фінансової грамотності для уникнення помилок у поведінці.

Фінансова поведінка дорослих людей формується під впливом багатьох факторів, серед яких ключову роль відіграє суб'єктивна оцінка власного фінансового стану. Дослідження показують, що саме ця оцінка є одним із найсильніших предикторів фінансових рішень, впливаючи на здатність до заощаджень, інвестування та загальну фінансову поведінку (Furnham & Cheng, 2019). Водночас соціальний статус батьків, рівень освіти та професійні досягнення також суттєво впливають на фінансові установки людини.

Ширший соціальний контекст також формує фінансові переконання. Дослідження студентів у Словенії демонструє, що мотивація до заощаджень часто визначається зовнішніми чинниками, такими як бажання забезпечити фінансову стабільність у майбутньому чи накопичити кошти для великих інвестиційних цілей. Важливим фактором є вплив батьків, які передають моделі фінансової поведінки своїм дітям. Це підтверджується схожістю мотивів заощаджень у родинах (Lep et al., 2021).

Емоційна складова також є важливим аспектом у прийнятті фінансових рішень. Емоції, такі як тривога чи страх втрат, часто змушують людей уникати ризиків, навіть якщо це суперечить їхнім довгостроковим цілям (Mei et al., 2021). З іншого боку, впевненість у власних фінансових знаннях сприяє активній участі в ризикових інвестиціях, хоча надмірна впевненість може призводити до переоцінки власних можливостей і фінансових втрат (Zaleskiewicz & Traczyk, 2020).

Фінансова стабільність має вирішальне значення для психологічного благополуччя людини. Вона сприяє зниженню рівня тривожності, покращує емоційний стан і підвищує життєву задоволеність. Дослідження серед дорослих людей показують, що фінансова нестабільність, борги чи відсутність заощаджень можуть стати джерелом хронічного стресу та депресії, тоді як відчуття контролю над своїм фінансовим станом значно покращує якість життя (Wolfe et al., 2021). Особливо це важливо для літніх людей, для яких фінансова стабільність є одним із головних чинників підтримання життєвого балансу та задоволення (Huang et al., 2020).

Загалом, фінансова поведінка дорослих є складним процесом, який залежить від суб'єктивних, соціальних та емоційних факторів. Розуміння цих аспектів допомагає розробляти ефективніші стратегії управління фінансами для досягнення стабільності та благополуччя. Психоекономічний підхід допомагає глибше зрозуміти мотиваційні чинники фінансової поведінки, дозволяючи не лише аналізувати вплив економічних умов, але й створювати стратегії для їх адаптації до потреб сучасної людини.

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## Sociological sciences

### **THE IMPACT OF SINGLE PARENTHOOD ON CHILDREN'S SOCIALIZATION: INSIGHTS FROM A SOCIOLOGICAL STUDY**

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#### **Abstract**

*In contemporary societies, family dynamics and the influence of family environment on children's social development are among the most crucial and pertinent issues. Within this context, raising children in single-parent families warrants particular attention, calling for a deeper understanding of the underlying social and psychological mechanisms governing this process.*

*This article will find out what conditions have a positive impact on the socialization of children growing up in single-parent families in society and, conversely, have a negative impact. We can also see the socialization of the child, and which factors provide the best help. 10 single mothers received interview. The results were shown in comparison with world studies.*

*This research holds significant relevance in the context of evolving social dynamics, where the prevalence of single-parent families continues to rise, underscoring the need to understand the nuances of life and child-rearing within such family structures. The novelty of our study lies in the utilization of in-depth interviews with single parents as a qualitative data collection method. This approach facilitated an in-depth exploration of the problems and challenges confronting contemporary single-parent families, while concurrently identifying the psychological and social factors impacting children's development and adaptation.*

**Keywords:** *single-parent families, single motherhood, child-rearing, behavioral characteristics, children's adaptation, children's socialization, sociological analysis, in-depth interviews, Kazakhstan.*

#### **Introduction**

*In recent years, the problem of raising children in single-parent families has become one of the most pressing issues in sociological research. Single-parent families face a multitude of challenges and difficulties that affect both parents and children, including adaptation to new conditions, psychological adjustment, as well as social and economic hardships. The increasing prevalence of single-parent families is a global phenomenon, with research indicating that approximately 15% of children worldwide live in single-parent households (OECD, 2019). In the United States alone, the proportion of children living with a single parent has doubled since 1968, reaching 23% in 2020 (U.S. Census Bureau, 2021). These statistics highlight the importance of understanding the unique experiences and needs of single-parent families across diverse cultural contexts.*

*In the context of Kazakhstan's reality, where single-parent families are becoming increasingly common, it is crucial to understand the peculiarities of raising children in such families and to develop appropriate support strategies. According to the Ministry of National Economy of the Republic of Kazakhstan (2021), the number of single-parent families in the country has grown by 12% over the past decade, with single mothers constituting the majority of these households. This trend is attributed to various factors, including high divorce rates, widowhood, and the growing acceptance of non-traditional family structures (Zhansugurova et al., 2020).*

*To gain a comprehensive understanding of the experiences of single-parent families in Kazakhstan, it is essential to consider the demographic characteristics of the families participating in the study. Kazakhstan is a culturally diverse nation, with a population comprising various ethnic groups, including Kazakhs, Russians, Uzbeks, and others (Agency for Strategic planning and reforms of the Republic of Kazakhstan, Bureau of National statistics, 2021). The interviews for this study were conducted with*

*Kazakh-speaking single parents, providing valuable insights into the subjective opinions and experiences of this specific demographic.*

*The Kazakh culture places a strong emphasis on family values, kinship ties, and traditional gender roles (Yessimova et al., 2021). In this context, single parenthood may be associated with specific challenges and stigmas that differ from those experienced in other cultural settings. For instance, single mothers in Kazakhstan may face greater social pressure to remarry or to rely on extended family support, while single fathers may struggle with the societal expectations of being the primary breadwinner and caregiver simultaneously (Aidarbekova et al., 2019).*

*By focusing on the experiences of Kazakh-speaking single parents, this study aims to shed light on the unique challenges and coping strategies employed by this population. The qualitative approach, utilizing in-depth interviews, allows for a nuanced exploration of the participants' subjective opinions and lived experiences. This research contributes to the growing body of literature on single parenthood in diverse cultural contexts and has the potential to inform culturally sensitive interventions and support systems for single-parent families in Kazakhstan and beyond.*

*Literature review. Over the past five years, a number of studies have been conducted in this area, which have shed light on various aspects of life in single-parent families from various cultures. One such study is the work of Carolina Lopez and colleagues (Lopez et al., 2020), who focused on the impact of parental divorce on children's psychological well-being. The study, which included a sample of 1,200 children aged 8-16 years from divorced families in Spain, found that children who maintained regular contact with both parents and received adequate emotional support exhibited better psychological adjustment compared to those who had limited contact or support. The authors emphasized the importance of co-parenting and the need for interventions that promote positive parent-child relationships post-divorce.*

*Another study conducted by David Smith and his co-authors (Smith et al., 2019) analyzed the impact of social support on the adaptation of children in single-parent families. The research, which involved a longitudinal study of 500 single-parent families in the United Kingdom, revealed that children who received consistent support from extended family members, friends, and school personnel displayed higher levels of resilience and better academic outcomes. The findings underscored the critical role of social networks in mitigating the challenges faced by children in single-parent households.*

*It is also worth noting the work of Jessica Clark and her colleagues (Clark et al., 2018), who focused on the role of parental support in the development of positive adaptive strategies in children from single-parent families. The qualitative study, which included in-depth interviews with 25 single parents and their children in the United States, identified several key factors that contribute to children's successful adaptation, such as open communication, emotional validation, and the promotion of self-efficacy. The authors suggested that interventions targeting these areas could help foster resilience in children from single-parent families.*

*These studies, and many others, highlight the importance of further research and the development of effective support strategies for single families in today's society. A meta-analysis conducted by Wang and colleagues (2021) reviewed 78 studies on the well-being of children in single-parent families, concluding that while these children may face increased risks for adverse outcomes, targeted interventions and policies that address their unique needs can significantly improve their well-being.*

*The findings of this study were based on data from more than 22,000 respondents in Germany. The authors employed latent class analysis to identify distinct subgroups of single mothers based on their financial well-being, revealing that those in the most economically disadvantaged group experienced the highest levels of psychological distress and lowest life satisfaction. The study emphasizes the importance of considering the heterogeneity within single-parent populations and the need for targeted financial support and mental health interventions.*

*Furthermore, recent research has also explored the challenges faced by single fathers, a demographic that has often been overlooked in the literature on single parenthood. A study by Johnson and colleagues (2021) investigated the experiences of single fathers in the United States, highlighting the unique stressors they encounter, such as societal stigma, work-family conflict, and limited access to support services tailored to their needs. The authors call for greater attention to be paid to the experiences of single fathers and the development of gender-sensitive interventions and policies.*

*As the prevalence of single-parent families continues to rise globally, it is crucial to expand research efforts to understand the diverse experiences and challenges faced by these families across various cultural contexts. Future studies should aim to identify culturally sensitive interventions and support systems that can promote the well-being of single parents and their children, taking into account the*

unique socio-economic, cultural, and political factors that shape their lives. Moreover, researchers should strive to adopt intersectional approaches that consider the interplay of various identity factors, such as gender, race, ethnicity, and sexual orientation, in shaping the experiences of single-parent families. By doing so, we can develop more comprehensive and effective strategies to support these families and ensure that their needs are adequately addressed in social policies and programs.

In the family dynamics of single-parent families, the absence of one parent has a significant impact on the psychological well-being of children. From the data presented, it is evident that children's reactions and emotional states to separation from their parent are individual and can vary depending on various factors, such as age, quality of previous relationships, availability of emotional support and environment. Support from other relatives, such as grandparents, uncles, aunts, plays an important role in the lives of children from single-parent families. This can be not only emotional support, but also practical help with everyday worries, which helps to reduce children's stress levels and help them better adapt to new environments. Also, as the study revealed, psychological help is significant for children experiencing psychological difficulties due to separation from their parents. Working with qualified psychologists can help children express their emotions, learn how to cope with stress, and develop coping skills. However, an equally important factor is the presence of emotional support within the family itself. Many single mothers studied in this study actively support their children's emotional well-being by communicating, listening to their feelings, and creating an environment for openness and safety. These findings are consistent with recent research emphasizing the protective role of supportive parenting and family relationships in promoting children's resilience following parental separation (Mahrer et al., 2021; Petren et al., 2021).

The study of the views and worldview of children living with only one parent reveals interesting aspects of social and psychological adaptation. A sociological analysis of the responses of single parents allows us to identify several common themes. First, close relationships and emotional support play a significant role. Most parents report that their children have become closer to them and more caring, some indicate that their children show compassion and openness, and a few report an increase in emotional openness and trust. At the same time, changes in the child's character have also become noticeable: some parents note an increase in responsibility and maturation, whereas others note the manifestation of various other changes in character, such as short temper or withdrawal. Adjustment difficulties and emotional changes are also evident. Parents note difficulties in adaptation, communication or emotional swings.

Psychological analysis of this data allows us to identify deeper aspects. Emotional changes in children are partly due to reactions to changes in the family, such as divorce or the absence of a parent, a quarter of parents citing this as the main cause. Adaptation and the use of defense mechanisms also play a role. However, emotional support from the parent plays a key role in this process: half of the parents note the importance of their role in supporting and caring for their children during the adjustment process. Thus, the analysis of the views and worldview of children from single-parent families allows us to understand the features of their social and emotional adaptation, as well as to identify the role of parents in this process. These findings align with recent research highlighting the complex interplay of individual, family, and contextual factors in shaping children's adjustment to parental separation (Hadfield et al., 2018; Steinbach, 2019).

This percentage analysis provides a better understanding of the main trends in the behavior and emotional changes of children living with one parent. These figures show that the majority of children show increased closeness and care to their parents, but there are also many cases where children have difficulties in adapting and show defense mechanisms. Support and care from the parent plays an important role for the successful adaptation and emotional well-being of the child in the new environment. Parental support is also crucial for children who exhibit defensive mechanisms, such as being withdrawn or short-tempered. Psychological support and a tolerant, understanding attitude of the parent can help the child cope with these difficulties and gradually overcome them. The shaping of a child's emotions by caregivers has implications for both the child's typical development and the risk of anxiety. Children, in turn, influence the environment in which they are placed with their temperament (Recksiedler et al., 2023). These findings highlight the importance of considering both parent and child factors in understanding children's adjustment to single parenthood, as emphasized in recent research on the bidirectional nature of parent-child relationships (Gómez-Ortiz et al., 2019; Mastrotheodoros et al., 2020).

Thus, it is clear from the analysis that the psychological support of the parent plays a key role in helping children living with one parent to successfully adapt, strengthen emotional stability and develop

healthy relationships with the outside world. It is important to be tolerant, listen and support the child as he or she emotionally adjusts to the new family situation. These findings have important implications for practice, suggesting the need for interventions that support positive parenting and promote children's resilience in the face of family transitions, as highlighted in recent literature (Feinberg et al., 2019; Sandler et al., 2018).

During the interview, it was interesting to find out what kind of relationships are now formed between parents and children, as well as between children and their peers. From the general answers, it can be concluded that the majority of children from single-parent families have warm and supportive relationships within their family and with relatives, although there are also cases of conflict, which is a natural part of family relations. Family support plays an important role in the emotional well-being and development of children in single-parent families. Baumrind (1966) identified three primary parenting styles based on her research: authoritarian, permissive, and authoritative. Authoritarian parenting is characterized by high demands and low responsiveness, with parents emphasizing obedience, respect for authority, and adherence to rules. Permissive parenting involves low demands and high responsiveness, with parents being more lenient, nurturing, and less likely to impose strict guidelines. Authoritative parenting, considered the most balanced approach, combines high demands with high responsiveness, where parents set clear expectations while being supportive, nurturing, and encouraging open communication with their children. These parenting styles can be interpreted as varying levels of warmth and control, with authoritative parenting exhibiting high warmth and high control, authoritarian parenting displaying low warmth and high control, and permissive parenting showing high warmth and low control.

Recent research has confirmed the differential effects of these parenting styles on children's social and emotional development, with authoritative parenting (high warmth, high control) being associated with the most positive outcomes (Pinquart & Kauser, 2018; Smetana, 2017).

In addition, parents need to take into account the age characteristics of their children when building communication. For example, it has been proven (Baiocco et al., 2019) that younger children have higher self-esteem than older children and adolescents, and this may be due to the fact that younger children do not yet have the ability to participate in the self-esteem process, which protects them from negative attitudes towards themselves. These developmental differences underscore the need for age-appropriate interventions and support strategies for children in single-parent families, as emphasized in recent research (Lebow, 2019; Weaver & Schofield, 2015).

Question about "Family Support and Its Impact on Children in Single-Parent Families".

Support for children in single-parent families can manifest in various ways, each having a distinct impact on their well-being:

**Emotional support:** Relatives, fathers, or older siblings who provide emotional support help build confidence and self-esteem in children, enabling them to cope with emotional difficulties, relieve stress, and improve their psychological state (Smith et al., 2021).

**Social support:** Family support can help children adapt to social situations and develop social skills, including academic support, mentoring, and practical assistance with everyday problems (Johnson et al., 2020).

**Stability and security:** In single-parent families, where one parent may be absent, the role of other family members in providing stability and a sense of security for children is crucial, creating a sense of support and protection that is essential for psychological well-being (Prendergast & MacPhee, 2020).

**Role models and parenting support:** Older family members can serve as role models for children in single-parent families, helping them internalize values and develop social and moral principles. Parenting support and mentoring from older relatives can significantly impact the formation of a child's personality (Mahrer et al., 2021).

**Adapting to change:** Family support helps children better adapt to the changes associated with single-parent families, such as the distress of divorce, the loss of a family member, or a change in circumstances (Weaver & Schofield, 2015).

Research shows that family support plays a key role in building emotional resilience, social competence, and overall well-being in children from single-parent families, creating the foundation for the development of healthy relationships, self-esteem, and self-confidence (Jamison et al., 2020).

The study highlights the persistent financial difficulties experienced by single parents, which is consistent with the findings of Nieuwenhuis and Maldonado (2018) and Struffolino and Bernardi (2020). The absence of a second parent and the associated challenges in parenting, education, and childcare are also prominent themes that emerge from the interviews, echoing the findings of Meier et al. (2020) and

Nomaguchi and Milkie (2020) on the increased parenting stress and role strain experienced by single parents.

The impact of single parenthood on children's psychological well-being and the importance of family support and emotional resilience are key findings of this study, which corroborate the results of recent research by Mahrer et al. (2021) and Petren et al. (2021). The complex interplay of individual, family, and contextual factors in shaping children's adjustment to parental separation, as highlighted by Hadfield et al. (2018) and Steinbach (2019), is also evident in the experiences shared by the participants.

The study's emphasis on the bidirectional nature of parent-child relationships and the importance of considering both parent and child factors in understanding children's adjustment to single parenthood aligns with the findings of Gómez-Ortiz et al. (2019) and Mastrotheodoros et al. (2020). The role of parenting styles and the differential effects of authoritative parenting on children's social and emotional development, as confirmed by Pinquart and Kauser (2018) and Smetana (2017), are also reflected in the experiences of the single parents interviewed in this study.

The findings underscore the need for targeted interventions and support systems that address the unique challenges faced by single-parent families, which is consistent with the recommendations of Feinberg et al. (2019) and Sandler et al. (2018). The study also highlights the importance of considering the developmental differences and the need for age-appropriate interventions and support strategies for children in single-parent families, as emphasized by Lebow (2019) and Weaver and Schofield (2015).

In conclusion, The findings align with and extend the results of previous studies, highlighting the importance of family support, emotional resilience, and targeted interventions in promoting the well-being of single parents and their children. The study underscores the need for further research and the development of culturally sensitive support systems that address the unique needs of single-parent families in diverse contexts.

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