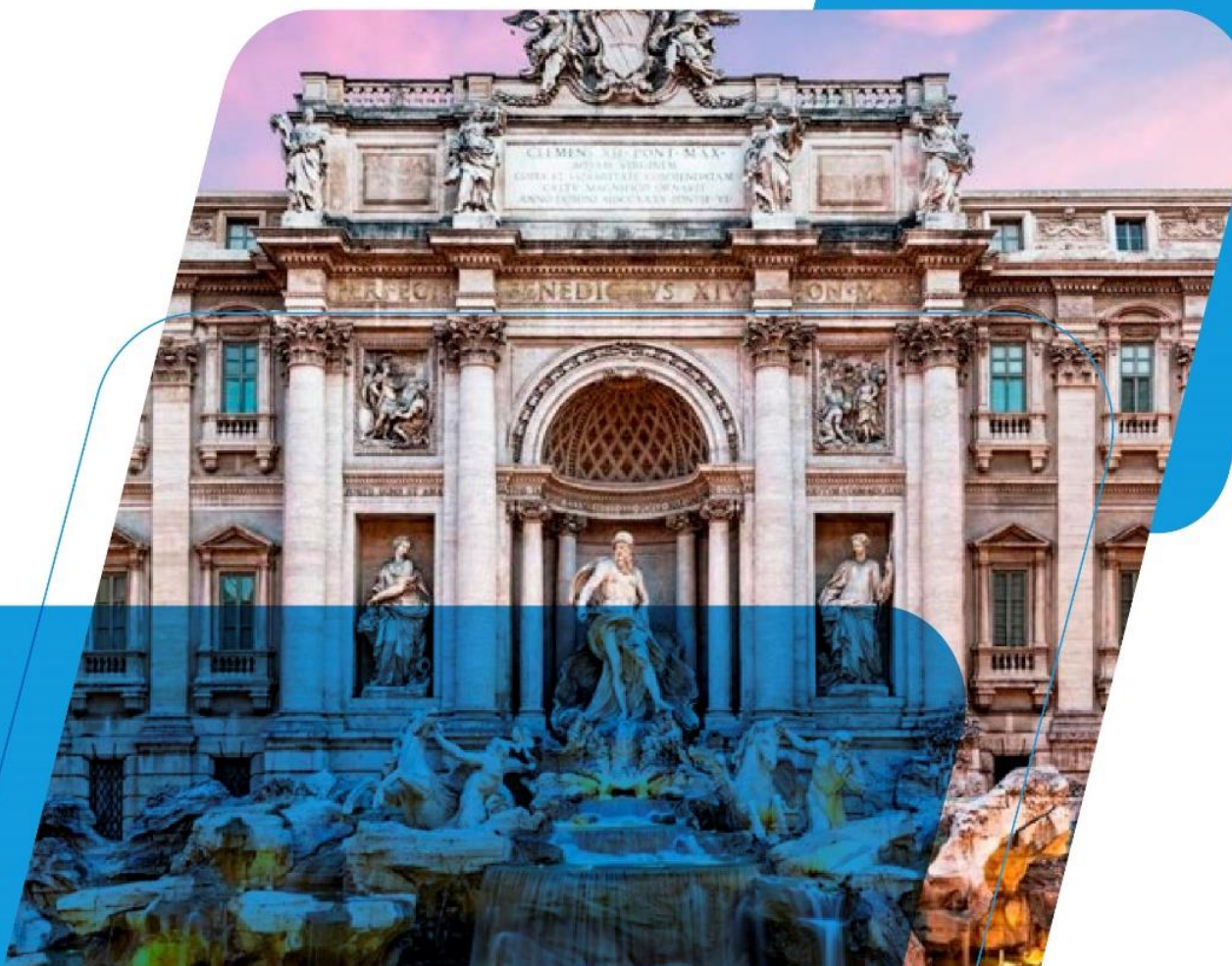




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Arts

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«MUSIC BY ALEXANDER ZATSEPIN FOR SHAKEN AIMANOV'S FILM THE SONG IS CALLING»

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УДК 75.051(574.25)

«МУЗЫКА АЛЕКСАНДРА ЗАЦЕПИНА К ФИЛЬМУ ШАКЕНА АЙМАНОВА «ПЕСНЯ ЗОВЕТ»

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Abstract

The article examines the music of the Soviet composer Alexander Zatsepin and the Kazakh director Shaken Aimanov. A historical, musical-ethnographic, art history, musicological analysis of the collaboration was made using the example of the film «The Song is Calling». The methods of work of the co-authors have been transformed in the format of a comedy with elements of a musical, as a vision of the new musical cinema of the late 1950s-1960s of the 20th century.

Аннотация

В статье рассматривается музыка советского композитора Александра Зацепина и казахского режиссера Шакена Айманова. Сделан исторический, музыкально-этнографический, искусствоведческий, музыковедческий анализ совместной работы на примере фильма «Песня зовет». Преобразованы методы работы соавторов в формате комедии с элементами мюзикла как видения нового музыкального кинематографа конца 1950-1960-х годов XX века.

Keywords: *music, song, films, Kazakh cinema, film music, theater director*

Ключевые слова: *музыка, песня, фильм, казахстанское кино, киномузыка, театральный режиссер.*

Введение

Развитие казахстанского кинематографа в постсоветском пространстве невозможно без национального самосознания. Советский Казахстан в рамках социалистической и коммунистической идеологии не стал исключением.

Выдающийся казахский режиссер, актер, народный артист СССР Шакен Айманов (1914-1970 гг.) в 30-е годы XX века впервые в своем творчестве заявил о традициях казахского народа, самобытности культурного наследия, традиции и новаторстве. А.Е. Кожабергенова в статье «Развитие национального кинематографа в Казахстане: историография проблемы» дает классификацию, отмечая три среза историографии и самым первым выделяет советский период 1930-1991 годы. Целью работы является рассмотреть музыковедческий и искусствоведческий анализ музыки Александра Зацепина к фильму Ш. Айманова «Песня зовет».

Основная часть

Для Шакена Кенжетеавича поиском нового, яркого, индивидуального и творческого почерка стала любовь к национальным корням. Рожденный в Баянаульском ауле в семье крестьянина-скотовода он впитал с детских лет дух свободы родного края. Исследователь С.Б. Жолдасбекұлы (2001г), изучив архивные данные, отмечает, что в 1928 году артист окончивает школу, а с 1931-1933 проходит обучение в педагогическом техникуме города Семипалатинск. В 1933 году по приглашению советского писателя, драматурга и общественного деятеля Г.М. Мусрепова (1902-1985 гг) зачислен в труппу Казахского драматического театра в городе Алма-Ате на главные роли в спектаклях. Прирожденный острый ум, тонкий юмор, смекалка помогают раскрыть в нем талант актера и не только. С 1947 по 1953гг его назначают главным режиссером и художественным руководителем этого же театра.

С 1954 года Шакен Айманов работает в кино. Такой выбор он сделал еще в 1938 году, когда подрабатывал актером. На вопрос почему все же отдается им предпочтение кинематографу, он ответил: « в театре смотрят спектакль несколько сот человек, если даже он идет в нескольких театрах, а вот фильм – тысячи!».

Работая с казахстанскими драматургами и писателями Г.М. Мусреповым, М.О. Ауэзовым, И.Ж. Жунсугуровым, А. А. Абишевым, Х.Ш. Хусаиновым и другими он воплотил яркие образы национальных героев Ахана-Сере, в «Кызы-Корпеш и Актоқты», Кодара в «Козы-Корпеш и Баян сулу», Кобланды «Каракипчак Кобланды», Керима «Абай», Исатая «Исатай и Махамбет», Алдара-Косе «Алдара-Косе», Фогель «Гвардия Чести» и другие.

Шакена Айманов в 40-е и 50-е годы XX века проявляет себя как режиссер на Казахфильме. В это время в свет выходят художественные полнометражные фильмы: «Амангельды» (1945г), «Дружба и любовь» (1947 г), «Поединок» (1948г), «Таланты и поклонники» (1949г), «Абай» (1949г), «Дочь степей» (1954г), «Здесь мы живем» (1956г), «Наш милый доктор» (1957г) «Шквал» (1959) и другие.

Одной из главных задач режиссер видит в освещении жизни «простых людей»: сельчан, трактористов, пастухов, доярок, молодого поколения. Показывает их стремление жить лучше. Поэтому мотивы фильмов понятны и близки зрительской аудитории. Казахский народ богат песнями. Согласно режиссерской традиции были включены в фильмы народные и авторские песни, а также инструментальные выступления с казахскими народными инструментами.

Долгие годы Шакен Айманов продолжал творческий союз с советским композитором Александром Зацепиным (1926г), автором многочисленных хитов кинематографа (член союза кинематографистов (1957г), членом союза композиторов (1956г), членом Национальной академии кинематографистов и науки РФ (2002г), народным артист Российской Федерации (2003г).

Выбор пал не случайно. Сам Александр Зацепин пишет музыку современную, легкую, понятную зрителям (сказался опыт работы с режиссером А. Гайдаем). Мастер легкого юмора, гротеска, умеющий подчеркнуть и дополнить образный ряд героев. С 1956 года создает совместные киноленты с Шакеном Кенжетеавичем такие как «Шквал» (1958г), «Дорога Жизни» (1959г), «Мы здесь живем» (1956г) и другие.

Фильм «Песня зовет» (1961г) режиссёра Шакена Айманова является важным произведением казахстанского кинематографа, который отражает казахские мотивы, культуру и историю. Музыка и песни являются неотъемлемой частью казахской культуры, в фильме занимают важное место.

В рамках «оттепели» 50-х-60-х годов XX века свобода мысли и отход от «штампов» политической направленности дает возможность максимально творчески подходить к тематике и сюжетности музыкального оформления. Также появилась возможность пересмотреть жанрово-стилистическую концепцию музыки, находить новые решения и ставить более интересные задачи. Так фильм «Песня зовет» содержит яркое музыкальное оформление, включающее, вероятно слияние нескольких жанров, таких как мюзикл и музыкальный спектакль. Это проявляется в следующем. Во-первых, саундтрек фильма сразу вводит в атмосферу географического действия фильм через лейтмотив народной песни «Наз коныр». Во-вторых, каждый главный и второстепенный герой, персонаж, наделены своим музыкальным номером (песней, танцем, выступлением). В-третьих, в живом отклике присутствуют фольклорные темы (качание на качелях (Наурыз), танец джигитов (Байга), а также элементы буффонных, маскарадно-ряженных персонажей (в стиле средневекового театра масок д-лярте «Сцена в доме культуре, с переодеваниями»). В-четвертых, весь фильм

пронизан духом становления самостоятельных театров, свободы выбора направления творческой деятельности, что усиливает национальную общезмоциональную и чувственную атмосферу фильма.

Оттенки «оттепели» сказываются на протяжении всего произведения. Мы можем наглядно увидеть зарождение существенных признаков, раскрывающих характер главных героев, судьбы людей, нравственные устои, этнографические принадлежности.

Начинается фильм «Песня зовет» с саундтрека в основу которого положена песня «Назқоңыр» Естая Беркембаева (1874-1946гг), знаменитого казахстанского акына, композитора, заслуженного деятеля искусств КазССР. Выбор этой песни композитора и режиссера неслучайны.

Впервые эту песню записал нотами фольклорист и композитор Г. Мурзагалиев в сборнике «Этносольфеджио». Текст песни рассказывает о молодости, красивой девушке в сравнении с родным краем, «лунными веками, золотыми ресницами, алыми губами». А. Зацепин вкладывает в работу огромный смысл. В полной оркестровке звучит сцена, когда Айгуль-водитель привозит знаменитого артиста Досая Нурланова (исполняет Ермек Серкебаев) на юбилей 75-летнего старца. В этот момент председатель высказывает очень важное наблюдение «...наши люди знают цену песни». Мелодия песни в объеме большой терцдецимы в сочетании сложного четырехдольного и простого двухдольного размеров повествует о размахе бескрайних степных просторов, свободомыслии и красоте. Квартовое движение в восходящем движении в мелодической направленности создает характер взволнованности, трепета, юношеского очарования. Особенно хотело бы подчеркнуть мелодию и текст в припев «Ха-ла-лаку лилай!» дополняющий лирически-романтическое настроение, что представлено на рисунке 1.



**Рисунок №1. – Песня «Назқоңыр» -
оригинальный текст и музыка Естая Беркембаева**

Александр Зацепин нашел оригинальное решение, сделав джазовую обработку песни с хоровым бек вокалом. Он этим самым обогатил форму и содержание музыкального материала. Во многом сам выбор авторов, именно Естай Беркембаева, оправдывает главную идею фильма «Поющий аул», т.к. сам Естай из Актогайского района села Муткенова в 4 км от Павлодара.

«Синий вечер подари» - (музыка А. Зацепина, слова Ю. Полухина и Б. Гайковича) является легкой весенней, романтической песней в которой оживает природа, слышно благоухание разнотравья, в воздухе слышны тонкие нотки цветущей акации, ранней зорьки на рассвете. Все это в гармоничном сочетании мелодии текста. Композитор нашел очень интересное мелодическое и гармоническое решение. В мелодии нисходящие секвенции в шаге секунды выстраиваются в три звена, образуя повторность мелодии на другой высоте. Первые аккорды вступления сразу обогащают мелодию VI46 II7, II65 VII7, VII7 II7, D7 - преобладают нонаккорды и септаккорды с альтерированными II, VI пониженными ступенями, что придает большие диссонансы и гармонического напряжения. Эти аккорды создают более сложные гармонические отношения и акценты, что делает музыку еще более интересной. В песне есть отклонение в параллельную тональность Ми в мажор. Сама же песня написана в до миноре. Также присутствует нисходящая секвенция.

«Лирическая песня» - (музыка А. Зацепина, слова Ю. Полухина и Б. Гайковича) в исполнении Н. Дорда она выражает глубокие чувства, эмоции и внутренний мир исполнителя. Текст песни очень поэтичный и метафоричный, а музыкальное сопровождение подчеркивает эмоциональную глубину и настроение композиции. Лирические песни часто надолго запоминаются зрителям и помогают понять чувства задуманными композитором, и эта песня стала не исключением.

«Песня лучшая моя» - (музыка А. Зацепина, слова Ю. Полухина и Б. Гайковича) исполняет Е. Серкебаев, а также он играет роль знаменитого певца в данном фильме – Досая Нурланова. Текст песни похож на другую композицию в этом фильме, «Лирическая песня». Он такой же фигуральный, образный и метафоричный. В ней сливаются голос исполнителя, музыка оркестра и смысл текста, делая её по-настоящему неповторимой.

«Я тринадцатая дочь» - (музыка А. Зацепина, слова Ю. Полухина и Б. Гайковича) исполняет Н. Дорда (за кадром). Эта песня по-настоящему вызывает зрительское вовлечение в смысл и текст песни для того что бы погрузить зрителя в атмосферу фильма. В конечном итоге эта песня способна побудить в зрителе любознательность к главному герою.

Заключение

Из выше сказанного, мы можем сделать вывод, заключающийся в следующем:

1. Композитор и режиссер проявили сотрудничество, создав новую музыкальную комедию с элементами мюзикла, в которой музыка обогащает сюжетную линию, есть легкость исполнения песен эстрадного характера, комедийные и лирические песни разноплановы, присутствуют фольклорные элементы, народные песни, танцы.

2. Развитая драматургия фильма и музыкального материала объединила сольные и ансамблевые номера в единый ансамбль –сюжета и музыкальной драматургии. В ней сплетается романтическая мелодрама, хореографические вставки и комедийные номера. Музыканты (актеры) не только говорят. Они поют, танцуют, активно принимают участие в сюжетном действии фильма.

3. Наличие национального материала позволило обогатить сценический материал, делая его свежим, злободневным, понятным зрителю. Композитор сделал несколько современных аранжировок песни «Назқоныр» эстрадно-джазовой обработке в начале фильма как саундтрек и в исполнении концертном номере главного героя Досая Нурланова для юбиляра в качестве подарка;

4. Жанровая и стилистическая подача музыкального материала воссоздала разносторонние неповторимые образы, действующих персонажей;

5. Общая атмосфера фильма направлена на вопросы «оттепели». Обращена на проблемы быта трудящихся и сельчан. Поднимаются темы целинных земель, вопросы молодежи на селе, трудовой молодежи обучающихся в профтехучилищах и институтах.

6. Тема создания «народных самодеятельных театров», «самодеятельных оркестров различных инструментов», «хоровых коллективов», «народных вокальных ансамблей» по всей стране в конце 50-х начале 60-х годов XX века стояла остро.

7. Поиск народных талантов дал свои результаты, На эстраду страны вышли новые имена исполнителей таких как Роза Багланова, Бибигуль Тулегенова, Ермек Серкебаев, Куляш Байсеитова, Шахмардан Абилов, Алибек Днишев и другие.

8. В музыкальной комедии «Песня Зовет» стилистические концепции замысла режиссера и композитора были ярко выражены а именно: Ш. Айманов стремился создать яркое и позитивное представление о жизни, используя легкий и развлекательный стиль. А. Зацепин в своей музыке сочел нововведение и элементы национальных песен, что подчеркивало динамичность сюжета и добавляло музыкальную экспрессию.

В заключение хотелось бы добавить, что объединение стилистических концепций, жанровой свободы режиссера Шакена Айманова и композитора Александра Зацепина позволило создать запоминающуюся и радостную атмосферу, характерную для музыкальных комедий того времени.

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CONCERT PERFORMANCE AND ITS SIGNIFICANCE**Kadirbekov K.***Teacher, Master of Arts,
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Almaty, Republic of Kazakhstan***КОНЦЕРТНО-ИСПОЛНИТЕЛЬСКАЯ ДЕЯТЕЛЬНОСТЬ И ЕЁ ЗНАЧЕНИЕ****Кадирбеков К.***Преподаватель, магистр искусствоведческих наук
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The concert and performance activities of the choir should be planned. The number of concert performances of the band is determined by its artistic and creative capabilities, the level of performing skills, the quality and quantity of the prepared repertoire. You can not perform on a concert stage with unfinished or poorly sung works. A small number of concert intros is just as bad as too many. Practice shows that a trained amateur choir should perform no more than 10-12 times a year.

Аннотация

Концертно-исполнительскую деятельность хора следует планировать. Количество концертных выступлений коллектива определяется его художественно-творческими возможностями, уровнем исполнительского мастерства, качеством и количеством подготовленного репертуара. Нельзя выступать на концертной эстраде с недоученными или плохо впетыми произведениями. Малое количество концертных вступлений так же плохо, как и слишком большое. Практика показывает, что подготовленный самодеятельный хор должен выступить не более 10-12 раз в год.

Keywords: *choir, organization, pedagogy***Ключевые слова:** *хор, организация, педагогика*

Концертно-исполнительская деятельность – важнейшая часть творческой работы хорового коллектива. Она является логическим завершением всех репетиционных и педагогических процессов. Публичное выступление хорового коллектива на концертной эстраде вызывает

у исполнителей особое психологическое состояние, определяющееся эмоциональной приподнятостью, взволнованностью. Самодеятельные артисты испытывают подлинную радость от соприкосновения с миром художественных образов, интерпретаторами которых они являются. Творческий контакт со слушательской аудиторией имеет очень большое значение для артистов хора.

Каждое концертное выступление хора должно быть тщательно подготовлено. Плохо подготовленное выступление хора, малое количество слушателей в концертном зале порождает разочарование участников хора, неудовлетворенность деятельностью хорового коллектива. Неудачное выступление хора приносит глубокие переживания его участникам, а иногда приводит и к распаду коллектива.

Концертно-исполнительская деятельность хора является одним из активных средств музыкально-эстетического воспитания широкой слушательской аудитории, поэтому очень важно, чтобы во время концерта хора концертный зал не пустовал. Для этого следует проводить большую организационную работу. Распространение билетов, организация рекламы концертных выступлений - важнейшая часть работы совета хора. Этому должен уделять большое внимание и руководитель хора.

Виды и особенности концертных выступлений

Виды концертных выступлений хорового коллектива могут быть различными как по объему выступления, так и по содержанию концерта. Наиболее распространенным видом выступления хора является участие его в сводкой концерте наряду с другими творческими силами, когда хор исполняет 2-3 произведения. В таких концертах выбор репертуара обычно определяется творческим замыслом режиссера. Часто сборные концерты посвящаются какому-то событию и имеют театрализованную направленность. Руководителю хора нужно добиваться того, чтобы репертуар хора в таких концертах не был одноплановым. Элемент контрастности репертуара должен всегда присутствовать в концертных выступлениях.

Нередко хору приходится участвовать в концертах-лекциях, концертах-встречах, в которых главным действующим лицом является лектор или тот, с кем встречаются в зале. В таких выступлениях хору также важно иметь успех, свое творческое лицо.

Самым сложным видом концертного выступления является самостоятельный концерт хора в одном или двух отделениях. Концерт в одном отделении обычно длится до одного часа. Когда концерт состоит из двух отделений, то каждое отделение обычно занимает 30-40 минут. В самостоятельном концерте хор исполняет 20-25 произведений. Концертная программа должна быть разнообразной. Это достигается подбором разноплановых произведений контрастных художественным образом, характеру музыкального материала, стилю изложения и т.д. Концертная программа может быть построена или в хронологической последовательности, или по жанрам, или по стилистической принадлежности составляющих ее произведений. Руководитель хора при составлении программы должен иметь в виду, что интересу слушателей к выступлению хора должен возрастать к финалу концерта. Сверх объявленной программы хору следует иметь одно-два произведения, которые могут быть исполнены по настоятельным просьбам слушателей в конце концерта. Особенно понравившееся слушателям произведение из концертной программы (продолжительные аплодисменты, скандирование "бис") можно повторить в том случае, если дирижер уверен, что при повторении оно прозвучит не хуже первого исполнения.

Поведение дирижера хора на сцене, его артистичность, обаяние в значительной степени влияет на успех концерта.

За 10-15 минут до выхода на сцену желательно провести стоя, в концертных костюмах короткую 5-7-минутную настройку хора, во время которой следует спеть одно-два упражнения, настраивающие хор на начало концерта, а главное, сосредоточить внимание коллектива к выходу на сцену, снять излишнее напряжение, естественно возникающее у певцов перед началом концерта.

Концертно-исполнительскую деятельность хора следует планировать. Количество концертных выступлений коллектива определяется его художественно-творческими возможностями, уровнем исполнительского мастерства, качеством и количеством подготовленного репертуара. Нельзя выступать на концертной эстраде с недоученными или плохо впетыми произведениями. Малое количество концертных выступлений так же плохо, как и слишком большое. Практика показывает, что подготовленный самодеятельный хор должен выступать не более 10-12 раз в год.

Каждое концертное выступление хора должно анализироваться, обсуждаться с хоровым коллективом. Следует отмечать положительные стороны, обращать внимание на недостатки с целью их устранения в дальнейшей концертно-исполнительской деятельности.

Работа дирижера самодеятельного академического хора сложна и многогранна. Руководитель хора должен быть не только высококвалифицированным, одаренным хормейстером и дирижёром, но и умелым, талантливым педагогом, организатором и воспитателем. В противном случае он не добьется ощутимых художественных результатов, если не сумеет создать дружный, увлеченный коллектив единомышленников, для которых хоровое пение является важной духовной потребностью.

Главной особенностью работы с самодеятельным хоровым коллективом является творческий процесс, прочно взаимосвязанный процессами обучения, воспитания и организации. В этом разрезе педагогическую и психологическую образованность руководителя самодеятельного хора невозможно переоценить.

Нынешний этап развития самодеятельного хорового искусства переживает серьёзный кризис по трём основным направлениям - экономический, социальный и в определённой степени духовный. В этой ситуации проверяются на прочность не только профессиональные качества

руководителя, но и его, прежде всего, педагогическое умение организовать коллектив, вывести его на должный исполнительский уровень и удержать от распада. И чтобы при этом не пострадало творчество.

Всё это представляет собой проблемы прежде всего педагогического характера - нужно научить людей петь в хоре, понимать, хор, любить хор и, главное, - не предавать хор ни при каких обстоятельствах.

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ORGANIZATION OF REHEARSAL AND TEACHING WORK**Zhaulshakova S.***Teacher, Master of Arts,
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Almaty, Republic of Kazakhstan***ОРГАНИЗАЦИЯ РЕПЕТИЦИОННОЙ И ПЕДАГОГИЧЕСКОЙ РАБОТЫ****Жаулшакова С.***Преподаватель, магистр искусствоведческих наук
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In order to successfully and as soon as possible overcome the gap between some singers and others, a mentoring system is widespread in amateur choirs. One or two novice choir artists are attached to an experienced, musically literate singer. At the rehearsal, they should be located together. Such placement of singers in the choral part creates favorable conditions for the active process of self-learning of the choir members, contributes not only to accelerated study of the repertoire, but, most importantly, to the growth of vocal and choral skills of low-income choir members.

Аннотация

С целью успешного и наиболее скорого преодоления отставания одних певцов от других в самодеятельных хорах распространена система наставничества. К опытному, музыкально грамотному певцу прикрепляются один-два начинающих артистов хора. На репетиции они должны располагаться вместе. Такое размещение певцов в хоровой партии создает благоприятные условия активного процесса самообучения участников хора, способствует не только ускоренному изучению репертуара, но, что особенно важно, росту вокально-хорового мастерства малоопытных участников хора.

Keywords: choir, organization, pedagogy**Ключевые слова:** хор, организация, педагогика**Руководитель хора как генератор традиций**

Важнейшим организационно-педагогическим вопросом в работе хорового коллектива является создание традиций. Без интересных, разнообразных, крепких традиций деятельность самодеятельного хорового коллектива недолговечна.

Главнейшей традицией хорового коллектива должна быть дружба его участников, творческая атмосфера его деятельности. Традиции могут создаваться в различных нормах: организация совместных вечеров отдыха, поездки за город, поздравления с днем рождения участников хора, творческая дружба с самодеятельными и профессиональными хоровыми коллективами, а также с композиторами и известными артистами, поддержание контактов с бывшими участниками хора и т.д.

Организация занятий и методы разучивания репертуара

Самодеятельный хор должен заниматься регулярно в течение 10-11 месяцев в году. Основной вид занятий хора - репетиция. В неделю проводится не менее двух репетиций, каждая по 2-3 часа с 10-15-минутным перерывом. Репетиции проводятся в точно намеченное время, обычно после основной работы участников хора. Нередко выбор времени для репетиций осложняется сменной работой артистов хора. В таком случае одна репетиция в неделю может проводиться разновременно, с учетом сменной работы участников хора, а вторая репетиция обязательно должна проводиться в выходной день, когда артисты хора могут собраться все вместе. Иногда репетиции проводятся в обеденный перерыв или между сменами. Такие репетиции должны быть исключением, так как они изначально обладают невысоким

педагогическим потенциалом могут обеспечить значительного роста исполнительского мастерства хора.

Каждое занятие хора следует четко организовывать и планировать с учетом долговременных творческих задач хорового коллектива.

Педагогическое значение хорового распевания

Репетиция, как правило, начинается с распевания обязательной формы работы самодеятельного хора. В профессиональных хорах распевание может не проводиться, так как артисты-профессионалы должны являться на работу уже в распетом (рабочем) состоянии. В самодеятельных хорах это исключено.

Распевание может проводиться одновременно со всем хором, по группам (женская, мужская), по хоровым партиям. Распевание, проводимое со всем хором, способствует организации начала занятий. Однако для достижения прочных вокальных навыков целесообразно проводить распевание по партиям или группам, в процессе распевания, которое обычно длится 10-20 минут, артисты хора помимо разогревания голосового аппарата совершенствуют певческие навыки. Следовательно, распевание преследует три основные задачи: разогревание голосового аппарата, психологический настрой для вокально-хоровой работы и совершенствование певческих приемов и навыков.

Начинать распевание целесообразно в среднем отрезке диапазона каждой хоровой партии. Немаловажно учитывать структуру упражнений, особенно в начале распевания.

Нецелесообразно начинать распевание в очень медленном или быстром темпе. Упражнения в быстрых и медленных темпах необходимы только после того, когда певцы уже приведут голоса в рабочее состояние и смогут заниматься совершенствованием певческих навыков.

Вариантов упражнений может быть много. Руководитель хора должен уметь подобрать для конкретного состава хора и решения конкретных педагогических задач те или иные упражнения.

Необходимо, чтобы упражнения носили стабильный характер, так как положительный результат возникает только при многократном повторении одних и тех же попевок. Прочные навыки вырабатываются в результате длительных и систематических тренировок.

Упражнения для распевания должны быть несложными для восприятия, удобными для усвоения, лаконичными, предельно ясными и целенаправленными.

Подбор упражнений, интенсивность распевания определяются следующим: происходит ли распевание перед выступлением хора или оно -- часть очередной репетиции. Если распевание предшествует концертному выступлению хора, то имеет большое значение объем выступления: несколько произведений, отделение или целый концерт. Чем короче выступление, тем значительнее должно быть распевание. Недостаточная распетость хора отрицательно сказывается на качестве исполнения. Не следует проводить длительное, напряженное распевание перед концертом хора в двух или одном большом отделении, так как большая певческая нагрузка артистов хора во время распевания может утомить их и привести к потере певческой формы в процессе концерта.

Освоение руководителем методики и практики распевания необходимо для правильной организации певческого воспитания хорового коллектива.

Разучивание репертуара. Психолого-педагогические особенности

Основное репетиционное время отводится работе над репертуаром. Репетиции условно можно подразделить на две группы: рабочие репетиции и репетиции перед концертом. Две-три репетиции перед концертом хора должны включать, главным образом, репертуар, который будет исполнен в концерте. Если выступление хора состоит всего из двух-трех произведений, то непосредственная репетиционная подготовка к выступлению может быть сокращена. Следует выделить репетицию в день концерта. Помимо распевания в нее включается повторение наиболее сложных фрагментов из исполняемого в концерте репертуара. Не следует стремиться пропевать все произведения полностью. По времени репетиция в день концерта не должна превышать один-полтора часа.

Методы организации рабочей репетиции хора во многом определяются уровнем исполнительского мастерства и музыкальной грамотности участников хора. Чем выше этот уровень, тем меньше времени можно отводить на репетиции по хоровым партиям. Низкий уровень исполнительского мастерства хорового коллектива требует не только больше

времени отводить занятиям по хоровым партиям, но и организовывать занятия с отдельными певцами хора.

Организация рабочей репетиции определяется степенью сложности репертуара, состоянием его освоения на данный момент.

Рабочую репетицию самодеятельного хора целесообразно проводить, используя разнообразные формы ее организации (по партиям, группам, совместно). Разнообразные формы оживляют содержание работы, вызывая меньшую утомляемость участников хора. Наиболее целесообразно первую половину репетиции (один-полтора часа) заниматься по партиям или группам хора, а после перерыва предпочтительна общая репетиция, когда произведения, включенные в репертуар хора, находятся на разной стадии освоения. На общей репетиции следует работать над произведениями, уже прошедшими стадию разучивания по партиям или группам хора. Группы хора могут состоять из различных партий. Разделение хора на группы определяется спецификой фактуры изучаемых произведений.

Помимо организации занятий качество репетиционной работы с хором зависит от правильного выбора методов разучивания произведения. Детальная их разработка определяется хормейстером в процессе подготовительного этапа работы над произведением и составления тщательного и хорошо продуманного плана работы. "Дирижер должен прежде всего усвоить простую истину, пишет - П.Г.Чесноков в своём бестселлере **"Хор и управление им"** - ...нельзя учить других тому, чего сам не знаешь. Самое подробное и глубокое предварительное изучение сочинения составляет долг дирижера".

Начинать работу над новым произведением целесообразно с общего знакомства с ним артистов хора. Формы знакомства с новым произведением могут, быть разными: можно сыграть произведение на фортепиано, прослушать его в записи. Следует рассказать о его художественных достоинствах, кратко остановившись на тех или иных вокально-хоровых сложностях, которые придется преодолевать хору в процессе его разучивания.

Главное – заинтересовать участников хора новой работой.

Методы работы над репертуаром - повторение, вычленение, сопоставление отдельных частей и всего произведения.

План работы хормейстера над каждым произведением включает в себя ближайшие задачи, касающиеся очередной репетиции, и хорошо продуманную систему различных этапов работы над каждым произведением репертуара хора вплоть до полного его освоения. Художественному совершенствованию исполнительского процесса не бывает предела, но сроки разучивания каждого произведения должны иметь определенные границы. Для разучивания произведение следует разделить на несколько частей. Очередность их разучивания может быть различной. Не обязательно начинать работать над произведением с его начала. Обычно на репетиции разучивается несколько произведений, каждое из которых находится, как правило, в разной стадии освоения, это объясняется различной сложностью произведений, неодновременностью включения их в репетиционный процесс. Поэтому на каждой репетиции должен решаться широкий круг учебно-методических задач. Не следует на одной репетиции заниматься только самыми сложными задачами в работе над репертуаром, а на другой наиболее простыми. Каждая рабочая репетиция должна быть насыщена творческими задачами и носить разнообразный характер их решения.

Руководителю хора следует помнить, что педагогические аспекты в работе над репертуаром не следует отрывать от художественно-выразительного начала. На начальной стадии освоения произведения преобладают педагогический и технологический процессы, на заключительной – процесс художественно-выразительный. На любом этапе работы над произведением хормейстер должен ясно и четко формулировать задачи, стоящие перед хором. Нельзя повторять с хором отдельный эпизод или произведение в целом, не объяснив коллективу, какие цели и задачи решаются в процессе этого повторения.

Каждое разученное произведение с хором должно пройти стадию впеваания процесс прочного закрепления вокально – хоровых навыков и приемов, приобретенных за время разучивания этого произведения. Ощущение хормейстером степени впеваания произведения достигается опытом работы с хором.

"Педагогика сотрудничества"

Репетировать с хоровым коллективом нужно интенсивно, эмоционально, энергично, но не суетливо, чётко реагируя на реакцию хора. Хормейстер, работая с самодеятельным хором,

обязан всегда помнить, что он занимается с людьми, добровольно и бескорыстно отдающими свое время любимому искусству.

В работе с хором недопустима грубость, раздражительность, невыдержанность. Наряду с требовательностью к коллективу хормейстеру нужно уметь доброй шуткой, мягким юмором смягчить порой напряженную репетиционную работу хорового коллектива. Один из популярных принципов декларации статуса руководителя самодеятельного хора - "Старший среди равных".

При этом в деятельности хора должна доминировать аксиома – и дирижёр и артисты хора делают одно дело, все заинтересованы сделать его хорошо.

Психолого-педагогические особенности расположения хора

Успешная творческая деятельность хора во многом зависит от правильного расположения его участника на репетициях и концертной эстраде.

В самодеятельных хорах участвуют певцы, имеющие не только различные вокальные данные, но и неодинаковую музыкальную подготовку и опыт пения в хоре. Помимо этого они различаются по возрасту, образованию, роду основной трудовой деятельности, коммуникабельности, психологической адаптивности и культурному уровню. Успех репетиционной работы хорового коллектива определяется не только вокально-хоровым мастерством его участников, но и психологической атмосферой в хоровом коллективе. Особенно это относится к артистам хора, находящимся на репетиции и концертной эстраде рядом друг с другом. Они в первую очередь должны ощущать дружескую эманацию внутри хоровой партии. Это необходимо учитывать руководителю хора при расположении певцов внутри каждой хоровой партии. Непонимание руководителем исключительной важности этого аспекта приносит коллективу множество неприятностей. При нахождении хотя бы пары певцов в отношении конфликта руководителю следует принять все меры для его погашения или вынесения за пределы хорового коллектива. Если в данный момент времени это не представляется возможным, то в процессе репетиции или концерта конфликтующие певцы не должны располагаться в зоне "личного пространства" друг друга. "Собака не виновата, что она собака. Кошка не виновата, что она кошка. Просто не следует сажать их в один ящик", - пишет Роберт Шоу в своей педагогической монографии **"Хор. Маленькие инструкции"**. Безусловно, maestro утрирует, но в этом высказывании заложен один из принципов, которым должен руководствоваться руководитель самодеятельного хора в подобных ситуациях.

Кроме психологического аспекта, при взаимном размещении артистов хора нужно руководствоваться их вокальными данными.

Голоса рядом находящихся певцов должны быть предельно органичны между собой по тембру и силе. При расположении певцов в хоровой партии следует учитывать не только вокально-хоровые умения и навыки, но и музыкальную грамотность участников хора.

Хороший результат, получается, когда вместе собрана группа певцов с хорошими певческими и хоровыми навыками, но при этом не должны быть изолированы и начинающие, малоопытные артисты хора.

С целью успешного и наиболее скорого преодоления отставания одних певцов от других в самодеятельных хорах распространена система наставничества. К опытному, музыкально грамотному певцу прикрепляются один-два начинающих артистов хора. На репетиции они должны располагаться вместе. Такое размещение певцов в хоровой партии создает благоприятные условия активного процесса самообучения участников хора, способствует не только ускоренному изучению репертуара, но, что особенно важно, росту вокально-хорового мастерства малоопытных участников хора.

В начинающих хорах случается так, что опытных певцов очень мало или их нет совсем. В этих случаях следует наиболее способных, голосистых певцов располагать вместе, учитывая и их товарищеские интересы. Это будет способствовать быстрому созданию прочной основы хора.

Нередко новичков, пришедших в опытный хоровой коллектив, располагают с краю, с тем, чтобы в первое время они, находясь в хоре, больше вслушивались в пение своих опытных товарищей и постепенно входили в исполнительский процесс.

Необходимо, чтобы участники хора располагались на репетициях и концертной эстраде в строго определенном руководителем хора порядке. Все перемещения певцов осуществляются только с разрешения и по указанию руководителя хора.

На концертной эстраде следует вместе располагать артистов, хорошо спевшихся друге другом в процессе репетиций. Наиболее квалифицированные певцы с хорошими вокальными данными размещаются в центре хорового коллектива.

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Biological sciences

THEORETICAL BASIS OF APPLICATION OF GENOMIC TECHNOLOGIES FOR GENETIC MAPPING OF APPLIED WHEAT BREEDING

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Abstract

A big problem in modern wheat breeding is the decrease in the genetic diversity of wheat, which is primarily due to the limited number of varieties used in pedigrees. As a result of the depletion of the genetic pool of wheat, its resistance to phytopathogens is overcome, which generally reduces the stability of agrophytocenosis. One of the ways to expand the genetic diversity of wheat is the transfer to its genome of genes of economically valuable traits from closely related genera and species combined into three genetic pool: primary (varieties of durum and soft wheat), secondary (various types *Triticum* and *Aegilops*), tertiary (the most remote species of *Triticeae*).

The review pays special attention to amphidiploids, namely wheat-wheatgrass hybrids (PPGs), combining the wheat genome and the whole or part of the wheatgrass genome. The role of PPG in wheat breeding is considered both as an independent object of cultivation and as a "breeding bridge", that is, an intermediate stage in the transfer of genes from wheatgrass to wheat. The transfer of large fragments of chromatin carrying the target gene is often associated with the additional transfer of "genetic debris", that is, genes of wild relatives that reduce the quantity and worsen the quality the final product of wheat. In this regard, introgressive wheat lines are considered the most valuable forms, in which there is a small insert of chromatin of a foreign genome carrying a useful gene.

Keywords: wheat, genes, distant hybridization, wheatgrass, wheatgrass hybrids, *Thinopyrum*, *Dasypyrum*, *Pseudoroegneria*, *Elymus*, *Agropyron*.

Introduction

Hexaploid wheat as a species arose after the second allopolyploidization 8-10 thousand years ago, its cultivation took place in the area. The Fertile Crescent in the territory of modern southeastern Turkey. Further, wheat followed the paths of human migration both to the west, to Europe, and to the east, to Asia, and finally to America and Australia. As a result, local varieties adapted to local cultivation conditions have emerged [1]. Ancient wheat varieties (landraces) are always

It was characterized by genetic heterogeneity and heterogeneity. Due to this, cultivar populations have greater environmental stability and plasticity and respond more flexibly to fluctuations in weather and climatic conditions [2]. In such cultivar populations from homozygous lines, the population structure most often changes over time, but provides resistance to biotic and abiotic stresses [3]. Since 1970 the beginning of the active stage of the Green Revolution, and to date, there has been an active substitution of local varieties with commercial genetically homogeneous varieties suitable for high-intensity agricultural technologies, as a result of which the gene pool has been depleted and allelic diversity has decreased [4]. To describe the consequences of this human activity, leading to a decrease in genetic diversity.

In the early 1970s, the term "genetic erosion" was proposed. Later, the term was adapted in the Russian scientific community both in literal translation and in the formulation "erosion of the gene pool".

Reducing genetic diversity is a global problem affecting most cultivated plants, but with regard to wheat as the most consumed global crop (area of crops in 2017 218 million hectares, harvest 772 million tons, 15% of all calories consumed by the world's population). These processes are the most extensive — 65-84% relative to wild ancestral forms. The depletion of genetic diversity is primarily due to the wide spread of similar varieties with overlapping pedigrees, which were selected mainly for yield. The situation is aggravated by global climate change, urbanization, plowing of new lands, fires, and military

operations; these factors lead to the loss of local varieties, as well as a reduction in the natural range of wild wheat relatives, which could also be used to increase its genetic diversity [5]. As a result, more aggressive races of phytopathogens arise, outbreaks of epiphytotics are recorded, the stability of agroecosystems decreases, and the dependence of agriculture on chemicalization increases.

The main sources of increasing the genetic diversity of wheat are represented by three pools: primary (represented by local and ancient varieties and variety populations — landraces); secondary (other species of *Triticum*) and tertiary (other genera — *Secale*, *Aegilops*, *Thinopyrum*, etc.). In the 1970s, a group of varieties with a different than that of ancient and local varieties, genetic diversity, which is associated with the introgression of foreign genetic material into the wheat genome

from its relatives, primarily rye, during distant hybridization (1). Currently, alleles from 50 species representing 13 genera are known to be transferred to the wheat genome (23). Among the donors of genes of economically valuable traits in the tertiary genetic pool, perennial cereals occupy a special place, in particular such well-known and well-established species as middle wheatgrass and Pontic wheatgrass[6].

As a result of crosses of wheat and perennial cereals, the following types of breeding material can be obtained: amphiploids, the hereditary material of which includes the complete genome of wheat and the complete (in the case of a diploid species) or partial (in a polyploidy species) genome of wild grain; supplemented lines (in them the complete genome of wheat is combined with a pair of supplemented chromosomes of wild replaced lines (their chromosome set is formed by the complete wheat gene, with the exception of one pair of chromosomes replaced by chromosomes of wild grain); translocated lines (wheat lines, one or more chromosomes of which carry translocations); introgressive lines (one or more chromosomes carry introgressions — small inserts of chromatin of wild grain into wheat chromosomes)[7].

The so-called "genetic debris" is a big problem in transferring beneficial genes to the wheat: in the chromatin region a wild relative embedded in the wheat chromosome, in addition to the target gene, there may be genes that worsen the final product quality. Unnecessary chromatin fragments are removed by chromosomal engineering using spontaneous translocations, radiation exposure, tissue culture and induced recombination[8].

Representatives of the genus *Agropyron* originally grew in the steppes

of the European part of Russia and in southeastern Siberia, and may also have been cultivated in the Volga region east of Saratov. This genus is represented by 10-15 species, of which *A. cristatum* and *A. fragilie* are introduced and grown in North America, and five species live in China. The most characteristic representative of this genus is the tertaploid form of *A. cristatum*, which grows in Central Europe and Central Asia, in Central Asia and Siberia, China and Mongolia, in the same place as the rarer diploid forms; hexaploids are found in Turkey, Iran and Kazakhstan. On the basis of supplemented and replaced lines, using gametocidal chromosomes, radiation exposure, and other methods, separate segments carrying genes for resistance to powdery mildew and leaf rust (chromosome 2P) were transferred to wheat chromosomes; genes that increase productive bushiness and the number of grains in the ear, and genes for resistance to leaf rust and powdery mildew (chromosome 6P) (139-142); genes that increase drought resistance and weight of 1000 grains (chromosome 7P). Thus, in addition to resistance genes, the comb granary carries genes and QTL (quantitative trait loci), which positively affect the elements of the crop structure[9].

The genus *Elymus* is represented by more than 200 exclusively polyploid species combining the genomes of St, H, Y, P, and W (24, 35). In the offspring from crosses and backcrosses of the allohexaploid apomictic species *E. rectisetus* with soft wheat, a line was obtained, disomically supplemented with chromosome 1Y, which is characterized by moderate resistance to helminthosporiosis and septoria, and the addition of chromosomes of the 2nd and 5th homeological groups provided good resistance to ear fusarium. *Tsukushiensis*, which became a gene donor *Fhb6* (chromosome 1Ets#1S), transferred to wheat chromosome 1AS, and *E. repens*, with the participation of whose chromatin various introgressive fusarium-resistant wheat lines were obtained, also serve as sources of resistance to fusarium. *E. trachycaulis* was a donor of the soft wheat resistance gene to leaf rust Lr55. Wheat-elimus hybrids based on *E. farctus* have great prospects.

The use of molecular and cytogenetic markers allows targeted introgression of target genes into the wheat genome, thereby greatly facilitating the work of breeders. The data of genome-wide sequencing, which is currently actively developing, and genomic editing technologies will undoubtedly increase the efficiency of using the genetic resources of native species. Many traits were subsequently successfully transferred to the wheat genome directly from wheatgrass or by means of octaploid

amphidiploids into disomically supplemented, disomically substituted and translocated lines of soft wheat, which are resistant to diseases and new protein subunits. It is important to note that even the disomically substituted the forms can eventually become commercially successful varieties; an example of this is the Tulaykovskaya and Belyanka varieties and their derivatives, in which resistance to brown rust is provided by chromosome replacement[10].

The 6D chromosome of wheatgrass of medium 6J of various origins . It has been shown that the genes of economically useful traits are localized on

different chromosomes of wheatgrass, which can be successfully introgressed into the genome of soft wheat through the exchange of sites between chromosomes.

Conclusion

Thus, the successful use of the genetic potential of wild perennial wheat relatives makes it possible to expand its genetic diversity, which is significantly depleted as a result of the limited use of the same varieties in pedigrees. The list of species of perennial wild relatives and useful genes transferred to the wheat genome is certainly not limited to those listed in this review. Our analysis showed that the general trend is the transfer and characterization of genes of wild relatives, which not only increase stability, but also positively affect the elements of the crop structure and the quality of the final product, that is, they clearly improve, and not just do not worsen these characteristics. Molecular and cytogenetic markers, genome-wide sequencing methods and genomic editing technologies will be effective tools for breeders. It is necessary to use all available resources to expand the genetic base of wheat, by attracting both ancient varieties and populations of *Triticum* species to breeding and *Aegilops*, as well as new species and genera of perennial grasses *Triticeae*.

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THE METHODOLOGY OF LABORATORY WORK ON THE HYBRIDOLOGICAL ANALYSIS OF DROSOPHILA SIGNS

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Abstract

The purpose of the laboratory work is to study the heredity of some individual characteristics of drosophila. In the laboratory work, the topics of the interaction of two main allelic, non-allelic genes and inheritance of a trait in combination with gender are considered. Each experience lasts 4 weeks. The results obtained in each group are discussed with the group. The main problems of genetics were also considered at the laboratory session: cytological foundations of heredity, G. Mendel's laws, interactions of allelic genes and non-allelic genes, gender genetics and patterns of inheritance of traits in combination with gender, phenomena of combined inheritance and crossing over, human genetics, fundamentals of molecular genetics, population genetics, ways to solve genetic problems have been developed. This article is about organizing the methodology of laboratory work on the hybridological analysis of drosophila signs.

Keywords: *drosophila signs, hybridological analysis, laboratory work, methodology, gender, genotype*

Introduction

The first practical work. *The subject of genetics and its purpose. Methods of genetic analysis. The main object of the workshop. Genetic symbolism. Laboratory work.*

Stage 1. Studying the inheritance of one pair of wheat traits. The purpose of the practice is to familiarize students with the basics of genetics and methods of genetic analysis, to study the patterns of inheritance through experiments and requirements for objects of genetics. Students are introduced to the protocol of genetic experiments with some approach to the compilation of documents and statistical processing of the data obtained. In addition, one of the main goals of the workshop is to teach students how to solve genetic problems. Genetic analysis is a system of research conducted to study the heredity of a trait and its variability. A key element of genetic analysis is hybridological analysis or the hybridization method. A system of research conducted to study the heredity of genetic traits and their variability. Genetic analysis allows you to determine how many genes control a trait or trait, the interaction of these genes, on which chromosome the genes are installed, the genotype of the studied individuals and the mechanisms of gene interaction. The basis of genetic analysis is hybridological analysis. This basic method in genetics is used by G. Mendel proposed.

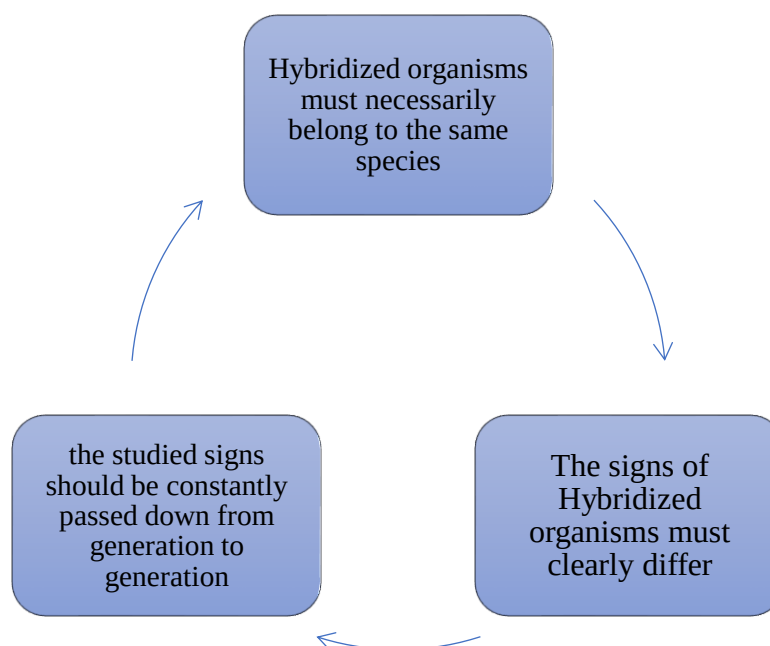


Figure 1: The basic principles of hybridological analysis

Successful application of hybridological analysis is possible only if several conditions are met.

✓ Primary parental forms should be ascertaining (permanent), differing in the characteristics under study.

✓ The purity of the primary parental forms is due to their (34) self-pollination and sorting over generations.

✓ In genetic analysis, the analysis of individual traits of the second (B2) two to three and several generations is carried out (in accordance with the purpose of the study), the essence of which is that, regardless of other traits, there is a discrepancy for each pair of traits.

After determining the genetic structure of each trait, their joint inheritance is studied. Each generation is analyzed for all individuals of the virgin, and the data obtained are processed statistically. The hybridological analysis uses a system of multiple reflections: reciprocal, analytical and hybridization. Such hybridizations include: obtaining the first generation, obtaining the second generation by mutual crossing of males and females of individuals in hybrids of the first generation and hybridization with males according to the primary recessive trait. In reciprocal (reciprocal) hybridization, individuals with a dominant and recessive trait use both females and males. For this, direct and reverse hybridization takes place. The purpose of reciprocal hybridization is to determine whether the trait under study is compatible with autosomal or sex chromosomes. Crossing of heterozygous tadpoles obtained by F1 in hybridization (HC) with the original female individual. DP refers to the offspring obtained by crossing offspring 1. Under hybridization (HT), the analyzer refers to the hybridization of offspring H1 from the primary sign of recite with the male genotype. Here, the B1 generation is due to the heterozygosity of the offspring.

Genetics itself, as an exact science, was associated with the application of the mathematical method in the study of biological patterns. G. Mendel conducted a statistical analysis in determining the results of steam deprivation. Since then, the comparison of experimentally obtained quantitative data with theoretical assumptions has become an integral part of genetic analysis. The mathematical method is widely used in the study of inheritance of quantitative traits, as well as variable variability, especially in the study of non-inherited variable variability. Genetic symbolism. Reflection scheme special symbols of genetics are used to record phenotypes and genotypes of individuals. The letter R stands for male female forms (from Latin. parenta – male female); G – gametes (germ cells); The letter F transmits offspring from a couple (Latin Filia – offspring), and the first, second, third offspring is designated F1 F2 F3, etc. X is a sign of hybridization.

Under the sign ♀ denote the female sex (Sholpan mirror); under the sign ♂ denote the male sex (shield or spear of Mars). We must remember! When solving genetic problems, carrying out hybridization of plants and animals, etc. In individuals, the female sex is designated as male, and the male sex is designated as male. And in humans: in the female field, traits are used in the male sex (I. F. Zhimulev, 2002). Dominant genes are indicated by capital letters of the Latin alphabet, recessive genes are indicated by lowercase letters, allelic genes are indicated by letters with the same name. To record the

phenotype, the phenotypic radical A-, B-, aa, bb, A-B, A-bb, etc. is used. As a favorable object for genetic research – borax, corn, barley, wheat, drosophila, mouse, domestic rabbit; from micro organisms – *Escherichia coli* and hay bacillus, from deaf ears - ascomycetes, unicellular algae *chlamydomana*, etc. Wheat as the main object of research in practical classes in the discipline "Genetics" (*Triticum aestivum* L.) and *Drosophila* (*Drosophila melanogaster*). Wheat is a self-pollinating houseplant and a well-studied preferred genetic object. To determine the types of wheat, such signs as the color of the Ear and wheat grain, grain size, pubescence, etc., used as a genetic analysis, are used. And in genetic research, wild species and mutant lines of the fruit fly, drosophila, are widely used. The object of research used during the experiment is a fruit fly-requirements for drosophila: * the presence of flies with easy-to-observe, clearly visible external signs (body color, wing length, etc.); * a small number of chromosomes, only 4 pairs.

The possibility of obtaining individuals in a short time (every 10 days) and high productivity, which is important in the statistical analysis of the data obtained; • the presence of a clear bifurcation between maternal and male individuals, allowing observation during reflection;

• the favorability of growing a nutrient medium from plant raw materials in laboratory conditions is selected depending on the characteristics.

When labeling mutant lines, lowercase letters of the English alphabet are used. They match or correspond to the first letter of the English name of the mutant lineage. For a short period of time (every 10 days) signs and signs of allelic traits of rich individuals are marked with the symbol +, which is of great importance in the statistical analysis of the data obtained, for example, the white color of the recessive eye of drosophila-w (white – White), the growth of the mutant trait, the eye color of the dominant allele + when reflecting paternity resolves the red motherboard and is indicated by the symbol or w+. The presence of a clear difference between the dominant ribbon-like sexes; the defining mutant gene is selected with the letter B, and the recessive allele + b or B+ medium, which determines the roundness of nutrients obtained from plant raw materials in laboratory conditions in wild flies, is selected depending on the characteristics of the favorable cultivation. indicated by a sign.

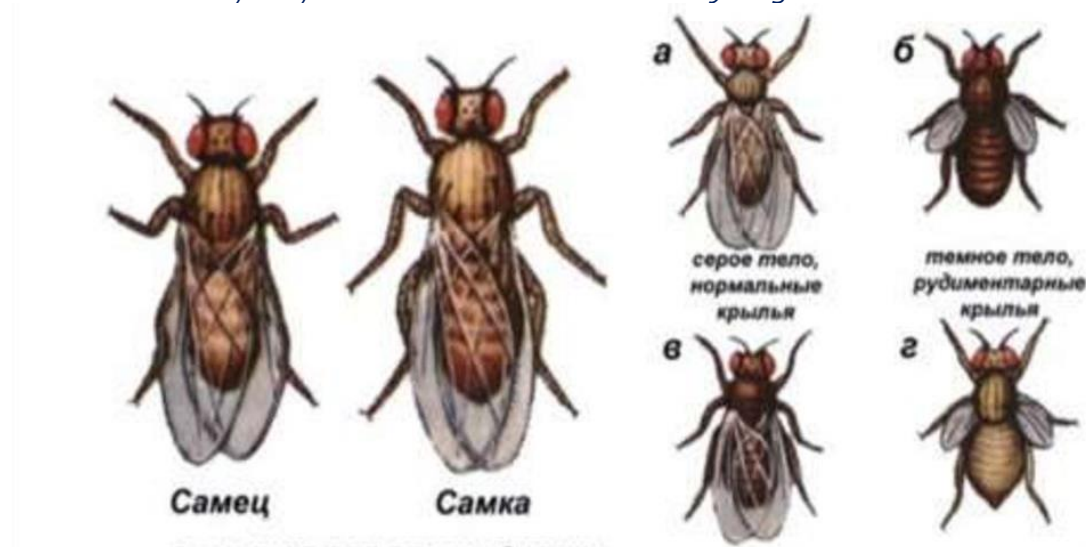


Figure 2. Various hereditary species of drosophila flies

Various hereditary species of drosophila flies: a – male;

A – female (wild B – gray – gray, stocky, with a long wing;

B – gray B - female (porcupines); types);

B long; A-male; stocky wing, wing d-black body,

wing long;wing d – black body, wing B immature; – gray body,

wing immature; - black body, long; g-black body, immature wing

When marking mutant lines, lowercase letters of the English alphabet are used. They correspond to the first letter or several letters of the English name of the mutant line. Allelic features of wild individuals are indicated by the symbol +, for example, the white color of the recessive drosophila eye is indicated by the sign of the mutant w (white – White), and the red color of the eye of the dominant allele is indicated by the symbol + or w+. The dominant ribbon mutant gene defining the eye is denoted by the letter B, and the recessive allele +B or B+ defining the circular eye in the wild fly.

Conclusion

The stage of development of *drosophila* can be divided into several stages: early embryogenesis – time up to 2.5-3 hours after fertilization; late embryogenesis with multiple division of the stage of development of *drosophila*–stage after fertilization: stage before hatching (20-22 hours after fertilization). early embryogenesis is the larval stage up to 2.5–3 hours after fertilization from the moment of hatching of the larva, pupation time; late embryogenesis includes the period after fertilization (120 hours) - interval. The larval stage, in turn, is divided into three stages (from fertilization-the primary stage after (stage I), 20-22 secondary (stage II) after) and tertiary (stage III) from an hour before hatching, the transition from one stage to another is the stage of the molting process; the main larval larval stage of molting occurs under ecdysone control (exchange of cuticle formation and outer coating). Thus, the development of *drosophila* continues for 9 days from fertilization to the transition of the imago from the stage to the second stage before the departure of the main hormone of the molting process. - the duration of the development of external molting (cuticular formation of *drosophila*), occurring under the control of ecdysone.

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Chemical sciences

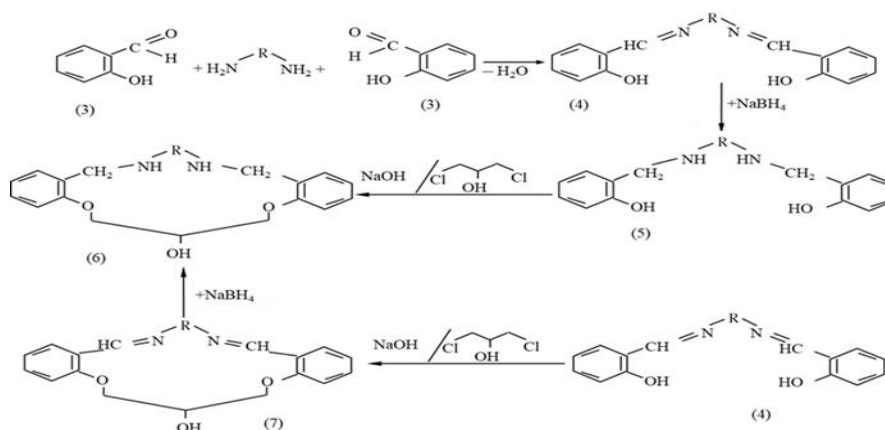
SYNTHESIS AND PROPERTIES OF SUPRAMOLECULAR ENSEMBLES OF FUNCTIONALLY SUBSTITUTED DIAZCROWN ETHERS WITH NANOPARTICLES IRON OXIDE

Leyla Vazirova

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In order to enhance intermolecular interactions, crown compounds with amine, multiple and hydroxyl groups in the macrocyclic ring have been synthesized, which have prospects for application in nanotechnology. It is assumed that the presence of two amine groups and one hydroxyl group in the macrocyclic ring allows the crown ether to transition from a two-dimensional (2D) structure to a three-dimensional (3D) structure.

The synthesis was carried out according to the following methods. 1. The condensation reaction of salicylic aldehyde with organic diamines (ethylenediamine, 1,3-diaminopropane, diethylenetriamine, triethylenetetramine and 1,4,8,11-tetraazaundecane) and subsequent closure of the resulting Schiff base (previously reduced with sodium tetrahydroborate), 1,3-dichloro-2-propanol. When this compound is condensed with diamines in high yield (65–70%), a yellow crystalline compound, bis-phenol (4), is formed. The resulting saturated bis-phenol (5) is converted into a macrocyclic crown compound (6) upon subsequent closure of its phenolate by reaction with 1,3-dichloro-2-propanol in a dilute solution of 1-butanol.



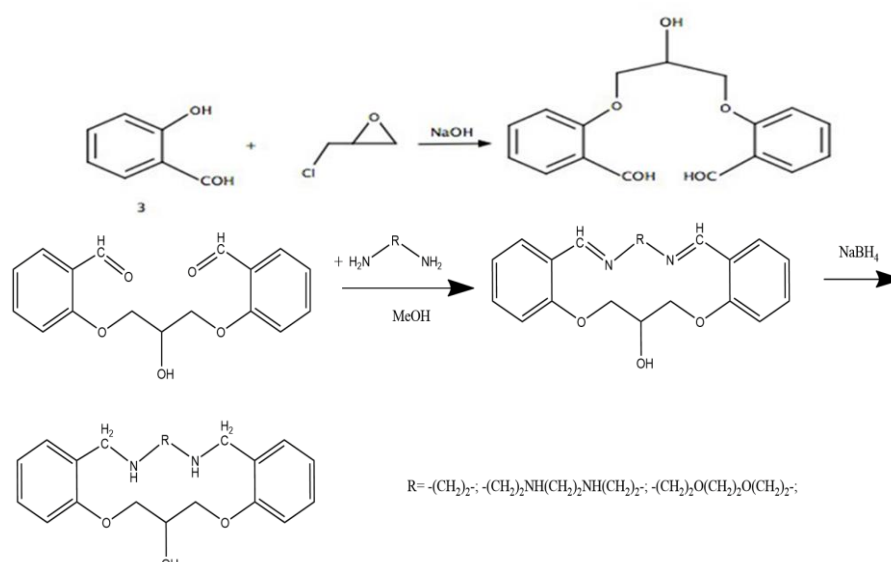
The purity and identity of these compounds were determined by thin layer chromatography (TLC) on a Silufol plate, using a mixture of ethanol and diethyl ether as the eluent.

The structure of the compounds was established based on elemental analysis data, mass and NMR spectroscopy, as well as studying its IR spectrum.

In the IR spectrum of these compounds, absorption bands were detected at 1496 cm⁻¹ and 1499 cm⁻¹, characterizing the presence of two secondary amine groups (–CH₂–NH–C₂H₅–). A wide absorption band at 2994 - 2998 cm⁻¹ corresponds to the benzene rings of the compound. The resulting saturated bis-phenol is converted into a macrocyclic crown compound by first converting it into a phenolate and then closing its phenolate by reaction with 1,3-dichloro-2-propanol in a dilute solution of 1-butanol.

2. Preparation of diazacrowns by the reaction of salicylic aldehyde with epichlorohydrin with further condensation of dialdehyde with organic diamines

To optimize methods for the preparation of hydroxyl-containing diazacrown ethers, counter synthesis reactions were carried out by the reaction of salicylic aldehyde with epichlorohydrin with further condensation of dialdehyde with organic diamines.

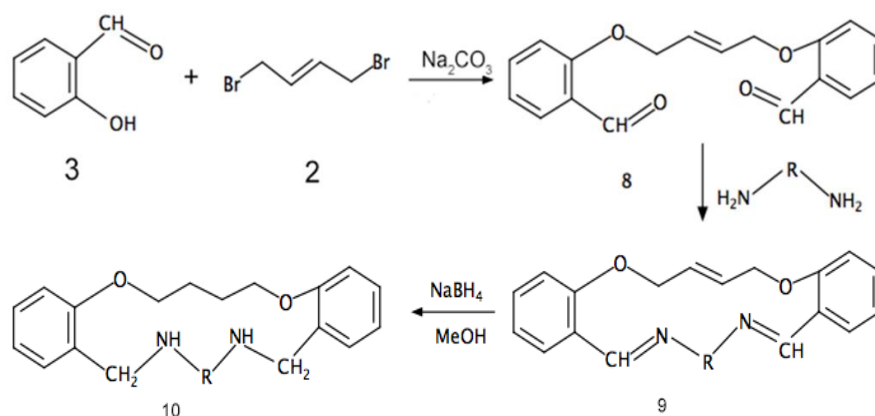


According to this scheme, the reaction of salicylic aldehyde (3) with epichlorohydrin in the presence of NaOH gave 1,3-bis(2-formylphenoxy)-2-propanol. With the previous scheme for the step-by-step production of diacrown ethers, this scheme turned out to be more convenient, since it did not require isolating intermediate reduction products.

The structure of the obtained crown compounds was established on the basis of elemental analysis data, mass and NMR spectroscopy, and the study of their IR spectra.

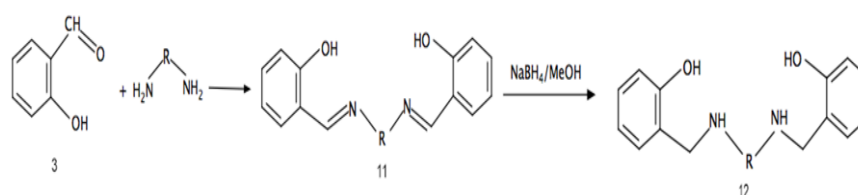
3. Study of the macrocyclization reaction of salicylic aldehyde with 1,4-dibromobutene-2 with further condensation with diamine compounds

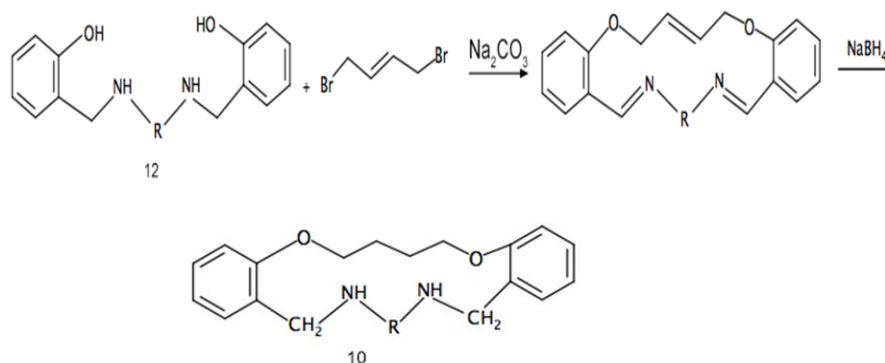
We have synthesized new dibenzoazacrown ethers by the macrocyclization reaction of salicylic aldehyde with 1,4-dibromobutene-2 to form 1,4-bis(2-formylphenoxy)-butene-2, which upon further condensation with diamine compounds, namely ethylene-diamine and triethyltetramine, and subsequent reduction of the corresponding bis-imine derivatives with sodium tetrahydroborate, led to the formation of diazacrown ethers.



$\text{R} = (\text{CH}_2)_2, (\text{CH}_2)_3, (\text{CH}_2)_2\text{NH}(\text{CH}_2)_2, (\text{CH}_2)_2\text{NH}(\text{CH}_2)_2\text{NH}(\text{CH}_2)_2, (\text{CH}_2)_2\text{O}(\text{CH}_2)_2\text{O}(\text{CH}_2)_2$

An alternative synthesis was also carried out in a two-stage method, including in the first stage the condensation of salicylic aldehyde with the corresponding diamines, followed by the reduction of bis-imine derivatives with sodium tetrahydroborate. The second stage of the synthesis was a ring-closing reaction of the corresponding derivative with 1,4-dibromobutene-2, leading to the formation of diazacrown ether.





The structure of the compounds was established based on elemental analysis data, mass and NMR spectroscopy, as well as studying its IR spectrum.

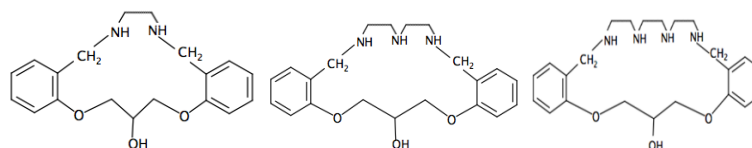
It was found that when carrying out the macrocyclization reaction in a three-component system in one stage, a higher yield (30-35%) was observed, while an alternative two-stage synthesis was noted for a lower yield of the target product (20-25%).

The resulting diazacrown compounds were tested for antimicrobial activity against clinically resistant gram-negative *Klebsiella* spp., *Enterobacteriaceae* and gram-positive *Staphylococcus aureus*. It was found that diazacrown ethers exhibit a significant antimicrobial effect against *Klebsiella* spp., while the effect against *Staphylococcus aureus* was much less pronounced.

Transition metal complexes with synthesized diazacrown ethers

Several transition metal complexes with synthesized diazacrown ethers have been prepared and characterized. Ligands L1, L3 and L4 have four, five and six potential coordinating ring atoms, respectively.

L1 L2 L3



Their complexes with transition metals (Co, Ni, Fe) were prepared by adding the appropriate ligand to the corresponding metal chloride or perchlorate in methanol.

Table 1.

Antimicrobial activity of the complexes against Gram-negative *E. coli* and Gram-positive *Staphylococcus aureus*.

Test culture	Concentration (MG)	CoL1Cl ₂ 3H ₂ O		NiL3Cl ₂ 3H ₂ O	
		Inhibitory zone (mm)		Inhibitory zone (mm)	
<i>St. Aureus</i>	5	24	25	-	-
	2.5	-	-	-	-
<i>E. coli</i>	5	-	-	-	-
	2.5	-	-	-	-

The compounds were tested for antimicrobial activity against Gram-negative *E. coli* and Gram-positive *Staphylococcus aureus* (Table 1).

IR study of the complexes shows that during the formation of complexes, the nitrogen atoms of the macrocyclic ring are coordinated with metal ions. The oxygen atoms of the ring also take part in coordination with metal ions.

Conclusions

1. In order to enhance intermolecular interactions, diaza crown compounds with multiple bonds, amine and hydroxyl groups in the macrocyclic ring were synthesized, which have prospects for application in nanotechnology. The presence of two amine groups and one hydroxyl group in the macrocyclic ring allows the synthesized crown compounds to transition from a two-dimensional (2D) structure to a three-dimensional (3D) one. The structure of the obtained compounds was established by NMR, mass, IR spectroscopic and chromatographic analyzes and counter synthesis.

2. The development of methods and conditions for the preparation of supramolecular assemblies of functionally substituted diazacrown ethers with magnetite nanoparticles, formed due to non-covalent interactions according to the principle of self-assembly and pre-organization, was carried out. The study of the structure, morphology and physicochemical characteristics of the resulting supramolecular assemblies was carried out using modern methods of SEM, X-ray diffraction, EDS, UV and AAS.

3. The quantitative loading of adsorbed molecules of functionally substituted diazacrown ethers on the surface of magnetite nanoparticles was established using optical and atomic adsorption spectroscopy.

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FORMATION OF NANOCOMPOSITES IN THE SYSTEM OF $Ru^{2+}SiO_2$ COMPLEXES**Minira Aghahuseynova**

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The number of macroligand complexes of transition metals and research in the field of chemistry is constantly increasing. In addition to theoretical research, attention is paid to the use of these compounds and the creation of new materials based on them to solve practical problems

Among the transition metals, ruthenium occupies a separate place and is of great interest. It has attracted special attention due to its ability to exhibit different oxidation states and different coordination numbers in complex compounds. Due to this, it is possible to form coordination compounds with different structures during complex formation with macrocyclic ligands. Complex combinations with macromolecular ligands allow not only the application, but also the creation of physico-chemical bases of new technologies and materials as substances having the properties of both metal complexes and macromolecules. The significant advantages of metal complex catalysts are achieved by changing the ligand coverage and increasing the potential for controlling the electrical and optical properties of their catalytic activity.

The analysis of relevant scientific data shows that there are certain gaps in the study of ruthenium nitrogen-containing macroligand compounds available in the literature. This situation played an important role in setting up the present study.

Complex compounds of ruthenium with nitrogen-containing macromolecular organic ligands. The development of new ways of their synthesis, the study of the coordination type of various ligands, the dentate structure of ligands, and their physico-chemical properties. Detailed physicochemical studies of synthesized ruthenium phthalocyanine and its crown-substituted derivatives, macromolecular complexes of polyacrylonitrile, and nanohybrid composites based on ruthenium complexes were carried out.

Polymer-immobilized ruthenium nanoparticles were obtained by polymerization of acrylamide complex of ruthenium nitrate and evaluation of their catalytic properties in cyclohexene hydrogenation reaction.

It was determined that there are high valence $Ru=O$ groups in the obtained complexes. The absence of EPR signals for ruthenium complexes with $Ru=O$ bonds proves the diamagnetism of the formed complexes.

Based on ruthenium complexes, 2 types of new nanocomposite materials were obtained by sol-gel and frontal polymerization methods. Nanocomposites were synthesized by hydrolysis of ruthenium complexes in an inorganic matrix with SiO_2 by organic tetraalkoxysilane sol-gel method and then obtained by polycondensation of the obtained compounds.

Newly developed composite materials surpass metal complex classical systems by a number of properties.

Development of original methods of synthesis of new complex compounds of ruthenium with various types of organic ligands, determination of their structure and study of properties is a great contribution to fundamental knowledge in the field of chemistry of complex compounds. The obtained regularities and results can be used in the targeted synthesis of ruthenium with other classes of ligands. Nanocomposite materials based on ruthenium complexes are very promising for use.

- The increasing demands of modern innovative technologies in new effective materials determine the relevance and perspective of developing and researching new multifunctional polymer nanomaterials with complex practical valuable properties. Synthesis and research of nanocomposite based on Ru -complexes, formation of nanocomposites in the system of $Ru^{2+}-SiO_2$ complexes, Synthesis and study of organic-inorganic composites consisting of nano-sized Ru particles stabilized by inorganic carrier SiO_2 and polymer matrix, catalytic properties of ruthenium nanocomposites information about High-molecular compounds, especially nitrogen-containing polymers with different types of heterocyclic groups depending on their functionality, show high efficiency as polymer matrices that stabilize metal nanoparticles by preventing their aggregation. The presence of nitrogen-containing heterocyclic fragments and functional groups leads to their effective interaction with metallic nanoparticles at the early stages of their formation. Ruthenium 2,2'- complexes with bipyridyl and 1,10-phenanthroline have interesting photophysical, photochemical and electrochemical properties, as well as high thermal (up to 4000C) and chemical stability (they are inert against solid sulfuric acid and 50%

alkaline solution). An additional interest in these structures is their possible use as catalysts in the decomposition of water into elements under the action of visible light. The practical use of these properties of ruthenium complexes is related to the introduction (binding) of the complexes into the polymer matrix. Various organic polymers can be used as a matrix - polymethacrylates, polyurethanes, polyamides, polyimides, polybenzimidazoles, etc. Unfortunately, organic matrices have a number of disadvantages: low thermal stability, uniform distribution of complex molecules in the obtained material, and they also contain Ru(II). It does not allow the synthesis of hydrides by more than 1% of the concentration of the complex.

The solution to this problem is related to the replacement of the organic polymer with the inorganic matrix - SiO₂ (synthesized through the hydrolysis of tetraalkoxysilanes by the sol-gel method and then obtained by polycondensation of the obtained compounds).

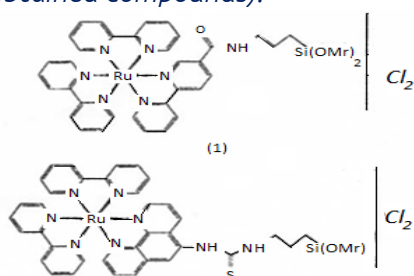


Fig. 1. Obtained hybrid structure

In this case, the homogeneity and stability of the obtained composites is mainly determined by the possibility of chemical bonding of the components of the hybrid. To obtain such structures, ruthenium complexes with a trimethoxysilyl group in the side chain of one of the ligands were used:

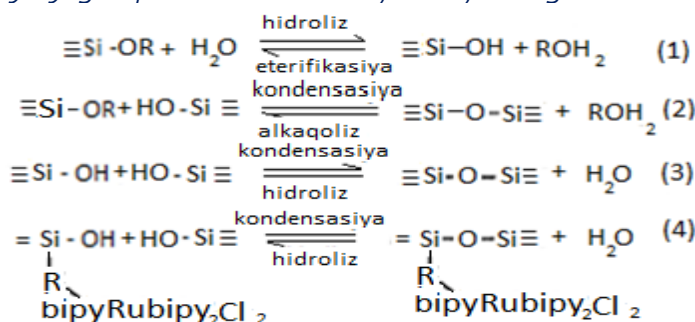


Fig. 2. Preparation of nanocomposites by sol-gel method

For the purpose of research, the specified complexes are injected into the SiO₂ matrix synthesized by the sol-gel method and the physical-mechanical and optical properties of the obtained nanohybrid materials are studied. At that time, the main issue was the purchase of composites in the form of monolithic samples. The chemical processes involved in the synthesis of nanocomposites using the organic sol-gel method are quite simple. The sol-gel method of composites is carried out as shown below. We added 4 equivalents of water to a mixture of tetramethoxysilane (TMOS) (1 equivalent), acetic acid (1 equivalent) and a solution of ruthenium (I) or (II) complexes in methanol. We placed the obtained systems in hermetically closed polypropylene containers with a flat bottom and kept them for 2 days (48 hours). Then we opened the lid of the containers and dried the wet gels for 48 hours at 500C, 24 hours at 600C, 24 hours at 700C, 24 hours at 800C and 48 hours at 900C. We increased the temperature at the rate of 30C/hour. Absorption and luminescence spectra of hybrids in comparison with the corresponding spectra of solutions of ruthenium complexes (Fig.3) slightly lengthened, and the luminescence maxima of the composites shifted to shorter wavelengths. This can be explained by the effect of uneven broadening of the spectra and the rigidity of the chemical coverage of the complexes in the polymer matrix.

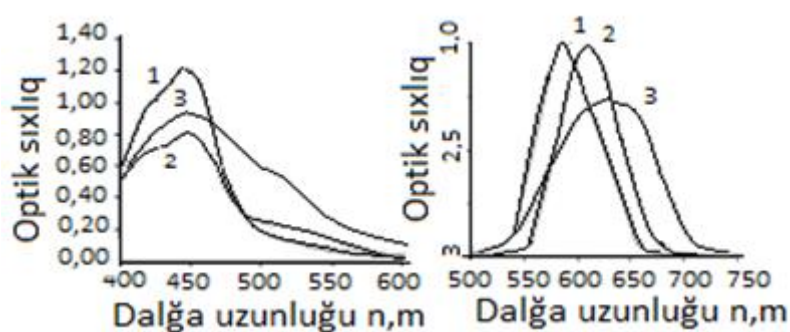


Fig. 3. Absorption spectra and luminescence of nanohybrids in $[RuL_3]Cl_2(5\%) - SiO_2$ system.

Photoluminescence spectra of $[RuL_3]Cl_2$ complex immobilized on SiO_2 were recorded. Excitation of the sample was carried out at 300 K with a 2 PM-11 type helium-cadmium laser. As can be seen in Figure 10, the spectrum of the substance covers a wavelength of 500-750 nm. Two intense peaks at 560, :10 nm and a relatively weak peak at 630 nm are observed in the spectrum. New metal-polymer complexes of Ru(II) were synthesized in the form of monolithic organic-inorganic nanocomposites, in which the organic-inorganic components of the system are chemically connected.

Inorganic of basic SiO_2 as a polymer the use of the matrix allows: a) to control the amount of ruthenium complex in the nanocomposite, b) to significantly increase the thermostability and physical-mechanical characteristics of the obtained material, c) to simplify the process of obtaining the initial polymer structure.

The possibility of obtaining a nanocomposite material based on the ruthenium complex with another approach has been shown. As an inorganic carrier - SiO_2 , as a complex of ruthenium - acrylamide complex of ruthenium nitrate was taken. Ruthenium nanoparticles were obtained, fixed on the SiO_2 carrier surface and stabilized by adding a polymeric ligand. The aim was achieved by obtaining polymer-immobilized Ru nanoparticles by polymerization of acrylamide complex of Ru nitrate in the presence of inorganic carrier SiO_2 and evaluating their catalytic properties in cyclohexene hydrogenation reaction. Solid nitric acid $HNO_3(\rho = 1.18 \text{ g/cm}^3)$ by expelling at atmospheric pressure 1100C fraction at the boiling point was separated. We used acrylamide (AAM) without additional purification. "Silica gel 60" brand silica gel was used as an inorganic carrier (220-240 mesh, $Sud = 240 \text{ m}^2/\text{g}$). The results of the elemental analysis of the hydrogenation of cyclohexene are shown in table 6. According to the infrared spectroscopic results, the coordination of the metal atom occurs through the oxygen atom of the carbonyl group of the AAM ligand: in the IR spectrum, the bands of the carbonyl group have shifted to the long-wave range CO (1667 cm^{-1}), which is typical for similar complexes of transition metals. This is also confirmed by the transition of the C1s (ESV = 288.3 eV), N1s (ESV = 399.8 eV) and O1s (ESV = 531.6 eV) lines to the high-energy region of 0.5, 0.7 and 0.5 eV, respectively, in the RFE spectra. Bands of valence vibrations of nitrate-anion at $1385 \text{ cm}^{-1} (NO_3^-)$ were also noted in the IR-spectra of the complexes. The presence of a low-intensity line of Ru3d (ESV = 337.2 eV) in the RFE spectrum, as well as an increase in the intensity of the ESV = 285.7 eV line, due to the double bond of the metal atom to the ligand π -coordination can be explained. Such cases are not uncommon for Ru-alkene complexes. The Ru/N and O/N ratios of atoms in the upper layer are equal to 0.11 and 1.4, respectively. AAM complexes of ruthenium nitrates have the property of effective polymerization in the frontal mode when condensed, that is, this is a condition where the process of converting monomer into polymer starts in the local reaction zone and spreads layer by layer to the entire volume.

Table 1

Elemental composition of acrylamide complexes of ruthenium nitrate and relative composition of different elements in them according to RFES results

Complex	Element composition, wt.% (found/calculated)				Relative composition, %			
	C	H	N	Rs	C	He	N	Rs
$Ru(NO_3)_2$	-	1.4/1.5	10.3/10.5	40.2/39.9	-	66	22	10.6
RuAAM	20.1/19.4	3.5/2.7	15.4/15.0	29.2/28.6	54	26	18	2
RuAAM/ SiO_2	-	-	-	5.4	15	58	6	0.8

In the mode of heat wave propagation, the polymerization process takes place in a small temperature range. The heat released during the reaction is transferred to the heating zone, and the

substance heats up due to heat conduction, the temperature rises to the point where the reaction begins, that is, the polymerization boundary spreads. The initiation of the reaction is a short-term (~15 p.) was achieved by heating. In this part of the ampoule, a sample of RuAAM monomer pressed in the form of a cylinder or its mixture with a mineral carrier was placed. In this case, the melting zone is visually formed, spread (phase transition), and its color changes from light-brown to dark-brown and black. The speed of the reaction can be controlled by the color change. The "ignition" temperature of the frontal polymerization of the acrylamide complex of ruthenium (80-1000C) is. At higher ignition temperatures (150-1700C) the reaction mass is ejected from the glass tube and the transition to the combustion mode is observed, which may be related to the formation of highly dispersed pyrophoric ruthenium particles.

The use of the FP (frontal polymerization) method in obtaining nanocomposite materials is of interest in the creation of mixed (hybrid) "metal nanoparticles - polymer - inorganic carrier" polymer immobilized catalysts. Indeed, the acquisition of the acrylamide complex of ruthenium on the mineral carrier and its subsequent polymerization leads to the formation of a polymer-inorganic composite, which, according to the indicators of the electron microscope, consists of nano-sized Ru particles with a diameter of 4-8 nm and their aggregates of 10-20 nm.

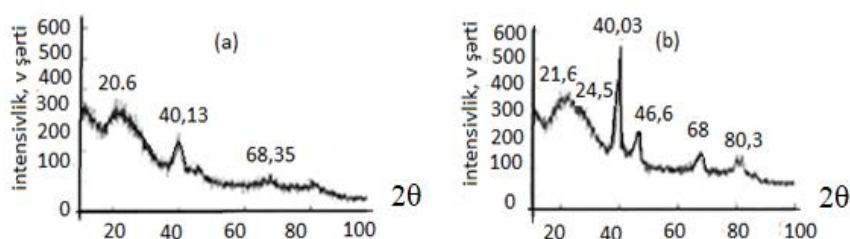


Fig. 4 115(a) and 130°C(b) diffractograms of poly-Ru AAm/SiO₂ samples taken at temperatures

From 360 to 850 2 in radiographs of the received samples. In the field, there are broad diffraction peaks belonging to crystallinity Ru⁰ (Figure 13). The spread state of the diffraction maxima and the broadening of the lines indicate that the particles are in an ultradispersed state. New metal-polymer complexes of Ru(II) were synthesized in the form of monolithic organic-inorganic nanocomposites, in which the organic-inorganic components of the system are chemically connected. The system we analyzed shows a fairly high activity in the cyclohexene hybridization model reaction. Thus, under suitable conditions, the initial speed of the reaction on the poly-RuAAM /SiO₂ catalyst is almost twice as high as on the standard Ru catalyst (table 7, figure 14). The nanocomposite we studied retains its catalytic activity even when repeated cycles of the reaction are carried out on it, and its immobilized form allows it to be easily separated from the reaction mixture and used repeatedly.

Table 2.

Initial velocities (Wo) of cyclohexene hydridation reaction in the presence of hybrid polymer-immobilized Ru nanoparticles

An example	Conditions of purchase	Wo, mol l ⁻¹ s ⁻¹		
		1 cycle	2 cycles	3 cycles
Poly – RuAAM/SiO ₂	FP	22.9	16.7	-
	FP, 1000C	10.8	12.6	10.1
	FP, 1200C	13.4	10.5	11.2

The catalytic properties of the nanocomposite we studied are affected by the formation conditions of Ru nanoparticles, for example, the use of different modes of FP in an inert environment. The rate of hydridation of cyclohexene on nanocomposites obtained at high temperatures decreases. Most likely, the reason for the decrease in the reaction rate is the increase in the size of Ru particles during the preparation of nanocomposites at high temperatures.

Note that after hybridization, the main part of Ru in poly RuAAM (90%) is in a zero-valent state: the weight of the catalyst is 0.05-0.10 g, the temperature 200C, solvent-isopropyl alcohol, initial amount of cyclohexene 6.9 mmol. Thus, the synthesized hybrid polymer-immobilized Ru nanoparticles show high activity in the hybridization reaction of cyclohexene and retain their activity in repeated cycles of the reaction. The catalytic properties of nanocomposites depend on their preparation conditions and affect the size of the formed Ru nanoparticles

Conclusion

1. The complexes of ruthenium were obtained by hydrolyzing the inorganic matrix with SiO₂ using the tetraalkoxysilane sol-gel method, and then the nanocomposites obtained by polycondensation of the obtained compounds were synthesized.
2. New nanoscale composite materials of ruthenium (II) in the form of monolithic organic-inorganic nanocomposites were synthesized and it was determined that the organic and inorganic components of the system are chemically connected.
3. An efficient and selective hybrid nanocomposite catalyst was synthesized for the hydrogenation reaction of cyclohexene. The synthesis of the ruthenium acrylamide complex on the SiO₂ surface, its subsequent polymerization and reduction leads to the formation of both nano-sized Ru particles stabilized by the polymer matrix and an organic-inorganic composite containing an inorganic carrier.

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Economic sciences

NATIONAL ECONOMIC SECURITY ENSURING IN THE PEOPLE'S REPUBLIC OF CHINA

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PhD in Economics

Abstract

Object of the study: national economic security.

Subject of the study: national economic security insuring in China.

Research methods: general scientific methods, systematic approach, economic-statistical methods.

Purpose of the coursework: research of methodological issues and practical aspects of the national economic security ensuring in China.

OBJECTIVES OF THE COURSEWORK:

1. Research of methodological issues of the national economic security ensuring in the context of globalization.

2. Analysis of practical aspects and peculiarities of the national economic security ensuring in the People's Republic of China, characteristics of its elements

3. Analysis of China's national economic security in the external sphere, its tendencies, factors and indicators.

Conclusions: National economic security is a system composed of interrelated and complementary elements (components), and state's economic security level depends on the security of its each component. China has undergone tremendous changes from a centrally planned to market economy that have transformed an impoverished country into an economic power. Currently, the Chinese economy is an unattainable role model for many developing countries. However, we can observe that the economy of China is slowing down, because the sources which were the foundation of the growth are slowly losing their driving power. In order to ensure economic security in the long run and maintain a stable economic growth as well as avoid the middle income trap China has introduced the BRI. The New Silk Road concept aims to use the advantages of the Chinese economy and the states participating in the initiative to stimulate its economic growth. Therefore, it is a strategy of providing long-term economic security.

Keywords: national economic security, external economic security, foreign trade, foreign investment, China

Introduction

Guaranteeing long-term economic security is a priority for the economic policy of any state. The effectiveness of any strategy of building economic security is largely dependent on recognising and optimising the utilisation of internal and external conditions.

Economic globalization is one of the important characteristics of contemporary world economy, and it is also an important trend of world economic development. At present, economic globalization is embodied in the globalization of market economic system, trade, production, finance and economic information.

Economic globalization is a "double-edged sword", which not only realizes the optimal allocation of resources in various countries and promotes the development of the world economy, but also brings some negative effects to China's national economic security. Therefore, through the discussion of national economic security in the era of globalization, this paper puts forward some measures to safeguard China's economic security. It determines the significance and the relevance of the master's thesis topic.

Purpose of the master's thesis is the research of methodological issues and practical aspects of the national economic security ensuring in the context of globalization, development of directions and recommendations to neutralize the external threats to the national economic security of China.

Objectives of the master's thesis are:

- 1. Research of methodological issues of the national economic security ensuring in the context of globalization.*
- 2. Analysis of practical aspects and peculiarities of the national economic security ensuring in the People's Republic of China.*
- 3. Development of directions and recommendations to neutralize the external threats to the national economic security of China.*

The phenomenon of economic security was researched by many scientists. Among them Muller (2015), Nam et al. (2016), Morris and Deprez (2013), Simasius and Vilpisauskas (2005), Tamosiunien and Munteanu (2015), Makstutis A. (2006), Markevicius (2011), Lei Gu, Gu Haibing and Sharla Cheung, Moran Zimmermann, Zeng, Fanhua and Cao, Shixiong, Lei Suo and Chen Lianghui, Wadhwani, Cable.

The macroeconomic security approach was supported by a Russian economic school, which attempted to quantify economic security, as well as a model developed by Professor Lino Briguglio, which assesses economic security, taking into account the country's economic vulnerability and resistance level.

The household or individual economic security is the object of microlevel research. Human economic security is researched by Parthasarathy (2014), Bloom (2010), Brown (2011), Hacker et al. (2014), Hsieh (2015), Muruthi, Lewis (2016), focusing on the importance of savings and threats to the quality of life of adults and the elderly. Analysing household, Muller (2015), Nam et al. (2016) Morris and Deprez (2013) Quinn and Cahill (2016). Economic security of business structures on micro level is studied by Falovic (2013), Misko and Maliuta (2015), Kasyanova and Kasyanov (2015), Baldzhy (2017), Kocikin (2016).

Gu Haibing and Sharla Cheung [5] defined national economic security as the ability to resist external risks and ensure the stable operation and healthy development of the internal economy. This definition embodies the principle of "focusing on the outside and starting from the inside" in the research of national economic security. Ye Ping [6] believes that national economic security represents a state where economic sovereignty has not been seriously damaged and the risk of economic crisis is controllable. Here, the "state theory" defined by the concept of national economic security is a static perspective.

Generally speaking, previous studies have defined the categories of national economic security from two angles.

First, from the perspective of the source that threatens the national economic security, relevant scholars regard economic security as the ability to resist external shocks or keep a stable state under external shocks. Moran [7] believes that the weak link of national economic security lies in trade, finance and currency.

Zimmermann [8] found that ensuring the family's deposit security is the key to the country's personal economic security and financial system stability, and the continuous reform of the system of global protection of depositors can cope with the risks brought by financial globalization. Zeng Fanhua and Cao Shixiong [9] put forward two dimensions of safeguarding national economic security, namely, resisting external negative impacts and coping with domestic systemic risks.

Some scholars [10-11] put the emphasis of safeguarding national economic security on dealing with foreign shocks. Lei Suo and Chen Lianghui [12] think that the key point of maintaining national economic security lies in the country itself, and it is necessary to achieve national economic growth, fair distribution of wealth and improvement of life quality.

The second is to connect national economic security with related concepts.

Wadhwani [13] thinks that economic security is equal to the security of personal wealth, and analyzes how to manage savings banks to achieve the goal of ensuring the wealth security of wage earners.

Cable [14] broke through the limitation of national boundaries, put forward the idea of realizing the economic security of all countries through cooperation from the perspective of "regional economic security", and believed that economic security might be affected by four aspects: taking economic policy as a tool of aggression; Trade events that may affect national defense security; The degree to which military capability is influenced by economic strength; Panic caused by global economic fluctuations.

Fan Ying [15] emphasized the importance of economic competitiveness on the issue of economic security. Ye Ping [16] put forward that the key to economic security is that the economic crisis is controllable and the economic sovereignty is not violated. Ding Bing [17] equates China's economic security with the socialist basic economic system without threat or infringement.

In recent research, Zhang Yuyan and Feng Weijiang [1] started from the basic framework of determining the relationship between security level, security capability and security threats, and formally defined the core concepts of China's national security in the new era, such as positive security, negative security and security dilemma, absolute security and relative security, unintentional security and intentional security, and balanced security.

Lee [18] pointed out that compared with an abstract understanding of the concept of economic security, it is more important to study four issues: "whose security is economic security, what is the significance of studying economic security, where the threats to economic security come from, and by what means to maintain economic security". Based on the related literature at home and abroad in the past, this paper holds that the basic category of economic security under the open condition should cover five dimensions: resource security, industrial security, financial security, information security and ecological security. China's economic security capability should include not only the ability to resist the impact of external risks, but also the ability to recover from the impact.

Zhang Hanlin and Wei Lei [22] divided economic security into eight aspects: food security, employment security, financial security, market security, energy resources and environment security, cultural security, information security, human capital and technology security, and added international measurement indicators. Generally speaking, these studies understand economic security as "economic security state" or "economic security capability", and design corresponding index system for monitoring and early warning from these two angles.

The relevance of the study is due to the fact that the modern theory of economic security has no signs of complexity and can not offer unique studying methods and techniques of the economic security management processes of the national economy, which have an interdisciplinary significance.

1. THEORETICAL ISSUES OF THE NATIONAL ECONOMIC SECURITY ENSURING IN THE CONTEXT OF GLOBALIZATION

Economic security of the state is one of the main elements of the national security system. It gained a special significance after the global economic crisis in 2008. Economic security has many definitions. It is most frequently defined as a state that guarantees smooth development of the national economy (table 1). The chance to achieve the desired status of a country's economic security should be mainly seen in internal strengths and consistently and wisely pursued an economic policy. At the same time it should be noted that the level of economic security is not stable and is likely to change. Therefore, only the ability to use strengths of the economy and external opportunities, at the same time dealing with weaknesses and threats coming from the international environment, will guarantee economic security in the long term perspective.

Considering table 1, it should be noted that there is no generally accepted definition of economic security. Still, it is possible to identify certain features that provide an overall picture of what this concept means. Economic security should be understood as the ability of the economy to achieve a relatively fast and sustainable economic growth and create favourable conditions for raising the level of broadly understood well-being of citizens under free trade and free flow of factors of production (especially the capital in the form of foreign direct investment). It should be emphasized that at the current stage of development of the world economy it is impossible to ensure economic security and overcome developmental barriers across the country or region. Moreover, it often requires taking global action. Although the shape of the economic security strategy still largely depends on internal factors such as economic policy, amount and structure of natural resources, capital as well as human resources. Economic security of a given country is also dependent on the international economic and political situation, relations with neighbours and membership in international economic, political and military structures.

Economic security of the state is a complex and multidimensional issue.

It encompasses various issues which are essential for economic development and for the existence of a state. Thus, it should be analysed not only from an economic point of view but also from a political, legal, military, demographic, social, technological and environmental perspectives [Książkowski, 2011; Mkrtchyan, 2015; Reznikova, 2016]. Since economic security includes many components, its measurement is a complex issue. Moreover, it refers not only to current situations but also to future situations, making its measurement much more difficult.

Table 1

Overview of the definitions of state economic security

<i>Author</i>	<i>Essence of economic security</i>
<i>B. Buzan [1991]</i>	<i>economic security concerns access to the resources, finance and markets necessary to sustain acceptable levels of welfare and state power</i>
<i>M. Perczyński [1990]</i>	<i>the susceptibility of a country to negative changes in its economic environment, including external political and economic attempts to destabilise its socio-political system, development, and defence capability</i>
<i>Z. Stachowiak [1994]</i>	<i>a state of national economy, which ensures its highly effective functioning through the proper use of internal development factors and the ability to effectively oppose external pressure, which can disturb its development</i>
<i>Z. Kołodziejak [1996]</i>	<i>the ability of a state's economic system to use internal development factors and international economic co-relations in a way which would guarantee its undisturbed development</i>
<i>E. Halizak [1997]</i>	<i>situation in which the economy can develop, generate incomes and savings for investment, and in which there are no external dangers which can disturb the economy</i>
<i>Y. Jiang [2007]</i>	<i>the ability to provide a steady increase in the standard of living for the whole population through national economic development while maintaining economic independence</i>
<i>R. Włoch [2009]</i>	<i>a situation which guarantees economic conditions necessary for survival, prosperity, and balanced social development within the borders of a given state, as well as for the preservation and efficient functioning of the state's institutions</i>
<i>K.M. Księżopolski [2011]</i>	<i>the undisturbed functioning of the economy – preserving its basic development indicators and a comparative balance with the economies of other countries</i>
<i>K. Raczkowski [2012]</i>	<i>relatively balanced, internally and externally, state of functioning of the national economy, where the risk of occurring imbalances is kept within acceptable organisational and legal norms and principles of social coexistence</i>

ECONOMIC SECURITY IS UNDERSTOOD AT TWO (MICRO AND MACRO) LEVELS. ECONOMIC SECURITY AT MICRO LEVEL.

It can be stated that the micro level examines the individual approach of the economic security structure of Tamošiūnienė and Munteanu (2015) research and the private security of the Glaser (1997) national security description.

So, the household or individual economic security is the object of micro level research. Many scientists are examining it. Human economic security is researched by Parthasarathy et al. (2014), Bloom et al. (2010), Brown (2011), Hacker et al. (2014), Hsieh (2015), Muruthi, Lewis (2016), focusing on the importance of savings and threats to the quality of life of adults and the elderly. The composite economic security definition of these scientists is the personal financial provision supply, social integration, health safety strategies, guaranteeing dignity and quality of life.

Analysing household, Muller (2015), Nam et al. (2016) also emphasize that long-term economic security and family development depends largely on savings and accumulation of wealth. These scientists describe economic security as a measure of individual or household capacity. The better are indicators of economic security, the greater individual or household is protected from the negative factors of the environment - labor, health, survivors' loss, solvency problems, the more they can expect - quality rest, comfortable living environment, health insurance, pension fund increase.

Morris and Deprez (2013) analyze the financial sourcing, quality of life and competitiveness of the working age women in the United States in the labor market, so the understanding of their economic security is greatly simplified and focused on the ability of the individual to self-care. Their opinion, economic security, is a financial situation where one can live the way he wants, not the way it is. Quinn and Cahill (2016) analyzed the influence of different economic vulnerability measures on the general

economic security of the individual. Thus, the definition of their economic security is similar to those already mentioned, i.e. financial opportunities, solvency, social welfare and sustainability from external threats.

It needs also to be noticed, that the business enterprises' economic security is analyzing on micro level. Economic security of business structures is studied by Falovič (2013), Misko and Maliuta (2015), Kasyanova and Kasyanov (2015), Baldzhy (2017), Kočikin (2016). The definition of the economic security of these scientists is a condition where resources are used effectively to prevent threats and ensure the functioning and stable development of the company. They characterize economic security as a combination of qualitative and quantitative indicators. In order to achieve the highest level of economic security, companies must ensure maximum safety of the main functional components. Researchers analyzing the economic security of companies distinguish the following elements of economic security: finance, human resources, technology and innovation, political and legal environment, ecological environment and information security.

ECONOMIC SECURITY AT MACRO LEVEL.

Macro level is the country's economic security.

***State economic security** is a complex and multifactorial system which presents a material basis for the formation of other components of national security. The economic security assurance is one of the primary problems of the state, as the emergence of the numerous socio-economic problems in the country, as a rule, is conditioned by state's failure to take preventive measures or not implementing them in time. Hence, the state must provide such a level of security which will guarantee internal and external stability, necessary for normal economic functioning, active participation of country in the international division of labor and competitiveness, at the same time it will provide a ground to ensure a sufficient level of security.*

Generally, the economic security of the state acts as a system whose main functions are divided into five groups: protective, regulatory, warning, innovative and social.

***The protective function** is expressed by the ability to protect the state economic system from internal and external threats. The implementation of this function is directly related to the formation of economic resource potential and its effective use.*

***The regulatory function** appears in different economic subsystems through the assurance of state economic security and application of functional mechanisms targeted to risk neutralization. These include mechanisms which simulate market self-regulation property as well as eliminates market failures (market insoluble problems).*

***The warning function** of state economic security is focused on predicting the emergence of potential crisis situations during economic activity and on preparing economic system to resist them. It implies socio-economic and organizational-technical measures, the result of which is the strengthening of the defensive function of the system.*

***The innovative function** acts through non-traditional decisions made by the state on economic processes and innovative solutions focused on the acceleration of economic development pace or on the neutralization of possible negative effects of the latter. The results of this function emerge in the economy mediatedly and, as a rule, are expressed in the form of increase in the efficiency of other safety functions.*

***The social function** of state economic security system suggests full satisfaction of demands of all members of society and full compliant of interests. The realization of this function contributes to the rise of the level and quality of life and guarantees the protection of citizens' rights and freedoms. It should be noted that this kind of classification of the functions of state economic security system is conventional, since these functions are interrelated and interdependent and often features of one function can be repeated in defining another function. The efficiency of ensuring state economic security depends on the capacity of full operation of these functions together and simultaneously. In addition, the problems of these functions can be changed in ensuring the individual components of economic security.*

THE SCIENTISTS SEPARATE SEVERAL ECONOMIC SECURITY GOALS:

- *stability of economic power and ability to finance defense needs;*
- *securing "strategic products" (eg energy, etc.);*
- *diversification of foreign trade;*
- *independence from dominant players in the international economy;*
- *security against economic espionage;*

- good macroeconomic indicators;
- property security;
- the individual's social security, at a certain level of livelihood;
- employment secured by jobs;
- efficiency of economic activity.

THE COMPONENTS OF STATE SECURITY SYSTEM OF ECONOMY

In economic literature the security system of state economy is presented by internal and external subsystems, which have their own components:

- external security subsystem, including technological, commercial, financial securities;
- internal security subsystem, including technical and manufacturing, food and raw materials, energy, environmental, informational securities (figure 2).

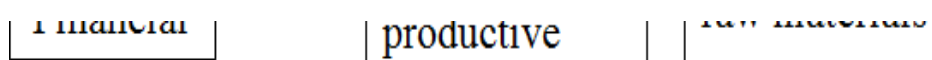


Figure 2 – The Main Components of State Economic Security

The technological component of state economic security is characterized by active participation in international scientific and technological progress, which guarantees the ability of state to apply the latest technological solutions in national production and ensures the competitiveness of production of national goods and services in the international market of high-tech products. International experience shows that the assurance of the component of economic security technology is possible only in the case when the national economy is placed on the bases of innovative development [2].

Currently the country which has most innovative technological systems in the world is the United States (according to 2013 data it has 34% of world expenditures made on scientific-technical and experimental-constructural operations) [3]. China also pays great attention to the development of scientific industries. In 2013 China's expenditures on the scientific-technical and experimental-constructural operations were amounted to 2% of GDP and 16.5% of the expenditures on that purpose in the world [3]. European countries also have significant proportion (22.4% in 2013) in expenditures on scientific and technical operations in the world [3].

The commercial component of state economic security represents a possibly large assurance of diversification in the country's export and import trade

structure. In the circumstances of geographical diversification the country's exports and imports will not depend on the "whim" of one or a few big centers. And from the point of view of product diversification the following indicators are important: the specific gravity of high technology and food in import, the country's dependence on imports of strategic goods, the specific gravity of competitive and high-tech products in export.

The financial component of state economic security can be defined as country's capability to implement independent monetary policy and to provide stable functioning of the financial system through refunding international loans and gaining, distributing, using and refunding foreign investments in the presence of adverse external and internal conditions.

In this regard, the following indicators of financial system are important: the establishment level of securities and financial market, the main directions of financial flows and the possibilities of securing their repayment, the amount of state budget deficit, free convert of national currency, the internal resources of exchange rate stability, the level of internal and external public debt, the amount of foreign exchange and gold reserves and so on.

The importance of **industrial and technical component** of state economic security leads to the assurance of manufacturing and technical possibilities of implementation of the expanded reproduction of the economy. It implies the ability of the economy to meet the needs of society, even in situations when external or internal economic favorable conditions are disturbed. The failure of this component of state's internal economic security leads to the growth of dependence on other countries. Today, in this regard, Japan and the United States are considered more independent from the developed countries, which imports was 17% of GDP in 2012. And, for the example, in France, Germany, Great Britain and Italy in ranged between 25-50%. The states where this indicator ranges between 50-80%, have already faced the danger of independence loss. These countries are the Netherlands, Czech Republic, Denmark, Iceland, and so on. Armenia is also included in the states which have crossed the 50% threshold, in 2012. it was 49%, while in 2013 it was 51%. So, Armenia is already in the danger zone. In the countries (for

example Estonia) where the above mentioned index is higher than 80%, there is a great loss of sovereignty and the production process is almost entirely conditioned by imports [4].

The food and raw material component of state economic security implies

economic assurance with necessary amount of food and raw material. The provision of food and raw materials is one of the most important components of state economic security and in the numerous countries of the world there are laws defining minimum standards for food security. For example, according to the United States Food Security Act (Food Security Act, 1985), minimum food reserve requirement is 40% of the average annual consumption.

It should be noted that from the point of view of state food and raw material security the most significant problem is the dependence from the imported raw materials and foods, which is necessary to keep on the lowest possible level, based on the state's resource provision.

The next component of state economic security is **energetic security**, which implies stable supply of sufficient amount of required energy for domestic consumption. For this purpose analyzes are carried out consistently in all countries, identifying the circumstances the appearance of which could undermine the country's fuel and energy system activities.

Since 1995 a number of studies have been implemented in Armenia, which were aimed at forecasts of electricity and natural gas consumption, the development of the production power of gas supply system with minimum cost, as well as the development of strategy in order to remove from exploitation Armenian Nuclear Power Station, in the result of which Armenian energetic security concept was adopted in 2011, according to which in Armenia energy security suggests increase in economic energy efficiency, development of nuclear energy and efficient use of renewable energy resources.

The ecological component of state economic security is state's ability to prevent and remedy the gap between public interests and the protection of the environment on time. The problem of environmental pollution is closely related to human economic activity, so for ecological security it is necessary to minimize the anthropogenic impact on ozone layer, Flora and Fauna, gene pool and other environmental components. In this regard there are global problems in the world, the solution of which is out of the opportunities of one or a few countries.

For instance, in the middle of 19th century the content of CO₂ in the atmosphere was 280 ppm, at the end of the 20th century it was increased up to 370 ppm as a result of fuel use, deforestation, etc. According to predictions, in the case of not taking preventive measures, it will reach to 450-550 ppm level in 2050, which will lead to global warming with all its unwanted consequences. Therefore, states must not only take effective measures for providing ecological security, but also to unite their efforts around global environmental problem.

The informational component of state economic security, in the case of existing internal and external links suggests such economic activities as a result of which the reliability of information exchange, increase of the share of nonmaterial actives into national wealth, the increase of information "relative density" in the process of domestic effect as well as the privacy of production technology are guaranteed. Information security suggests protection of informative area, information appliance only by its recipients and only in targeted manner, the protection of whole information privacy and availability, the protection of military, political, economic, social, demographic, informative and telecommunication management systems. Information security suggests first of all telecommunications security.

THE INDICATORS OF THE NATIONAL ECONOMIC SECURITY

In recent years, foreign scholars' quantitative analysis of economic security can be divided into model analysis method and index evaluation method according to different understandings of the factors affecting economic security and the mechanism of economic security. Cable [14] analyzed the influencing factors and mechanism of national economic security by using the international economic activity confrontation model. Mastuno [23] analyzes the evolution of American academic and political circles' understanding of the relationship between economy and security from a historical perspective.

Evaluation system is a general tool to analyze the national economic security at present. It is a common practice to monitor the national economic security situation and predict the national economic security trend by using the index system, but there are still different understandings about the structure and content of the index system. At present, domestic and foreign scholars have done a lot of trials in the construction of index system.

To interpret the content and the essence of the concept of economic security a system of criteria is used, but to assess the level of the latter in the modern conditions it is more essential to use thresholds instead of the parameters of their limits. Threshold-exceeding is considered an obstacle towards the economic growth and development, resulting in the emergence of negative trends in the sphere of

economic security. According to Seletkov S.N., economic security thresholds are presented as quantitative parameters, forming the boundary between risk and no - risk zones in the various sectors of the economy [52, p. 28].

THE ANALYSIS OF EXISTING APPROACHES ALLOWED US TO FORMULATE SOME PRINCIPLES FOR ECONOMIC SECURITY THRESHOLDS, NAMELY:

1. Economic security thresholds are subject to a dynamic change because of economic and social trends and paradigms;

2. The growing problems of economic security during the crisis, and as a consequence, the constant revision of the limit values;

3. An impact of the productive forces in a given country or region of natural and geographical factors, the state of society, etc. on the dynamic development of the thresholds system the economic indicators.

4. In accordance with the theory of social stability within a systemic approach for assessing the level of economic security and performance analysis of the limit values, one should use the entire set of parameters.

Most of the leading experts in the field of economic security specify the following evaluative parameters [21, p. 153, 26, p. 44, 48, p. 234]:

1. Quality of life (per capita GDP, the level of income inequality, the availability of material goods and services for major groups, employability of the population, environmental conditions, etc.).

2. Dynamism and adaptability of the economic mechanism as well as its dependence on external factors (inflation, deficit of consolidated budget, the effect of external economic factors, the stability of the national currency, internal and external liabilities);

3. Economic growth rate (the dynamics and structure of national production and income, the growth rate of industrial production, sectoral structure of the economy and dynamics of individual industries, the size of investment, etc.);

4. State capacity (natural resources, industrial, scientific and technical).

National Security Strategy of the Russian Federation contains the main characteristics of the national security state. They are designed to assess the state of national security and include assessment of the level of unemployment, the decile ratio (the ratio of the incomes of the richest 10% and 10% of the population), the growth rate of consumer prices, the share of external public and domestic debt as a percentage of the total gross domestic product, the degree of resource supply to such areas as health, culture and education, science as a percentage of gross domestic product, the level of the annual renewal of weapons, military and special equipment, as well as security and military engineering technical staff [3, 4, 5]. Maximum allowable values of economic security may be presented as a set of general and socio-economic parameters, in particular [7, p. 51, 21, p. 54, 29, p. 152,

54, p. 79]:

1. Threshold of decline in economic activity, output growth, investment and financial processes, exceeding which endangers the economic development of the state, its scientific and technological progress and competitiveness of the economy, maintaining the required level of the potential of the country (defense, scientific, technical, of innovation, investment and educational qualification);

2. Threshold reduction welfare, level and quality of life, exceeding which leads to serious negative social situation, social tension in society, the probability of conflict, leak productive "human capital" into more socially favorable regions;

3. Threshold of reducing the costs of preservation and development of natural ecological potential, exceeding which entails the emergence of the threat of environmental disasters, destruction of ecosystems, loss of natural resources as a factor of economic growth, as well as harm to life and health of citizens.

Thresholds indicators of economic security are determined by national interests of the country in the economic sphere (table 2).

According to a number of practitioners and scholars **the following thresholds of economic security in the manufacturing sector may be taken into consideration:**

1. GDP as a whole - 75% of the national average of G8;

2. GDP per capita - 50% of the mean in terms of GDP countries of the Group of Eight, 100% of the average GDP worldwide;

3. The proportion of manufacturing - 70%, engineering - 20% in total industrial production

of the country;

4. The share of imports in domestic consumption - 30%, including food - 25%;

5. The share of new products in total output - 6%;

6. Investments - 25% of GDP [52, p. 39, 63, p. 432, 64, p. 223].

Thresholds indicators of living standards of the population may be presented through the following parameters: the proportion of the citizens with incomes below the subsistence minimum, - 7%, life expectancy - 70 years; relation between income 10% of the most profitable and 10% of low-income groups - 8 times, the unemployment rate - 7% in total population of the country [48, p. 235].

To assess the economic security from the perspective of the financial condition, we can use the following criteria: the volume of domestic debt - 30% of GDP, external debt - 25% of GDP, budget deficit - up to 7% of GDP, the volume of foreign currency in cash to the amount of cash rubles - 25%, money - 50% of GDP [27, p. 161]. Summarizing the material of the first part of the paper, we can say that in modern science, economic security is a scientific-economic concept, meaning availability of abilities, capabilities and readiness of the national economy to ensure social stability and economic development in the context of maximizing societal needs and protect the interests of the state and regions in different areas against internal and external threats.

Table 2

The indicators of national security

<i>Sphere</i>	<i>Indicators</i>
<i>1</i>	<i>2</i>
<i>Economic security</i>	<i>Gross domestic product(GDP);</i> <i>-Average annual growth rate of GDP</i> <i>The volume of industrial production; -Foreign exchange reserves;</i> <i>The balance of trade;</i> <i>The rate of inflation;</i> <i>The proportion of the cash component of the money supply;</i> <i>-Surplus(deficit)of the federal budget;</i> <i>-Investment in the fixed assets;</i> <i>Budget expenditures on science in budget system levels</i> <i>Share in GDP surplus(or deficit)of the federal budget</i> <i>-The proportion of the costs of servicing the public debt in the amount of the federal budget;</i> <i>-Innovative products share in total industrial production of mechanical engineering and metal working.</i> <i>-Accounts payable share in production volume;</i> <i>The degree of depreciation of the active part of the fixed assets;</i> <i>Shares of fully depreciated fixed assets</i>
<i>Food supply security</i>	<i>The gross grain harvest,</i> <i>- The share of food, received on imports in total food resources</i>
<i>Social security</i>	<i>Volume of real disposable income,</i> <i>- To the subsistence level of per capita income, the average monthly pension, the proportion of persons with incomes below the subsistence minimum in the whole population;</i> <i>- The ratio of incomes of the population between most prosperous and least secured;</i> <i>-Index of income concentration</i> <i>- The proportion of the employed population with secondary and higher education;</i> <i>The share of the unemployed in the economically active population</i>
<i>Demographic security</i>	<i>Ratio to the threshold values of life expectancy</i>
<i>Environmental security</i>	<i>Ratio to limit values of concentration of harmful substances indicators</i>
<i>Military security</i>	<i>Expenditure on defense ratio to the thresholds of the proportion of GDP</i>

INDICATORS OF ECONOMIC SECURITY IN THE EXTERNAL SECTOR.

To estimate the foreign trade component of the national economy development, it is proposed to use an appropriate system of foreign trade indicators that can act as economic security factors. Accordingly, changing the identified indicators (in an appropriate direction) may identify threats (risks) to foreign trade security as a component of a country's economic security. The following system of indicators of impact on foreign trade security is proposed:

- Exports of goods and services to GDP, % (I1) is an important indicator of a country's integration into the world economy. It should be noted that the increase in a degree of openness of the economy (export quota) provides for an increase in the level of involvement of the country in the system of world trade relations, ability of the national economy to maximize the benefits of foreign economic activity for economic growth, and increase its level of competitiveness. According to the World Bank, if the country's export quota is less than 10%, then such economy is considered relatively closed, from 10 to 25% – moderately open, from 25 to 35% – fairly open.
- Imports of goods and services to GDP, % (I2) determines the degree of dependence of a country on imports (import quota), the significant growth of which determines the risks of dependence on economic partners and the situation on world markets.
- Balance sheet index, % (I3) is defined as the ratio of import export coverage which is a criterion for the effectiveness of foreign trade interaction, characterizing how much foreign exchange earnings from exports cover the cost of import. If the index is more than 100%, then a country has a positive trade balance. Trade can be considered effective if the balance equals less than 100%, and in fact, this means that the country has a negative trade balance and such foreign trade cannot be considered effective.
- Exports of goods and services to world exports, % (I4) and imports of goods and services to world imports, % (I5) are important indicators that characterize the position (importance) of a country in the world trade system. Higher values of indicators lead to more influential positions of the country.
- Foreign trade turnover per capita, USD (I6) is an indicator that reflects the level of participation of a country in the world trade system.
- The coefficient of anticipation of growth of exports over imports, % (I7) takes into account the following: first, the nature of the exports dynamics and imports dynamics, acts as an indicator of growth of foreign trade activity), and second, acts as a criterion for the effectiveness of trade cooperation. It is only logical that if this ratio exceeds 100%, then exports growth outstrips the growth rate of imports; if less than 100%, the rate of change of exports is lagging behind the dynamics of imports growth.
- The trade conditions index (I8) acts as an indicator that characterizes the change in the terms of trade for the country and is calculated by the ratio of changes in prices of exports and imports. If the value of this index is more than 100, it can be noted that trading conditions have improved, export prices have increased faster than import prices; if less – then the terms of trade deteriorated, the rise in export prices turned out to be less than the increase in import prices.
- Export Concentration Index (I9) is an indicator of a country specialization level which characterizes the degree of market concentration and makes it possible to determine the degree of narrowness of a country's export range in comparison with the world structure of exports.
- The Export Diversification Index (I10) reveals differences between a country's trade structure (group of countries) and the world average export structure.
- High-tech exports to GDP, % (I11) is an important indicator of the quality (adaptability) of foreign trade in a country.

So, the foreign trade component of security depends on the efficiency of a country's foreign trade activity, which, in turn, largely determines conditions for formation of the competitiveness level. It should be noted that a sufficiently high competitiveness level is a provision for a secure environment. Taking into account the competitive advantages and potential directions of their strengthening will make it possible to increase the efficiency level of foreign trade activity, achieve a sufficient level of the economy openness as well as an optimal specialization level thereof in the system of international labor division, which in turn will help to increase the level of foreign trade security of a country.

2. NATIONAL ECONOMIC SECURITY ENSURING IN THE PEOPLE'S REPUBLIC OF CHINA: SPECIFICS, CHARACTERISTICS OF THE ELEMENTS AND INDICATORS

The research on national economic security started in 1990s in China, which is an inevitable reflection of the deep development of globalization and China's accelerated integration into economic globalization. The theoretical and policy research results in this field over the past 20 years have

concentrated on the deep thinking of domestic academic circles on safeguarding national economic security under the background of globalization.

China has transformed from a poor rural country into one of the main economic powers as a result of the economic reforms initiated in the late 1970s. The government understood that the country cannot develop in economic isolation and that in order to accelerate the pace of development it is necessary to engage in international trade and obtain foreign direct investments. The sources of the success of China's economy can be found first and foremost in the government's effectively implemented economic policy aiming to integrate China with the world's economy, the use of foreign capital to modernise the national economy and the use of the comparative advantage in the form of unlimited cheap labour resources [Kostecka, 2009].

For many years, the Chinese export-oriented model of development based on FDI and the exports of labour-intensive goods with low added value has been effective. China has become the world's largest exporter and holder of foreign exchange reserves as well as one of the largest importers and exporters of foreign capital in the form of FDI. Moreover, it has developed at an impressive rate which was unattainable for the world's largest economies [WTO, 2018; IMF, 2018; UNCTAD, 2018]. China is an undisputed leader in the global economy in terms of the gross domestic product (GDP) dynamics. Since 1978, it has been the fastest growing country in the world with the average annual GDP growth rate approaching 10%. However, we can observe that the economy of China is slowing down. China's annual GDP growth rate dropped from the average rate of 9.6% in the period 1978-2017 to 6.9% in 2017 [World Bank, 2018].

It should be stressed that the slowdown in the Chinese economy is not only

the result of a deterioration in global economy, but also of serious structural problems which the Chinese economy has struggled with for years. The economic growth mechanism, which relies on the availability of cheap labour and low production costs, exporting labour-intensive products of low added value, artificial undervaluation of the yuan, foreign direct investment, foreign technologies and intense inward investment loses its effectiveness and cannot guarantee a sustainable growth of the economy in the long term [Kostecka, 2009].

The global financial crisis has shown that the dependence of the Chinese economy on foreign markets proved to be too high and risky. As the global economic situation deteriorated leading to a decrease in exports and foreign direct investments, the economic growth in China has slowed down visibly. In order to control overheating and overcome the crisis, the Chinese authorities tried to change its development strategy to be less dependent on exports and more based on internal consumption. They used different economic tools to increase the domestic demand. The anti-crisis measures implemented by the government, among others, included measures that affect employment (new infrastructural investments thanks to which new jobs were created) and the country's social situation (e.g. lower taxes, social assistance) [Kostecka, 2011].

However, the most important component of China's stimulus package was the investment in infrastructures, especially in railways, roads, and airports which helped to avoid the surge of mass unemployment for migrant workers which were under the threat as a result of the collapse of the external demand. Though the stimulus program was effective to overcome crisis, one of its lasting side effects was the creation of massive excess capacity in many industrial sectors (e.g. steel, cement, aluminium, etc.). It should be stressed that if, in the long run, China fails to change its growth model through structural adjustments, it will not be able to sustain its growth. From a macroeconomic point of view, China needs to lower its investment rate. Due to the fact that investment rate in China has been increasing further, it has deepened the problems related to overcapacity.

Initially, overcapacity was overcome by investing more. However, more

investment creates more overcapacity for the future [Yu, 2009]. In the future, if the government fails to tackle structural problems, and if the growth of domestic consumption fails to increase significantly, it will be difficult to absorb the overcapacity.

The results of China's stimulus program were impressive. Thanks to huge stimulus package and extensive stimulus measures implemented by the government, China began to recover from the global economic recession quicker than any other major economy. However, the 2007/2008 global financial crisis revealed a serious weakness of the export-oriented and FDI-driven growth model applied by China [Kostecka, 2011]. In the early 1980s, China became attractive for foreign direct investment (FDI) which helped restart the economic growth.

Over the course of time, China became an open economy involved in the global value chains (GVCs), highly dependent on exports. Becoming a part of the GVCs is an important step towards economic

development, but to achieve a sustainable economic growth not only should developing countries increase their participation in the GVCs but also move them up. Thus, in order to stimulate growth and competitiveness China needs to climb the global value chain ladder and move toward high-tech industries.

Within the last four decades foreign direct investments flowing into China have played a significant role in the economic growth, because they provided the Chinese economy with access to finances, advanced technologies or modern management methods. However, the influx of cheap labour-seeking FDI perpetuates the current development model. Thus, the hitherto model of development, based on low labour costs and access to cheap resources is disadvantageous in the long run and cannot be the basis of permanent economic security and prosperity, and can even strand China in the middle income trap. The adopted model of development is also burdened with high risk, because the increase in wages reduces competitiveness and attractiveness of the market for foreign capital. Therefore, low wages and cost-based competition have become an essential structural problem for the Chinese economy and it requires immediate in-depth reforms, the lack of which is going to prevent China from joining the group of the highly developed economies. It should be stressed that FDI flowing into China and the focus on exports are not what the economy needs and may entrench a disadvantageous economic structure, which may be a threat to future development. At the current stage of China's economic development, the inflow of each foreign direct investment has lost its significance.

Much more important from the point of view of economic development is the quality of the investment and the level of technological advancement. In the longterm perspective, it is possible to induce the changes in the structure of the economy by targeting investments at the desired areas of production. Therefore, the policies to attract foreign investors should be more selective.

The table 3 presents the strengths and weaknesses of China's economy.

Table 3

Overview of strengths and weaknesses of China's economy

Strengths	Weaknesses
large foreign exchange reserves over 1.3 billion potential consumers - access to strategic resources, including rare earth metals - high position in rankings of attractiveness for investors - improving quality of market economy institutions increasing importance of the service sector high adaptability of Chinese companies - availability of investment capital for new technologies - significant R&D spending (public and private) - increasing number of companies involved in R&D increasing employment in high and mid-high technology companies	- hidden unemployment (Chinese statistics do not include rural areas) pollution - low awareness of intellectual property issues - in manufacturing an imitative approach prevailing increasing non-wage labour costs - overly high participation of the state in the economy - relatively low participation of high-tech in export - the economy specialises in the production of goods of relatively low technological advancement level - local companies base their competitiveness on low prices low quality legal systems and problems with
increasing employment in high and mid-high technology companies - increasing education levels (including graduates of foreign universities) - high numbers of university and doctoral students high number of higher education specialties - high activity in obtaining access to resources in foreign markets high biodiversity and diversity of natural values	executing contracts and property laws - relatively low numbers of people with higher education low health care expenditures - poor position of Chinese higher education institutions worldwide underdeveloped continuing education growing local government debt

The table 4 presents the indicators of the national economic security of China.

Table 4

The indicators of the national economic security of China

<i>Sphere</i>	<i>Indicators</i>	<i>2020</i>	<i>2015</i>
<i>Economic security</i>	<i>Gross domestic product(GDP)</i>	<i>1015986.2billion</i>	<i>688858.2billion</i>
	<i>Average annual growth rate of GDP</i>	<i>2.3%</i>	<i>6.9%</i>
	<i>The volume of industrial production</i>	<i>116.1</i>	<i>98.1</i>
	<i>Foreign exchange reserves</i>	<i>\$32165billion</i>	<i>\$3330.4 billion</i>
	<i>The balance of trade</i>	<i>\$3659billion</i>	<i>\$5350 billion</i>
	<i>The rate of inflation</i>	<i>2.5%</i>	<i>3%</i>
	<i>Surplus (deficit) of the federal budget</i>	<i>1832.72billion</i>	<i>1541.92billion</i>
	<i>Investment in the fixed assets</i>	<i>52.73 trillion yuan</i>	<i>40.59 trillion yuan</i>
	<i>Budget expenditures on science in budget system levels</i>	<i>35095.57billion</i>	<i>1004.91billion</i>
	<i>Share in GDP of surplus (or deficit) of the federal budget</i>	<i>2.8%</i>	<i>-2.3%</i>
	<i>Innovative products share in total industrial production</i>	<i>52.1%</i>	<i>8.4%</i>
	<i>The degree of depreciation of the active part of the fixed assets</i>	<i>4.75%</i>	<i>5%</i>
	<i>Shares of fully depreciated fixed assets</i>	<i>5.2%</i>	<i>12%</i>
<i>Food supply security</i>	<i>The gross grain harvest</i>	<i>61674.3million tons</i>	<i>61818.4million tons</i>
	<i>The share of food, received on imports in total food resources</i>	<i>21.3%</i>	<i>20.1%</i>
<i>Social security</i>	<i>Volume of real disposable income</i>	<i>32189yuan</i>	<i>21966yuan</i>
	<i>level of per capita income</i>	<i>32188.8yuan</i>	<i>21966.2yuan</i>
	<i>the average monthly pension</i>	<i>2940yuan</i>	<i>2251yuan</i>
	<i>The ratio of incomes of the most prosperous and least secured population</i>	<i>4.6</i>	<i>4.07</i>
	<i>Index of income concentration</i>	<i>27540yuan</i>	<i>21966yuan</i>
	<i>The proportion of the employed population with secondary and higher education</i>	<i>90%</i>	<i>96.3%</i>
	<i>The share of the unemployed in the economically active population</i>	<i>5.2%</i>	<i>4.05%</i>
<i>Demographic security</i>	<i>Life expectancy</i>	<i>77.9</i>	<i>76.3</i>

Compared with 2015 and 2020, GDP is much higher, but the growth rate is not as fast as that of 2015. From the consumption decision theory, a conclusion can be drawn: as long as the marginal propensity to consume increases with income, the fluctuation of consumption growth rate must be lower than that of GDP growth rate. That is to say, in the economic recession, consumption will fall slower than GDP, but in the economic boom, consumption will rise slower than GDP. Therefore, consumption can only "grow steadily", but it cannot "drive growth". Demand-side growth can only be driven by investment or export. From the production point of view, the economic performance in 2020 is mainly as follows: GDP will increase by 2.3% in 2020, and the achievement will not be easy.

In the first quarter, it was severely impacted by the COVID-19 epidemic, and it will recover quarter by quarter after the second quarter, and the growth rate in the fourth quarter will exceed the same period of last year; The growth rate of the added value of the secondary industry took the lead in rapid recovery in the second quarter, and then steadily rose quarter by quarter, with the construction and manufacturing industries making outstanding contributions; The added value of the tertiary industry maintained a rapid recovery trend after the second quarter, and the added value of most industries achieved positive growth throughout the year.

In 2020, the national general public budget expenditure increased by 2.8% year-on-year, and the general public services, education, health care, national defense, foreign affairs, public security and other expenditures related to government consumption increased slightly. However, due to the large drop in

household consumption expenditure, the final consumption expenditure jointly determined by household consumption expenditure and government consumption expenditure will drop, and the final consumption expenditure will push down GDP by 0.5 percentage points in 2020.

From the perspective of income, the main performance of economic operation in 2020 is as follows: the growth rate of per capita disposable income of residents in the whole country will rise quarter by quarter, and the actual growth rate of the whole year will basically keep pace with the economic growth rate; The growth rate of total profits of industrial enterprises above designated size is rising quarter by quarter, and the annual growth rate is higher than that of the previous year; The growth rate of general public budget revenue in China shows a V-shaped trend, employment is still under pressure, and the growth rate of residents' income is low.

In social security, both per capita income and pension have increased. In life expectancy, with the development of science and technology, life expectancy will increase in 2020 compared with 2015. Although the national urban unemployment rate dropped to 5.2% in December 2020, which was the same as the same period of last year, there were 11.86 million new jobs in cities and towns nationwide in 2020, a decrease of 1.66 million from the previous year. The Ministry of Education predicts that the number of college graduates will reach 9.09 million in 2021, an increase of 350,000 over 2020. The contradiction between the limited number of jobs and the increasing number of graduates means that the employment pressure is still severe. In 2020, the nominal and actual growth rate of per capita disposable income in China is lower than that of the previous year, which may reduce residents' consumption tendency and put pressure on consumer demand. The uncertainties and challenges faced by China's economic development in the international community have increased sharply. First, the COVID-19 epidemic has severely impacted the economies of many countries.

The world has entered the deepest economic recession since the Second World War, and the economy is facing a difficult recovery period, which has brought challenges to China's traditional development mode outside the market. Second, in recent years, anti-globalization has been on the rise, and the epidemic situation has further aggravated the trend of anti-globalization. With the normalization of epidemic prevention and control, the frequency of international investment, culture, tourism and other activities has decreased, the global industrial chain may face a new layout, and the development mode of China with traditional resources outside is also facing challenges. Third, although Biden's election has reduced the uncertainty of Trump administration's decision-making, the game between China and the United States is long-term. President Biden of the United States has clearly put forward the policy of "the United States re-leads the world", which is likely to unite with other western countries to block and suppress China's technology, science and technology and other fields, which also brings challenges to China's development mode with traditional technology.

3. CHINA'S NATIONAL ECONOMIC SECURITY IN THE EXTERNAL SPHERE: TENDENCIES, FACTORS AND INDICATORS

China's international trade and economic cooperation has gradually increased. China's participation in international trade also has grown rapidly during the period of reform, and its share of world trade has risen a lot. Chinese economic reforms not only spurred an enormous growth in trade, but the reforms have transformed the commodity composition as well, aligning China's pattern of trade more closely with its true pattern of comparative advantage (table 5).

Table 5

International Trade and Economic Cooperation

Item	2015	2016	2017	2018	2019
1	2	3	4	5	6
Import and Export of Goods	245502.9	243386.5	278099.2	305008.1	315627.3
(RMB 100 million yuan)					
Exports	141166.8	138419.3	153309.4	164127.8	172373.6
Imports	104336.1	104967.2	124789.8	140880.3	143253.7
Balance	36830.7	33452.1	28519.6	23247.5	29119.9
Import and Export of Goods	39530.3	36855.6	41071.4	46224.2	45778.9
(USD 100 million)					
Exports	22734.7	20976.3	22633.5	24866.8	24994.8
Imports	16795.6	15879.3	18437.9	21357.3	20784.1

<i>Balance</i>	5939.0	5097.1	4195.5	3509.5	4210.7
<i>Import and Export of Services</i>	6541.6	6616.3	6956.8	7918.8	7850.0
<i>(USD 100 million)</i>					
<i>Exports</i>	2186.2	2095.3	2280.9	2668.4	2836.0
<i>Imports</i>	4355.4	4521.0	4675.9	5250.4	5014.0
<i>Balance</i>	-2169.2	-2425.7	-2395.0	-2582.0	-2178.0
<i>Inward Foreign Direct Investments</i>	1262.7	1260.0	1310.4	1349.7	1381.3
<i>(USD 100 million)</i>					
<i>Newly Established Foreign-Invested Enterprises</i>	26575	27900	35652	60533	40888
<i>(FIEs) (unit)</i>					
<i>Registered Foreign-Invested Enterprises</i>					
<i>Number of Registered Enterprises (household)</i>	481179	505151	539345	593276	627223
<i>Total Investment (USD 100 million)</i>	45390.2	51240.1	68992.4	77738.0	88400.3
<i>Registered Capital (USD 100 million)</i>	26681.6	31243.4	37107.2	42738.6	50159.7
<i>Capital from Foreign Investors</i>	20756.7	23918.5	28266.2	32341.9	37894.5
<i>Outbound Direct Investment</i>	1456.7	1961.5	1582.9	1430.4	1369.1
<i>(USD 100 million)</i>					
<i>Economic Cooperation with Foreign Countries & Regions</i>					
<i>(USD 100 million)</i>					
<i>Contracted Value of Contracted Projects</i>	2100.7	2440.1	2652.8	2418.0	2602.5
<i>Value of Turnover Fulfilled of Contracted Projects</i>	1540.7	1594.2	1685.9	1690.4	1729.0

Source: China's Statistical Yearbook, 2020

According to the structure of the state economic security described in the chapter 1 of the master's thesis, the external security subsystem includes technological, commercial and financial components.

COMMERCIAL COMPONENT OF CHINA'S EXTERNAL ECONOMIC SECURITY

One of the most important threat to China's external economic security is the high reliance on exports and susceptibility to fluctuations in global economy (figure 3).

Once trade liberalization began, and the leadership allowed market prices rather than planners to guide exports and imports, trade flourished. Economic incentives to export such as a more realistic exchange rate, the rebate of indirect taxes on processed exports, the duty drawback on inputs used in processed exports, the reduction of barriers to export, and the growing role of foreign-funded firms as exporters fueled an explosion of Chinese exports. That in turn provided the foreign exchange to finance a dramatically higher volume of imports.

By 2000, China had become the world's seventh largest trading nation and the second most important destination for foreign direct investment. But, as Lardy points out, China still maintained high levels of protectionism in selected sectors and was far from meeting international rules for protecting intellectual property rights. Joining the WTO would help open China's markets, further domestic economic reform, and bring China into closer compliance with the rules of a liberal international trading regime.

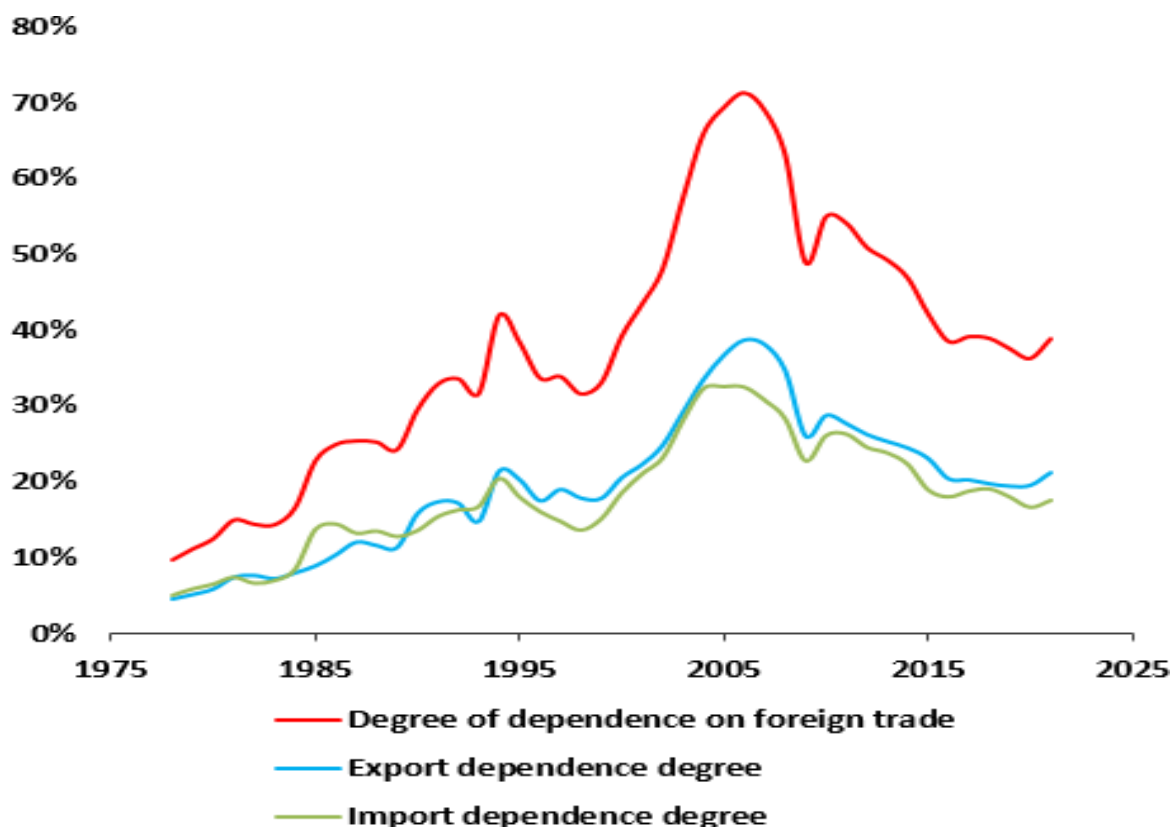


Figure 3 – Trend of China's dependence on foreign trade, 1978-2021

The China's accession to the WTO has also had a huge impact and impact on the country's export trade pattern. It has made China's exports face new national economic security challenges while coping with the negative impact of the Asian financial crisis that has not yet been completely eliminated. challenge.

Since the reform and opening up in 1978, China's foreign economy and trade have developed rapidly. In 1978, China's export value was only 9.57 billion yuan per US dollar. By 2002, it had reached 325.57 billion US dollars, an increase of 33 times from the current price. The total export trade volume grew at an annual average rate of 16.4%, surpassing national production in the same period. The average annual growth rate of gross GDP. In 1997, China became one of the world's top ten export trading nations. In the next few years, the proportion and ranking of my country's export trade in the world's total exports continued to rise.

The outbreak of the US subprime mortgage crisis in 2008 brought a serious impact to the world economy. Under the correct leadership of the party, the Chinese economy was able to quickly resume stable operations. In 2010, China became the world's first exporter and second largest importer, and it has remained for three consecutive years. In 2013, China's total import and export of goods surpassed the United States, becoming the world's largest trading country in goods.

In 2018, China's total import and export of goods was 4.623 trillion U.S. dollars, ranking first in the world for two consecutive years following 2017. As the U.S. unilaterally expanded trade frictions again and the U.S. set up more stringent and unreasonable trade barriers, Sino-U.S. trade was greatly impacted. In 2018, the EU replaced the United States as China's largest trading partner, with a total import and export volume of 4,316.12 billion U.S. dollars. The United States retreated to second place with an import and export volume of US\$401.72 billion, and the import and export volume between China and ASEAN countries ranked third at US\$372.15 billion.

Affected by the subprime mortgage crisis that broke out in mid-to-late 2008, the total import and export trade volume in 2009 dropped from US\$25,63.26 billion in 2008 to US\$2207.54 billion. Its growth rate fluctuated sharply, from 17.8% in 2008 to -13.9% in 2009, reaching the lowest value in the 11 years from 2008 to 2019. After the subprime mortgage crisis, the Chinese government issued a series of policies aimed at economic cyclical fluctuations to stabilize the domestic market. When the global economy was in recession, China's economy faced difficulties and the policy had achieved obvious results. After 2009, import and export trade began to rebound and showed relatively rapid growth. In 2010

alone, it surpassed the 2008 level. After reaching the peak in 2014, there was a cyclical decline. Although 2016 was affected by the trade war provoked by the United States, China's import and export trade remained stable, and the import and export trade continued to grow from 2016 to 2018. With the expansion of unilateral trade frictions in the United States, the total import and export volume in 2019 fell to US\$457.13 billion.

At the same time, we should also see that behind the high growth of China's

exports, there are many deep-seated contradictions and problems that have been exposed after the outbreak of the Asian financial crisis. After the Asian financial crisis, affected by many factors, my country's export growth rate dropped sharply. The export growth rate dropped from 21% in 1997 to 1% in 1998. Foreign trade exports once fell into an embarrassing situation of stagnation. The China's accession to the WTO has also had a huge impact and impact on the country's export trade pattern. It has made China's exports face new national economic security challenges while coping with the negative impact of the Asian financial crisis that has not yet been completely eliminated challenge.

Overall, despite significantly rising domestic and international risks and challenges, China's foreign trade scored both steady growth in quantity and continuous improvement in quality throughout the year of 2020.

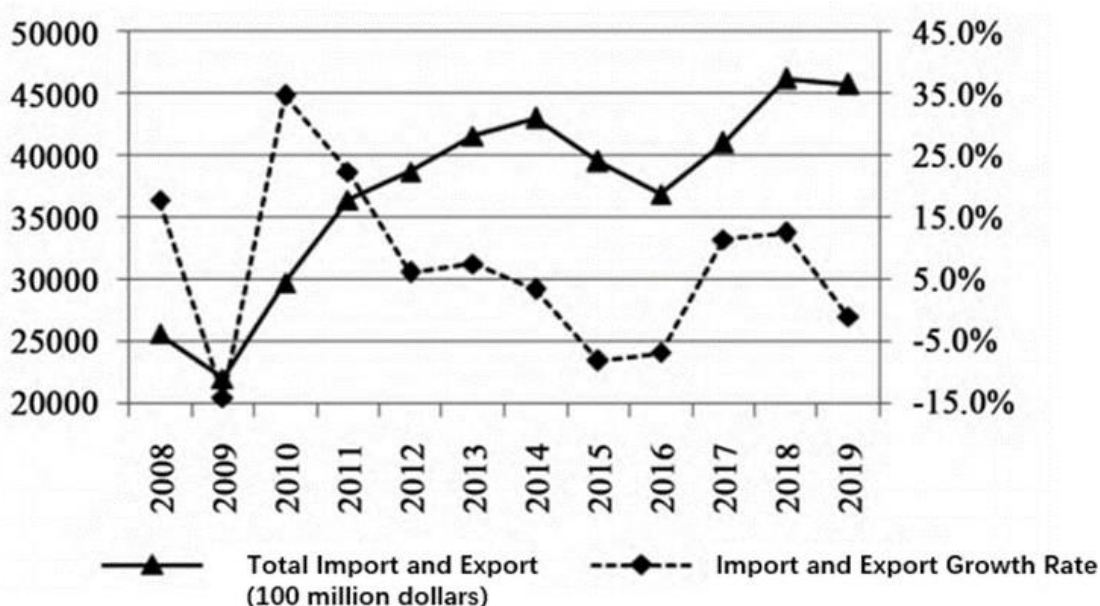


Figure 4 – Import and Export Trade Volumes and Growth Rates in 2008-2019

The analysis of the data in the figure 4 shoes the perspective of the import and export growth rate curve, the curve presents a dynamic trend of great ups and downs. The growth rate gradually dropped from 17.8% in 2008 to -13.9% at the bottom of 2009, and then rapidly increased to 34.7% the following year, with a peak difference of up to 48.6%. After that, it dropped rapidly to 6.2% in 2012, and then declined to varying degrees, until it recovered in 2016, and then dropped to

-1% in 2019. It can be seen that the growth rate of import and export trade volume has fluctuated with a relatively large low-bending curve, and the rate of change has been volatile in recent years.

Trade has become an increasingly important part of China's overall economy, and it has been a significant tool used for economic modernization. As reported by WTO in 2020, exports of goods in 2019 were USD 2,499.4 billion and imports USD 2,078.4 billion, while exports and imports of services in 2019 reached USD

281.6 billion and USD 497 billion respectively. According to the World Bank data of 2019, China's trade surplus for goods stood at USD 425.2 billion, an increase from USD 395.1 billion in 2018. The overall trade balance (including services) was USD 164.1 billion in 2019, from 103 billion the previous year (table 6).

Table 6

China's foreign trade main indicators in 2015-2019

Foreign Trade Values	2015	2016	2017	2018	2019
Imports of Goods (million USD)	1,681,951	1,587,431	1,843,793	2,135,748	2,078,386
Exports of Goods (million USD)	2,274,949	2,098,161	2,263,345	2,486,695	2,499,457
Imports of Services (million USD)	466,330	453,014	464,133	520,683	496,967
Exports of Services (million USD)	285,476	208,488	226,389	269,697	281,651

Exports of Goods and Services (million USD)	2,560,425	2,306,649	2,489,734	2,756,392	2,781,108
Imports of Goods and Services (million USD)	2,148,281	2,040,445	2,307,926	2,656,431	2,575,353
Trade turnover in Goods and Services (million USD)	4,708,706	4,347,094	4,797,660	5,412,823	5,356,461
Trade balance in Goods and Services (million USD)	412,144	266,204	181,808	99,961	205,755
Foreign Trade (in % of GDP)	39.5	36.9	37.6	37.5	35.7
Imports of Goods and Services (% of GDP)	18.1	17.3	17.9	18.3	17.3
Exports of Goods and Services (in % of GDP)	21.4	19.6	19.7	19.1	18.4

Source: World Trade Organization (WTO).

The analysis of the information presented in the table 6 shows that in 2019 China's exports of goods and services was 2781108 million USD dollars, the share of exports in GDP (export quota) was 18,4%. The trade turnover was 5356461 million USD dollars, and trade balance was positive 205755 million USD dollars.

Thanks to its enormous trade surplus over the past few years, China has become the world's largest exporter and ranks second among the world's largest importers. Despite its strict policies, the country is fairly open to foreign trade, which represented 35.7% of its GDP in 2019 (World Bank, 2020).

At the same time nowadays we can a tendency of decreasing of positive trade balance in China. Compared to 2015, the trade turnover increased in 13%, while the positive trade balance decreased in 20.6%. From one side, this a negative trend, from the other side, it reflects the change of China development strategy from export-oriented to domestic demand oriented. At the same time, it still means the high dependence of China's production on imports.

FINANCIAL COMPONENT OF CHINA'S EXTERNAL ECONOMIC SECURITY

Since China's reform and opening up in 1978, thousands of foreign-funded companies have entered China. In 1979, the first home appliance company and the first foreign-funded company to enter the mainland market was Matsushita Electric. Pierre Cardin, who has just passed away, was the founder of Pierre Cardin, the first foreign-funded apparel company to enter China, KFC, the first to open a fast food chain brand in China, IBM, which entered China in 1979, and Volkswagen, etc. The leading company in the industry. The investment, establishment and business development of these foreign companies in China have played a very important role in China's economic take-off. On the one hand, foreign companies have brought advanced technologies, products and management systems and management experience. On the other hand, they have been in the past few years. Cultivated a large number of outstanding industry talents, these industry talents have also led to the great development of various industries in China, as well as the rapid advancement of industry technology and management level, and enhance the competitiveness of various industries in China, which will help China quickly enter and occupy the world after its entry into the WTO. The market has laid a very important talent foundation for becoming the world's second largest economy.

China is one of the leaders in the world in FDI inflows and its FDI outflows also grow rapidly in recent years.

According to UNCTAD's latest Global Investment Trends Monitor released on 24 January 2021, Global foreign direct investment (FDI) flows fell 42% worldwide in 2020 compared to 2019, but grew 12% in East Asia. In this global context, China's FDI increased by 4% during the same period of time, a result helped by an 84% rise in the value of Mergers and Acquisitions transactions, mostly in information services and the e-commerce industries. In 2019, seven of the top 20 host economies were developing economies.

A host of factors influence FDI in China, such as availability of world investment capital, stability, government regulatory policy and local Chinese market and business climate.

Capital Availability National government policies can be a double-edged sword, especially those that favor state entities at the expense of privately-held firms, as is the tradition in China. This has historically made China a less favorable investment destination, where investors looking to set up manufacturing facilities there have encountered high start-up costs, heavy legal exposure, and other compliance entanglements. On the other hand, the Chinese government promotes investment in commercial and entrepreneurial activities by providing attractive financial incentives in the form of tax

breaks, grants, low-cost government loans, and subsidies. Such government-sponsored inducements can ultimately boost profitability, and help businesses succeed quicker.

The sheer size of China's population makes it an attractive nation for investors to commit capital to higher-end industries like healthcare, information technology, engineering, and luxury goods. Furthermore, economic growth and FDI can start a "success domino effect." In essence, the more FDI a region attracts, the more it grows, which in turn stimulates more FDI, to create overall sustained growth.

DYNAMICS OF FDI INFLOWS IN CHINA.

After China's accession to the World Trade Organization, a rapid momentum of foreign investment began. The investment industry has become more and more widely distributed, and remarkable results have been achieved in all aspects.

In 2019, China was ranked the world's second largest FDI recipient after the United States and before Singapore (figure 5). The country is the largest recipient in Asia. The implementation of projects and the expansion of production investments, such as those of BASF (Germany), Exxon Mobil (USA) and automotive multinationals such as Tesla (USA), Toyota (Japan), Volkswagen and Daimler (both German), have helped to sustain growth.

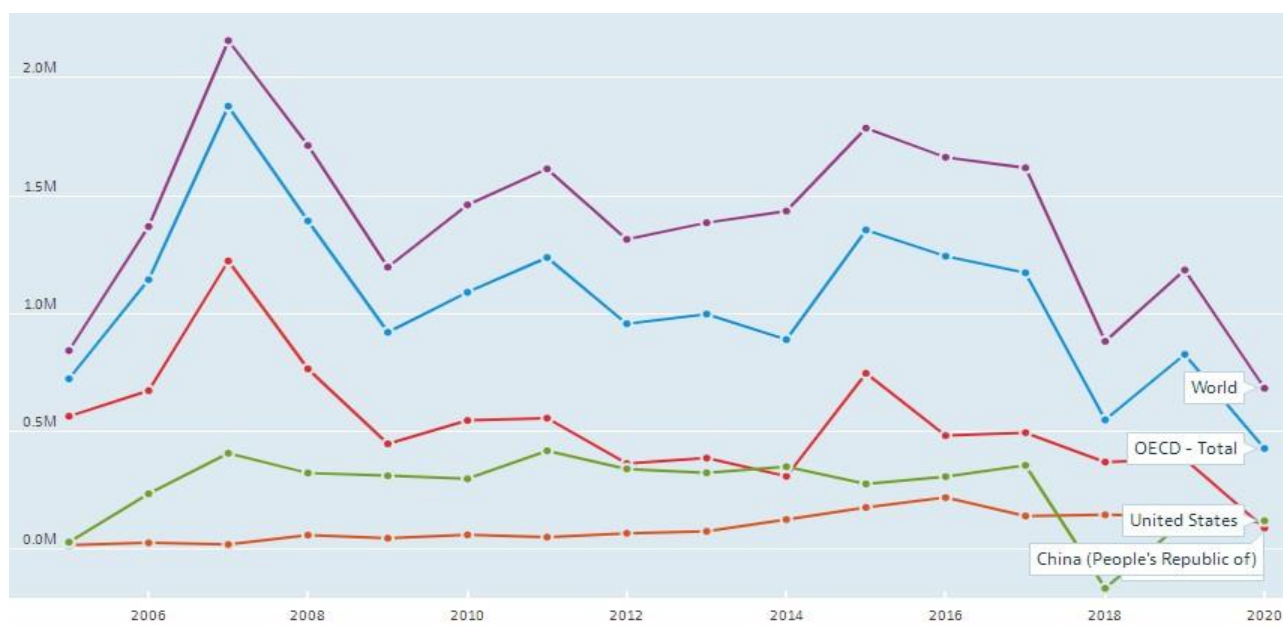


Figure 5 – FDI flows Inward, Million US dollars, 2005 – 2020

China was ranked 31st out of 190 countries in the World Bank's 2020 Doing Business report, a major improvement from 2019, when it was ranked 46th out of 190. China was one of the top 10 economies to improve the most between the 2019 and the 2020 reports. This progress reflects improvement in a wide array of subcomponents ranging from procedures for starting a business to measures to improve electricity access and get construction permits. The country demonstrated reform agendas that aim to improve the business regulatory environment in the country over the course of several years. The reforms mainly focus on increasing the efficiency of business processes, such as tax cuts, trade with tariff cuts, and reduced barriers to foreign investors. In order to attract further foreign investment, the country has introduced mechanisms to improve the delivery of major foreign investment projects, reduce import tariffs, streamline customs clearance, and establish an online filing system to regulate FDI. With a wealth of employees and potential partners eager to learn and evolve, the country is a base for low cost production, which makes it an attractive market for investors. Nevertheless, certain factors can hinder investments, such as China's lack of transparency, legal uncertainty, low level of protection of intellectual property rights, corruption or protectionist measures which favour local businesses. FDI inflows to the high-tech sector have been rising significantly and currently account for almost a third of total inflows.

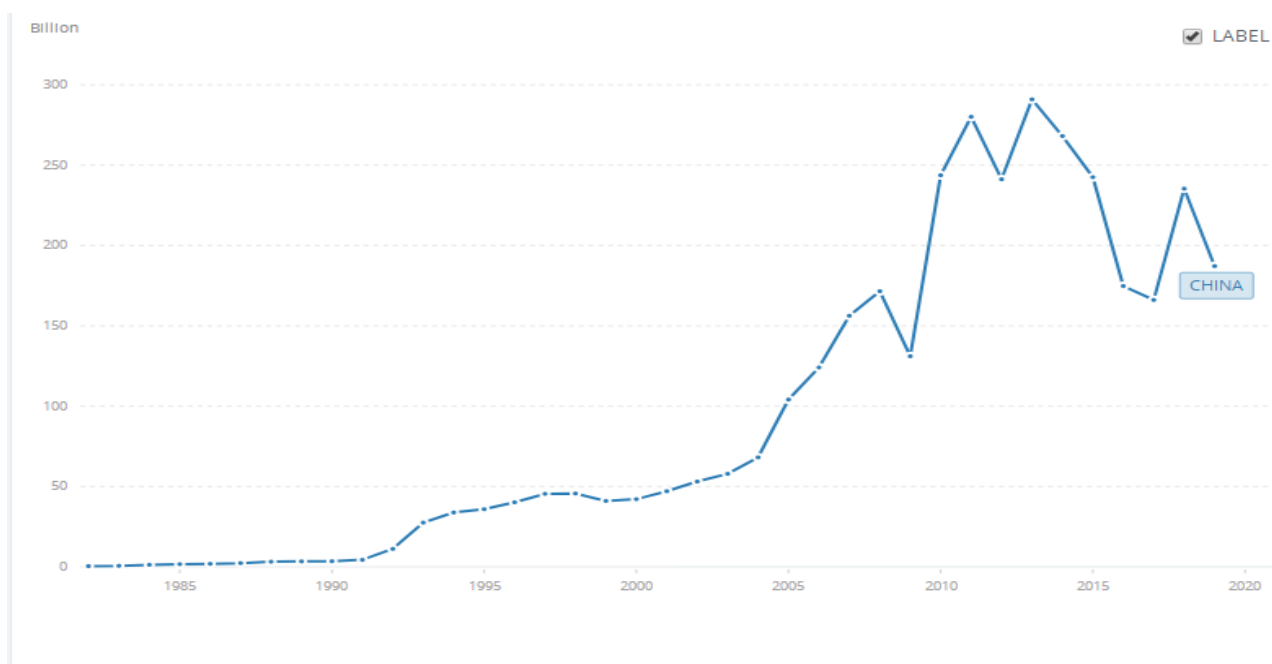


Figure 6 – Foreign direct investment, net inflows (BoP, current US\$) - China

Source :<https://data.worldbank>

This statistic displays the value of foreign direct investment (FDI) inflows to China from 2010 to 2020. In 2020, the value of FDI inflows to China amounted to approximately 187.17 billion U.S. dollars (figure 6).

Table 7

Utilization of Foreign Capital

Year	Number of Projects (unit)		Total Amount of Foreign Investment Actually Utilized (USD 100 million)	
		Foreign Direct Investment		Foreign Direct Investment
1	2	3	4	5
1985	3145	3073	47.60	19.56
1990	7371	7273	102.89	34.87
1995	37184	37011	481.33	375.21
2000	22347	22347	593.56	407.15
2001	26140	26140	496.72	468.78
2002	34171	34171	550.11	527.43
2003	41081	41081	561.40	535.05
2004	43664	43664	640.72	606.30
2005	44001	44001	638.05	603.25
2006	41473	41473	698.76	658.21
2007	37871	37871	783.39	747.68
2008	27514	27514	952.53	923.95
2009	23435	23435	918.04	900.33
2010	27406	27406	1088.21	1057.35
2011	27712	27712	1176.98	1160.11
2012	24925	24925	1132.94	1117.16
2013	22773	22773	1187.21	1175.86
2014	23778	23778	1197.05	1195.62
2015	26575	26575	1262.67	1262.67
2016	27900	27900	1260.01	1260.01
2017	35652	35652	1310.35	1310.35
2018	60533	60533	1349.66	1349.66
2019	40888	40888	1381.35	1381.35

Source: China's Statistical Yearbook, 2020

DYNAMICS OF FDI OUTFLOWS IN CHINA.

Nowadays China's FDI outflows are growing quickly. Since 2000, China's outward foreign direct investment (OFDI) has grown at an accelerating rate as a result of a switch in government policy to strong encouragement of Chinese enterprises to "go global." The bulk of this investment has been into the primary and tertiary sectors, with relatively little so far going into manufacturing. Most has gone to Asia, but Chinese investment is now spreading throughout the world.

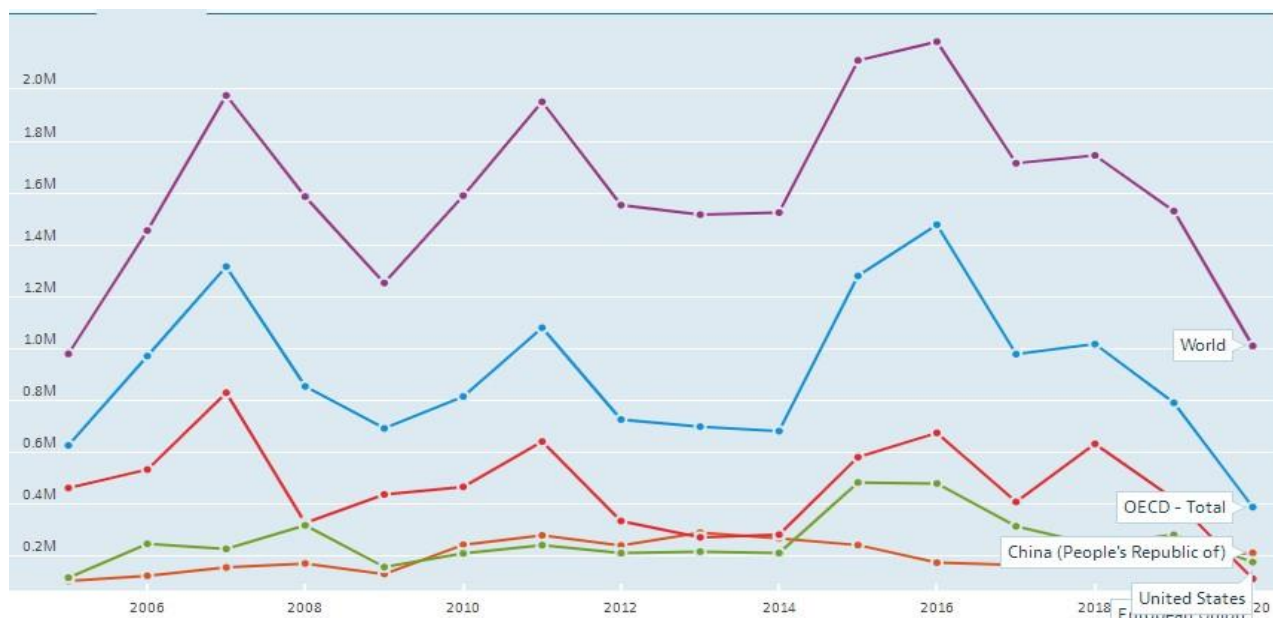


Figure 7 – FDI flows Outward, Million US dollars, 2005 – 2020

Source: Benchmark definition, 4th edition (BMD4): Foreign direct investment: financial flows, main aggregates

The statistics display the value of foreign direct investment (FDI) inflows to China from 2010 to 2020. In 2020, the value of FDI outflows to China amounted to approximately 109.922 billion U.S. dollars (figure 7).

The Government has been slow to tackle administrative obstacles to Chinese companies wishing to invest abroad, but has recently begun to relax them. The global crisis has presented opportunities for Chinese multinationals, which were less seriously affected than their counterparts in the developed world, to raise their stake in the world economy.

TECHNOLOGICAL COMPONENT OF CHINA'S EXTERNAL ECONOMIC SECURITY

Nowadays China's role in the international technological market is expanding. Developing countries in parts of Asia are taking some large strides in the area of high-tech development and world high-tech exports, accentuated by China beginning to overtake the US to lead the globe in this sector since 2000. In 2013 the world witnessed the US lose its leading place in high-tech exports to China, which surpassed the US as number one by nearly 6.5%. Other countries that are still developing and beginning to compete in the high-tech export market include Indonesia, Malaysia, South Korea, and Vietnam. Some economics experts think that their prospects could hinge on changes in government policy, political leadership, and in business practices. These countries remain near the top 20 in high-tech exports across the globe, which is a good position to have as they continue to develop their role in the world trade market.

The global rank of countries by high tech exports is presented in the table 8 (first 60 countries of the rank 2019).

Table 8

High-technology exports by countries, current US dollars

<i>China</i>	<i>\$715 302 940 183,00</i>
<i>Germany</i>	<i>\$208 148 360 615,00</i>
<i>United States</i>	<i>\$153 923 490 830,00</i>
<i>Korea, Rep.</i>	<i>\$153 546 690 360,00</i>
<i>Singapore</i>	<i>\$150 031 230 830,00</i>
<i>France</i>	<i>\$120 534 304 793,00</i>
<i>Japan</i>	<i>\$103 896 710 397,00</i>
<i>Viet Nam</i>	<i>\$90 430 118 220,00</i>
<i>Netherlands</i>	<i>\$86 980 976 671,00</i>
<i>Malaysia</i>	<i>\$86 900 596 733,00</i>
<i>United Kingdom</i>	<i>\$76 894 056 310,00</i>
<i>Mexico</i>	<i>\$75 162 629 529,00</i>
<i>Thailand</i>	<i>\$40 141 556 044,00</i>
<i>Ireland</i>	<i>\$39 354 584 461,00</i>
<i>Czechia</i>	<i>\$37 656 863 124,00</i>
<i>Philippines</i>	<i>\$35 825 934 134,00</i>
<i>Belgium</i>	<i>\$33 078 387 589,00</i>
<i>Italy</i>	<i>\$32 548 431 190,00</i>
<i>Canada</i>	<i>\$31 536 892 938,00</i>
<i>Switzerland</i>	<i>\$29 872 166 791,00</i>
<i>India</i>	<i>\$23 470 537 791,00</i>
<i>Poland</i>	<i>\$19 829 127 576,00</i>
<i>Hungary</i>	<i>\$18 426 664 252,00</i>
<i>Sweden</i>	<i>\$17 416 511 319,00</i>
<i>Austria</i>	<i>\$15 959 507 308,00</i>
<i>Spain</i>	<i>\$15 036 520 591,00</i>
<i>Israel</i>	<i>\$12 563 738 000,00</i>
<i>Russian Federation</i>	<i>\$10 756 539 589,00</i>
<i>Denmark</i>	<i>\$9 579 549 585,00</i>
<i>Brazil</i>	<i>\$9 391 878 589,00</i>
<i>Slovak Republic</i>	<i>\$8 048 021 844,00</i>
<i>Romania</i>	<i>\$6 994 469 286,00</i>
<i>Australia</i>	<i>\$6 347 419 761,00</i>
<i>Indonesia</i>	<i>\$6 281 266 981,00</i>
<i>Norway</i>	<i>\$4 610 571 780,00</i>
<i>Finland</i>	<i>\$4 563 213 722,00</i>
<i>Turkiye</i>	<i>\$4 280 200 491,00</i>
<i>Portugal</i>	<i>\$3 594 679 150,00</i>
<i>Lithuania</i>	<i>\$2 526 907 344,00</i>
<i>Slovenia</i>	<i>\$2 333 128 839,00</i>
<i>Kazakhstan</i>	<i>\$2 247 383 121,00</i>
<i>Bulgaria</i>	<i>\$2 098 844 335,00</i>
<i>South Africa</i>	<i>\$1 832 830 758,00</i>
<i>Greece</i>	<i>\$1 778 203 351,00</i>
<i>Estonia</i>	<i>\$1 734 953 949,00</i>
<i>Latvia</i>	<i>\$1 469 863 747,00</i>
<i>Ukraine</i>	<i>\$1 165 828 545,00</i>
<i>Costa Rica</i>	<i>\$1 154 572 202,00</i>
<i>Morocco</i>	<i>\$1 017 946 700,00</i>
<i>Croatia</i>	<i>\$952 468 294,00</i>
<i>Tunisia</i>	<i>\$840 506 111,00</i>
<i>Luxembourg</i>	<i>\$790 975 094,00</i>
<i>Belarus</i>	<i>\$756 847 198,00</i>

Malta	\$754 560 019,00
Colombia	\$753 151 214,00
United Arab Emirates	\$679 396 253,00
Chile	\$672 133 557,00
New Zealand	\$572 744 454,00
Argentina	\$561 915 855,00

Source: The World Bank data

Not surprisingly, the top countries for high-tech exports also spend a great amount of money on the research and development (R&D) of high-tech commodities. As a matter of fact, in some cases they may be spending at ten or more times as much as their foreign competitors. The prospect for diverting an increased level of funding into R&D leaves plenty of room for other countries to develop their own technologies and fight for a position in global high-tech exports. However, new developments in the high-tech world means that smaller countries must strive to keep up. Keeping up with high-tech improvements might be a challenge, as new development takes money and some of the top contenders are still working to elevate their status from that of a poor developing country.

Most times, the cost of labor is cheaper in developing countries, so it comes as no surprise that the leading countries in exporting high-tech gadgets are often having their products created outside of their own countries. For example, China outsources its high-tech exports as joint ventures which may seem to increase the exports from those developing countries. Those countries have individuals who think about how to improve on the technologies that they see in the factory. This creates opportunities for technological advances in these countries, which may enhance the developing country's chances for competing on the world market for high-tech exports.

According to the figure 8, in 2020, China's exports of high-tech products exceeded that of the United States, and the overall scale showed a trend of continuous expansion. In terms of imports, it lags behind the United States. At the same time, the proportion of China's high-tech exports in China's foreign trade exports is increasing. The export of high and new technology shows a trend of continuous expansion, which proves that the export of high and new technology products in China develops rapidly and has a strong momentum.



Figure 8 – USA vs China 1960-2020: Exports, Imports, High Technology and Patents

Source: The World Bank data

On one hand, China's high-tech products mainly absorbed and transformed the technology of other countries, and the workload of R&D personnel would affect the absorption and transformation of foreign technology, thus significantly affecting the export of high-tech products. At the same time, the number of patent grants reflecting China's independent innovation ability has no significant impact on the export of high-tech products. After the financial crisis, on the one hand, the developed economies represented by the United States, in order to correct the imbalance of their own economic structure and the world

economy and maintain their central position and dominance in the world economic structure, changed their own economic policies and foreign trade policies, and imposed various restrictions on the export of technology and FDI.

On the other hand, China's technological level has been greatly improved, which has basically reached the international level. Most of the technologies can not rely on absorbing foreign technology to enhance their competitiveness, but can only rely on independent innovation to promote the export of high-tech products. Therefore, the number of patent authorizations reflecting the performance of technological innovation has a significant impact on the export of high-tech products.

Table 9

Statistics on Scientific and Technological Activities in China, 2015-2019

Item	2015	2016	2017	2018	2019
Statistics on R&D Input					
Full-time Equivalent of R&D Personnel (10 000 man-years)	375.9	387.8	403.4	438.1	480.1
Basic Research	25.3	27.5	29.0	30.5	39.2
Applied Research	43.0	43.9	49.0	53.9	61.5
Experimental Development	307.5	316.4	325.4	353.8	379.4
Expenditure on R&D (100 million yuan)	14169.9	15676.7	17606.1	19677.9	22143.6
Basic Research	716.1	822.9	975.5	1090.4	1335.6
Applied Research	1528.6	1610.5	1849.2	2190.9	2498.5
Experimental Development	11925.1	13243.4	14781.4	16396.7	18309.5
Government Funds	3013.2	3140.8	3487.4	3978.6	4537.3
Funds from Enterprises	10588.6	11923.5	13464.9	15079.3	16887.2
Ratio of Expenditure on R&D to GDP (%)	2.06	2.10	2.12	2.14	2.23
Statistics on S&T Outputs and Results					
Scientific Papers Issued (10 000 pieces)	164	165	170	184	195
Publication on Science and Technology (kind)	52207	53284	54204	53629	52067
Number of Major Achievements in Science and Technology (item)	55284	58779	59792	65720	68562
Number of National Invention Prizes Awarded (item)	66	66	66	67	65
Number of National Scientific and Technological Progress Prizes Awarded (item)	187	171	170	173	185
Number of Patent Applications (piece)	2798500	3464824	3697845	4323112	4380468
Inventions	1101864	1338503	1381594	1542002	1400661
Statistics on Export and Import of High-tech Products and Technical Market					
Total Value of Export and Import of High and New-tech Products (USD 100 million)	12033	11272	12515	14185	13685
Export	6552	6036	6674	7468	7307
Import	5481	5236	5840	6717	6378
Transaction Value in Technical Market (100 million yuan)	9836	11407	13424	17697	22398

Notes:

a) Since 2017; number of patent applications accepted change to number of patent applications. The same applies to the relevant tables following

b) Ratio of expenditure on R&D to GDP was revised by use of latest up dated historical data of GDP.

Data sources: China statistical yearbook 2020.

The table 9 shows that in 2012-2015 after the financial crisis, among the three factors of patent authorization number, R&D staff full-time equivalent and R&D internal expenditure, the number of patent authorization reflecting technological innovation performance significantly affects the export of high-tech products. In 2012-2020, the exports of high-tech products increased by 0,301% for every 1% increase in the number of patents granted in China.

CONCLUSION

Thus, state's economic security is a system composed of interrelated and complementary elements (components), and state's economic security level depends on the security of its each component. Moreover, we believe that all discussions which state that one of above mentioned components is more or less important, and more attention should be focused on state security. State economic security is a complex concept, and the whole security is connected to separate security levels of its components. Therefore, the primary task of the state is to provide appropriate security level for each component of state economic security, through which the state economic security will be guaranteed. It should also be noted that the constant changes in the world, taking place around the political, economic, social, military and other issues, also change the nature and content of economic security threats, and they demand equal and simultaneous changes in the policy of states' economic security system.

The academic circles have concentrated on the policy research of ensuring economic security, reaching consensus in some fields, but it also shows that the research vision of ensuring national economic security needs to be further expanded. It can be seen that the research fields of national economic security are complex, but the main lines of research are clear, and the depth and breadth of research are constantly improving with China's further opening to the outside world and accelerating its integration into globalization, which fully reflects the domestic scholars' grasp of the laws governing the safe operation of national economy under the background of globalization, and also reflects the maintenance of national economy.

Guaranteeing long-term economic security is a priority for the economic policy of any state. The effectiveness of any strategy of building economic security is largely dependent on recognising and optimising the utilisation of internal and external conditions. In 2018, China is celebrating the 40th anniversary of its reforms and opening-up which has led to the spectacular growth and impressive reduction of poverty. Over the past 40 years, the Chinese strategy of ensuring economic security has been successful. China has undergone tremendous changes from a centrally planned to market economy that have transformed an impoverished country into an economic power. Currently, the Chinese economy is an unattainable role model for many developing countries. However, we can observe that the economy of China is slowing down, because the sources which were the foundation of the growth are slowly losing their driving power. In order to ensure economic security in the long run and maintain a stable economic growth as well as avoid the middle income trap China has introduced the BRI. It should be stressed that the main motive behind the Chinese Belt and Road initiative is to develop transport and energy infrastructure which will allow China to gain access to natural resources and new markets. An efficient transport network will facilitate trade, while energy infrastructure will prevent problems with energy and resource supply, which the Chinese economy needs. The New Silk Road concept aims to use the advantages of the Chinese economy and the states participating in the initiative to stimulate its economic growth. Therefore, it is a strategy of providing long-term economic security.

China belongs to the fastest growing economies in the world, with a significant economic, demographic, and military potential as well as a growing international position. Within one generation China has transformed from a poor rural country into one of the main economic powers. Furthermore, during the 2008 economic crisis China's economy was one of the few which continued growing. However, nowadays we are witnessing an economic slowdown, because the current engines of growth are slowly losing their power to drive the Chinese economy. China needs new growth impulses to maintain stable economic growth and avoid the middle income trap. In order to overcome middle income trap and to sustain economic growth Xi Jinping has introduced the Belt and Road Initiative. This initiative comprises the land-based Silk Road Economic Belt and the sea-based 21st Century Maritime Silk Road. The Belt and Road Initiative is an ambitious long-term strategy focused on infrastructure development, promotion of broadly understood connectivity and integration between Asia, Europe and Africa. Since its announcement, the concept has been gradually gaining in importance and has finally become the key instrument of the Chinese foreign policy and a major element of economic development strategy. The aims of the paper are to identify the most significant internal and external factors affecting the economic

security of China and assess the importance of the Belt and Road Initiative for China's future development.

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FEATURES OF FINANCIAL CONTROL IN THE ERA OF DIGITALIZATION

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Abstract

In the context of the active introduction of digital technologies into the life of society, significant changes are taking place in the field of financial control. This thesis examines the key features of this process in the era of digitalization, highlighting several important aspects. The thesis emphasizes that adapting to the new realities of the digital age is an integral part of effective financial control, and successful organizations must strive to continually improve their methods and tools in this area.

Keywords: *finance, public finance, digitalization, transformation*

Introduction

In the modern era, one of the key directions of the country's development is the process of digital transformation, which is covering all areas of public activity. The economic transformation of the country is carried out using innovative technologies, such as robotization, artificial intelligence, internet of things and big data processing. The role of digitalization at the present stage of development of our society is quite enormous. This is determined by the fact that it affects almost all areas of everyday life, and in some cases it is simply impossible to do without it. Public finance, which is undergoing significant changes under the onslaught of the digital era, is no exception [1].

The result of the digitalization process will be the creation of a new world based on digital technologies, in which new values and management technologies arise. Digitalization is the integration of modern digital technologies into various areas of life and production, including science, education, economics, and even traffic management, and the list can be continued endlessly. This concept is actively used in every country without exception. This can be compared and equated in importance to the industrial revolution, and even called the fourth industrial revolution or digital revolution.

In modern countries, the main emphasis on the implementation of digitalization falls on the economy, which is gradually becoming "digital" thanks to data processing by using digital technologies. Digitalization of the financial sector is becoming an integral component of the development of the global economy. Progress in the field of information technology, resulting from advanced scientific achievements, opens up opportunities for improving the mechanisms and tools for conducting effective financial control in the public financial management system. Modern socio-economic conditions are significantly changing financial relationships in the country, which requires an in-depth study of these processes and modernization of the system of state financial control.

Literature review

Financial control is a set of activities and operations aimed at checking financial aspects and related issues in the activities of business entities and management bodies. This process is carried out using specific forms and methods of organization, which include analysis of financial statements, monitoring of budget processes, monitoring the fulfillment of financial obligations, and other tools aimed at ensuring effective management and financial stability.

Kaluzhsky defines the digital economy as a communication environment of economic activity on the Internet, as well as forms, methods, tools and results of its implementation [8]. Uksumenko claims that, digitalization of the economy significantly expands the possibilities of financial control [2]. Other authors believe that the importance of financial control in the field of financial management is quite large, since it ensures the functioning and compliance with state policy in the field of financial security [3]. Bakalo agrees with this opinion, and notes that today financial control is in serious danger, since with the development of computer technology and artificial intelligence (AI), a new type of crime inevitably begins to appear - cybercrime, which affects not only Internet users, but and the state [4].

Morozov also adheres to the opinion that the digitalization of the economy has a specific impact on financial control. The control process is simplified, the efficiency and accuracy of the response of the government entity increases, and administrative costs for carrying out control and supervisory activities

are reduced [5]. The digitalization of financial control, which is a “comprehensive legal and institutional transformation” [6], generally has a positive effect on the development of financial legislation. Information systems and digital services supporting public administration [7] simplify the procedure for collecting, processing and storing information about the financial and economic activities of controlled entities, and also lead to a reduction in administrative procedures that have long leveled the obligatory nature of financial legal relations.

Based on the opinions of the above authors, we can say that, financial control, characterized by activities such as analyzing financial statements and monitoring budget processes, plays a crucial role in ensuring effective management and financial stability. The advent of the digital economy, as noted by various authors, not only expands the possibilities of financial control but also introduces new challenges, such as cybercrime. However, digitalization simplifies the control process, enhances government response efficiency, and contributes to the positive transformation of financial legislation. Overall, the integration of digital tools positively impacts the effectiveness and efficiency of financial control in the evolving economic landscape.

Analysis and discussion

The use of digital tools is relevant in the work of control authorities who seek to obtain up-to-date and high-quality information about the activities of objects under their control or supervision. Digital forms of relationships in the field of control and supervision are changing the principles of control. There is a transition from an adversarial model, characterized by an emphasis on inspections and limited monitoring, to a partnership model, where the emphasis is on minimizing verification procedures, and monitoring becomes the basis of control activities.

The impact of digital transformation on the financial system is one of the most noticeable and profound, which is associated with the development of electronic government, the rapid spread of electronic payment services, lending without intermediaries, and interest in transactions in the blockchain and cryptocurrency. The future of the financial system is determined by four areas: digitization of payments, platform, sharing, big data. The state's task is to formulate “rules of the game” that are understandable to all actual and potential participants. In this aspect, first of all, we need to talk about creating a general environment of trust in the digital financial space. It should be noted that the digitalization of control activities in the field of public finance allows us to talk about the formation of new principles for control over public finances. In our opinion, these principles should look like this: the principle of minimizing risks when carrying out control activities, the principle of minimizing digital risk (cyber risk), the principle of non-interference of artificial intelligence in the activities of control subjects, the principle of simplicity of functioning of information technologies in control activities, the principle of information security. The latter principle is similar to the above-mentioned principle of minimizing digital risks, however, if the latter implies the protection of information entered on electronic media, the principle of information security proclaims the protection and protection of information in general [9].

Citizens and organizations subject to verification and monitoring activities express a clear interest in digital control. For them, the value of digital control is manifested in its positive changes, in the benefits that it brings to the practice of the control and supervisory sphere. Electronic and digital forms make interaction with regulatory authorities easier, making it more open and less burdensome. This reduces the burden on the objects of control and reduces the risks of corruption by eliminating direct interaction between participants in control activities.

Automation and typification of procedures in the field of control and supervision ensure maximum clarity and transparency of relationships. The activities of inspection bodies become open to inspected organizations. The latter have the opportunity to familiarize themselves with the requirements governing their activities, evaluate their digital profile on a daily basis, regularly receive information about emerging risks in work and technological processes, develop an action plan to eliminate violations and follow it without waiting for inspectors to arrive. This helps to increase the level of trust between subjects and objects of control.

Many countries are actively implementing various systems, including an integrated public financial management information system, to ensure transparency, openness and accountability of government at the state and municipal levels, as well as budgetary and extra-budgetary funds and institutions at both levels. This system also improves the quality of financial management of these organizations through the formation of a single information space. The Electronic Budget system is focused on a number of functionalities:

a) ensuring transparency of information about the financial position of public legal entities, state and municipal institutions, as well as the assets and liabilities of these organizations;

b) creation of a platform for the relationship between budget and strategic planning, monitoring the achievement of financial results in the process of implementing national programs and assessing the quality indicators of the performance of functions;

c) ensuring open access to information on the planned and actual financial results of government bodies, budgetary and extra-budgetary funds, as well as other organizations receiving funds from the country's budgets;

d) ensuring the interconnection of the processes of drawing up and executing budgets, maintaining accounting records, preparing reports and analytical information of entities and institutions of the country;

e) strengthening the connection between the budget process and procurement procedures to meet the needs of entities, place orders and fulfill contracts of national and municipal importance;

f) ensuring the connection of registers of expenditure obligations with the powers of entities in accordance with the law.

One of the main components of the Electronic Budget system is the Financial Control subsystem, designed to automate the functions of internal financial control. It provides control mechanisms in the field of finance and budget, as well as analysis of the activities of the main administrators of the corresponding budget within the framework of internal financial control. In addition, the subsystem performs functions related to departmental control by government authorities.

In order to ensure external control, the "Financial Control" subsystem provides external regulatory authorities with access to the data contained in the "Electronic Budget" system. This subsystem can also be used by executive authorities to implement control measures in relation to institutions under their jurisdiction.

Treasury authorities are showing interesting experience in the field of digitalization. They are one of the leaders in the use of information technology. The unified procurement information system used by the Treasury provides a high level of transparency in this area. This system not only converts all purchases into electronic format, but also integrates with other information systems. In addition, the Treasury has the ability to draw up protocols on administrative violations of the main managers of budget funds, which helps to unify the work of control bodies and reduce labor costs when conducting inspections compared to traditional methods of on-site inspections.

The introduction of digital technologies in state financial control is accompanied by a number of positive results. In particular, this includes saving time for participants in control and supervisory relations, reducing costs in the control process, switching to electronic storage media, preventing violations by control objects when entering data, ensuring access to the necessary information and the possibility of conducting counter checks.

However, it is worth highlighting a number of problems that financial control authorities may encounter when introducing digitalization of economic processes:

Delay in the process of updating the regulatory framework, lagging behind developing IT technologies, since the introduction of digital technologies occurs faster than the development of relevant regulatory documents.

Slow adaptation of employees to new IT technologies in comparison with the pace of implementation of the latter.

Risks associated with the use of personal data when identifying an individual in the digital space and carrying out economic transactions, which can lead to a possible leak of important information.

To solve these problems in the field of digitalization of state financial control, the following steps can be taken:

Updating the regulatory framework:

- Carrying out systematic monitoring of the development of IT technologies and the formation of a flexible regulatory framework that quickly responds to new digital trends.

- Implementation of mechanisms for rapid updating and correction of regulations in accordance with changes in the digital environment.

Adaptation of employees to new IT technologies:

- Conducting training programs and training for staff with an emphasis on the use of new digital tools.

- Implement step-by-step, easy-to-learn IT solutions with support from technical staff for advice and support.

Personal data risk management:

- Development and implementation of strict security protocols for the processing and storage of personal data.

- Implementation of modern encryption and authentication systems to ensure information security.

- Regular updating of security systems in accordance with the latest standards and requirements.

In addition, it is important to establish clear accountability mechanisms for compliance with digital standards and ensuring data security at all levels of government. This will allow us to more effectively solve problems associated with digital transformation in the field of financial control.

Establishing clear accountability mechanisms for compliance with digital standards and ensuring data security at all levels of government is a key factor for the successful implementation of digital transformation in the field of financial control. This approach not only minimizes possible risks and challenges associated with digital technologies, but also contributes to more effectively achieving the goals and objectives of regulatory authorities.

First and foremost, the roles and responsibilities of employees responsible for digital security and compliance need to be clearly defined. This includes the creation of special units or the appointment of responsible persons to ensure the implementation, support and monitoring of digital systems. Each level of government structure must have its own person responsible for information security and digital processes.

Next, it is important to provide resources to continually update security systems and ensure they comply with the latest technology standards. This includes investing in modern security tools, ongoing staff training and hiring qualified digital security experts.

The final point is to implement control and monitoring systems that allow you to quickly identify and respond to potential threats. This includes regular security audits, monitoring network activity and updating security procedures to reflect changes in the digital environment.

Conclusion

In general, clear accountability mechanisms and safety nets provide a strong foundation for successful digital transformation in financial controls. This not only provides protection against possible threats, but also contributes to the effective work of control authorities, creating conditions for optimal use of the advantages of digital technologies in achieving the strategic goals of the financial sector.

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Medical sciences

SLEEP AND ITS IMPACT ON THE CONDITION OF STUDENTS

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Introduction. Sleep has the significant role in overall human health. The quality of sleep directly influences physical and emotional well-being. Sleep deprivation, particularly insomnia, can contribute to a state of allostatic overload, disrupting brain neuroplasticity and stress-immune pathways, thereby contributing to mental disorders [3]. Inadequate sleep negatively affects memory acquisition and retention in both vertebrates and invertebrates. Sleep is also a homeostatic process influenced not only by wakefulness duration but also by neural activity and plasticity [2]. Long-term sleep improvement measures were discussed, including recommendations for sleep duration (7 to 9 hours), maintaining a consistent sleep-wake schedule, regular sleep patterns, regular physical exercise, and avoiding certain substances at the end of the day [1].

Acute sleep loss leads to cognitive function impairment, memory deficit, depressive mood, and episodes of involuntary daytime sleep. Furthermore, prolonged sleep restriction increases the risk of depression, type II diabetes, obesity, and cardiovascular diseases [4]. Long-term studies have established that sleep positively influences memory retention. Sleep, a brain state optimizing memory consolidation, differs from the wakeful brain, which is optimized for encoding memories. Consolidation occurs through the reactivation of recently encoded representations in neural memory, happening during slow-wave sleep, transforming these representations for integration into long-term memory [5].

The purpose of the study. The study of the influence of sleep quality and duration on the condition of students and their academic performance

Materials and methods. To study the impact of sleep quality and duration on students' performance, we conducted a survey among first-year medical students using a questionnaire we developed. The survey included 382 participants, with 50.3% males and 49.7% females. The questionnaire was administered through a Google Docs form, consisting of nine questions related to daily routine adherence, sleep duration and quality, etc.

Result and discussion. Of the respondents, 86% entered university after completing high school, 14% after academic lyceums and colleges. The first two months of university life were identified as the most challenging for adaptation due to changes in the environment, habits, lifestyle, and increased responsibility. During the survey, it was revealed that 70.6% of students did not adhere to a daily routine. Failure to follow a daily routine leads to rapid fatigue, reduced performance, and decreased attention span.

Despite their busy schedules, most students prefer reading information on their phones or tablets in their free time. The increased use of gadgets today contributes to dependence, negatively impacting sleep quality. Depression, anxiety, and worsened sleep quality are associated with excessive smartphone use. Before sleep, 84.5% of surveyed students preferred reading information on their phones or tablets, with around 40% reporting difficulty falling asleep. The results showed that responses did not depend on the respondents' gender.

Regarding students' well-being in the mornings, 50.2% felt tired and weak upon waking up. A significant number of people across all age groups, from infants to the elderly, prefer daytime naps. Sleep in the second half of the day restores wakefulness and promotes productivity and learning. Most students face inconsistency in sleep patterns between weekdays and weekends. Of the respondents, 22.5% stated a preference for daytime sleep on weekdays, while 43.7% preferred resting during the day only on weekends.

Analysis of the responses revealed that about 60% of students sleep less than 7 hours, with 23.8% frequently waking up at night. Persistent sleep deprivation disrupts attention, concentration, and causes

drowsiness during classes. Our data showed that 65% of students feel drowsy during the first class and often resort to drinking coffee or energy drinks for alertness.

In conclusion, our survey indicated that first-year students face issues with falling asleep, sleep duration, leading to morning drowsiness and impaired attention. For better assimilation of educational material, students should adhere to a daily routine, eat properly, and sleep for at least 7-8 hours. Excessive engagement with gadgets, especially before bedtime, also has a negative impact on sleep

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SEXUAL DREAMS AS AN INDICATOR OF SEXUAL STATUS

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Abstract

The issues of the influence of real events in the intimate area, as well as the physical condition of a person on the content of dreams of sexual content are considered. It is emphasized that dream analysis makes it possible to clarify the characteristics of the sexual state of a healthy person, as well as those with sexual problems or sexual and mental disorders. A system for analyzing sexual and erotic dreams and options for an intimate scenario of a sexual dream are presented.

Keywords: dreams, sexual development, anorgasmia, partner conflicts, pseudosexual dreams, dream analysis

The modern theory of continuous sleep treats dreams as part of the general mental process of a person, which affects behavior in the waking state, and the dreams themselves depend on the situation in reality. [1, 2, 3, 4, 5, 6]

In this way, the ideas of S. Freud are realized, gradually incorporating manifestations of both the unconscious and real life, education, external influence [7, 8, 9, 10, 11, 12].

But human nature is dual: he is an animal, a mammal, having all the instincts of any other animal. And at the same time, a person has mental processes, socialization, and the ability for abstract thinking, which no other living creature has. Therefore, the modern attitude towards dreams is fundamentally different from the views of S. Freud, since the psyche is still secondary in relation to the physicality [13].

This position allows us to consider dreams, first of all, as a reflection of real reality, and only then as a way of influencing behavior outside of dreams [14].

Dreams of sexual content are common to both sexes. [15, 16, 17]. [18] showed that, based on the results of an analysis of 3500 self-reports on the topic of sexual dreams, completed by both men and women, the scenarios of such dreams contained situations about sexual intercourse and/or sexual contact, masturbation, oral sex, kissing, sexual adventures and fantasies. [19] demonstrate that the content of dreams in certain age groups of people (for example, students) changes very little from generation to generation.

The bodily part of our existence has a strictly defined system, and all processes in the body are interconnected, and mental processes are also subject to physiological changes. Therefore, the features of sexual dreams directly depend on the level of development of sexuality and its changes in the process of growing up and aging. These same patterns are inherent in both healthy people and those with disorders in any area of the body or psyche. Dream analysis allows us to draw conclusions about the current state, as well as what processes took place in the past - including the problems of maturation of sexuality during childhood and adolescence [20, 21, 22, 23].

Sexuality is a set of emotional experiences and behavioral acts caused by sexual desire [24], that is, the psychological mediation of a physiological process [24].

Sexuality develops from the moment of birth until approximately 23-25 years of age, and changes in sexuality continue throughout life. The development of sexuality occurs in stages, in strict sequence and at certain age periods [25].

1. **Intrauterine.** Formation of morphological sex.
2. **Infancy. Childhood.** 0 – 5-7 years. **Who am I like?** Formation of personality and sexual identity
3. **Adolescence.** 5-7 – 11-13 years. **What am I like?** Formation of gender roles. Awakening of platonic libido in girls at the end of the stage.
4. **Youth. Puberty.** 11-13 – 15-18 years. **Who am I with?** Awakening of erotic and sexual libido. Formation of psycho-sexual orientations.
5. **Youth.** 15-18 – 25-30 years. **Who do I need?** Gaining partnership experience and searching for a permanent partner.

6. **Maturity.** 25-30 – 55-60 years. *Regular sex life with a regular partner.*

7. **Elderly age. Old age.** 50-55 – 70 years and older. *Reverse development of libido. Decreased sexual activity. Asexuality.*

A certain state of mental development, combined with the endocrine background at different ages, gives a coherent picture of maturing sexuality. In the process of maturing sexuality, a person develops a certain internal picture of his Self in relationships with himself and with others, be it peers, children, adults of any age, phenomena directly related and not directly related to sexuality, as well as adaptation to the requirements of society in relation to behavior each of the sexes.

There is a fixed conditional norm of psycho-sexual development, as well as accelerated (previously) PSR, and on the other hand, a delay (retardation) of PSR.

Dreams of conventionally sexual content correspond to the maturation of the psyche and body, as an indicator of readiness for sexual behavior. Or, primarily, readiness for procreation, and for the socialized version of this process.

Depending on age, as well as being at a certain level of development of sexuality, dreams change significantly, openly demonstrating how much the teenage child is progressing in the development of the basic instinct.

In accordance with the stages of psycho-sexual development, these are dreams with the following content:

1. Formation of sexual identity and sex roles (0-7 years): **WHO AM I?**

Dreams of this period often contain situations in which the child's gender is questioned or, conversely, a positive assessment of the child as a representative of a given gender is expressed. The child is teased by his peers, or adults express doubts about his gender. The dream is often dedicated to the struggle to establish the gender that the child considers his own. Victory in a confrontation can be expressed in a magical solution or in the form of superiority of the sleeper over his opponents. Conflict with one's own gender occurs as an exception. As a continuation of such dreams within the framework of a continuous dream, the child's behavior can change in reality: he becomes more self-confident, bravely proves his gender identity. Much less often, if the dream ends in the "defeat" of the child in the dream situation, he may become less active in reality, experiencing his unstable position in the children's society.

2. Formation of gender roles (6-13 years): **WHAT AM I?**

At the beginning of the period (6-7 years) - scenes of relationships with peers and adults in which the child's gender is tested. Also scenes in which the child's behavior within the framework of gender is accompanied by a positive assessment of significant others (autoeroticism without masturbation). Or significant others react negatively to insufficiently expressed socio-sexual behavior [26].

A little later (9-10 years) the formation of platonic libido occurs - a blurred love for everyone and no one. Boys have heroic fantasies and dreams, girls have dreams about overly romanticized relationships without bodily aspirations.

At the end of this stage (11-13 years), as puberty approaches, in the process of developing romantic and erotic libido, scenes appear with elements of eroticism (touching, kissing, hugging) with hints of sex as such. And at this age, various deviations from normative sexual development may occur [27].

3. Formation of psychosexual orientations (12-18 years old): **WHO AM I WITH?**

Erotic dreams are characterized by a gradual shift towards sexual ones in combination with fantasies and masturbation: working out a combination of physiological and romantic manifestations of sexuality. Various options for the initiation and development of intersexual relationships are explored. Difficulties arising from such search behavior are also reflected in dreams. [28]

In the diversity of development of a child, teenager, boy (girl), there are possible options when psycho-sexual development is delayed at a certain stage. In this regard, the AKP will take a direction that does not meet the conventional standards. This condition—delayed PSR—promotes a unique maturation of sexuality, which in an adult is also reflected in sexual dreams [29].

Scenarios of conditionally normative dreams according to the stages of PSR and delays of PSR have the following structure.

1. A dream in which a sleeping girl/woman feels herself in a romantic setting, when she is alone, and the presence of a man is only guessed or anticipated. The situation is affectively perceived as exciting both during sleep and after awakening. Sometimes the dream may include an orgasm. This situation corresponds to the age of awakening of platonic attraction (9-10 years), so there is a blurring of what is happening, an optional partner, emotions coming from within, without external partner stimulation.

Such a dream in an adult woman is an indicator of delayed psycho-sexual development at the Platonic stage.

2. A dream in which the sleeping girl/woman feels like she is in a romantic setting. There is a man nearby, with whom it is calm and pleasant. A man's touch causes pleasant excitement, but is not exciting. The role of a man is romantic, sex is not expected or is expected by the sleeping person as tender contact without the participation of the body. During sleep or upon awakening, it is possible to experience an orgasm. The situation corresponds to the age of a girl of 12-16 years (the older she is, the more pronounced the sexual component is). Such dreams in an adult woman are an indicator of delayed psycho-sexual development at the erotic (romantic) stage.

3. Any scene in which there is sexual intercourse or active petting indicates that all stages of psycho-sexual development have been completed, and the woman has conditionally mature sexuality.

[30] list dream scenarios that, in adolescents and adults, are a significant indicator of a possible disorder in the development of sexuality. Thus, dreams in which the sleeper sees himself from the side or in the mirror wearing clothes of the opposite sex, as well as the transformation of a woman into a man and vice versa, are typical for persons with gender identity disorder and marginal transsexuals; with delayed psycho-sexual development, the dream includes only scenes of erotic caresses, but not sexual intercourse; in the presence of abnormal sexual attraction, dreams reflect the situation of incest, sexual intercourse with children, objects, and other paraphilias. The authors also attach great importance to the position of the observer in a sexual dream at the age of puberty, although this sign itself is rather vague.

[31] completely agrees that dreams can be perceived as reality by the sleeper. [32] shares the same opinion.

Dreams at the level of mature sexuality, with caresses, petting, intercourse, regardless of whether it is felt by the sleeper himself or he observes from the outside - an indicator of mature sexuality with the characteristics, limitations and complexes inherent in a given person. At the same time, subconsciously a person may not remember dreams, not perceive them positively, and reject what he dreamed. [33].

Both men and women also reported having orgasms themselves in about 4% of their erotic dreams, although women reported an additional 4% of dreams involving another character in the dream orgasming, while men reported that characters in their erotic dreams, different from themselves, did not achieve orgasm at all [34].

And [35] draw attention to the differences in how and what dreams men and women remember more often.

Sexual dreams of an adult mature person reflect:

1. Trends in the development of sexuality,
2. Limiting factors in intimate life and feelings of oneself as a sexual subject and object,
3. Attempts to solve a problem or circumvent prohibitions.

Such dreams reveal internal coincidences in one's own sexuality and partnership.

1. Demonstration of trends in the development of sexuality is manifested in scenes in which a person is offered a choice between various options for intimate behavior. The choice may depend on the sleeper himself or be forced (any violence within the dream scenario). For example, a dream about an extreme situation, from which there may be a choice between behavior within the framework of a socially acceptable decision or leaving the zone of psychological and/or physical comfort. Such a dream may concern third parties, including significant others in the role of participants or observers, as well as non-sexual scenes, in the opinion of the dreamer, related to the choice of sexuality [36].

This is especially true for women who experienced cruel and restrictive family behavior in childhood and adolescence.

2. Demonstration of limiting factors, or range of acceptability. The range of acceptability is a person's views on what is good in sex for himself, but also for certain groups of people. For example: a person does not accept homosexual relationships for himself personally, but is calm towards his neighbors - a homosexual couple, although he supports the state ban on certain manifestations of homosexuality.

Dreams indicating a similar state of sexuality of a given person are more often initially exciting, but when situations arise that go beyond the range of acceptability, it turns into a nightmare, or a violent awakening with a feeling of negative emotions, weakness, heaviness in the body.

Restraint Tips: Can be either stimulating or a symbol of conflict with one's own/societal views. The participation of significant third parties is also possible, and in many cases it is they who make the decision on the acceptability of such new behavior or condemnation of it.

For example, in a sexual scene of intimacy, a woman suffering from anorgasmia becomes more and more excited, approaches orgasm, but at the last moment a symbol of the mother appears nearby, who says "orgasm is a punishment for a dissolute woman..." After this, the excitement disappears, and the dream takes the form of a nightmare, or is interrupted.

Another option for dreams with restrictions is dreams with nudity in society. Moreover, two options are possible: as a symbol of condemnation (I'm walking naked in the crowd, and everyone is looking and judging me) or overcoming (I'm walking naked in the crowd, but no one notices me, no one is interested) - depending on the emotional reaction in the dream and during awakening. Thus, the lack of reaction from others in the crowd can be regarded by the person himself as positive ("I can do whatever I want, and no one will judge"), and as negative ("nobody needs me, no one notices me").

In this case, suppressed thoughts and expectations play a special role, due to which dreams take on a negative connotation or are "forgotten." [37].

3. Attempts to solve a problem or circumvent prohibitions. In the dream there is an edge state on the border between acceptable and unacceptable within the range of acceptability. The sleeper is faced with a choice, which, as a rule, is decided in favor of violating boundaries. Following the action comes an assessment of what is happening - from clearly negative ("this should not happen again anywhere") to positive ("if I even dream about this, then my body / subconscious demands it and is ready for it"). Such dreams are often thought about for a long time after awakening, and further fix the choice made in the dream, or aggravate the problem of decision-making. Depending on the supposed physiological or socio-psychological background of the problem (for example, anorgasmia as a physical problem, or the desire for extramarital contact with a married woman as a social-psychological one), the presence of significant third parties of different levels in the dream is possible. This could be a doctor and his opinion on arousal and orgasm, the image of parents in connection with thoughts of an extramarital affair, the symbol of a boss in the development of relationships at work, etc.

Dreams as a mitigation of abstinence. Involuntary sexual abstinence as a result of the absence of a partner, religious views, living conditions / service / work can be partial (using masturbation to alleviate frustrations), or total - in the absence of both intercourse and masturbation. In the latter case, physiological discharge occurs due to wet dreams in men or orgasm during sleep in women.

In such cases, there are usually full-fledged sexual dreams, which, as a rule, demonstrate the usual sexual motives inherent in a given person in reality. Less often we talk about symbolic dreams. In any case, the dream involves achieving orgasm or, less commonly (and more often in women), *satisfactio sine orgasmo* - satisfaction without orgasm. Also, a dream can stimulate arousal, in a state of which the awakened person masturbates, providing physiological release.

Much less often, a dream can take on a frightening or even nightmare character. Thus, the sleeper receives an additional incentive to abstain, rather than strive to give himself release. Temporary relief gives way to even more pronounced frustration.

[38] pay attention to the influence of the affective perception of a dream on the affective tone in the waking state.

This mood directly affects your sense of self, level of self-confidence, relationships with your partner and loved ones [39].

Dreams of neutral content can have an affectively stimulating nature, giving a certain meaning to the plot of the dream. Either orgasmic release occurs or the need for masturbation occurs after waking up. This type of dream can be classified as latent dreams according to Freud. When analyzing such dreams, a person is usually not able to independently reveal the internal connections and symbols of such a dream.

Nightmares can be associated with various factors. [40, 41].

Most often they are associated with sexual behavior itself - abstinence or active sex. Anxiety before intimacy (syndrome of anxious anticipation of sexual failure), complications during intercourse (lack of erection, loss of erection, accelerated ejaculation, lack of orgasm, dissatisfaction with the dream partner, etc.) are themselves a manifestation of psychological / mental problems, and support the presence of these problems in reality. More often, the scenario of such dreams is of a simple everyday nature, less often - intimacy or only intercourse with strangers, in a situation beyond the range of acceptability, etc. The build-up of mental pressure, hopelessness, vital melancholy, and the inevitability of such things in reality are sometimes accompanied by non-sexual dreams in which, however, there are details that provoke a nightmare.

Nightmares may be related to your partner's gender or personality. For example, dreams involving minor partners often cause rejection due to the upbringing of the dreamer or his personal memories. For

women, a character may participate in a dream, symbolizing the personality of the real rapist. A nightmare can end with a sharp awakening with vegetative manifestations, or, much less often, with a transition to the "rescue" stage - resolution of the conflict without harm to the sleeper. [42]

Nightmares associated with the social components of intimate communication usually follow a scenario associated with significant third parties or unidentified characters who wield power in the dream. Their approval or disapproval of the sleeper's sexuality often occurs outside the sexual situation, indirectly, at a higher level than intercourse itself. [43].

Finally, nightmares may reflect the sleeper's own fantasies or plans regarding intimate behavior, an intimate partner, intimacy situations, and other individual aspects of the sexual future. Personal experience in the development of a nightmare situation may be completely absent. Usually such dreams accompany a real departure from the range of acceptability.

A separate group of sexual dreams is associated with anorgasmia, and male versions of such dreams practically do not occur. Male hypoorgasmia associated with mental disorders reflects the disorder itself. As for female anorgasmia, a woman's experiences are associated both with the initial situation in which anorgasmia developed, as well as worries about the very presence of anorgasmia, the impact on relationships, personal life, and, finally, with physiological and psychological dissatisfaction.

At the same time, among men they physiologically experienced an orgasm in their sleep, or an orgasm was experienced by a character with whom they identified themselves in 4% of cases. The minor characters did not experience orgasm. Women experienced orgasm in their dreams 4% of the time, and minor characters were able to achieve orgasm in 4% of their dreams [44].

There are several types of anorgasmia [45].

- coital anorgasmia (there is no orgasm during partner sex, but it is possible during masturbation, petting, and sleep;

- partial anorgasmia (orgasm occurs only with persistent masturbation and during sleep, or absence both during intercourse and during masturbation);

- total anorgasmia: orgasm is not achieved under any conditions, even arousing dreams are absent.

However, as clinical experience shows, women, almost without exception, upon targeted questioning, describe a state containing signs of orgasm. At the same time, such an experience is devalued for various reasons, does not meet personal and social criteria, and therefore subjectively the woman complains specifically about anorgasmia.

Sexual dreams, accompanied by arousal and possibly orgasm, are a consequence of the interaction of social factors with the freedom of the subconscious in a situation of sexual freedom or prohibitions, the presence/absence of partner sex, the presence/absence of orgasmic release. Dreams with orgasm compensate for the lack of sexual satisfaction in reality; they occur more often during periods of insufficient saturation.

Excitement dreams can be divided into groups:

1. **Normative option:** the dream satisfies the needs of the sleeper, the scenario is within the range of acceptability, arousal increases, orgasm occurs during sleep or immediately after awakening.

2. **Initial violent suppression in reality:** the dream excites, arousal reaches a pre-orgasmic level, not reaching orgasm, the dream is interrupted, upon awakening the arousal is strong, stimulating masturbation, as a continuation of the process in a dream, up to orgasm.

3. **Prohibitive option:** the dream excites, arousal increases, orgasm begins, but sleep is interrupted, arousal gradually decreases.

4. **Suppressive option:** even in a dream, self-control is present: the dream excites, arousal reaches a pre-orgasmic level, but before orgasm the sleeper awakens, and the arousal immediately disappears.

5. **Total self-control:** the dream excites, arousal increases to a moderate level, without reaching the pre-orgasmic state, orgasm does not occur, giving way to a nightmare.

Thus, a common warning factor in arousal dreams is waking up before orgasm occurs. These are manifestations of hyper-control of various origins.

Sexual dreams with non-sexual content. Conditional sexual dreams are always latent (according to S. Freud). demonstrating in a sexualized form the non-sexual problems of the sleeper. This camouflage of the dream leads to a multiplicity of folk interpretations of the dream: seeing, for example, a carriage means wanting a woman, or a casual acquaintance, or an unsuccessful marriage, or a warning about possible betrayal, or a warning about the danger of an upcoming contact, etc.

In contrast to such dreams, there are also dreams that have external signs of sexual, but are associated with non-sexual moments. That is, sexual dreams are often conditionally sexual, and are not associated with libidinal pressure.

Such pseudo-sexual dreams carry a general psychological load, such as a distraction from a stressful situation, allowing the sleeper to gain relief from constant tension. But, at the same time, the situation is not completely resolved and manifests itself in the situation, conditions, and specifics of sexual behavior. For example, a work environment in which intimate contact occurs, especially if inappropriate affection or intercourse is involved, clearly relates to work-related stress rather than sexuality-related stress.

Such dreams can be a manifestation of deeply hidden complexes that appear only in exceptional cases - during severe or prolonged stress, when the subconscious is disinhibited in a state of alcohol or other intoxication, etc.

A sign of a pseudo-sexual dream may be a demonstration of homosocial motives in a heterosexual, for example, an assessment of figure, achievements, strength, appearance, etc. Such a dream may well turn out to be a manifestation of homosocial processes: envy of other representatives of one's own sex regarding their success in work, attractiveness opposite sex, material security, etc.

Thus, overtly sexual dreams may turn out to be a manifestation of motives other than sexual ones. This requires a careful analysis of a person's living conditions so that a latent dream is not considered a manifestation of a mental disorder.

Dream analysis is currently carried out using various algorithms, including the classical Jungian one. [46]. And also many others [47, 48, 49, 50, 51]. In this case, the authors may not even program the analysis according to its goals [52].

Questionnaires, programs contain certain algorithms and may include various sub-items that reveal the individual characteristics of the patient, his openness, willingness to cooperate, etc. [53, 54, 55, 56, 57].

Probably the best known framework for dream analysis is the work published in 1966 by Hall & Van de Castle [58, 59, 60].

This system views the dream report as a story or play, and includes an analysis of 12 components:

1. Characters (animals, men and women, friends, strangers)
2. Social interactions (aggression, friendliness, sexuality)
3. Activity (thinking, talking, running)
4. Successes and failures
5. Misfortunes and good fortune
6. Emotions (joy, sadness, embarrassment)
7. One or more settings (indoors or outdoors, familiar or unfamiliar)
8. Objects (chairs, cars, streets, body parts)
9. Descriptive modifiers (tall, fast, crooked)
10. Temporary links
11. Elements from the past
12. Links to food and nutrition

Taking into account these features of the Hall & Van de Castle system, we have developed our own original version of the algorithm for analyzing dreams in a sexual context [61].

1. Theme of the dream.

Is the dream sexual or pseudo-sexual? Does the dream relate to the personality of the person himself, or to his relationships (with whom exactly?), or social conditions, etc.

2. Dream content.

A. Does the dream fall into the category of accompanying psycho-sexual development (in children and adolescents), or is it a case of retardation of psycho-sexual development, anorgasmia, partner relationships, going beyond the range of acceptability.

B. Does the dream lead to an alleviation of sexual or other discomfort?

C. Are signs detected?

- demonstration of trends in the development of sexuality,
- limiting factors in intimate life,
- identifying oneself as a sexual subject and object,
- attempts to solve an intimate problem or circumvent prohibitions.

3. Sleeping position. Participating in what is happening or observing from the side.

4. Dynamics of the emotional context. What are the emotions of the sleeper in a dream situation: throughout the dream, as well as after waking up.

Whether the dream is experienced with positive emotions, negative, has the essence of a nightmare.

5. The sequence of changes in the emotional assessment of the dream.

- positive beginning – positive ending, relaxation, possibly orgasm
- positive beginning – transition to negative scenes, tension
- negative start, gradual change in assessment to positive, regardless of whether the dream situation has changed
- negative beginning, gradual deepening of negative assessment, up to a nightmare
- a nightmare.

The described sequence allows you to quickly and qualitatively distinguish the dreams of a healthy person from dreams that reflect difficulties in intimate life and from those that are a definite symptom of a disease.

Of course, the basis for understanding the direction of a dream is the affective filled situation of the dream. [62, 63].

The use of dream analysis, based on an understanding of both psychological and physiological mechanisms, is a significant factor in the clinical analysis and treatment of many painful and social conditions. [64, 65].

As an analysis of literary data and our own practical experience shows, the analysis of dreams on sexual themes allows us to more objectively assess the condition of healthy individuals, as well as those with intimate difficulties individually or in a couple, and to clarify the origin and state of the sexual area in patients with mental and sexological diseases. At the same time, the analysis of dreams can concern not only the current state, but also periods of psycho-sexual development, complicated by intimate traumas, improper upbringing, and the influence of micro-society. This information improves the effectiveness of assessment and treatment of these disorders.

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GENDER PECULIARITIES OF THE LEADING FACTORS OF MOTIVATION IN GENERAL PRACTITIONERS

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ГЕНДЕРНІ ОСОБЛИВОСТІ ПРОВІДНИХ ФАКТОРІВ МОТИВАЦІЇ У ЛІКАРІВ ЗАГАЛЬНОЇ ПРАКТИКИ-СІМЕЙНИХ ЛІКАРІВ

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Вступ. Мотивація - це сила, яка спонукає рухатись до мети та є ключовим елементом успішності у професійному розвитку. За даними літератури мотивація медичних працівників має прямий вплив на організацію надання медичної допомоги, на продуктивність роботи, на відданість роботі в закладі та на задоволення від роботи.

Лікарі загальної практики-сімейні лікарі (лікарі ЗПСЛ) є безумовно лікарями «першого контакту» в організації медичної допомоги, від яких залежить подальший маршрут пацієнта в системі охорони здоров'я та збереження його здоров'я тощо. Тому питання мотивації вказаних лікарів до належної медичної практики є надзвичайно актуальним в управлінні персоналом закладу охорони здоров'я. Серед лікарів ЗПСЛ дві третини становлять жінки. Для розроблення оптимальної системи мотивації в ЗОЗ необхідно враховувати гендерні особливості лікарів ЗПСЛ.

Мета дослідження полягала у визначенні гендерних особливостей провідних факторів мотивації у лікарів ЗПСЛ відповідно до теорії Ф. Герцберга.

Матеріали та методи.

Дослідження проведено серед лікарів ЗПСЛ за методикою Ф. Герцберга. Участь у опитуванні прийняло 80 лікарів ЗПСЛ, серед яких 68 лікарів жіночої статі та 12 чоловічої статі.

Згідно з теорією мотивації Ф. Герцберга опитування за його методикою включало 30 тверджень, серед них з 1 по 14 твердження стосувалися оцінки факторів мотивуючої групи, що формують відчуття задоволеності роботою та з 15 по 30 твердження – факторів гігієнічної групи, що попереджають виникнення невдоволеності роботою. Як модель шкали оцінки окремих тверджень анкети використано шкалу сумарних оцінок Лайкерта (англ. Likert scale), у якій лікарі оцінювали ступінь своєї згоди або незгоди з кожним судженням, від «повністю згоден» до «повністю не згоден» за 5-бальною шкалою. Участь в анкетуванні лікарів за спеціальністю ЗПСЛ була добровільною.

За використаною методикою до мотивуючих факторів відносяться наступні чинники: «досягнення в роботі» (№ 1-3 питання), «професійний розвиток» (№ 4-5 питання), «відповідальність у роботі» (№ 6-8 питання), «визнання успіху» (№ 9-11 питання), «просування по кар'єрі» (№ 12-14 питання). До гігієнічних факторів – «система управління в організації» (№ 15-17 питання), «визнання та ставлення колег» (№ 18-20), «впевненість та стабільність в роботі (гарантія зайнятості)» (№ 21-23), «визнання та ставлення керівництва» (№ 24-26), «заробітна плата» (№ 27-28), «умови праці» (№ 29-30).

Для аналізу та порівняння відповідей за статтю, віком, загальним стажем роботи лікарів ЗПСЛ використовували методику Kruskal-Wallis та Mann-Whitney. Статистичний аналіз був проведений з використанням ліцензійного пакету the statistical analysis package MedCalc v. 19.4.1 (MedCalc Software Inc, Broekstraat, Belgium, 1993–2020).

Результати та обговорення дослідження.

Аналіз отриманих результатів свідчить про наявність достовірних відмінностей у лікарів ЗПСЛ в залежності від статі в оцінці гігієнічних факторів мотивації ($p < 0,05$). У групі жінок достовірно вищі медіани оцінок всіх гігієнічних факторів мотивації (система управління, ставлення колег, впевненість та стабільність роботи, ставлення керівництва, заробітна плата, умови праці), ніж у групі чоловіків ($p < 0,05$).

За рейтингом медіани оцінок гігієнічних факторів за 5-бальною шкалою в групі жінок на першому місці перебував фактор «ставлення колег» (5,0 (4,25-5,0)), останньому місці – фактор «заробітна плата» (4,0 (3,0-5,0)) та фактор «умови праці» (4,0 (3,0-4,5)). У групі чоловіків на

першому місці – «ставлення колег» (4,0 (3,67-4,67)) та «ставлення керівництва» (4,0 (2,5-4,0)), а на останньому – «заробітна плата» (3,0 (2,38-3,63)). Тобто для жінок дуже важливим у попередженні формування відчуття невдоволеності роботою є «ставлення колег», а для чоловіків, крім цього фактору, ще і «ставлення керівництва». Фактор «заробітна плата» має достовірну вище оцінку в групі жінок, проте за рейтингом займає в двох групах останнє місце.

Медіани оцінок мотивуючих факторів за 5-бальною шкалою мають достовірні відмінності у групі жінок та групі чоловіків лише за медіанами оцінок факторів «визнання та схвалення результатів роботи» та «кар'єра» ($p < 0,05$). У групі жінок медіана вказаного фактору достовірно більша, ніж у чоловіків. За іншими показниками в групі жінок та в групі чоловіків достовірні відмінності відсутні («досягнення в роботі», «професійний розвиток», «відповідальність у роботі») ($p > 0,05$). Тобто для групи жінок достовірно найважливішим фактором мотивації, що формує відчуття задоволеності роботою, є «визнання та схвалення результатів роботи» та «кар'єра».

За рейтингом медіани оцінок мотивуючих факторів, як в групі жінок, так і в групі чоловіків, перше місце посідає «відповідальність у роботі (зміст роботи)» (4,17 (4,0-5,0)) та (3,83 (3,33-4,17)) відповідно, на останньому місці – «професійний розвиток» (3,5 (3,0-4,1)) та 3,25 (2,38-4,0)) відповідно ($p > 0,05$). Тобто гендерні особливості у пріоритетності факторів мотивації за рейтингом відсутні ($p > 0,05$).

Отже, в нашому дослідженні визначено достовірні відмінності в оцінці гігієнічних факторів мотивації за статтю лікарів ЗПСЛ ($p < 0,05$). Для жінок надзвичайно важливим є наявність оптимальної, на їхню думку, системи управління в ЗОЗ, адекватного ставлення колег в колективі та керівництва, впевненості та стабільності в роботі, заробітної плати, яка відповідає прикладним зусиллям, та належні умови праці. Для чоловіків гігієнічні фактори мають менше значення в системі мотивації, ніж для жінок ($p < 0,05$). В той же час, серед гігієнічних факторів найбільше значення для всіх лікарів ЗПСЛ має фактор «ставлення колег», а для чоловіків – «ставлення колег та керівництва». Найменше значення серед гігієнічних факторів, як для жінок, так і для чоловіків має фактор «заробітна плата». Ймовірно, це обумовлено тим, що при наймі на роботу лікар усвідомлено приймає рішення щодо працевлаштування, знаючи розмір своєї зарплати. В той час, як з іншими гігієнічними факторами лікар стикається вже в процесі роботи.

Серед мотивуючих факторів вплив гендерності був лише за оцінками факторів «визнання та схвалення результатів роботи» та «кар'єра» ($p < 0,05$). Тобто для жінок характерно більші значення за вказаними факторами, ніж для чоловіків. Для них фактори «визнання та схвалення результатів роботи» та «кар'єра» є провідними факторами мотивації, які ймовірно, впливають на внутрішню мотивацію. Керівникам необхідно таку особливість жінок-лікарів враховувати та посилювати шляхом обов'язкового запровадження зворотного зв'язку в діловій комунікації. Незалежно від статі лікарів ЗПСЛ перше місце в рейтингу мотивуючих факторів посідає «відповідальність у роботі (зміст роботи)», а останнє місце – «професійний розвиток». Ймовірно, що лікарі високо цінують зміст своєї роботи та недооцінюють, як важливий елемент мотивації до роботи, фактор «професійний розвиток».

Висновки. Для створення оптимальної системи мотивації лікарів ЗПСЛ в центрах первинної медико-санітарної допомоги необхідно враховувати гендерні особливості провідних факторів мотивації. Результати дослідження можуть бути корисними для формування стратегії управління персоналом на основі гендерних особливостей мотивації лікарів ЗПСЛ.

Ключеві слова: мотивація, лікар загальної практики-сімейний лікар, теорія мотивації Ф. Герцберга.

Pedagogical sciences

THE PRESENT STATE OF USING DIGITAL RESOURCES IN EDUCATION IN THE TRAINING OF BIOLOGY TEACHERS

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Abstract

The theme of informatization of the educational process is one of the most relevant and widely discussed. The use of digital resources in biology lessons is one of the successful modern pedagogical teaching methods that allows increasing the understanding of biological processes and phenomena by increasing the visibility of the studied material using 3D models, interactive illustrations, simulations of biological processes and performing virtual laboratory work and research projects at universities. This article briefly describes the present state of using ICT tools in teaching biology, types of electronic educational publications on biology.

Keywords: competitive atmosphere, ICT, biology, competent teachers, computer modeling, virtual laboratory.

Introduction

Nowadays, the development of computer software and hardware opens up wide opportunities for involving students in the learning process, design and testing. Modern realities are such that the voluntary assimilation of any information by children of this time occurs through gadgets. Therefore, the use of information and communication technologies (ICT) in biology lessons at university is one of the successful modern pedagogical methods of teaching. In 2020, the world is faced with a serious epidemiological situation that it affected all spheres of life. The field of education was no exception. The inability to conduct face-to-face classes and attend schools to switch to a distance learning format. And here the main role of an assistant, an intermediary between a teacher and a student, was taken over by computer technology.

Unfortunately, we are currently seeing how commercially oriented ICTs lead to the opposite process. The easy accessibility and ease of use of information and gaming applications create the illusion for users that they are deeply advanced in "programming" and have unlimited freedom in self-expression and the choice of certain solutions. Therefore, young people spend a lot of time on completely useless communication on social networks. It is possible to reverse this situation with the help of the same ICT, redirecting the uselessly wasted energy into a creative channel by involving students themselves in the teaching process by participating in the development of control and training systems [2].

The theme of informatization of the educational process is one of the most relevant and widely discussed. The phenomenon of informatization has been brought into the number of universal ideological categories, forming a new triad in the scientific and educational space: "Matter – Energy – Information". Information and telecommunications acquire not only cognitive meaning in the modern information society, but also become a powerful transformative force in the organization of its life [1].

Information and communication technologies are an extensive area that includes radio, television, as well as new digital technologies such as computers, smartphones and the Internet. The latter is a potentially powerful tool for change and reform in the field of education. When used correctly, various ICTs are designed to expand access to education and improve the quality of education, turning teaching and learning into an exciting, active process related to real life [3].

Biology is a complex discipline, it has many sections, each of which has its own characteristics, the secrets of our life that seem inaccessible until you join the process of learning them and understand how interesting and attractive this science is. When submitting new material in biology, constant demonstration support is required. Modern students are not interested in simple pictures, they need to be constantly surprised. Research shows that most biology teachers still use traditional and outdated

methods in teaching biology. Teachers convey the facts of biology directly to students and encourage rote memorization of actual knowledge for exams that cannot teach students to solve complex biological problems [4].

According to the Center for the Sociology of Education of the Kazakhstan, Kazakhstani teachers strive to use the capabilities of modern ICT: many teachers create their own data banks on their subject (47%), according to teaching methods (39%), offer homework that requires the use of computers (65%), and keep pedagogical diaries on the Internet (23%).

The practice of working at school has shown that the use of ICT in the organization of the biology teaching process allows solving a number of tasks of different orientation: increasing visibility, improving the effectiveness of the learning process, developing creative abilities, stimulating learning motivation, developing cognitive interest, self-education and individualization of learning, identifying gaps in students' knowledge [6].

Interactive illustrations are used to increase visibility – 3D models of biomolecules, living organisms, interactive animated biological processes. The computer modeling method is an excellent way to visually study a range of topics from molecular biology to evolution and can be a safe and effective form of introducing students to laboratory work.

To solve these problems, we can use:

1. Scientifically reliable 3D models and animations from Visual Science, which are engaged in visualization, education and communication in the field of science, pharmaceuticals, medicine and other high-tech fields requiring scientific expertise.
2. The program of the Massachusetts Institute of Technology (MIT)

Software Tools for Academics and Researchers (STAR), aimed at bridging the gap between scientific research and the classroom, because understanding and applying various research methods can be complicated due to lack of time and the need for advanced equipment. STAR contains components and modules of educational programs that facilitate the use of their educational resources in various educational institutions.

3. VirtualLab and PhET virtual laboratories, representing educational interactive laboratory work that allows students to conduct virtual experiments in natural science disciplines.

One of the survey questions is aimed at determining the value of multimedia teaching tools in the process of teaching biology. University teachers showed the values of using ICT tools:

- development of educational motivation and interest in the subject-42%;
- formation and development of knowledge in biology-25%;
- development of universal educational activities-20%;
- helps teachers to see students in an unconventional form of education-8%.

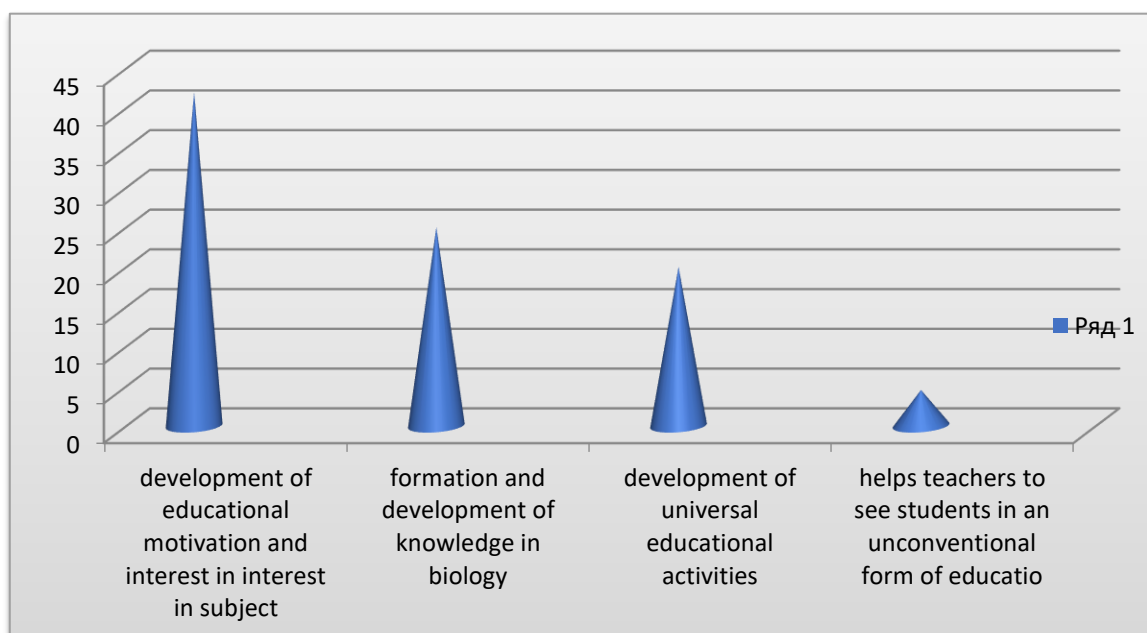


Figure 1: Teachers' answers towards the value of multimedia teaching tools in the process of teaching biology

All these resources allow us to diversify the learning process, make it more visual. In addition, the use of such ICTs helps students to get much more opportunities for independent study of the material, organizing research activities in the form of laboratory work in combination with a computer at home and a real experiment at school, planning and analyzing those experiments that are not feasible in real life in school laboratories, but are possible in virtual reality. In addition, do not forget about the expediency of using ICT for the development of students' personality and their preparation for independent production activities in the conditions of modern information society.

Conclusion

It is also necessary to involve students in research projects. The project is a set of actions specially organized by the teacher and independently performed by students, culminating in the creation of a creative product [5]. We study the structure of scientific research, the writing and presentation of research work, learn to obtain and systematize reliable scientific information using a computer, multimedia, work with scientific databases and scientific search platforms NCBI, Elibrary, Google Academy, thereby going beyond the school curriculum and instilling in them a love of science. The technology of project preparation takes into account the age and individual characteristics of children, stimulates independence, the need for self-realization.

The use of ICT in preparation for the Olympiads and the Unified State exam also has a number of advantages. To date, many multimedia textbooks on biology have been developed, which can be used for self-study of the material, repetition or consolidation of the topics covered, allow for monitoring and evaluation of knowledge. The use of ICT in pedagogical activity helps to ensure that the process of teaching biology meets the advanced requirements of pedagogical science, combines all the best of classical pedagogy with innovation, which ultimately leads to an increase in the efficiency of the educational process [5]. The competent use of ICT allows us to present the studied material in as much detail and detail as possible, solves the problem of the shortage of visual aids, optimizes the process of understanding and memorizing educational material and increases interest in the educational process to a higher level.

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IMPLEMENTATION OF THE REGIONAL COMPONENT OF BIOLOGICAL EDUCATION IN RURAL SCHOOLS

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Abstract

In this article, the authors put forward the problem of forming a value attitude to a healthy lifestyle in the context of the introduction of the country's standard in the practice of the theory and methodology of teaching school biology. To solve the above problem, the authors propose to create conditions for the formation of a new system of attitudes to health and the transformation of the existing hierarchy of values among students. This article suggests one of the ways and conditions for solving the above problem: the introduction of regional data and ethnographic material on the preservation and improvement of the human body. Taking into account the specifics of the Republic of Kazakhstan can involve students in maintaining their health based on the emotional component of the content of biological education. The principle of regionality in education opens up wide opportunities for solving problems within the framework of academic disciplines. At the same time, the authors emphasize that we are not talking about a limited isolation and the formation of a completely new content of school biological education, but rather about a more productive and effective.

Keywords: *regional component, school biology education, values, health, healthy lifestyle, methods of teaching biology, value attitude to a healthy lifestyle*

Introduction

The introduced educational standards of the new generation are focused on the formation of personal characteristics of a school graduate, active, positive, sociable, having good physical and mental health. For this, the formation of a value attitude towards a healthy lifestyle plays an important role.

The current social, economic, and cultural problems have an impact on the health of the population, the demographic situation, lifestyle, and reproduction of ethnic groups [1, p. 35]. In this regard, the idea of regionalization of education becomes relevant. The regionalization of education is understood as a process bringing the educational sphere closer to the real needs of the school, taking into account the specifics of the region, its cultural and historical features.

The school subject biology is one of those subjects where almost every topic has the possibility of including a regional component. Since in high school, plants, animals, their relationship to each other and to the environment are studied only in biology lessons. Students will learn which plants are widespread and which animals live in our area, gain knowledge about its medicinal plants, rare animals that need to be protected.

The principles characterizing the regional content in the formation of healthy lifestyle skills in the study of biology in schools of the Republic of Kazakhstan are:

1. The principle of consistency and integrity.

Consistency and integrity characterize a person as an organism with a complex highly ordered structure and systemic organization. When selecting regional content, we took into account that the additional material introduced in the form of assignments for home and independent work, problematic tasks should be included in the the content of the course "Man and his health", without contradicting the goals and objectives of the main content and without downloading it, but at the same time should contribute to the achievement of the goals set in the study.

The principle of specificity of regional content.

The assimilation of the essence of the scientific concept of a healthy lifestyle is combined with the student's attitude to a conscious attitude to the goals and methods of health conservation, which is very

important in developing the position of responsibility of schoolchildren for their health. The deployment and actualization of the emotional and value content of education. It is methodically advisable to pay attention to the regional features of the structure, growth and development of a person, his lifestyle, fitness, rational content of carbohydrates, proteins and fats in food for living in the Far North, as well as the health and morbidity of indigenous and alien populations, disease prevention, human nutrition in the North; endemic and natural focal diseases and their prevention.

This contributes to the deepening of students' knowledge, education, the formation of the skill of independent observation, the development of necessary practical skills techniques and a conscious attitude to one's own health and leading a healthy lifestyle. L.S. Vygotsky [2; 3] wrote in his writings that the essence of education in education is the formation of a child's personality. When organizing education in the educational process, the teacher should play a secondary role, should not educate from above. It will be enough for him to organize such a learning process in which the child will study independently and thus educate himself, and the teacher will only help and guide the child's activities.

So in the pedagogical literature, problem-based learning is understood as the educational and cognitive activity of students with the assimilation of knowledge and methods of activity based on the creation and solution of problem situations. Each educational problem is an artificial pedagogical construction that is modeled by the teacher in the structure of the content of the educational subject.

The method of problem presentation is a method, using which, the teacher:

- creates a problematic situation;
- forms a problem task;
- solves it by demonstrating the stage of problem solving, the sequence of reasoning, the pattern of reasoning.

And the student:

- perceives, realizes, comprehends, remembers knowledge about the course of solving a holistic problem;
- argues with the teacher.

The purpose of the application of problem presentation is the assimilation by students of knowledge about the main stages of solving the problem, their content and sequence of presentation [3].

Stages of the lesson on the theme: "Patterns of heredity and variability in living organisms"

I. Announcement of the lesson theme and setting the purpose and objectives of the lesson.

II. Updating students' knowledge on the issues.

1) What does genetics study? What is the origin of the name of science?

2) Define the concept of "gene".

3) Who is the founder of genetics?

4) Define the concept of "heredity".

5) Prove by examples the universal character of this property of organisms.

6) Define the concept of "variability".

7) Prove by concrete examples that this property is universal for all living things.

8) Demonstration of PPT presentation illustrating the phenomena of heredity and variability.

Problem-based learning (PBL) is an exciting way to learn biology and is readily incorporated into large classes in a lecture hall environment. PBL engages students in solving authentic biological case problems, stimulating discussion among students and reinforcing learning. A problem-based learning environment emulates the workplace and develops self-directed learners. This is preferable to a mimetic learning environment in which students only watch, memorize, and repeat what they have been told.

In the educational material on the work of the heart and its hygiene, as an additional regional material. As practice has shown, the use of regional material on this topic contributes to a more effective assimilation of such complex issues as the importance of blood in metabolism, coagulation as a protective reaction of the body, immunity, and its importance in human life. prevention of diseases of the circulatory system, substantiate the relationship of blood, lymph and tissue fluid, the harmful effects of alcohol, drugs, smoking on the composition and function of blood.

Application knowledge about blood clotting, immunity, the number of red blood cells and leukocytes. Introduction of regional material to the content of the lesson on the topic "Blood. Blood circulation and lymph circulation" promotes students' understanding of the essence of culture, methods of treatment for cardiovascular diseases, diseases of the cardiovascular system, to use natural gifts to improve their health, the history of their people, being a necessary step in introducing them to the traditions of national culture. For example, the study of human and frog blood cells under a microscope; studying the movement of blood through blood vessels; examining blood under a microscope;

determining the size of one's heart and other experiments that students conduct in practical classes, and compare the results with all kinds of folk signs, allow students to be proud of the wisdom, observation of their ancestors. It is not likely that the students will solve a problem on the first pass, and the feedback from the instructor motivates the next round of small group work. The students could now be told that the man's lumbar spine density is 3.1 standard deviations below the average age-matched healthy female (osteoporosis = 2.5+ SD), his height is 204 cm, his left middle finger is 10 cm, and knee films show open epiphyses[6]. The cycle of small group work and instructor feedback can be continued during the current class session or on future occasions.

Conclusion

The researchers expect this study can be a source of information for teachers in applying regional content in schools, thus students can construct their knowledge. The implementation of this model should be done continuously to improve the students' critical thinking skill. Before the class begins, teachers should prepare everything well mainly the selection of real problems appropriate with the materials. Therefore, students can analyze and solve problems accordingly. Teachers also need to manage their time to better implement new technologies. Further researchers can conduct the similar study focusing on other materials, and even other fields of study.

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WAYS OF DEVELOPING A STRUCTURAL AND CONTENT MODEL FOR THE FORMATION OF FUNCTIONAL LITERACY IN BIOLOGY

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Abstract

The issue of students functional literacy development is the main topic of the study, which is based on pedagogical literature. Analysis and testing are done on the outcomes of students both before and after the application of test tasks influencing the development of functional literacy in schoolchildren. The following characteristics of how these tasks affected the intellectual kids. In order to be prepared for the intellectual competitions in biology, it is found that complicated tasks have an impact on the growth of functional literacy. The style of inquiry was used with pupils between the ages of 14 and 16. The level of students was found to be impacted by tasks for the development of functional literacy.

Keywords: *functional literacy, biology, intellectual competitions, complexity level, research projects*

Introduction.

"Understanding, assessing, and using written materials and engaging with them to participate in society, attain one's goals, and develop one's knowledge and potential" is the definition of literacy [1, 15 p]. Biology is a fundamental and applied science field that is rapidly growing. It is crucial to our understanding of life at all scales, from molecular biology to interactions on a global scale [2, 35 p].

The ability to function in the social roles of a voter, consumer, family member, and student is determined by functional literacy. It enables you to put your abilities to use in setting up various adventures, creating connections with various social structures and organizations, etc [3, 206–238 pp]. PISA understands functional literacy in a broad sense as a set of knowledge and skills that ensure the successful social and economic development of the country; [4] in a narrow sense, as the key knowledge and skills necessary for a citizen to fully participate in the life of modern society [5]. A person's capacity to answer questions about the natural sciences, as well as their preparedness to have a keen interest in scientific concepts, developments, and innovations [6, 52-75pp.]. PISA includes a set of specified competencies for science literacy. The ability of pupils to use the knowledge and abilities they have learned in school in real-world settings is referred to as competence [7, 224-263 pp.]. In PISA, there are three main categories of tasks:

1. "How do you know?" tasks that require the use of ways of knowledge.

2. Assignments to "try to explain" events and facts

3. "Make a conclusion" assignments help students develop the ability to draw conclusions based on data. People who are biologically literate should comprehend the fundamental ideas in biology. Students that are biologically literate should understand the variety of species and how they are categorized. The fundamental ideas of biology should be understood by all citizens. Memory, analysis, comprehension, learning, and reasoning are only a few examples of cognitive skills. "Developing functional literacy toolkits for middle and high school students in biology" is intended to: promote the development of a range of skills and abilities that are at the core of functional competence. The developed set of tasks is a tool for developing specific skills, which together constitute biology as a subject and the essence of functional abilities. Possession of these abilities and skills serves as an indicator of base in students while preparing for biology intellectual competitions.

Applied in biology innovative methods and techniques.

These biology tasks include 25 complex tasks based on the example of PISA tasks. The questions are created in accordance with basic biological principles. The focus of the tasks on the organization of

functional literacy includes topics on botany, zoology, genetics, physiology, ecology, immunology, microbiology and general biology.

Task № 1. The picture shows a spider and a pin standing in water.



The reason spiders float in water is the presence of hairs that cause the spider to be weightless. Because the pin is lightweight floats in water

Question 1: What do a spider floating in water and an iron pin have in common?



Answer 1.1:

1. Pedipals
2. Fangs
3. Chelicerae
4. Eyes
5. Legs
6. Spinnerets
7. Abdomen
8. Pedicel
9. Cephalothorax

Task 2: Identify the structure of the spider in the picture.

Task 3. State whether each of the following concepts is a TRUE or FALSE:

A student found two different leaves of different plants. He took it with him and then noticed that it had started to rot. They are shown in picture A and B.



<https://www.gettyimages.com/detail/stock-photo/67016645-green-leaf-png-image>

A



<https://upload.wikimedia.org/wikipedia/commons/0/0d/Leaf.jpg>

B

Answer: A – Dicotyledonous (leaf) B – Monocotyledonous (leaf)

Task 4. Identify to which two main groups the leaves shown in the picture belong.

Task 5. The process of putrefaction is most often caused by bacteria. Name one other organism that can prevent decay.

Task 6. Leaf rotting improves the composition of the soil and creates conditions for good plant growth. Explain how the process of rotting returns nitrogen to the soil.



Task 7: Humans are thought to be descended from animals such as gorillas, as shown in Figure A. Humans walk on two legs. What is this movement called?

Task 8: Describe two ways in which the skeleton in picture B adapted to this type of movement.

Task 9: Mention one advantage of Homo sapiens associated with vertical walking

Table 1

Stages of preparing for the intellectual research competitions

<i>Research and design</i>	<i>The "mature" project reflects the personal and individual position of the author and has a social and practical significance. With such projects, our students became the winners of the regional</i>
<i>Solving problems, performing tests</i>	<i>The student has the opportunity to gradually perform simple tasks first, and then a higher level of complexity.</i>
<i>Carrying out practical work</i>	<i>The requirements for the practical tour are increasing every year, because it is here that the student can apply his knowledge in practice.</i>
<i>The principle of knowledge activity</i>	<i>Olympiad tasks are compiled in such a way that the entire stock of knowledge is in active use. They are compiled taking into account all previous knowledge, in accordance with the requirements of the standard of education and the knowledge gained at the moment</i>

[a table is compiled by authors]

The goals may be different, as a rule, it is a generalization, systematization of the material, or, conversely, a leading question before studying a new topic. In search of the necessary information, a variety of sources are "shoveled", the necessary skills are acquired, and the products created at the same time are then used as reference materials. Much attention is paid to working with educational and reference literature on ecology, because this subject is not studied in our school, and schoolchildren show great interest in it.

Currently, along with books, perhaps an important role is played by such a source of information as the Internet. Electronic versions of books, journal articles, various tests, tasks of Olympiads of various levels can also be found on various biological sites. Is it possible and necessary to manage this flow of information? In any case, it is advisable to familiarize students with a list of biological sites where they can find useful information for themselves. One of these sites is undoubtedly www.kpdbio.ru, where resources are placed to prepare for the regional stage in biology. On this site, you can get online advice on a question of interest, test your knowledge by performing test tasks of previous years, watch a video tutorial.

Conclusion

The fundamental ideas of biology should be understood by all citizens. Memory, analysis, comprehension, learning, and reasoning are only a few examples of cognitive skills. "Developing functional literacy toolkits for middle and high school students in biology" is intended to: promote the development of a range of skills and abilities that are at the core of functional competence.

The scientific novelty of this work was that testing tasks should correspond to different levels of biology mastery, which contributes to student development while taking into account unique student characteristics in preparation for PISA, various Olympiads, etc. The development of knowledge, in our case the development of FG students, is most effective when carried out methodically, with a variety of types and forms.

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LANGUAGE AND CULTURE: INVESTIGATE THE CONNECTION AMONG LANGUAGE AND CULTURE, ANALYZING HOW LANGUAGE REFLECTS AND SHAPES SOCIAL STANDARDS, VALUES, AND PERSONALITIES

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Abstract

The scientific article, "Language and Culture: Exploring the Connection Between Language and Culture, Analyzing How Language Reflects and Shapes Social Standards, Values, and Personalities," presents a comprehensive analysis of the interrelationships among language, culture, and individual personality. The authors conduct a theoretical overview emphasizing the significance of language as both a reflection and a shaper of social standards and values. An empirical study conducted within the Russian-speaking community confirms the pivotal role of language in shaping individual traits while highlighting unique cultural aspects influencing linguistic behavior. The conclusion summarizes the research, emphasizing its contribution to understanding the intricate connections among culture, language, and personality in contemporary society. This article provides a valuable contribution to the fields of linguistics, cultural studies, and sociology.

Keywords: Language, culture, social standards, values, linguistic behavior, cultural identity, cross-cultural communication, sociolinguistics, empirical research.

In the modern world, the interaction between language and culture is central to understanding complex sociocultural phenomena. Language, being the main means of communication, not only reflects established social standards, values and norms, but also actively shapes them, creating a special cultural space. In this article we will focus on exploring the close connection between language and culture, attempting to analyze how language not only reflects, but also actively contributes to the formation of social standards, values and personal identities.

The complex relationships between language and culture are reflected in everyday life, traditions and perceptions of the world. Our analysis will be focused on identifying linguistic features that express social norms, values and form individual personality traits. By diving deeply into these relationships, we aim to uncover not only the structural and lexical aspects, but also the semantic nuances that create the bridge between language and culture.

The purpose of our research is not only to analyze specific cases, but also to identify general trends characterizing the influence of language on the formation and modification of cultural characteristics. We invite the reader to join us on a journey through the complex ways of interaction between language and culture, in search of answers to questions about how language becomes a mirror and builder of our sociocultural realities.

The study of the interaction of language and culture requires a clear definition of both concepts. Language, as a complex system of signs and symbols, is not only a means of communication, but also a reflection of cultural characteristics. By culture we will understand a system of social attitudes, traditions, art and ideologies that shape public consciousness.

The essence of the relationship between language and culture lies in the complex two-way interdependence of these phenomena. Language, as a kind of carrier of cultural codes, not only reflects, but also forms the thinking and values of society. In turn, culture has a significant impact on linguistic structures, giving them unique forms and meanings.

Semantic and structural elements of language, such as vocabulary, phraseology and grammar, become an integral part of cultural heritage. As noted, "the absence or excess of certain words or concepts may indicate unique aspects of cultural experience." By analyzing the language features, it is possible to reveal the deep roots of social beliefs and norms.

However, the relationship is not limited to simply reflecting cultural aspects in the language. Culture actively influences the very process of forming linguistic structures. This manifests itself in the

way in which certain concepts and ideas are expressed and encoded. Cultural taboos and social norms influence the creation of specific linguistic structures, thereby forming unique ways of thinking and communication.

In addition, language acts as a mirror reflecting and affirming social standards. At the same time, "the analysis of linguistic features allows us to reveal many aspects related to social norms and expectations in society." Language becomes a tool through which society asserts its values and forms social stereotypes[1].

An important aspect is also how language functions in expressing social relationships and hierarchies. Forms of politeness, the use of titles and greetings are linguistic mechanisms that reflect the degree of respect and distance between those communicating. "The analysis of changes in the level of politeness can reveal the dynamics of sociocultural changes in society," allowing us to better understand the evolution of social relations and structures.

Language is a multifaceted tool that extends beyond its basic function of communication, encompassing a crucial role in expressing and shaping social relationships and hierarchies. One of the fundamental ways in which this occurs is through the intricate dance of politeness embedded in linguistic interactions. The forms of politeness, ranging from choice of words to the use of titles and greetings, serve as subtle markers that reflect the nuances of respect and the interpersonal distance between communicators. By delving into the analysis of changes in politeness levels over time, one can unravel the dynamic tapestry of socio-cultural transformations within a society.

Beyond the realm of politeness, linguistic elements such as accent, word choice, and phrase structure emerge as powerful indicators of an individual's social status. In essence, language becomes a potent instrument through which both individual and collective identities are not only forged but also laid bare for scrutiny. The deliberate selection of linguistic elements becomes a means through which individuals project their social standing, establishing a complex interplay between language and social hierarchy.

Moreover, the structures and formalities embedded in language contribute to the reflection of broader sociocultural expectations. The degree of formality employed in linguistic expression can be seen as a mirror reflecting the prevailing social norms that govern interactions across various contexts, ranging from the intricacies of business negotiations to the simplicity of everyday communication. In this sense, language serves as a dynamic barometer that gauges and mirrors the ebb and flow of societal expectations.

Delving deeper into the societal fabric, social rituals, including linguistic ones, emerge as integral components in the construction of social standards. Through a meticulous analysis of linguistic manifestations within diverse social events and rituals, one can discern not only the prevailing features but also the subtle shifts and alterations in sociocultural norms. Language thus operates as a conduit through which these rituals are enacted, reinforced, and sometimes challenged, contributing significantly to the ongoing evolution of social standards[2].

In essence, the profound interconnection between language and society goes beyond mere communication, extending into the intricate realm of social dynamics, identity construction, and the perpetuation of cultural norms. As a powerful force shaping and reflecting societal structures, language stands as a testament to the complex interplay between individual expression and collective expectations within the tapestry of human interaction. Language, in its essence, is an integral component of the formation and transmission of values in society. It not only reflects a system of values, but also actively participates in their creation, influencing the perception and interpretation of the world. Let's consider how linguistic elements express and form values in a sociocultural context.

The significance of vocabulary in conveying concepts of value cannot be overstated. Words and expressions laden with emotional nuances serve as a mirror reflecting the societal values deemed crucial. The scrutiny of terminology allows for the identification of prevailing priorities and distinctive features within a given culture's value system.

"The words we choose to use when we communicate with each other, carry vibrations. The word 'war' carries a whole different vibration than the word 'peace'. The words we use are showing how we think and how we feel. The careful selection of words, and the manner in which they are employed, unveil the intricate tapestry of values woven into the fabric of a society."[3]

The semantic landscape of language, entwined with values, not only amplifies their substance but also furnishes a contextual framework for comprehension. The interpretation of linguistic units, whether words or phrases, undergoes significant variations contingent upon the characteristics embedded within

the prevailing value system. Tracking the evolution of the semantics of a word or phrase across temporal dimensions yields profound insights into the dynamic shifts in societal attitudes towards values.

Language functions as a sculptor, shaping our perception of the world by articulating values affiliated with nature, society, and human behavior. The verbal depiction of the surrounding reality serves as a medium through which individuals articulate their value priorities. This manifestation is discernible through metaphors, associations, and euphemisms that not only capture but also characterize the idiosyncrasies of perception and assessment of the world.

An inseparable interconnection exists between language norms and value guidelines. In parallel to language regulating communication, values wield influence in determining the acceptability or unacceptability of various forms of expression. The analysis of linguistic norms thus becomes an illuminating lens through which one can discern the values upheld by society and trace their evolving dynamics.

Language and cultural influences synergize to mold individual personality traits, serving not merely as a mode of communication, but as the very substance shaping one's character, beliefs, and cognitive style. This intricate relationship between language and personality is evident in various aspects of linguistic expression.

Take, for example, the choice of language as a tool for personal identity construction. The specific words and phrases one selects, coupled with the structural nuances of their statements, collectively craft a distinct self-image within the framework of societal and cultural norms. Consider a bilingual individual who seamlessly navigates between languages, adapting their expression to different contexts. In doing so, they reveal facets of their identity strategically, showcasing the adaptability and complexity of their personality[4].

Delving deeper into linguistic analysis, the exploration of self-determination through language unveils intentional emphasis and subtle highlighting of certain aspects of one's character. An individual may choose specific descriptors or employ particular linguistic devices to underscore traits that align with their desired self-presentation. For instance, someone might consistently use positive and assertive language to convey confidence, thereby reinforcing the perception of a self-assured personality.

Moreover, the nuances of language interaction, encompassing elements such as accent, intonation, and vocabulary, contribute significantly to the intricate tapestry of personal identity. The way in which an individual engages with others, the linguistic means they employ for communication, all contribute to the distinctive amalgamation of their personality. Consider the example of regional accents shaping identity; a person's unique pronunciation may signify not just geographical origin but also cultural affiliation and a sense of belonging.

By scrutinizing these facets of language, researchers gain valuable insights into the symbiotic relationship between language and the formation of identity. A thorough examination of accent variations or the evolution of vocabulary within specific social groups, for instance, allows for a nuanced understanding of how language actively participates in shaping the multifaceted mosaic of individuality.

Language not only reflects, but also influences the formation of individual character traits. How a person describes himself and the world around him, what emotional shades he attaches to his words, reflect his unique character. Analysis of linguistic manifestations allows us to identify the connection between the use of certain expressions and the expression of individual personality traits.

Language enables individuals to express their thoughts, feelings and views. It becomes a bridge between the inner world of the individual and the external society. Analysis of linguistic behavior and choice of vocabulary allows us to understand how a person builds his unique image in a sociocultural context.

The research was specifically tailored to the Russian-speaking community residing in Turkey, encompassing a diverse range of individuals across various age groups and sociocultural backgrounds who share the commonality of Russian as their primary language. The objective of the study was to delve into the intricacies of language preferences, the extent of Russian language retention, the utilization of terminology reflective of personal values, and the nuanced perception of personality as conveyed through language.

To achieve a comprehensive understanding, a meticulously crafted questionnaire was administered to 300 respondents through an online survey platform. The participants, Russian-speaking immigrants, were strategically selected to represent a broad spectrum of age and sociocultural cohorts. The data collection phase spanned two months, ensuring a thorough and in-depth exploration of the subject matter.

A paramount consideration for the researchers was the establishment of a representative sample that mirrored the diversity inherent within the Russian-speaking community in Turkey. By including individuals from different age groups and sociocultural backgrounds, the study aimed to capture a holistic view of the community's experiences and perspectives.

Following the data collection phase, a rigorous analysis ensued, employing both qualitative and quantitative methodologies. This multifaceted approach enabled the researchers to derive nuanced insights into the intricate interplay between language dynamics, cultural values, and the formation of individual personality traits.

Through the coding and analysis process, key thematic categories emerged, shedding light on the relationships between language characteristics, the preservation of cultural traditions and values, and the manifestation of personality traits through language expression. Notably, the findings underscored a strong correlation between the retention of the Russian language and the preservation of cultural identity, emphasizing the language as a vital conduit for the transmission of cultural heritage[5].

Of particular significance was the revelation that the expression of personality through the Russian language played a pivotal role in the self-determination of respondents and the shaping of their individual character traits. The study illuminated the dynamic role of language not merely as a communicative tool but as a profound influencer in the ongoing process of identity formation within the Russian-speaking community in Turkey.

In conclusion, understanding these relationships is essential in today's world, where a multicultural society requires a deep respect for diversity. The study of these issues not only expands our knowledge in the field of linguistics and cultural studies, but is also aimed at building a more tolerant and mutually understanding society, where every language and every personality finds its unique place in the rich mosaic of human culture.

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PECULIARITIES OF DEVELOPING A METHODOLOGY OF INCLUSIVE EDUCATION IN TEACHING BIOLOGY

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Abstract

In accordance with the principles of inclusion, according to the new standard, the teacher must: be able to communicate with children, recognizing their dignity, understanding and accepting them; be able to design and create situations and events that develop the emotional and value sphere of the child (culture of experiences and value orientations of the child); be able to build educational activities taking into account children's cultural differences, gender, age and individual characteristics, and maintain a business-friendly atmosphere in the children's team. There are also other factors to take into consideration when examining pathways to successful inclusive practices. Many scholars state that moving towards inclusion requires systematic evaluation at the overall school level including identifying the attitudes and perceptions of school professionals. The aim of this article is to develop a methodology of inclusive education in teaching biology and identify teachers' role in inclusive education.

Keywords: *inclusive education, cultural difference, individual characteristics, gender, disability, controlling.*

Introduction

Over the past decades, local and national governments have adopted inclusive education policies. International human rights framework states that schools are responsible for providing equal educational opportunities and that classroom teachers are the key agents in promoting inclusion for all students. However, despite a large body of literature on inclusion, there is a lack of empirical evidence on its impact on student growth. Disability is one of many individual differences and from this perspective, inclusive education is defined as providing appropriate educational practices to students with disabilities by classroom teachers in regular classrooms[1]. While opponents of inclusion argue that inclusive teaching takes away from the learning opportunities of students without any special needs, some suggest that inclusion benefits all students. Research also suggest that although students with special needs may benefit socially from inclusion, the academic benefits remain unclear. Lack of empirical evidence on inclusive education may be perhaps due to conceptual limitations such as a lack of consensus over a definition of inclusion and methodological challenges such as establishing control in natural settings.

Statement of the Problem

According to Dyson et al, there are limited numbers of classroom-based observation studies examining effective teaching practices in inclusive classrooms. Indeed, a component that is often not included in research examining effectiveness of inclusion and its impact on student outcomes is an observation of the quality of classroom teaching[4]. Farrell suggests that studies should examine observation of actual teaching as opposed to focusing on comparisons of placement labels such as "inclusive" versus "special" classrooms. Thus, focusing on classrooms as units of analysis is a step forward in identifying how inclusive education can be implemented effectively in practice for all students[5]. There are also other factors to take into consideration when examining pathways to successful inclusive practices. Many scholars state that moving towards inclusion requires systematic evaluation at the overall school level including identifying the attitudes and perceptions of school professionals.

Research findings point out that classroom teachers' positive attitudes towards inclusion is amongst the most important factors in creating inclusive classrooms. However, evidence also suggests that classroom teachers are reluctant about implementing inclusion and adapting instruction for all students. In addition to school level factors, factors at the classroom level also influence impact of inclusive education. Classroom teachers are expected to take the leading role in providing support for

students with special needs within the regular classroom context[6]. Evidence from studies of effective teaching reveal that teaching in inclusive classrooms requires not only a general understanding of best practices in teaching but also a more specialized knowledge of adapted instruction for students with special needs. However, research findings on teachers' negative attitudes towards students with disabilities may also suggest that teachers are reluctant to implement inclusive practices.

In educational psychology, although literature examining the link between teachers' behavior and attitudes is quite extensive, research focusing on empirical study of inclusive education and the effects on teaching of biology are limited.

Objectives of the Study

Two research objectives shape the present study. The first objective is to examine whether there is a relationship between teachers' teaching practices and their perceptions of inclusion in inclusive education and effects on teaching biology. The second objective is to explore whether any classroom level factors including various components of teachers' teaching practices and attitudes are significantly related to student outcomes of reading attainment, social inclusion, self concept, bullying and students' perceptions of inclusion. Through a nested design with students nested within classrooms, the present study will examine individual variation in reading attainment of biology.

Research Question

- (1) what is inclusive education?
- (2) how is it implemented?
- (3) what are its effect on teaching practices?

Significance of the Study

The present study seeks to examine how students' develop in relation to different classroom contexts as measured by observations of classroom teaching of biology and attitudes towards inclusion surveys through hierarchical analyses. The present study will aim to make substantive conceptual and methodological contributions to the field of inclusive education by 1) examining normal classroom variation through looking at growth in attainment and social outcomes and 2) by exploring the shared classroom variation as the dependent variable independent of unique student level variance. Finally, the present study aims to guide professional development in the implementation of inclusive education particularly at the classroom level and its effects on teaching of biology.

Each teacher plans their activities independently. Selects interesting, accessible, personally and practice-oriented content. Uses various manuals and technical means to achieve goals. Organizes a variety of children's activities, including creative ones related to various types of art: excursions, didactic games, etc. In subject programs, teachers learn to differentiate the multi-level requirements for mastering the content of educational material: basic and minimally necessary (reduced). This makes it possible to individualize work with children with special needs. Unfortunately, some students often feel insecure about their own abilities while working independently. By working in pairs or groups of shifts, children get the opportunity to cope with the task much more successfully, realizing that how they perform their part of the overall task is very important for the productive work of the whole group. In addition, the introduction of collective forms of learning into the lesson makes it possible to revitalize the lesson, to realize the communicative needs of students[2].

One of the leading factors in the positive result of the lesson is information and communication technologies, since children with special educational needs like not only the process of working with an interactive whiteboard in itself, but also the competitive moment of who will come out first and start writing with a pen, or moving objects in various tasks. With this organization of the material, 3 types of children's memory are included: visual, auditory, and motor. Multimedia presentations bring the effect of clarity to the lesson, increase motivational activity, promote a closer relationship between teacher and student and instill love and interest in the subject.

In order for the lesson to be dynamic, productive and interesting for each child, it is important to apply a variety of teaching methods, to provide for a change of activities in the lesson[3].

In biology lessons, I widely use game techniques. Every teacher has faced a situation when students are not diligent in class. In this case, an unexpected change of activity and the form of the lesson helps (excursion, trip, crossword puzzle, game, quiz). The lesson ceases to be a lesson, remaining it, in fact. I focus on the individual development of children. In classes where children with different cognitive abilities study, I try to monitor achievements for each child. The involvement of various didactic games allows me to carry out an individual and differentiated approach to students. Differentiated training allows everyone to work at their own pace, gives them the opportunity to cope with the task, increases interest in learning activities, and forms positive motives for learning.

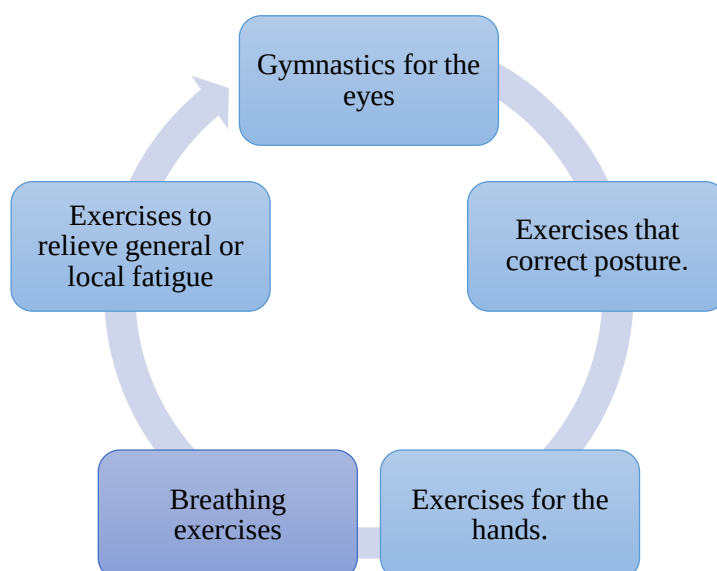


Figure 1: The main requirements for the conduct of physical education in the classroom

In order for students to be focused on a positive outcome of the lesson, with the achievement of all set goals, it is important to create a situation of success. A success situation is a combination of conditions that ensure success. What are these conditions? First of all, you should remember which group of students you will be working with. For children with special educational needs, the leading activity is communication. Creating a situation of success at the motivational stage is the basis for the formation of positive emotions. I use different techniques to do this. To form a positive psychological attitude of students at the beginning of the lesson, I use the "Give a smile" technique or the "Weather Forecast" training exercise, and also often use various videos that help students recharge with positive emotions before the lesson begins.

For example, the "Puzzle" technique, split pictures are distributed to the whole class, the task is given to put them together and name the resulting object, etc. Some students receive a set of small pictures from which they can put together a puzzle. I additionally give individual children a large card, which consists of large-sized parts. It is important that students get the impression of the identity of the tasks they have received. The game can be used at any stage of the lesson, for example, in the form of riddles, rebuses, charades, anagrams. To develop students' imaginative and logical thinking, I use the "communicative attack" technique at the beginning of the lesson. For example: "Having solved the riddle, you will find out what we will study in the lesson."

When setting goals and objectives of the lesson, performing practical work tasks, I use the technique of "Advancing a successful result": for example, "the topic is difficult, but I have no doubt you will succeed, you will definitely cope", "I do not even doubt the successful result", "people learn from their mistakes and find other ways solutions", "we have been through this material with you, you know everything and will easily cope with the tasks", etc.

Using this technique allows you to inspire a child with confidence in their abilities and capabilities.

The technique of "Removing fear" helps to overcome self-doubt, timidity, fear of the case itself and the assessment of others. In order to maintain a successful situation throughout the lesson at all stages, I use the "Emotional stroking" technique: I easily give compliments, say "well done", "good girl", "guys, I'm proud of you!" many times. After all, it is very important to inspire a child with self-confidence - this is the key to successful learning.

Conclusion

Students with special educational needs get tired quickly and need to change activities frequently. No matter how interesting the lesson is, after 20-25 min. from the beginning of the lesson, children experience a decrease in performance, the pace and quality of work decreases, motor activity changes, interest in the lesson is often lost, distractions become more pronounced. Physical education minutes in the lesson provide active rest for students, switch attention from one type of activity to another, help eliminate stagnation in organs and systems, contribute to increased attention and activity at the subsequent stage of the lesson. The start time of the physical education minute is determined by the teacher himself. It is most advisable to spend a physical education minute at a time when students show the first signs of fatigue. The external manifestations of fatigue are an increase in the number of

distractions, loss of interest and attention, weakening of memory, handwriting disorders, and decreased performance.

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METHODOLOGY OF MODELING QUANTUM MECHANICAL PROCESSES

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Abstract

Pedagogical experience shows that students have difficulty understanding the Schrodinger equation and solving related problems. Therefore, it is necessary to consolidate skills in solving quantum mechanical problems. The article poses and solves the one-dimensional Schrodinger equation for a particle located in an infinitely high potential well.

Keywords: particle, potential field, probability of finding a particle, wave function, Hamilton operator, wave number.

A workshop on solving problems, one of the main parts of the quantum mechanics course, occupies an important place in the system of university training of specialists and plays an important role in familiarizing students with the theoretical foundations of the fundamental laws and phenomena of quantum mechanics.

The position of a particle in space at a given moment of time is determined in quantum mechanics by setting the wave function:

$$\Psi(\vec{r}, t)$$

The form of the function is obtained from the solution of the Schrodinger equation:

$$-\frac{\hbar^2}{2m} \cdot \nabla^2 \Psi + U\Psi = i\hbar \frac{\partial \Psi}{\partial t} \quad (1)$$

The Schrodinger equation is the fundamental equation of non-relativistic quantum mechanics. If the force field in which the particle moves is stationary, then the function U does not depend clearly of time and has the meaning of potential energy. In this case, the solution to the Schrodinger equation splits into two factors, one of which depends only on coordinates, the other only on time:

$$\Psi(\vec{r}, t) = \psi(\vec{r}) \cdot \exp\left(i \frac{E}{\hbar} t\right) \quad (2)$$

Here E – is the total energy of the particle, which remains constant in the case of a stationary field. To verify the validity of expression (2), let's substitute it into the original equation (1). As a result, we obtain the Schrodinger equation for stationary states, which determines the wave function of the coordinates:

$$-\frac{\hbar^2}{2m} \cdot \nabla^2 \psi + U\psi = E\psi \quad (3)$$

The modulus square of the wave function determines the probability that a particle will be detected within the volume dV

$$d\omega = A|\psi|^2 dV \quad (4)$$

Here A – is the coefficient of proportionality.

The integral of expression (4) taken over the whole volume must equal one:

$$\int d\omega = \int A|\psi|^2 dV = 1 \quad (5)$$

This integral gives the probability that the particle is located at one of the points in space.

The Schrodinger equation allows us to find the wave function of a given state and, consequently, to determine the probability of finding a particle in different points of space.

Let us consider several problems on finding the wave function, determining the eigenvalues and eigenfunctions of the Hamilton operator, designed for students beginning to specialize in theoretical physics in order to develop their professional skills.

Exercise. Find the wave functions of a particle of mass m located in a one-dimensional infinitely deep potential well of width l ($0 \leq x \leq l$).

Solution: Assume that the particle can only move along the x -axis. Let the motion be limited by walls impenetrable to the particle: $x = 0$ and $x = l$. Potential energy $U = 0$ at ($0 \leq x \leq l$) and goes to infinity at $x < 0$ and $x > l$. Potential energy U has the form

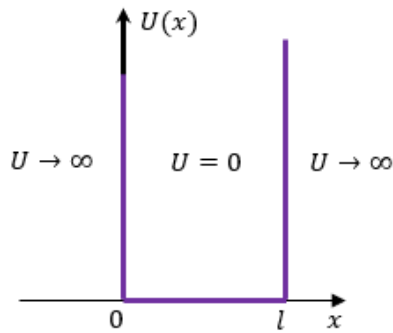


Fig.1. infinitely high one-dimensional potential well.

Let us consider the Schrödinger equation (3). The wave function depends on one coordinate x . Then the equation can be transformed to the form:

$$\frac{d^2\psi}{dx^2} + \frac{2m}{\hbar^2}(E - U)\psi = 0 \quad (6)$$

The particle cannot go beyond the potential well. Therefore, the probability of detecting particles outside the well is zero. Accordingly, the wave function outside the well is equal to zero. From the continuity condition it follows that ψ must be equal to zero at the boundaries of the well, i.e. what

$$\psi(0) = \psi(l) = 0$$

This is the condition that solutions to equation (6) must satisfy. In the region where ψ is not identically zero, equation (6) has the form

$$\frac{d^2\psi}{dx^2} + \frac{2m}{\hbar^2}E\psi = 0 \quad (7)$$

Let's introduce the notation

$$k^2 = \frac{2m}{\hbar^2}E$$

and the equation will take the well-known form in the theory of oscillations:

$$\frac{d^2\psi}{dx^2} + k^2\psi = 0 \quad (8)$$

The solution to this equation is

$$\psi(x) = A\sin(kx + \alpha) \quad (9)$$

The boundary conditions can be satisfied by an appropriate choice of constants k and α .

First of all, from the condition $\psi(x) = 0$ we obtain

$$\psi(x) = A\sin(\alpha) = 0$$

Whence it follows that $\alpha = 0$. Next, the condition must be met

$$\psi(l) = A\sin(kl) = 0$$

$$kl = \pm n\pi, \quad (n = 1, 2, 3, \dots) \quad (10)$$

Substituting the value of k into (9) obtained from condition (10), we find the eigenfunctions of the problem:

$$\psi(x) = A\sin\frac{\pi nx}{l}$$

To find coefficient A , we use the normalization condition:

$$\int_0^l A|\psi|^2 dx = 1$$

$$A^2 \int_0^l \sin^2\left(\frac{\pi nx}{l}\right) dx = 1$$

As a result, we get $A = \sqrt{\frac{2}{l}}$. Thus, the eigenfunctions have the form

$$\psi_n(x) = \sqrt{\frac{2}{l}} \sin\left(\frac{\pi nx}{l}\right), \quad n = 1, 2, 3, \dots \quad (11)$$

The graph of the proper wave function is shown in Fig.2a, with quantum number $n = 3$. Fig.2b shows the probability density of detecting a particle in a potential well. It is clear from the graph that the particle cannot be detected at points $x = l/3$ and $x = 2l/3$ of the well. This behavior of the particle is obviously incompatible with the idea of trajectories.

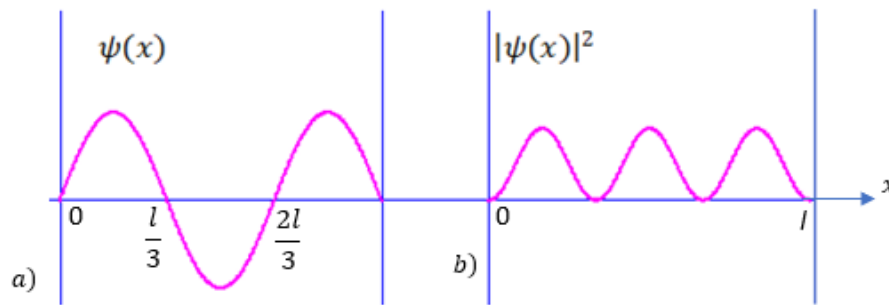


Fig.2. Graph of wave function and particle detection density

Conclusion

The Schrödinger equation is the fundamental equation of non-relativistic quantum mechanics. It can take different forms depending on the potential field in which the particle is located. The simplest version of this equation is its application to a particle in a one-dimensional, infinitely deep potential medium.

The problems given as examples in the article will help to strengthen the theoretical knowledge of the students on the subject of "Schrodinger's equation" in the science of quantum mechanics. It can be seen from the solutions of the problems that, in order to solve this type of problems, students need to have basic knowledge such as "Trigonometric function", "Derivative operation", "Finding the initial function", "Drawing the graph of complex functions" from the mathematics course.

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CULTURAL SENSITIVITY IN INTERGROUP COMMUNICATION COMPETENCE AMONG SENIOR STAGE STUDENTS: A CASE STUDY APPROACH

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Abstract

This study embarks on an exhaustive exploration, unraveling the intricate dynamics inherent in the intersection of cultural sensitivity and intergroup communication competence, with a dedicated focus on senior stage students. Employing a meticulous and comprehensive case study approach, our research delves into the nuanced interplay between cultural awareness and the cultivation of effective intergroup communication skills. In an era where societies undergo continuous diversification, understanding how senior stage students navigate and engage with this evolving cultural landscape becomes not only relevant but imperative for fostering a truly inclusive educational environment.

The investigative journey initiates with the establishment of a robust conceptual framework, meticulously defining the constructs of cultural sensitivity and intergroup communication competence. This foundational scaffolding not only provides clarity to the subsequent case study analysis but also offers a structured lens through which to examine real-life scenarios encountered by senior stage students. Through the immersive nature of the case study methodology, we aim to provide profound insights into the multifaceted challenges and successes faced by senior stage students in the intricate realm of intercultural interactions.

The case study methodology offers more than just a theoretical exploration; it provides an intimate lens into the lived experiences of senior stage students. This approach enables a granular examination of the cognitive, affective, and behavioral dimensions that underpin intergroup communication competence. Identifying patterns, barriers, and facilitators, our study makes a significant contribution to the broader discourse on intergroup communication competence within the specific context of senior stage education.

Beyond theoretical advancements, the findings from this research hold actionable implications for educators, policymakers, and practitioners. Leveraging the insights gained, these stakeholders can actively contribute to enhancing cultural sensitivity among senior stage students, fostering a learning environment that embraces and celebrates diversity. By grounding the study in the real-world experiences of students engaged in intercultural encounters, our research offers practical recommendations for implementing inclusive pedagogical practices.

Keywords: *cultural sensitivity, intergroup communication competence, senior stage students, case study approach, cultural awareness, diversity in education, inclusive learning, intercultural interactions.*

Introduction

The significance of intergroup communication skills and cultural sensitivity has grown in importance in an era of unparalleled global connection and cultural interdependence. This introduction acknowledges the transforming impact that these constructions have in molding the experiences of senior stage students and aims to shed light on their deep significance within the educational landscape.

The phrase "cultural sensitivity," which resonates with the complexities of society, refers to the knowledge, comprehension, and tactful recognition of many cultural subtleties. People, especially senior stage pupils, must be able to negotiate these cultural dynamics as countries change into kaleidoscopes of customs, languages, and viewpoints. A culturally sensitive person possesses the capacity to not only acknowledge cultural differences but also interact with them in a way that promotes understanding.

Concurrently, the notion of intergroup communication ability surfaces as an important aspect of the modern educational paradigm. Intergroup communication competency goes beyond language

proficiency and involves negotiating the challenges of communicating across various social groupings. As future leaders and members of the community, senior stage students need to be able to communicate successfully across cultural divides in order to promote teamwork, mutual understanding, and cohesiveness.

A patchwork of cultures, races, and viewpoints characterizes the terrain of modern nations, which have experienced an unprecedented inflow of diversity. Instead of being a problem, this diversity is a rich tapestry that, when accepted and comprehended, aids in people's overall development. The importance of recognizing and valuing this variety in educational settings cannot be emphasized. Senior stage students, poised at the threshold of higher learning and societal engagement, stand to benefit profoundly from the cultivation of cultural sensitivity and intergroup communication competence.

Through a case study method, we will explore the complex relationship between senior stage students' intergroup communication abilities and cultural awareness as we move through the following sections. We hope that our investigation will help educators, policymakers, and practitioners who are dedicated to creating inclusive and culturally competent learning environments by pointing out trends and obstacles as well as offering practical advice.

Method and Material

The rationale behind choosing a case study methodology for this research is its exceptional capacity to offer a comprehensive, contextualized comprehension of the complex relationships between intergroup communication competence and cultural sensitivity. A comprehensive lens that allows for the exploration of real-life situations and offers a nuanced perspective on senior stage student experiences is provided by case studies. Through case-specific investigation and contextual analysis, this methodology enables a thorough examination of the various factors influencing cultural dynamics in educational environments.

Furthermore, the case study methodology emphasizes the breadth and depth of the data collected, blending in perfectly with the research's qualitative focus. Cultural sensitivity and intergroup communication skills are complex phenomena that are intricately entwined with their personal histories. Utilizing a case study methodology enables the exploration of these complexities, facilitating a more profound understanding of the mechanisms at play.

Participants:

The primary participants will be senior stage students, ensuring that the experiences are directly relevant to the targeted demographic. Participants will be selected to reflect a diverse range of cultural backgrounds, fostering a comprehensive understanding of intergroup communication dynamics.

Procedure:

Through this meticulous selection process, the case study methodology is poised to unearth valuable insights into the lived experiences of senior stage students, offering a rich foundation for the subsequent analysis of cultural sensitivity and intergroup communication competence within the educational milieu.

Implementation of Intergroup Communication Competence:

To simulate authentic intergroup communication scenarios, participants will engage in carefully designed activities and discussions. These activities will be integrated into their educational environment and will encompass diverse cultural contexts, fostering a naturalistic setting for the observation and analysis of intergroup communication competence.

Data Collection:

1. Semi-Structured Interviews: Participants will engage in one-on-one interviews with trained researchers. The semi-structured format allows for flexibility, enabling participants to share personal insights beyond predefined questions to elicit rich and detailed narratives, perspectives, and reflections from senior stage students regarding their experiences with cultural sensitivity and intergroup communication competence.

2. Surveys: Participants will be provided with structured surveys consisting of a series of standardized questions related to intergroup communication. The survey format ensures consistency in responses and facilitates statistical analysis.

3. Non-participant Observations: Trained observers will discreetly observe selected scenarios involving senior stage students. The observational data will include verbal and non-verbal cues, group dynamics, and reactions to intercultural stimuli.

Analysis:

1. Thematic Analysis: Thematic analysis involves a systematic approach to identify, analyze, and report patterns within the data. To uncover patterns, recurring themes, and variations within the

qualitative data obtained from semi-structured interviews, non-participant observations, and surveys. The qualitative data will be transcribed, coded, and categorized to reveal overarching themes related to cultural sensitivity and intergroup communication competence.

2. *Quantitative Analysis:* Statistical techniques will be applied to examine trends, correlations, and variations within the quantitative dataset. To analyze survey data quantitatively, providing statistical insights into participants' self-assessed competencies in intergroup communication. Descriptive statistics will outline general patterns, while inferential statistics may be employed to identify relationships between variables.

Ethical Considerations:

Ethical guidelines were strictly adhered to throughout the research process. Informed consent was obtained from both students and their guardians, ensuring voluntary participation and confidentiality. All data were anonymized and treated with utmost sensitivity.

By combining these varied data collection methods, this research aims to construct a holistic and nuanced understanding of cultural sensitivity and intergroup communication competence among senior stage students. The integration of qualitative and quantitative data enables a comprehensive analysis, contributing valuable insights to both theoretical discourse and practical applications in educational settings.

Results

The data collection and analysis efforts culminate in a more nuanced understanding of senior stage students' intergroup communication competence and cultural sensitivity. The findings—which include both quantitative and qualitative information—provide a thorough understanding of the complex dynamics at work in this educational setting.

Quantitative Findings:

1. *Distribution of Competencies:* Participants exhibited a varied distribution of self-assessed intergroup communication competencies, indicating a diverse range of comfort levels in navigating cross-cultural interactions.

2. *Correlations:* Significant correlations emerged between cultural sensitivity awareness and perceived effectiveness in intergroup communication. Participants who demonstrated a heightened awareness of cultural nuances tended to report higher levels of competence in their interactions.

3. *Demographic Variations:* Analysis across demographic factors such as cultural background and prior intercultural experiences highlighted variations in self-perceived competencies. This suggests that individual backgrounds may play a role in shaping intergroup communication skills.

Qualitative Findings:

1. *Challenges in Intergroup Communication:* Participants shared common challenges, such as language barriers, stereotyping, and cultural misunderstandings, underscoring the complexity inherent in intergroup communication.

2. *Success Factors:* Success factors in intergroup communication emerged, including active listening, empathy, and a willingness to engage with diverse perspectives. These factors contributed significantly to participants' perceived effectiveness in cross-cultural interactions.

3. *Emerging Patterns:* Patterns in participants' experiences highlighted the role of educational activities in fostering cultural sensitivity. Real-world scenarios allowed students to apply theoretical knowledge, leading to more meaningful intergroup communication.

Comprehensive Progress Tracking:

The combined analysis of quantitative progress tracking and qualitative insights provided a comprehensive understanding of the progress made by senior stage students in enhancing cultural sensitivity and intergroup communication competence. The triangulation of data sources validated the observed shifts in self-perceived competencies, affirming the effectiveness of the implemented activities.

Implications:

1. *Tailored Educational Interventions:* Recognizing the identified challenges, tailored interventions can be designed to address specific aspects of intergroup communication, fostering a more inclusive learning environment.

2. *Cultural Inclusivity Strategies:* Strategies for promoting cultural inclusivity within educational settings, such as incorporating diverse perspectives into curricula and creating platforms for intercultural dialogue, can enhance overall cultural sensitivity.

Recommendations:

1. *Integrate Cultural Competency Modules:* Embed modules focused on cultural sensitivity and intergroup communication competence within the curriculum, providing students with structured opportunities to develop these skills.

2. *Faculty Development Programs:* Implement faculty development programs to enhance educators' cultural awareness and competency, ensuring that they can effectively guide students in navigating diverse cultural landscapes.

3. *Diversity and Inclusion Initiatives:* Establish initiatives that celebrate diversity and promote inclusion, creating a campus culture that values and appreciates differences.

4. *Continuous Progress Assessment:* Develop mechanisms for continuous assessment of students' progress in intergroup communication competence, allowing for ongoing refinement of educational strategies.

Limitations and Future Research:

1. *Short-Term Evaluation:* The research primarily focuses on short-term progress tracking following implemented activities. Long-term effects on cultural sensitivity and intergroup communication competence may require additional longitudinal studies.

2. *Cultural Background Variability:* The study acknowledges variations in participants' cultural backgrounds; however, a deeper exploration of specific cultural contexts and their impact on intergroup communication could provide more nuanced insights.

3. *Comparative Cross-Cultural Analysis:* Expand research to include cross-cultural comparisons, examining how cultural dimensions influence intergroup communication within diverse student populations.

Discussion

The research's many facets are explored in detail in the discussion section, which offers a thorough examination of the results, their implications, and the larger significance for education. The complex relationships between intergroup communication skills and cultural sensitivity that this study revealed among senior stage students demand serious thought and consideration.

Integration of Intergroup Communication Competence:

The quantitative results show that senior stage students' self-assessed intergroup communication competencies are distributed differently. This diversity highlights the need for customized strategies to handle differing degrees of comfort in negotiating cross-cultural relationships. The correlations found between perceived effectiveness and cultural sensitivity awareness highlight the mutually beneficial relationship between these constructs and imply that intergroup communication competence is positively influenced by a heightened awareness of cultural nuances.

Enhancement Through Tailored Interventions:

The findings suggest that customized educational interventions have the potential to improve the situation. Teachers can create interventions that specifically address common problems like language barriers and stereotyping by identifying these issues. The success factors that have been identified, such as empathy and active listening, offer important insights into the fundamental skills that can be improved. In addition to highlighting areas for customized support, the distribution of competencies guarantees that the enhancement process considers the particular requirements of every student.

Continuous Improvement Through Feedback Loops:

The need for ongoing development is suggested by the cyclical nature of intergroup communication competency and cultural sensitivity. A crucial part of this iterative process is setting up feedback loops where students can share their experiences and teachers can adjust interventions based on results. The idea of developing a dynamic learning environment that changes in response to student needs and shifting societal dynamics is in line with this continuous improvement model.

Challenges as Opportunities for Growth:

The research's challenges, which include stereotyping and language barriers, should not only be seen as roadblocks but also as chances for development. Every challenge offers a different path for focused interventions and educational opportunities that can support the growth of intergroup communication skills and cultural sensitivity.

Conclusion

This study's exploration of senior stage students' intergroup communication skills and cultural sensitivity has shed light on important aspects of their educational environment. As we come to the end of this investigation, several important lessons stand out, each of which advances our knowledge of how cultural competency is integrated and how to develop it in tomorrow's leaders.

Diversity as a Educational Imperative:

One prominent theme that emerges is the understanding of diversity as a requirement for education. In a world where global perspectives are entwined and interconnected, cultivating an appreciation for diverse cultures is not only desirable but also imperative. The wide range of self-assessed competency distribution highlights the distinct opportunities and challenges that every student brings to the classroom.

Real-world Application and Experiential Learning:

A shift away from a purely theoretical education is indicated by the emphasis on experiential learning and real-world application. Applying ideas in real-world situations is just as important as understanding them conceptually when it comes to integrating cultural competence. Experience learning can be a transformative tool for cultivating cultural sensitivity, as evidenced by the observed changes in self-perceived competencies after participating in such activities.

Challenges as Catalysts for Growth:

The challenges identified in this research are not roadblocks but catalysts for growth. Each challenge offers an opportunity to refine educational strategies, address gaps in cultural understanding, and foster an environment where challenges become steppingstones to enhanced cultural sensitivity.

In conclusion, developing cultural competency in senior stage students is a complex task that necessitates a paradigm change in teaching methods. Integrating intergroup communication competence is a social duty as well as an academic endeavor. Looking ahead, it is evident that we must create learning environments that foster cultural sensitivity, empathy, and successful intergroup communication in addition to imparting knowledge. By doing this, we help to shape the next generation of leaders who are able to navigate the complexity of an interconnected global landscape and who are both academically and culturally competent.

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PECULIARITIES OF PREPARATION OF A COMPLEX ONLINE COURSE ON THE DISCIPLINE "PHYSIOLOGY OF HUMAN AND ANIMALS"

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Abstract

This article analyzes the ways of using complex online courses in learning process. There are many techniques and methods of learning a particular subject, one of which is Stepik.org platform. Online courses hosted on Stepik.org have repeatedly won prizes in online course competitions, and the automated task verification system is used in a number of courses on the Coursera and edX platforms. Stepik.org is also actively developing the field of adaptive learning, where everyone will be able to study material individually tailored to their level of knowledge. This platform offers open access to online courses and the ability to create your own educational material.

Keywords: *online courses, biology, open access, complexity level, classification, task verification system*

Introduction

There are many techniques and methods of learning a particular subject, one of which is Stepik.org platform. Online courses hosted on Stepik.org have repeatedly won prizes in online course competitions, and the automated task verification system is used in a number of courses on the Coursera and edX platforms. The importance of online courses is confirmed by the practice and results of recent domestic and foreign research, the opening of mnemonics schools in Kazakhstan and abroad.

Online courses— a set of special techniques and methods that facilitate the memorization of the necessary information and increase the amount of memory by forming associations (connections).

Even the ancient Greeks developed rules of memorization based on simple but very effective principles and named them after the goddess of memory Mnemosyne[1].

Basic techniques of working in a Stepik.org platform:

- 1. Making a semantic phrase from the initial letters of the memorized information*
- 2. Rhyming, that is, translating information into poems, songs, rhymed or rhythmized lines.*
- 3. Memorizing long terms using consonant words*
- 4. Finding bright unusual associations (pictures, phrases) that connect with memorized information*
- 5. Cicero's method of spatial imagination. Imagine walking around your room, where everything is familiar to you. The information you need to remember, arrange mentally in the course of movement*

I want to describe my small "piggy bank" of mnemonic techniques, which included both fairly well-known, often used by biology teachers, some compiled independently or jointly with students[2].

Table 1

Advantages of using online course Stepik.org:

1	Peer-review <i>Peer-review available for open ended questions, e.g. for checking math proofs.</i>
2	Extended reports <i>Dive deep into your students' data using our extended reports and rich REST API</i>
3	20+ types of assignments <i>More than 20 types of assignments, including randomised data sets, programming assignments, string regexps etc</i>
4	Auto grading <i>Sophisticated assignment checking technologies, allowing for auto grading of programming assignments.</i>

[a table is created by authors]

1. Reception - Making a semantic phrase

Classification. The Animal Kingdom. Classification of the Plant Kingdom

<i>Rap (Rock)</i>	<i>Genus</i>
<i>Consider</i>	<i>Family</i>
<i>really</i>	<i>squad</i>
<i>Category</i>	<i>Type</i>
<i>Theme</i>	<i>Rank</i>
<i>Land</i>	<i>Kingdom</i>

<i>All</i>	<i>Type</i>
<i>Plants</i>	<i>Sort</i>
<i>Nice</i>	<i>Семејство</i>
<i>Look at</i>	<i>order</i>
<i>Around</i>	<i>Class</i>
<i>They</i>	<i>Unit</i>

2) Shaped elements of blood

<i>Elements</i>	<i>1st variant</i>	<i>2nd variant</i>
<i>Red blood cells</i>	<i>This</i>	<i>Eric</i>
<i>Platelets</i>	<i>So</i>	<i>spent</i>
<i>White blood cells</i>	<i>Easy</i>	<i>Lavandos</i>

3) Visual analyzer. Photoreceptors

During the day they work with cones, at night they walk with sticks – to memorize the specifics of the work of the photoreceptors of the retina[3].

Embryogenesis

The main stages in embryonic development are proposed to be remembered in the format of word-associations

<i>Blastula</i>	<i>Bo</i>
<i>Gastrula</i>	<i>Gi</i>
<i>Neurula</i>	<i>N</i>
<i>I was born</i>	<i>I</i>
<i>Goddess</i>	

Metabolism

Anabolism–Any builds; catabolism–Katya destroys.

Conjugation is the process of precise and close convergence of homologous chromosomes.

The HORSE went SOUTH to buy STOCKS.

Mitochondria - Mitya walks (similar to footprints)

Animal Tissue

E – Epithelial

C – Connecting

M – Muscular

and

H – Nervous

E – unified

C – whole

Geochronological scale

Geological periods can be remembered with the help of a comic phrase:

Every Excellent Student Should Smoke Cigarettes - Cambrian, Ordovician, Silurian, Devonian, Carboniferous, Permian,

Jurassic, Small – Triassic, Jurassic, Cretaceous

Drink Tea At Night - Paleogene, Neogene, Quaternary[4].

Keyword reception

This method is very simple and it consists in the following: to the word you need to choose another keyword from the English language, which will be similar to it in writing the first letter.

Highlighting the first letters when memorizing fruits and families.

Compound Flowers - Achene

Legumes - Bean

Cereals – Grain

K. D. Ushinsky is the founder of scientific pedagogy: "Teach a child some five words unknown to him - he will suffer for a long time and in vain, but connect twenty such words with pictures, and he will learn them on the fly[5].

"For any teacher who is not indifferent to his work, it is extremely important that his students love and know the item. Each of us strives to make our lessons bright, emotional and memorable.

Conclusion

In conclusion, it should be said that the use of online courses is by no means intended to replace the most well —known and widely popular method in the development and strengthening of memory. However, mnemonics copes with the task of helping to make the memorization process simpler and more interesting just perfectly. Try to apply the basic mnemonic techniques on yourself — and you will soon feel its usefulness and irreplaceability.

Internet resources can also be used by teachers to improve their skills (network methodological associations and virtual pedagogical councils, distance learning, participation in network projects, etc[6]).

Thus, cognitive activity presupposes readiness and ability to live and interact in the modern multicultural world. The lack of cognitive activity skills significantly complicates communication and understanding with representatives of foreign cultures. And project activity is a tool of education and training that promotes respect, understanding of the culture, traditions, language of another people, as one's own, and also helps to overcome fear and distrust in relation to another culture.

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WAYS OF FORMATION OF KEY COMPETENCIES OF STUDENTS IN BIOLOGY LESSONS THROUGH "LESSON STUDY"

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Abstract

The article briefly describes the essence of Lesson Study method in formation of research activities in teaching biology. The mechanisms of working with a pedagogical approach in the classroom and in extracurricular activities of a biology teacher are shown. The results of a pedagogical experiment on the problem of using research in action in teaching biology are summarized. There are some competencies that must be developed in living in the 21st century. They are critical thinking skill, problem solving, creativity and innovation, communication and collaboration, social skill and cross culture, and mastery of information.

Keywords: Lesson study, research activities, teaching approach, problem solving, biology, professional community, creativity, self-directed learners

Introduction

Lesson study is a pedagogical approach that characterizes a special form of research in action in the classroom, aimed at improving knowledge in the field of teaching practice. The approach was founded in Japan in the 70s of the 19th century, about 70 years ahead of the "Research in Action" approach used in the West.

The Lesson study involves groups of teachers who jointly plan, teach, observe, analyze learning and teaching, documenting their findings. Central to Lesson study is the "lesson study" or "lesson study" process, in which collaborating teachers study the student learning process to figure out how they could develop a specific approach to improve the quality of learning. The key characteristics of the Lesson study are creativity and scientific accuracy. Creativity is initiated by teachers working together to develop new teaching approaches, and scientific accuracy involves collecting data on student learning that will confirm the effectiveness of the approaches used. Lesson study is a democratic way to improve practice. Groups usually consist of at least three teachers, which is a factor favorably influencing each other's experience and knowledge. The teachers who make up the group, in most cases, work in the same school, but colleagues from other schools may be involved to work together to improve practice. Sometimes teachers who have experience in using certain approaches or aspects of the curriculum and have received appropriate training may be invited to serve as a professional curator of the group. Nevertheless, all members of the group are fully and equally involved in the process. During the Lesson study cycle, teachers can innovate or improve pedagogical approaches, which are then passed on to colleagues through open Lesson studies or the publication of a document describing their work. In the West, Lesson study has gained popularity only in the current century, after American researchers confirmed the fact that Japanese teachers have deep knowledge, both in the field of pedagogy in general and in the field of the subject taught, ensuring a high level of educational achievements of Japanese students, compared with similar groups of students in the United States. Currently, in East Asia, Lesson study is used, in addition to Japan, in Singapore, Hong Kong and China. This approach is also used in Western countries, including the United States, Great Britain, Sweden and Canada.

The methodology of the Lesson Study approach is effective because it helps teachers:

- ✓ to see children's learning being confirmed more clearly in various manifestations and details than is usually possible;
- ✓ to see the difference between what, according to the teacher, should happen during the education of children, and what is happening in reality;
- ✓ understand how to plan training so that it meets the needs of students as much as possible as a result;
- ✓ to implement the Lesson Study approach within the professional community of teachers, the priority goal of which is to help students in learning and professional training of group members

✓ use the opportunities of Lesson Study in your teaching practice.

The Lesson study approach is a cycle involving at least three Lesson studies jointly planned, taught/observed and analyzed by a group of teachers.

Signs of multimedia teaching methods verbal, visual and practical methods combine all channels of information transmission, which can be considered complex, integrated or multifunctional.

What is the role of multimedia skills in the practice of a biology teacher?

Multimedia, like traditional teaching tools, perform a trinity of didactic functions: teaching within the discipline, development, education.

1. The most common way of using multimedia is the use of educational electronic resources by a biology teacher.

There are the following types of educational electronic resources in biology:

- electronic edition containing text, digital complex, graphic, musical, speech, photo, video, audio and other information, as well as collectible printed documentation (maps, reproductions, archival sources, etc.). Electronic edition can be made in a magnetic or optical environment [4,p.65];

Research methods:

The pedagogical experiment took place in a secondary school and consisted of the stages of identification and training. The identification stage provided for an interview, a questionnaire. Direct contact with teachers at the designated stage of the study made it possible to determine the importance of using multimedia in the educational process [5, p.112].

One of the survey questions is aimed at determining the value of multimedia teaching tools in the process of teaching biology. Teachers showed the values of using Lesson Study method:

- development of educational motivation and interest in the subject-50%;
- formation and development of knowledge in biology-26%;
- development of universal educational activities-10%;
- helps teachers to see students in an unconventional form of education-14%.

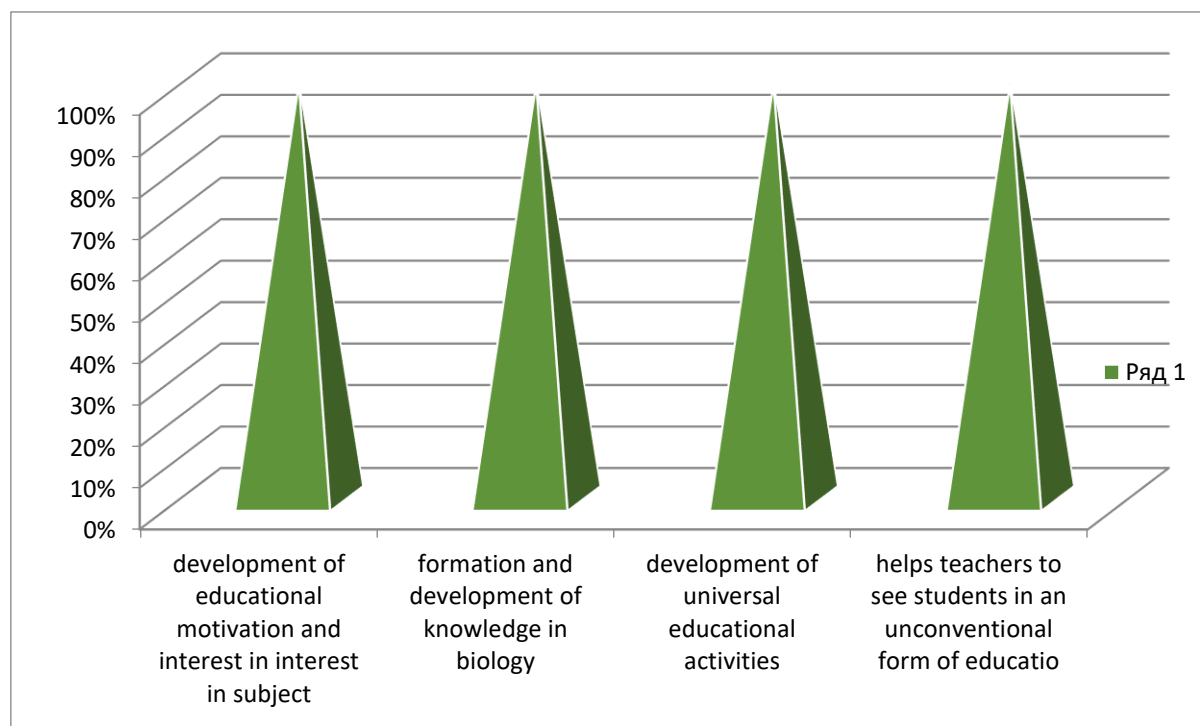


Figure 1: Teachers' answers towards the value of Lesson Study method in the process of teaching biology

The leading functions in the work of a biology teacher with Lesson Study technologies are: the function of preparing the components of the information environment, the function of organizing learning, the function of the process, the organization of activation and management in the classroom, individual control over the work of students. There are various ways to use Lesson Study method (the use of educational electronic resources, the development and use of computer presentations by the teacher, the development and use of "ready-made" test materials, the development of thematic collections on biology).

Using Lesson Study method, a teacher:

- creates positive atmosphere;
- forms a problem task;
- solves it by demonstrating the stage of problem solving, the sequence of reasoning, the pattern of reasoning.

And the student:

- perceives, realizes, comprehends, remembers knowledge about the course of solving a holistic problem;

- argues with the teacher.

The purpose of the application of problem presentation is the assimilation by students of knowledge about the main stages of solving the problem, their content and sequence of presentation

The effectiveness of using multimedia tools in biology lessons is due to the developed structure of the lesson, the complex didactic purpose with other visual aids, the content of educational electronic resources, the possibility of visiting a computer classroom, the acquisition of elementary computer skills by students, etc.

When choosing the type of multimedia tool and introducing it into the education system, the process should be guided by the learning objectives; the specifics of the content of the topic being studied; the type and structure of the lesson; the age characteristics of the student; the material equipment of the cabinet.

Conclusion

Based on the conducted research, we came to the following conclusion.

The problem of using didactic tools in the educational process is relevant in the modern conditions of general biological education. Currently, psychologists, educators, methodologists in general define the special role and place of multimedia means of informatization of society.

The use of ICT tools characterized as a method organized by the teacher in the educational process in order to form qualitative knowledge and develop students' skills, develop cognitive interests, abilities and personal qualities of the student promotes development.

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LANGUAGE POLICY IN KAZAKHSTAN- RISKS OF POLITIZATION OF THE LANGUAGE ISSUE**Rakhimzhanova T.E.**

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Karaganda University of Kazpotrebsouyz, Karaganda, Republic of Kazakhstan**Abstract**

This article will address the issues of the formation of language policy directions, its diversity for solving social and state issues, various processes and risks associated with the development of the country. The impact of this language policy on the educational spheres of the state. The relevance of this article is its importance in various fields of activity, because changes will also occur in the system of government. It is worth noting the language policy is quite important the current policy, which is put forward for further restoration of language issues. To implement this policy, they are first put on public display for the public to understand the relevance. On a legislative basis, the directions of language issues have also been identified, and their actions in further structures. The peculiarities of the functioning of the Kazakh, Russian, and English languages. To obtain new information on language issues, they are solved through linguists, the introduction of changes and their differences can be using these features. The necessary actions to ensure verbal communication, which includes both linguistic and political factors. The process of regulating the choice of language environments, according to research, is not necessary, since the structure of the policy changes generated depends entirely on the will of the speaker. The political component of language policy is an integral component of State sovereignty. Language policy is an integral part of the policy on the part of the state foundations. The introduction of a number of political changes may entail a problem related to the operation of the language system. To solve this task, it turned out to be extremely effective, since it is in the area of regulated speech behavior that the norms of the so-called speech etiquette, as well as language laws regulating the appearance of borrowings, operate. The method of changes in the political issue can also be considered with the help of political relations between other countries.

Keywords: language issue, legal methods, state policy, development program, Latin alphabet, linguistic factors, police structure.

In modern society, there are noticeable negative prospects with the development of the language issue. In order to develop solutions regarding language issues in Kazakhstan, the causes of this problem are being considered. The main object of language policy is to create an optimal state space in the ratio of languages, in which the state language should have a worthy place. The development of Kazakhstan's language policy is based on these tactical principles:

- improvement of the cultural language in all public spheres;
- strengthening the regulatory framework of the Kazakh language as the state language;
- implementation of projects aimed at digitalization;
- State assistance in language learning and organization of training courses;
- the introduction of a requirement obliging civil servants to know the language;
- implementation of language reform based on the Latin alphabet;
- tracking and perfection of Kazakh language proficiency in public institutions;
- implementation of a set of measures aimed at the language capital of citizens [1].

A language policy is being implemented in the Republic of Kazakhstan to develop statistics on state language proficiency. The purpose of this policy is to develop a linguistic culture in the state based on the Latin alphabet and for the development of language capital. The development of the state language operates on the territory of Kazakhstan in all spheres of public relations. The idea of forming a civil nation is relevant to the development of this policy, and language is an important factor in consolidating the population. The law on the adoption of language policy was also adopted on the official use of the Russian language on an equal basis with the Kazakh language. Until that day, the use of the Russian language in socio-political discourse was considered the norm and was calmly perceived in society. As we have already noted, the state language should act as one of the factors in the formation of a united

nation. There is a mixture of two strategies in the country, which does not allow us to develop a single strategy for strengthening the people [1].

The important main difficulties of this language policy are, firstly, ethnic Kazakhs, who prefer the use of the Russian language in most areas of life. Secondly, there are Kazakhs who know only the Kazakh language. In this situation, Kazakhs who know the Kazakh language remain in the minority and most of the people with knowledge of the Russian language predominate. In addition, the predominant use of the Russian language is facilitated by external and internal factors. They have a stronger impact than all political, socio-cultural, educational, information and communication measures within the framework of the officially implemented language policy of the authorities. This is one of the main reasons why the Kazakh language does not consolidate the Kazakhs themselves either in Kazakhstan or in other countries. The most serious disagreements and contradictory cultural and educational consequences have been caused by attempts to accelerate the introduction of Kazakh-English bilingualism or Kazakh-Russian-English tri lingualism, undertaken in recent years. Initiatives to translate the language into the Latin alphabet can also be added here - they are ambiguously perceived in the Kazakh-speaking environment itself, and their implementation will make it even more difficult for Russian-speaking ethnic groups to study it [2].

Political and economic changes in Kazakhstan have also affected the language priorities and language behavior of citizens.

To solve the problem of language learning, an "Explanatory dictionary" was released, developed on the innovative basis of the educational complex "Danalyk Kitaby". The range of distance learning opportunities has increased significantly, the emergence of projects of non-governmental television, animated films aimed at the use of the state language. In terms of analytics, they also want to add a multi-level language proficiency system to improve usage. These proposed methods for the dissemination of the state language helped to raise the statistics in the use of the state language in the printed mass media exceeded by 73 percent. As we can see the language problem all is still present. Its incomplete functioning is hindered by an uneven level of language proficiency and a low indicator of motivation for using the state language in a socially communal environment [3].

It is obvious that there are no serious restrictions for more extensive use in the field of official, social, household, interethnic communication, which means that the points assessed today as negative, when using certain tools and mechanisms, can be effectively removed. The state developers of the national language policy of the Republic of Kazakhstan analyzed the experience and provided a number of potential options. The first is the improvement of the language policy on a legislative basis, and the second is the establishment of responsibility in relation to the language.

For great knowledge or for a large flow of information, as well as good relations between countries in the state, you should have access to other foreign languages. Having studied the language and culture of other peoples, a person becomes an equal among them. Speaking about modern studies of language policy, it is possible to notice improvements in the levels of use of the Kazakh and English languages. It is known from history that Russian used to prevail in Kazakhstan and this served to begin improving our legally official language. Knowledge of three languages is not just a discipline. Let's start with the fact that the Kazakh language is the official language of the Republic of Kazakhstan. This is achievable and necessary. Learning the state language should already begin at an early age. The teaching of the state language begins already from preschool in public premises [3].

Education to improve the mother tongue should begin with the acceptance of how teachers will provide knowledge. The provisions of the Russian language are also undergoing changes in the field of education in Kazakhstan. At the same time, in educational institutions, the state and Russian languages are included in the mandatory educational signs. Even in the field of education, there are reviews about the call to abandon the Russian language. Judging by the lessons and their quality, the knowledge gained depends on them. According to statistics, Kazakh-language schools lag behind Russian-language schools in the quality of education. Feedback from the people is increasingly receiving negative comments about the quality of education. Among the supporters there are those who strive to replace the Russian language with English, because the study of English in our country is very lagging in development. For young people, high-quality education is becoming a powerful social elevator. Among the main problems in the national education system are the low qualifications of the teaching staff, corruption, and poor material and technical equipment of educational institutions. In Kazakhstan, a diploma of higher education obtained abroad is appreciated [4].

In order to consolidate the position of the Kazakh language, improve it and improve the quality of use, as well as reduce existing risks and threats, the system of state language construction has been

seriously reoriented. The new language policy pursued by the state now provides for a more comprehensive approach that combines both traditional measures and alternative ways to solve current and future tasks.

First of all, we are talking about the modernization of the Kazakh language based on Latin graphics. The implementation of this direction will require great efforts both in terms of changing the essence and logic of a number of regulatory and legislative acts, and on the part of scientists, linguists, linguists, whose scientific research can facilitate the transition to the Latin script.

The main tasks in this area are the state program for the implementation of language policy in the Republic of Kazakhstan for 2020-2025, which defines the orthological codification of the Kazakh language based on the Latin alphabet, improvement, unification and codification of the sectoral terminological system of the language, regulation and standardization of the onomastic space within the framework of the transition to the Latin script. Based on the Latin graphics, manuals are being introduced and will be developed for various consumer groups (schoolchildren, editors, dictators, consumers, politicians, scientific specialists, managers of trade industries). To approve the results of this reform, it will be envisaged to create an orthographic commission [4].

The modernization of our state language based on Latin graphics in a legislative form will affirm the ease of use in public life, and how this reform will affect the study of the state language.

To study the state language more effectively on the new schedule, it is necessary to train specialists at the highest level who will have experience in this field. The developers of this project also propose measures to improve the effective teaching of the Kazakh language:

- new formation of a special database of scientific and educational works on
- the methodology of teaching the Kazakh language;
- organization of special projects, courses, internships for more effective teaching in institutions;
- increase in qualities and quantities textbooks, check on logical consistency and clearer presentation of the state language for students.

Learning a language also depends on the presentation. According to statistics, more than

8.1% of adult respondents do not understand the state language and even if they have an idea of the concept of words, they do not know how to speak the state language. For these respondents, the above qualified courses in the Kazakh language will be introduced. There will be discussions on the development of teaching materials, discussion of curricula and materials for extensive use based on understandable explanations. Activation of the use of the Kazakh language as the language of science will enhance the functionality of the language, the use of terms in the Kazakh language and the borrowing system for its use will be carried out [5].

Summing up, it is worth noting that the language issue in Kazakhstan is a purely pragmatic issue. The fact that the majority of the population uses more Russian in everyday life and in society does not mean that this will always be the case. The language policy that Kazakhstan uses has great potential in the development of the state language within the country. Language policy should have its result and become the object of the fact that the official language of the people should not be changed or replaced in any way. These provisions in the country should influence the further adoption of the state language. The gaps between the study and the addition of new levels of language policy will, of course, be considered. But it is worth remembering that in history there have been cases when the presence of the language of the state people was considered and demanded.

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PECULIARITIES OF PREPARATION OF A COMPLEX ONLINE COURSE ON THE DISCIPLINE "BIOLOGY"

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Abstract

This article analyzes the ways of using complex online courses in learning process. There are many techniques and methods of learning a particular subject, one of which is Stepik.org platform. Online courses hosted on Stepik.org have repeatedly won prizes in online course competitions, and the automated task verification system is used in a number of courses on the Coursera and edX platforms. Stepik.org is also actively developing the field of adaptive learning, where everyone will be able to study material individually tailored to their level of knowledge. This platform offers open access to online courses and the ability to create your own educational material.

Keywords: *open access, complexity level online courses, biology, classification, task verification system*

Introduction

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Even the ancient Greeks developed rules of memorization based on simple but very effective principles and named them after the goddess of memory Mnemosyne[1].

Basic techniques of working in a Stepik.org platform:

- 1. Making a semantic phrase from the initial letters of the memorized information*
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I want to describe my small "piggy bank" of mnemonic techniques, which included both fairly well-known, often used by biology teachers, some compiled independently or jointly with students[2].

Table 1

Pluses of using online course Stepik.org:

1	Peer-review <i>Peer-review available for open ended questions, e.g. for checking math proofs.</i>
2	Extended reports <i>Dive deep into your students' data using our extended reports and rich REST API</i>
3	20+ types of assignments <i>More than 20 types of assignments, including randomised data sets, programming assignments, string regexps etc</i>
4	Auto grading <i>Sophisticated assignment checking technologies, allowing for auto grading of programming assignments.</i>

[a table is created by authors]

1. "How do you know?" tasks that require the use of ways of knowledge.

2. Assignments to "try to explain" events and facts

3. "Make a conclusion" assignments help students develop the ability to draw conclusions based on data. People who are biologically literate should comprehend the fundamental ideas in biology. Students that are biologically literate should understand the variety of species and how they are categorized. The fundamental ideas of biology should be understood by all citizens. Memory, analysis, comprehension, learning, and reasoning are only a few examples of cognitive skills. "Developing functional literacy toolkits for middle and high school students in biology" is intended to: promote the development of a range of skills and abilities that are at the core of functional competence. The developed set of tasks is a tool for developing specific skills, which together constitute biology as a subject and the essence of functional abilities. Possession of these abilities and skills serves as an indicator of base in students while preparing for biology intellectual competitions.

System of tasks in Stepik.org platform.

These biology tasks in a Stepik.org platform include 25 complex tasks based on the example of PISA tasks. The questions are created in accordance with basic biological principles. The focus of the tasks on the organization of functional literacy includes topics on botany, zoology, genetics, physiology, ecology, immunology, microbiology and general biology.

Task № 1.

The picture shows a spider and a pin standing in water.



The reason spiders float in water is the presence of hairs that cause the spider to be weightless. Because the pin is lightweight floats in water

Question 1: What do a spider floating in water and an iron pin have in common?



Answer 1.1:

1. Pedipals

2. Fangs

3. Chelicerae

4. Eyes

5. Legs

6. Spinnerets

7. Abdomen

8. Pedicel

9. Cephalothorax

Task 2: Identify the structure of the spider in the picture.

Task 3. State whether each of the following concepts is a TRUE or FALSE:

A student found two different leaves of different plants. He took it with him and then noticed that it had started to rot. They are shown in picture A and B.



<https://freepress.com/thumb/precen%20ives%65-green-leaf.png.png>

A



<https://upload.wikimedia.org/wikipedia/>

B

Answer: A – Dicotyledonous (leaf) B – Monocotyledonous (leaf)

Task 4. Identify to which two main groups the leaves shown in the picture belong.

Task 5. The process of putrefaction is most often caused by bacteria. Name one other organism that can prevent decay.

Task 6. Leaf rotting improves the composition of the soil and creates conditions for good plant growth. Explain how the process of rotting returns nitrogen to the soil.



Task 7: Humans are thought to be descended from animals such as gorillas, as shown in Figure A. Humans walk on two legs. What is this movement called?

Task 8: Describe two ways in which the skeleton in picture B adapted to this type of movement.

Task 9: Mention one advantage of Homo sapiens associated with vertical walking

Table 1

Stages of preparing for performing tasks in a Stepik.org platform

Research and design	The "mature" project reflects the personal and individual position of the author and has a social and practical significance. With such projects, our students became the winners of the regional
Solving problems, performing tests	The student has the opportunity to gradually perform simple tasks first, and then a higher level of complexity.
Carrying out practical work	The requirements for the practical tour are increasing every year, because it is here that the student can apply his knowledge in practice.
The principle of knowledge activity	Olympiad tasks are compiled in such a way that the entire stock of knowledge is in active use. They are compiled taking into account all previous knowledge, in accordance with the requirements of the standard of education and the knowledge gained at the moment

[a table is compiled by authors]

Conclusion

In conclusion, it should be said that the use of online courses is by no means intended to replace the most well —known and widely popular method in the development and strengthening of memory. However, mnemonics copes with the task of helping to make the memorization process simpler and more interesting just perfectly. Try to apply the basic mnemonic techniques on yourself — and you will soon feel its usefulness and irreplaceability.

Stepik.org platform can also be used by teachers to improve their skills (network methodological associations and virtual pedagogical councils, distance learning, participation in network projects, etc[6]).

Thus, cognitive activity presupposes readiness and ability to live and interact in the modern multicultural world. The lack of cognitive activity skills significantly complicates communication and understanding with representatives of foreign cultures. And project activity is a tool of education and training that promotes respect, understanding of the culture, traditions, language of another people, as one's own, and also helps to overcome fear and distrust in relation to another culture.

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FORMATION OF PROFESSIONAL QUALITIES OF FUTURE TEACHERS-PSYCHOLOGISTS**Serikova Ademi Bakytbekovna**

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Abstract

This article will highlight the points that need to be taken into account when preparing a future specialist-a teacher-psychologist, as well as the introduction of ways to improve professional qualities necessary for professional training, the preparation of a teacher-psychologist to become a specialist, taking into account personal development and moral qualities. The formation of a personality with a high general and professional culture is an indispensable condition for improving the training system of a future specialist.

Аңдатпа

Бұл мақалада болашақ педагог-психолог маманын дайындауда ескеру керек тұстар, сонымен бірге кәсіби дайындық кезінде қажетті саналатын кәсіби сапаны арттыру тәсілдерін қолданысқа енгізу, педагог-психологтың жеке бас дамуын және адамгершілігін қасиеттерін ескере отырып маман болуға дайындау туралы баяндалады. Жалпы және кәсіби мәдениеті жоғары тұлғаны қалыптастыру болашақ маманды даярлау жүйесін жетілдірудің ажырамас шарты болып табылады.

Аннотация

В данной статье будут освещены моменты, которые необходимо учитывать при подготовке будущего специалиста-педагога-психолога, а также внедрение способов повышения профессиональных качеств, необходимых при профессиональной подготовке, подготовка педагога-психолога к тому, чтобы стать специалистом с учетом личностного развития и нравственных качеств. Формирование личности с высокой общей и профессиональной культурой является непременным условием совершенствования системы подготовки будущего специалиста.

Keywords: teacher-psychologist, professional qualities, professional training, professional culture, future, personality, morality, specialist.

Кілт сөздер: педагог – психолог, кәсіби сапа, кәсіби дайындық, кәсіби мәдениет, болашақ, тұлға, адамгершілік, маман.

Ключевые слова: педагог-психолог, профессиональные качества, профессиональная подготовка, профессиональная культура, будущее, личность, мораль, специалист.

The priorities of modern higher pedagogical education are aimed at training highly qualified specialists capable of change, both in the personal sphere and in professional activities. Domestic and international experience shows that graduates of pedagogical universities experience many difficulties in practical work, since theoretical knowledge is an idealized model of structured actions of specialists. In particular, the activity of educational psychologists has a number of difficulties, including including in the field of providing diverse activities. These problems arise because practical communication and professional work skills were not formed during the training process. Considering the aspect of the work of a teacher-psychologist, it should also be noted the lack of practical skills. Due to the presence of these problems, there is a need to modernize outdated technologies for training specialists engaged in the field of "human-human", as well as the development of innovative programs for the preparation of future educational psychologists in the field of providing comprehensive psychological and pedagogical assistance, which will improve the quality, both in the educational sphere and in the field of maintaining the psychological health of society. This is due to the transition to a new philosophy of education. The priority vector of this philosophy of universal education is aimed at the needs of society, that is, the degree of public satisfaction will determine the quality of educational services provided [1].

The problem of professional formation of the personality of a future teacher-psychologist, the formation of professional qualities, specific skills and abilities important for the professional activities of

students of pedagogical psychologists is not new in psychological and pedagogical science, but it is still new and fresh information in Kazakhstan. Therefore, the relevance and importance of this issue in our country is increasing. To improve skills in the profession, appropriate abilities and practical skills are needed, on the basis of which knowledge and experience are formed, and internal professional motivation is also of great importance. After all, it is no secret that if a person does not like his job and does not have the necessary abilities and professional qualities for this profession, he cannot work well and make a bright career.

Thus, the modern state and society urgently need highly qualified specialists, including educational psychologists, and the success of their activities is largely determined by the conditions and features of the process of their professional self-determination and self-improvement [2].

Competence is manifested in a person's ability to solve professional tasks that require real knowledge, skills, and experience. It is expressed in the practical professional activity of a person as a systemic characteristic and has a certain structure. Competence can be measured quantitatively, for example, using selected levels, or qualitatively (methodologically, technologically, socially, etc.). Competence manifests itself in the space of socio-psychological impact, is determined by the position, social status, and official functions of a specialist. Therefore, it can be argued that competence is a set of professional knowledge, skills, ways of performing professional activities, and competence includes a set of certain rights, official duties of an employee, which he is authorized to solve. The competence of a specialist is determined by the regulatory documents of the organization. The professional competence of an individual includes: socio-legal competence (the ability to interact with social institutions and people); special competence (readiness to independently perform professional activities); personal competence (the ability to improve professional qualifications); autocompetence (adequate ideas about their own socio-psychological characteristics); professionally significant personality qualities that determine the productivity of activities, which are multifunctional, and each specialty has its own set. In our opinion, it is advisable to include in this list such a key competence as the competence of self-education, which contributed to self-improvement, self-development of a specialist, activated his willingness to independently acquire and replenish knowledge. Thus, the professional competence of an individual is a combination of such a level of formation of professional knowledge, practical skills, professionally significant personal qualities in the activities of a particular person, gives her the opportunity to constantly ensure a high end result, achieve effective organization of personal and collective work, take responsibility for her own decisions. It is the result of thorough basic training of a specialist, continuous professional development and turns out to be in a person's readiness to effectively perform their official and professional duties. The direction of further research may be the development of elements of a system for improving the professional competence of future specialists [3].

At each stage of Professional Development, certain requirements are imposed on the motor skills, thinking, memory, attention, other mental functions and properties of the personality of a teacher-psychologist. At each stage of mastering the profession, under the influence of the requirements of the activity, it is necessary to develop professionally important qualities, abilities of a person, ensuring the improvement of the necessary competencies that determine qualifications, skills. Thus, professionally important qualities are individual psychological qualities and personal abilities that determine the ability to successfully perform professional activities. Each teacher-psychologist understands the term "professionally important qualities" in different ways, and we cannot find this understanding to be an absolute error. For example, V. D. Shadrikov believes that in their quality one can consider the characteristics of the nervous system, the features of mental processes, personal qualities, orientation, beliefs and knowledge, as well as other characteristics of the personality [4]. And V.I.Lazutkin believes that professionally significant personality qualities include psychophysiological (sensory, sensorimotor, physical, adaptive-homeopathic); psychological (intellectual: perception, memory, thinking, etc.) [5].

One important trait that educational psychologists consider desirable is tolerance. This is a willingness to accept various manifestations of people without aggression and irritation. After all, a teacher-psychologist works with different people, and for effective work it is very important to be able to work without judging or criticizing a person. In addition, another indicator of quality is the quality of flexibility and openness to change. In this sense, we, as a future educational psychologist, can quickly adapt to new circumstances, a new environment, easily adapt, and also easily admit our mistake, with incorrect, objective consideration of the vision, striving to correct our mistake and master our behavior in the environment and certain situational situations and manage it. I believe that it is very important to be able to change. Thus, among the professional skills that I consider important for a future teacher-psychologist, - these are developed communication skills, that is, the ability to communicate more

healthily with another person, understand, interpret, use questions and answers, be able to express your point of view and argue with arguments, empathy, the ability to control emotions, the ability to keep confidential information, I attribute symbolic, analytical thinking, the ability to demonstrate a developed level of stability and high intellectual productivity flexibility, objective attitude, responsibility and patience.

The profession of a teacher-psychologist, like many other professions, has very strict qualities in accordance with the concept of professional suitability, characterized by a set of psychological and psychophysiological characteristics of a person formed in a particular work activity. This professional aptitude is assessed according to an objective criterion corresponding to the success of mastering the profession, and a subjective one – according to the degree of satisfaction with their work.

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THE USE OF VISUALIZATION INFOGRAPHIC MATERIALS IN TEACHING THE DISCIPLINE "BIOLOGY"**Shygysbek Qalima***1st year Master's degree student of Zhetysu University named after I. Zhansugurov,
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Infographics are aimed at visual perception and consolidation of images, using the visual and associative memory of students. It clearly and simply demonstrates complex processes, digital and other information. In biology lessons, "infographics" is a simple and visual graphical representation of educational information about wildlife objects, their structure and vital activity, including complex relationships between them. Beautiful understandable graphs and diagrams on population genetics, ecology, evolution, human anatomy and physiology are better perceived and they are remembered. And the Internet is a new way for students to share knowledge and research results. Biology teachers should keep up with the times, and moreover, teach students to work with information in such a way that they want to look at it.

Keywords: *infographics, biology, visual perception, complexity level, graphical presentation*

Introduction

So, visualization is the formation of a visual visual or mental image. In the 21st century, visualization occupies a central place in the educational process. Although it is more difficult to create visual applications, this is offset by an increase in the quality of education and becomes a matter of survival in a dynamic information and educational environment. The "Theory of generations", created at the end of the 20th century, assumes that people who were born at the same time, had a similar experience in childhood, will have the same values. And these values will distinguish them from people of other generations. Children, those born after 2000 are Generation Z. They are the first generation that was born in the digital world and can no longer imagine life without the mobile Internet and other gadgets. These children live from birth in a world without borders, although often this world is limited by the monitor screen. Generation Z students ask questions to Google, not to the teacher, they will find their way on the navigator, and they will make purchases online, and not necessarily in the country where they live. They are simultaneously learning lessons and texting with three friends,

They listen to music and talk to their grandmother. This ability to "see" several screens at the same time leads to the fact that the speed of perception of information increases dramatically. This quality has its downside — the brain, accustomed to high-speed information processing, begins to get bored when there is little information, for example, in biology lessons. It is this difference in the speed of information perception between students and older biology teachers that leads to many problems — teachers cannot keep the attention of schoolchildren, which leads to conflicts.

Thus, visualization is of great importance in the educational process, in particular when teaching biology to modern schoolchildren. It seems to us that in connection with the above, infographics are an interesting and effective electronic resource that can be actively used in biology lessons. According to the unanimous assessment of experts, the XXI century is the heyday of biology and biotechnology. Dynamically developing biology is one of the priorities for the development of modern science and production. A modern course in school biology should reveal the prospects for development biological sciences, directions, related sciences and fields of knowledge [1, p. 13].

In the "golden age" of biology, the content of secondary biological education is also undergoing a change. The volume of biological information to be assimilated in secondary school is increasing. In this regard, the further informatization of biological education is an urgent problem. Professor S. V. Sumatokhin understands the important condition of informatization as the consistent introduction of new information technologies into biological education, the availability of the necessary hardware and information infrastructure, which includes means of new information technologies, communication, reception and transmission of information [6]. Multimedia projectors, interactive whiteboards, touch

tables, (even walls), as well as mobile devices (tablets, e-books, smartphones, telephones, netbooks) are now common in schools. All these tools are capable of visualizing information interactively.

In the context of an increasing volume of biological knowledge, the problems of visualizing thinking among students are becoming more and more urgent. In addition to enhancing the didactic effect, the biology teacher strives to use multimedia visibility in order to present biology teaching material compactly, attractively, through a system of visual images and associations. Therefore, in our opinion, educational infographics become an integral part of the electronic educational resources used in biology lessons.

Infographics is a graphical way of presenting information, data and knowledge, the purpose of which is to quickly and clearly present complex information, one of the forms of information design.

Infographics — a method of visual representation of information has been actively used in print media over the past 30 years (it is believed that the combination of text and graphics was first called infographics in the editorial office of USA Today in 1982). According to American psychology professor Michael Friendly, infographics originated in the XII century with the appearance of 3 different diagrams. E. A. Baranova connects the origin of infographics with the appearance of the British newspaper Daily Courant (1702). Italian professor of infographics Alberto Cairo believes that infographics appeared in 1982 with

the release of the USA Today newspaper, which his followers agree with. In a few years, the newspaper has become one of the five most widely read publications in the country. One of the most noticeable and sought-after innovations of the USA

Detailed, well-drawn pictures with explanatory infographic comments became today. American readers quickly understood and accepted the advantages of this method of transmitting information — infographics conveyed a message faster than text (one well-made drawing replaced several pages of text) and in more detail than a standard illustration (thanks to the detail of the drawing and accurate abstract comments). Over time, it turned out that infographics are not only a technology, not only the field of business, but also art.

The main purpose of using infographics in biology lessons is to inform about any scientific (biological, medical or environmental) problem, biological phenomenon, process, about a number of biological facts, concepts, about the laws of biology, patterns and theories. The main difference between infographics and other types of visualization of information on biology is its metaphoricality, i.e. it is not just a graph, a diagram based on a large amount of biological data, but a graph in which visual biological information is inserted, analogies from life, objects and processes and phenomena to study.

There are three types of infographics that can be used in teaching biology:

Table 1

Types of infographics

static	single images without animation elements; most often a single slide without animated elements. This is the simplest and most common type of infographic;
interactive or dynamic	infographics with animated elements. The main subspecies of dynamic infographics are video-infographics, animated images, and presentations. Students can (to one degree or another) interact with dynamic data. This type of infographic allows you to visualize more information in one interface;
video infographics	it is a short video sequence that combines visual images of data, illustrations and dynamic text.

[a table is compiled by authors]

Table 2

Types of infographics by the type of source

The following types of infographics are distinguished by the type of source.

Analytical infographics	graphics prepared based on analytical materials. The analysis is carried out solely on the basis of quantitative indicators and biological or environmental studies;
News infographics	infographics prepared for a specific news item online (for example, the announcement of a discovery in biological science or medicine)
Reconstruction infographics	infographics that use data about an event (process) as a basis, recreating the dynamics of events in chronological order (for example, by topic "Anthropogenesis" or "The emergence of life on Earth", "Stages of development of the organic world").

[a table is compiled by authors]

When developing infographics, biology teachers and students need to follow a number of mandatory and important principles. Here are the principles of creating high-quality infographics:

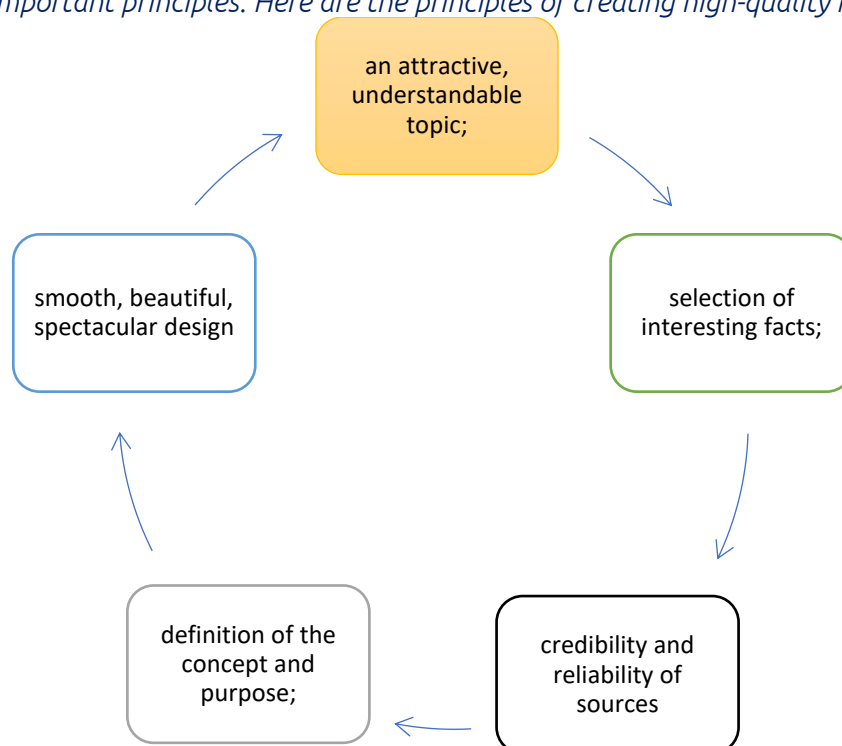


Figure 1: The principles of creating high-quality infographics

The task of a biology teacher when working with infographics is to evoke positive emotions, motivation and convey the essence of what is being studied through a visual image, thereby drawing the student's attention to the desired biological object, to an important biological/environmental problem. The student, having conducted his own research in biology, analyzes the textbook material, highlights the accents and independently creates an infographic. Working on it contributes to a more thorough study of educational and additional material in biology, develops students' reflection and critical thinking. Students can also work on infographics collectively using separate Internet services[9, 10]. This is a more effective form of working with schoolchildren. In the process of learning in cooperation, students form communicative universal learning activities, and develop teamwork skills.

The researchers note that the possibilities of the information and educational environment are developing so quickly that "one can assume the emergence of intellectual infographics, which itself will be able to change depending on human needs. Virtual environment due to its unique properties (intelligence, multimedia, modeling, interactivity, communication, productivity) [8]. The toolkit will allow creating diverse and methodically effective objects of intellectual infographics in school biology." The use of such a means of visualizing educational material in biology will certainly contribute to the growth of the quality of new educational results of students (both subject, meta-subject, and personal).

Conclusion

Like any technology, infographics has undeniable advantages and some disadvantages. Among the main advantages of infographics, it is possible to note the ability to more thoroughly master, consciously and effectively memorize educational material; quick coverage of a large amount of information; presentation of educational material in a fascinating, memorable form; increase

in the quality of educational results of students; activation of the process of visual thinking; development of creative abilities of students. It is worth noting the disadvantages of infographics as a pedagogical tool. First of all, the work of psychologists or teachers is necessary. Biology as an area of application of infographics also has an impact, since not every educational material (biological object, process, phenomenon) can be translated into infographics. Another disadvantage is the lack of the ability to show operations or actions. Oversimplification of the depicted object (process).

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ASSESSING THE IMPACT OF CLIL ON SECONDARY SCHOOL STUDENTS' LANGUAGE PROFICIENCY AND CONTENT UNDERSTANDING

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Abstract

This research investigates the evaluation of Content and Language Integrated Learning (CLIL) in enhancing language proficiency and content comprehension among secondary school students. CLIL, as an instructional approach, intertwines language learning with subject-specific content, providing an avenue for students to bolster both language skills and subject understanding concurrently. Unlike traditional language teaching methods, which often compartmentalize language acquisition from subject matter comprehension, CLIL integrates language skills within different content domains, offering a more holistic learning experience. Challenges in language acquisition arise from limited exposure to authentic language materials and difficulties applying language skills in real-world contexts. CLIL addresses these impediments by immersing students in language-rich content settings. This study aims to assess the impact of CLIL on secondary school students' language proficiency and content understanding, scrutinizing its effectiveness in fostering comprehensive language skills and subject knowledge. It seeks to analyze the advantages and challenges of implementing CLIL in secondary education, emphasizing its potential to fortify language skills and deepen content comprehension simultaneously.

Keywords: CLIL (Content and Language Integrated Learning), secondary school students, language proficiency, content understanding, language learning strategies, bilingual education, language acquisition.

Introduction

In today's dynamic educational landscape, the convergence of language proficiency and content understanding holds a pivotal role in equipping secondary school students for a globally interconnected world. As the demand for effective communication skills, particularly in English, continues to surge in an era characterized by technology and globalization, educators grapple with the task of innovatively enhancing linguistic abilities among secondary school students. This study initiates an exploration into Content and Language Integrated Learning (CLIL) with the aim of evaluating its impact, specifically on language proficiency and content comprehension among secondary school students. It acknowledges the intricate relationship between these two crucial dimensions of education.

The adoption of CLIL as a pedagogical approach has attracted attention as a potential solution to the intricacies of language acquisition and content understanding in the context of secondary education. Operating as an approach that interweaves language instruction with the exploration of subject matter, CLIL seeks to foster a seamless integration of language skills and disciplinary knowledge tailored to the needs of secondary school students. The scope of this research transcends the conventional boundaries of language teaching, delving into the holistic development of secondary school students by scrutinizing the symbiotic relationship between language acquisition and content comprehension.

In the realm of secondary language education, CLIL signifies a departure from traditional methodologies, providing a distinctive avenue for secondary school students to engage with language in authentic contexts while grappling with substantive subject matter. The inherent challenges and opportunities associated with this approach contribute to the ongoing discourse on language pedagogy, prompting a closer examination of its effectiveness in fostering linguistic competence and academic achievement among secondary school students.

This study navigates the landscape of CLIL's impact by specifically exploring its influence on language proficiency and content understanding among secondary school students. Through a

comprehensive analysis of the benefits and challenges linked to the implementation of CLIL in secondary education, the research endeavors to offer valuable insights to the ongoing dialogue on innovative teaching methodologies in language education tailored to the unique needs of secondary school students.

Furthermore, the investigation extends beyond the immediate outcomes of language proficiency and content comprehension, delving into the motivational and engagement aspects of CLIL among secondary school students. By unraveling the multifaceted impact of this pedagogical approach in the secondary education context, the study aspires to provide educators, curriculum developers, and stakeholders with nuanced perspectives that transcend the traditional dichotomy between language and content, addressing the specific needs of secondary school students.

In essence, this research aims to unravel the intricacies of CLIL's impact on secondary school students, shedding light on its potential as a transformative force in education tailored to the unique challenges and opportunities present in secondary education. As this scholarly exploration is undertaken, the study seeks to unveil the layers of CLIL's impact, providing a comprehensive understanding of its implications for language proficiency and content comprehension specifically among secondary school students.

The following objectives guide our exploration into the impact of CLIL on language proficiency as well as the deepening of content understanding with a qualitative and quantitative focus on subject matter knowledge:

- To investigate the impact of CLIL on language proficiency, specifically focusing on advancements in vocabulary, grammar, and reading comprehension among secondary school students.*
- To assess the influence of CLIL on the deepening of content understanding, both qualitatively and quantitatively, with a focus on subject matter knowledge.*
- To encourage a shift in educational practices by presenting CLIL not merely as an alternative but as a key strategy for navigating the evolving landscape of education at the secondary school level*

This study is conducted to address the following research questions:

- 1. How does the integration of CLIL methodologies affect secondary school students' language proficiency in the targeted language?*
- 2. To what extent does the implementation of CLIL strategies enhance students' comprehension of subject-specific content in secondary education?*
- 3. What are the perceptions of secondary school students regarding the effectiveness of CLIL in improving both their language skills and understanding of subject matter?*

Literature Review

Coyle and Meyer (2021) provide a comprehensive overview of CLIL, emphasizing its potential for enhancing language acquisition and content learning [1]. However, Llinares and Evnitskaya (2021) present a contrasting viewpoint by questioning the potential inequalities fostered by CLIL programs in terms of classroom interactions [2]. Their study highlights the importance of considering power dynamics and opportunities within CLIL environments, suggesting that these programs may not equally benefit all students.

Morton's work (2020) delves into cognitive discourse functions as a bridge between content, literacy, and language within CLIL [3]. The study emphasizes the crucial role of discourse in facilitating content understanding and language acquisition. It posits that integrating cognitive discourse functions effectively enhances both language and content learning outcomes, presenting a promising aspect of CLIL implementation.

Tompkins (2022) explores the correlation between socioeconomic status, English exposure, and CLIL motivation among high and low exposure CLIL groups [4]. The findings underscore the significance of these factors in influencing students' motivation and success within CLIL contexts, shedding light on the complex interplay between social backgrounds and CLIL effectiveness.

Van Mensel et al. (2020) conducted an insightful analysis of English and Dutch CLIL pupils in French-speaking Belgium, exploring whether CLIL perpetuates an elitist language learning approach [5]. Their study challenges the notion of elitism, providing a background analysis that suggests a more nuanced understanding of the impact of CLIL on diverse student populations.

Materials and Methods

1. Participants. The study participants included 100 secondary school students from two different schools, with 50 students enrolled in CLIL classes and 50 students enrolled in non-CLIL classes. The students were randomly assigned to the CLIL and non-CLIL groups, ensuring a representative sample of the student population.

2. *Setting.* The study was conducted in two secondary schools in a suburban area. The schools had similar demographics and academic profiles. The CLIL classes were taught by teachers who had received training in CLIL methodology.

3. *Study design.* This study employed a mixed-methods approach, encompassing both quantitative and qualitative data collection and analysis techniques. The quantitative strand involved administering pre- and post-tests to measure changes in language proficiency and content understanding among secondary school students enrolled in CLIL and non-CLIL classes. The qualitative strand utilized a series of semi-structured interviews with students and teachers to gather in-depth insights into their perceptions and experiences with CLIL. Apart from that, the CLIL intervention involved teaching the target subject matter (e.g., science, history) through the medium of English. This involved using a variety of teaching methods, such as collaborative learning, project-based learning, and authentic materials. The non-CLIL classes were taught using traditional methods of instruction, with English as the language of instruction.

4. Data Collection

a) *Pre-test:* A pre-test was administered to measure language proficiency and content understanding in the target subject area. The language proficiency test assessed students' vocabulary, grammar, and reading comprehension skills. The content understanding test assessed students' knowledge of the subject matter covered in the CLIL classes.

b) Intervention:

- *Interview:* Semi-structured interviews were conducted with 10 students (5 CLIL and 5 non-CLIL) and 5 teachers (3 CLIL and 2 non-CLIL) to gather in-depth insights into their perceptions and experiences with CLIL.

- *Surveys:* Students were administered surveys at the onset and conclusion of the study to evaluate their motivation, engagement, and attitudes toward the CLIL approach.

- *Classroom observation:* This phase involved systematically observing CLIL and non-CLIL classes to assess the implementation of CLIL strategies and their impact on student engagement and learning outcomes.

c) *Post-test:* After the completion of the intervention, both the intervention group (CLIL) and the control group (non-CLIL) underwent a post-test to evaluate changes in language proficiency and content understanding. The post-test assessment mirrored the structure and content of the pre-test, enabling a comparative analysis of pre- and post-intervention scores.

5. Data Analysis

- *Quantitative Data:* The pre- and post-test scores were analyzed using paired-samples t-tests to compare the changes in language proficiency and content understanding between the CLIL and non-CLIL groups.

- *Qualitative Data:* The interview transcripts were analyzed using thematic analysis to identify recurring themes, patterns, and insights related to students' and teachers' perceptions and experiences with CLIL.

6. *Ethical Considerations.* The study adhered to ethical principles of informed consent, confidentiality, and anonymity. Parental consent was obtained for all participants, and participants were informed of their right to withdraw from the study at any time. All data was stored securely and confidentially.

7. *Validity and Reliability.* To ensure the validity and reliability of the study, the following measures were taken:

- Multiple data collection methods were used to triangulate the findings.
- The interview transcripts were analyzed by two independent researchers to ensure coding consistency.
- The quantitative data was analyzed using appropriate statistical methods.

Results

The results of this study suggest that CLIL can have a positive impact on both secondary school students' language proficiency and content understanding. This table presents the outcomes from both the pre-test and post-test conducted among two distinct groups, namely the intervention group and the control group. The information depicted in the table showcases the findings as follows:

	<i>Intervention Group</i>	<i>Control Group</i>
<i>Number of Students</i>	50	50
<i>Pre-test Results</i>		
<i>Low (11-20)</i>	8	10
<i>Average (21-30)</i>	17	18
<i>High (31-40)</i>	25	22
<i>Post-test Results</i>		
<i>Low (11-20)</i>	6	9
<i>Average (21-30)</i>	18	19
<i>High (31-40)</i>	26	22

Qualitative examination of survey responses, interviews, and classroom observations uncovered a prevalent sense of motivation and engagement among students participating in CLIL classes. A majority of students displayed high motivation levels, expressing enthusiasm for CLIL due to the relevance of topics, engaging presentations, and exposure to authentic English language content delivered by native speakers.

Classroom observations further reinforced these findings, indicating active participation, robust engagement, and a vibrant atmosphere during CLIL sessions. Students were actively involved in discussions, posed inquiries, and showcased eagerness in sharing their perspectives, fostering a dynamic learning environment.

The integration of quantitative and qualitative data underscores the positive impact of CLIL on secondary school students, showcasing improvements in language proficiency, content understanding, motivation, engagement, and confidence levels among participants. These findings substantiate the efficacy of CLIL in fostering a conducive environment for holistic learning encompassing language acquisition and subject comprehension.

Discussion

The compelling findings of this study strongly affirm the efficacy of Content and Language Integrated Learning in concurrently elevating language proficiency and deepening content understanding among secondary school students. Students immersed in CLIL exhibited significant advancements in vocabulary, grammar, and reading comprehension, alongside a marked increase in subject matter knowledge. The pronounced positive shift in both quantitative and qualitative measures sets CLIL students apart, indicating a holistic impact beyond the traditional dichotomy of language and content.

Qualitative insights further illuminated the transformative influence of CLIL, with student interviews revealing themes of heightened motivation, increased engagement, and bolstered confidence. Beyond the mere acquisition of academic skills, CLIL appears to contribute to the broader development of students, fostering a positive attitude towards learning. These findings resonate with existing research, reinforcing the idea that the integration of language instruction with substantive subject matter provides students with authentic and meaningful contexts for language use.

The study has several limitations that should be considered when interpreting the results. First, the sample size was relatively small, which may limit the generalizability of the findings. Second, the study was conducted in a single school district, which may not be representative of all secondary schools. Third, the study relied on pre- and post-tests to measure changes in language proficiency and content understanding, which may not fully capture the complex effects of CLIL.

In the realm of educational practice, these findings advocate for the strategic incorporation of CLIL into the pedagogical toolkit of secondary schools. The study positions CLIL not as a mere alternative but as a proactive and viable choice for schools seeking innovative methods to enhance student learning outcomes. As the echoes of this research reverberate, it prompts educators, administrators, and policymakers to consider CLIL as a transformative force capable of cultivating well-rounded students

equipped with the essential linguistic and cognitive tools for success in our globally interconnected world. Embracing CLIL may well be a key strategy for secondary schools committed to navigating the evolving landscape of education.

Conclusion and recommendations

In conclusion, this research has delved into the multifaceted impact of Content and Language Integrated Learning on secondary school students' language proficiency and content understanding. The study has provided valuable insights into the effectiveness of CLIL as a pedagogical approach that goes beyond traditional language teaching methods by seamlessly integrating language skills with subject-specific content.

The findings of this research affirm that CLIL has a positive and holistic impact on students, leading to significant advancements in language proficiency, including vocabulary, grammar, and reading comprehension. Moreover, the study highlights the substantial deepening of content understanding among students engaged in CLIL, emphasizing the symbiotic relationship between language acquisition and subject knowledge.

Qualitative insights from student interviews have illuminated the transformative influence of CLIL, revealing increased motivation, engagement, and confidence among students. Beyond the acquisition of academic skills, CLIL appears to contribute to the broader development of students, fostering a positive attitude towards learning.

Based on the compelling results of this research, the following recommendations are offered:

- *Educators and curriculum developers should consider the strategic incorporation of CLIL into secondary school curricula. This entails providing training and resources for teachers to implement CLIL effectively, ensuring a seamless integration of language skills and subject matter knowledge.*

- *Teachers involved in CLIL should receive ongoing professional development to enhance their skills in implementing this pedagogical approach. Training programs can focus on effective strategies for integrating language instruction with subject matter content, fostering an optimal learning environment for students.*

- *Acknowledging the concerns raised by some scholars regarding potential inequalities in CLIL programs, efforts need to be made to ensure diversity and inclusivity. This includes considering the socio-economic backgrounds of students and addressing power dynamics within CLIL environments to ensure equitable benefits for all.*

- *To further strengthen the evidence supporting the impact of CLIL, longitudinal studies can be conducted to track the long-term effects on students' language proficiency, academic performance, and overall development. This would provide a comprehensive understanding of the sustained benefits of CLIL over time.*

- *Educators, administrators, and policymakers should collaborate and share best practices related to CLIL implementation. This collaborative approach can facilitate the exchange of insights and strategies, contributing to the continuous improvement of CLIL programs.*

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TRAINING TOOLS FOR FUTURE SPECIALISTS IN AUGMENTED REALITY TECHNOLOGY**Wang Bo**

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ЗАСОБИ НАВЧАННЯ МАЙБУТНІХ ФАХІВЦІВ ТЕХНОЛОГІЇ ДОПОВНЕНОЇ РЕАЛЬНОСТІ**Ван Бо**

аспірант кафедри освітології та інноваційної педагогіки
Харківський національний педагогічний університет імені Г.С. Сковороди
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Постановка проблеми. Засобами навчання майбутніх фахівців технології доповненої реальності є система навчально-пізнавальних завдань і задач, що спрямовані на вивчення і використання віртуальних технологій доповненої реальності, комп'ютерні і програмні платформи, що забезпечують роботу з технологією доповненої реальності, змістове наповнення у вигляді інформаційних шарів, 3D-моделей та матеріальних маркерів доповненої реальності.

Мета роботи – схарактеризувати існуючі засоби навчання майбутніх фахівців технології доповненої реальності у процесі професійної підготовки у закладах вищої освіти.

Виклад основного матеріалу. Доповнена реальність, виступаючи у якості засобу навчання та об'єкту вивчення, потребує створення системи навчально-пізнавальних завдань і задач, спрямованих на її вивчення та застосування. При цьому деякі типи завдань не мають чіткого розмежовування і відносяться одночасно до обох типів.

Платформою доповненої реальності може бути смартфон, планшетний комп'ютер, ноутбук, окуляри доповненої реальності тощо. При цьому така платформа має містити як апаратне забезпечення доповненої реальності – обчислювальні пристрої, пристрої позиціонування, відображення та інші пристрої, так і програмне забезпечення – операційну систему, фізичні, графічні та аудіо двигуни тощо. Для нормального функціонування пристрою доповненої реальності програмне забезпечення має бути сумісним з апаратним забезпеченням та коректно взаємодіяти, відображаючи інформаційні шари та 3D-моделі.

Для успішного використання віртуальних об'єктів в оточуючому просторі необхідні маркери доповненої реальності, які можуть бути динамічними і статичними.

При навчанні доповненій реальності суб'єкти освіти мають вирішувати і виконувати систему навчально-пізнавальних завдань і задач, розроблених, відібраних і оцінених викладачем.

Платформу доповненої реальності також можна використовувати для демонстрації матеріалів, необхідних для вивчення різних тем і розділів з навчальних дисциплін. Так само можна використовувати й 3D-моделі, не лише при підготовці майбутніх фахівців з різних дисциплін, але й розвиваючи в них здатність до самостійного створення віртуальних об'єктів та систем доповненої реальності.

Аналізуючи розроблені майбутніми фахівцями 3D-моделі, можна здійснювати перевірку та оцінку розроблених матеріалів, а також й рівень їхніх освітніх результатів.

При такому здійсненні освітнього процесу майбутні фахівці можуть не лише застосовувати маркери доповненої реальності при використанні такої технології, а й вивчати й створювати власні маркери.

Структура, зміст, засоби і вимоги, що висуваються до освітнього процесу при підготовці майбутніх фахівців застосуванню технології доповненої реальності мають відповідати сучасним вимогам до освітніх результатів.

Аналіз освітніх програм засвідчує, що підґрунтям таких вимог виступає застосування системно-діяльнісного підходу в освіті, що передбачає інтегроване використання технології доповненої реальності у якості об'єкта вивчення і засобу освіти в процесі професійної підготовки майбутніх фахівців.

Системно-діяльнісний підхід передбачає врахування індивідуальної специфіки кожного суб'єкту освіти, ступеня його обдарованості, наявності особливих потреб у освіті, інших чинників та розмаїття організаційних форм, що забезпечують підвищення мотивів пізнання й творчого потенціалу, розширення меж перспективного розвитку, а також взаємодія в пізнавальній діяльності з іншими суб'єктами освітнього процесу.

Висновок. Отже, навчання майбутніх фахівців технології використання доповненої реальності потребує створення системи навчально-пізнавальних завдань і задач, спрямованих на її вивчення та застосування. Цьому сприяє побудова освітнього процесу у закладах вищої освіти згідно положень системно-діялісного підходу, що передбачає врахування індивідуальних особливостей суб'єктів освітнього процесу, забезпечення їхніх освітніх потреб, розвиток творчого потенціалу та розширення можливостей для гармонійного професійного становлення у майбутній професійній діяльності.

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WAYS OF FORMING DIGITAL COMPETENCE OF A FUTURE ENGLISH TEACHER THROUGH ICT TOOLS

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Abstract

This article is devoted to the problem of using ICT tools in the process of teaching future foreign language specialists listening and pronunciation skills in the process of learning English. The article describes the advantages of using a website for the development of language competence in the process of teaching a foreign language. Modern pedagogical technologies such as learning using elements of cooperation, project methods, the introduction of modern information technologies, Internet resources can help to implement a personality-oriented approach to learning, provide individualization and differentiation of learning taking into account the capabilities of children, their level of learning. This article provides detailed information about the language competence, information competence of students, the effectiveness of the use of ICT tools (blog resources). This article is devoted to the study of the use of blogs in the formation of students' language competence. Since the Internet is an integral part of modern foreign language education, the use of a website is one of the requirements for a modern English teacher. Websites that have become popular in recent years have become widely used in the field of education. In addition, the website is an indispensable resource for developing the communication skills of future specialists.

Keywords: website, Internet, interaction, information and communication technologies, foreign language education.

At the current stage of the development of information technologies, there is a great demand to integrate information and software resources into the educational process. Therefore, it becomes paramount to teach students how to use modern technologies in a particular subject area; use of websites and expert evaluation of their quality; realizing the potential of a distributed information resource; self-learning techniques for the use of new technologies in the educational process.

The ability to communicate in a foreign language is one of the most important indicators of today specialist's competitiveness. Digitalization plays a significant role in teaching and provides a greater opportunity to improve foreign language skills. A competent organization of a foreign language teaching process with the use of digital technologies will contribute to increasing students' motivation and cognitive activity, the development of their creative abilities and skills to use a foreign language. Modern digital technologies used in a foreign language teaching also individualize the learning process, create conditions for self-education and self-development, and form the foreign-language competence of future specialists (Saraeva, 2021:42).

Thus, the profile school's information learning environment impacts positively on students' motivation in the educational process. In addition, on the basis of applying ICT tools in foreign language instruction, students interact with each other through interlinear communication by using interactive learning tools, classroom is filled with wide range of visual aids. Moreover, a variety of instructors' homework has a great amount of influence in the computer-based learning process. As a result, learners understand the solutions to numerous issues, think critically and deliberately, and entertain themselves with fun and interest.

Methodology

Participants

The population of this study included students of Aktobe state University named after K. Zhubanov. Students ages comprised between 17-18 ages.

Instruments

A questionnaire was developed to collect the relevant data. The main purpose of the questionnaire was to define the students' ability in using web-sites during the educational process. The questionnaire included two main themes relevant to the application of web-sites for the development of language competence of students in foreign language education. The questions are formulated from easier to difficult. To motivate students' interest in learning, questions included all areas of new technologies development. In some questions students had to think out-of the box and search for other information sources. The questionnaire used a five-point scale extending from 5 (very high pr strongly agree) to 1 (very low or strongly disagree). The verbal explanation was used to show the results of questionnaire.

Data collection

All students answered online and we collected the answers with the help of Google forms survey. Survey was sent to students' chat groups and they shared each other the link to the survey.

Students are provided with the chance to apply the authentic texts in the process of reading and communicate with the representatives of other cultures by the means of the Web. In other words, create a natural language environment (Sysoyev, 2010:181).

Internet technologies are used to solve the following problems:

- add network content in text (integrate it into the curriculum);
- for independent research of information from students within the project;
- for the first or second foreign language self-training intensive learning leads to the expulsion of aids in information, aptitudes and capacities;
- students train individually as an active applicant to effectively pass the exam;
- under the guidance of the teacher, learners have an opportunity to study efficiently at some distance a specific and desired foreign language (Titova, 2008:80).

Today, the digital Web is the exciting means of communication and sharing of knowledge between citizens. Moreover, Internet leads to application of authentic and original materials which considers the great condition of acquiring information of students.

Internet systems permit the utilization of sound documents, realistic data, and tapes to be used to invigorate learners' activity significantly in relation to printed data. Students in the process of getting solid data about life of a native speaker by the connection of the worldwide web, they go into intelligent correspondence with a local speaker and studies the nation's way of life. As a result, the utilization of Internet strategies permits foreign language learners to make reasonable application circumstances in foreign language learning (Khramtsov P. B., Brik S. A., Rusak A. M., Surin A. I., 2013:93).

Further integration of web-sites into the education process is a promising path in the foreign language education.

In the process of learning a foreign language, the currently leading IT tools can be used into two groups (Maksimova, 2014: 15):

- distributed or asynchronous methods for collaboration.
- synchronous devices for communication;

Synchronous platforms for interactive communication (video, and sound conferences, talk, world wide web,) enable students to interact in the present time by the means of video and sound conferences, talk chatting as well as world wide web.

Asynchronous networking provides students with interactive tools such as email, websites in the long-term sharing of information (Shcherba, 2003: 11).

In the period of globalization of the economy and social situation, one of the important problems is the high level of quality of education in the country. In order for our country to reach the level of education in developed foreign countries, it is necessary to fulfill two main conditions. Firstly, it is a comprehensive improvement of knowledge of the English language. Today, a foreign language belongs to the most important parts of society. Foreign language today is an indicator of the level of knowledge. In addition, a foreign language is the language of the specialty, in the field of any specialty there is English, as the language of knowledge is English. To achieve the highest category of each profession, we must know a foreign language. And in order for people to know a foreign language, it is necessary, first of all, to increase the level of knowledge and skills of teachers.

A foreign language teacher must be a person who speaks several languages and has a developed pedagogical qualification. The teacher should read, write and speak a foreign language well, be competent and interesting to the lessons, and motivate students to study. Currently, the younger generation has a great interest in foreign languages, including English. In this regard, the universities conducted in-depth study of the English language, as well as specialty training in English. For students to

master a foreign language it is necessary to have a sufficient level of knowledge, professional competencies and competencies of the teacher. Secondly, a new education is to achieve the level of formation of a fully developed personality with high knowledge and abilities, developed creativity, different intellectual abilities, able to conduct an independent search. In order for our future generation to be like this it is necessary to develop the professional skills of future teachers. In addition, it is important to develop the following professional and pedagogical functions of the future specialist: constructiveness, organizational, sociability, developing, information, research, competitiveness. These functions should be formed in higher education institutions. Therefore, before the current higher education is the question of the implementation of forms and methods of work of students and teachers. Professional opportunities of the teacher are connected with his self-education. Of course, the development of professionally-oriented competence depends on the specifics of the individual, work experience.

«Currently, different forms of instructional activities are carried out by the means of innovation tools as well as web implementation, interactive services, code research, teaching, and intercultural communication exercises focused on specific topics». Therefore, implementation of IT tools into the foreign language education is considered as the mandatory demand for the foreign language instructors to motivate learners and increase an interest in learning a foreign language. Web 2.0 programs involve network users with entirely different resources. They facilitate orientation toward its production and classification by the Web users and have transformed from an knowledge archive into a portal, a simple digital framework for instructional material development. It prompts in conjunction with the endless reliance on Web 2.0 sources, network software that facilitates community interaction, to radical decentralization.

The structure of the information society proposed by M. O. Korchazhkina is three component. It consists of their technical and technological, socio-political and socio-cultural components, and in all three, there is a humanitarian component. According to this model, the author deduces the definition of «information society». According to M. O. Korchazhkina, the information society is a society that «arose due to inventions and discoveries in the field of science and technology, but functions and develops according to humanistic principles ... by its unifying principles, which are unity of means, goals, ways of working with information resources, ensuring high speed and reliability of the access to them, strengthening mutual trust and security between countries and peoples living in the information space».

Thus, we can conclude that the information society is a sociological concept in which the production and use of information is the main factor of social development. The essential characteristics are a high level of information infrastructure development and, as a result, an increase in access to information for an increasingly wide range of people; the transformation of information and knowledge into a strategic resource of society.

The increasing amount of information in the modern world makes traditional teaching methods ineffective in the current education system. In other words, the development processes of the modern information society determine the reform processes of education as a significant mechanism for the development of public intelligence.

Informatization of the educational process leads to a change in the appearance of education, the development of new educational technologies, mediated pedagogical communications, and that the process of informatization of education allows adjusting the information society to the training framework in relation to continually changing real factors.

This process goes through various stages of development from high school to higher education. All these stages of the educational mechanism should function as a single mechanism for the subject's education in the field of informatization. Thus, informatization is a single target process that involves multi-stage development of the subject in the field of information technology. At this time, the priority task of training is the ability to find the necessary information in a short time and optimally use it in professional interests, converting it into knowledge. At the same time, the availability of information and, consequently, knowledge for all members of the information society, as well as the «culture of acquiring new knowledge», are indicators of the level of information culture of both the society and the individual.

Results and discussion

The study results organized and discussed in accordance with the research questions. To answer question number 2 "Have you ever used Web-sites in the classroom?" Results indicated that only 30% of students have used Web-sites in learning a foreign language. For the question number 2 "How often do you use Internet-resources?" All the students answered that they use it all the time, because they are

they always in need for authentic information sources. Also, for the question number 9 "Do you need to communicate with your teacher through the Internet?" Most of them answered in this way: Obviously, by communicating through the internet, we can define problems and find solutions as a group, which encourages a sense of community. Internet resources helps us get in touch with the teacher to facilitate knowledge acquisition, creation, and transmission. Most students' answers to the question: What are the advantage of Web 2.0 application? were the same such as (1) interaction, communication and collaboration, (2) knowledge creation, (3) ease of use and flexibility, and (4) writing and technology skills.

Conclusion

For many people, information technology has become a vital part of their daily lives. In education, new technologies, especially using web-sites has the potential to improve students' lives by improving teaching and learning.

Through the use of information technology in teaching a foreign language, we can develop the language competence of students at a sufficient level. There are many advantages and disadvantages of this method, both for the teacher and for the student. Through the use of web-sites in teaching a foreign language, we can contribute to the development of the language competencies of students, who know a foreign language at a certain level, can speak fluently, defend their opinions in any environment.

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Political sciences

DIGITAL DIPLOMACY: PROBLEMS AND PERSPECTIVES

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DİJİTAL DİPLOMATİYA: PROBLEMLƏR VƏ PERSPEKTİVLƏR

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Abstract

As a result of the rapid development of ICT, a new type of diplomacy, known as digital diplomacy, began to play a special role in modern international relations. In the article, the author examines the definition of digital diplomacy, analyzes the main prospective effects and problems of digital diplomacy. The emergence of the Internet and global social networks such as Instagram, Twitter, and Facebook brought up the issue of using digital technologies as a foreign policy tool of states. For international actors, the possibilities of digital diplomacy as a tool to promote their policies and achieve their goals in the international arena are quite wide. At the same time, a number of negative features of the digitization process in this area should be noted. Today, the development of ICT creates difficulties in the state security system to some extent. The emerging information environment becomes a factor of instability and threats in the global system. However, despite all the risks and disadvantages, digital diplomacy can be considered one of the key elements for diplomatic activity in the modern world.

Müərrəd

İKT-nin sürətli inkişafı nəticəsində müasir beynəlxalq münasibətlərdə rəqəmsal diplomatiya kimi tanınan yeni diplomatiya növü xüsusi rol oynamağa başladı. Məqalədə müəllif rəqəmsal diplomatiyanın tərifini araşdırır, rəqəmsal diplomatiyanın əsas perspektiv təsirlərini və problemlərini təhlil edir. İnternetin və Instagram, Twitter, Facebook kimi global sosial şəbəkələrin yaranması rəqəmsal texnologiyaların dövlətlərin xarici siyasət aləti kimi istifadə edilməsi məsələsini gündəmə gətirdi. Beynəlxalq aktorlar üçün rəqəmsal diplomatiyanın beynəlxalq arenada öz siyasətlərini təbliğ etmək və məqsədlərinə çatmaq üçün bir vasitə kimi imkanları kifayət qədər genişdir. Eyni zamanda, bu sahədə rəqəmsallaşma prosesinin bir sıra mənfi cəhətlərini qeyd etmək lazımdır. Bu gün İKT-nin inkişafı dövlət təhlükəsizliyi sistemində müəyyən dərəcədə çətinliklər yaradır. Yaranan informasiya mühiti global sistemdə qeyri-sabitlik və təhdidlər faktoruna çevrilir. Bununla belə, bütün risk və çatışmazlıqlara baxmayaraq, rəqəmsal diplomatiya müasir dünyada diplomatik fəaliyyət üçün əsas elementlərdən biri sayıla bilər.

Keywords: digital diplomacy, digitalization of foreign policy, diplomacy, information environment, state security.

Açar sözlər: rəqəmsal diplomatiya, xarici siyasətin rəqəmsallaşması, diplomatiya, informasiya mühiti, dövlət təhlükəsizliyi.

Informasiya-kommunikasiya texnologiyalarının sürətli inkişafı bütün dünyada sosial, iqtisadi və siyasi proseslərə əhəmiyyətli dərəcədə təsir göstərir. Dövlətlərin müasir siyasi fəaliyyəti sosial şəbəkələrin üstünlük təşkil etdiyi global informasiya məkanında həyata keçirilir və bu gün siyasətdə virtual informasiya komponentlərinin payı dinamik artım tendensiyasına malikdir. Son zamanlar ani informasiyaya çıxışı və interaktiv onlayn kommunikasiyanı təmin edən yeni texnologiyalar diplomatlar və hökumət rəsmiləri tərəfindən getdikcə daha çox istifadə olunur. Rəqəmsal diplomatiya siyasi diskursda mühüm mövzuya çevrilsə də, hələ də onun rəsmi tərfi yoxdur və bu termin sərbəst şəkildə

istifadə olunur. Tərifdə dəqiqliyin olmaması alimləri kibertəhlükəsizlikdən tutmuş sosial mediaya qədər hər şeyə diqqət yetirərək rəqəmsal diplomatiyanı müxtəlif perspektivlərdən araşdırmağa vadar etmişdir. Bu dəqiqliyin olmamasının digər səbəbi isə rəqəmsal diplomatiyanın tez-tez müxtəlif adlar altında çəkilməsi ilə bağlıdır. Tədqiqatçılar "kiber diplomatiya", "şəbəkə diplomatiyası", "elektron diplomatiya" və "tweet diplomatiyası" kimi terminlərdən istifadə edirlər. Ən çox yayılmış termin - "rəqəmsal diplomatiya" terminidir. Rəqəmsal diplomatiya internetdən, informasiya-kommunikasiya texnologiyalarından (İKT) və sosial mediadan diplomatik əlaqələrin möhkəmləndirilməsi vasitəsi kimi istifadə edən yeni ictimai diplomatiya formasıdır.

Internetin və Instagram, Twitter, Facebook kimi global sosial şəbəkələrin yaranması rəqəmsal texnologiyalardan dövlətlərin xarici siyasət aləti kimi istifadə edilməsi məsələsini gündəmə gətirdi. Xüsusilə, xarici siyasətin rəqəmsallaşması fenomeni ictimai diplomatiyanın elementi və müasir güclərin "yumşaq güc"ünün əsas vasitələrindən biri olan "rəqəmsal diplomatiya" termini ilə bağlıdır. Rəqəmsal diplomatiya ölkənin rəsmi dövlət orqanlarının xarici siyasətdə öz məqsədlərinə nail olmaq, beynəlxalq imic formalaşdırmaq və global aləmdə nüfuzunu qorumaq üçün sosial şəbəkə platformalarından istifadə etməsidir.

XX əsrin sonlarından siyasi və diplomatik elita sosial şəbəkələrin müsbət və mənfi təsirləri ilə qarşılaşdılar. Qlobal elektron texnologiya bazarında smartfonların və onlar üçün sosial şəbəkə proqramlarının yaranması aktiv istifadəçilərə hər saniyə məlumat əldə etmək imkanı yaratdı. ABŞ Prezidenti Barak Obamanın qeyd etdiyi kimi, 21-ci əsrdə xalqlar internetin yaratdığı geniş imkanlarla daha sıx birləşdilər. Hətta sosial media istifadəçiləri mitinqlər, tətilər və inqilablar da təşkil edərək öz etirazlarını və çıxışlarını rahatlıqla ifadə edə bilirlər.

İnformasiya qarşılıqlı qəzet səhifələrindən və televiziya ekranlarından dünya şəbəkəsinə keçdi. Siyasi elitanın qarşısındakı əsas məqsəd zamanla ayaqlaşaraq əsas güclərlə münasibətlərdə ənənəvi vasitələrin yerinə yeni alətlərdən - sosial şəbəkələrdən istifadə etməklə dövlətin milli maraqlarını müdafiə etmək idi.

Rəqəmsal diplomatiyanın mənşəyi ABŞ-la bağlıdır, daha konkret olaraq, keçmiş dövlət katibi Hillari Klinton yeni texnologiyalardan istifadə etmək üçün Dövlət Departamentinin xarici siyasət strategiyalarını formalaşdırmışdır. Amerika administrasiyası ilk dəfə sosial media hesablarından ölkənin imicinə müsbət təsir göstərə biləcək bir vasitə kimi istifadənin vacibliyini vurğuladı. ABŞ Dövlət Departamentinin innovasiyalar üzrə xüsusi müşaviri Alek Rossun məsləhəti ilə ABŞ-ın o zamankı dövlət katibi Hillari Klinton diplomatiyanın yeni alətini müasir çağırışlara uyğun silah adlandıraraq, ABŞ-ı elektron diplomatiya (eDiplomacy) sahəsində liderə çevirdi. (2)

Belə ki, dövlət katibi olduğu müddətdə Klinton sosial medianı Dövlət Departamentinin idarə etdiyi bir çox proqramların tərkib hissəsinə çevirərək, bu populyar yeni tendensiya dövlətçilik aləti kimi istifadə etməyə çalışdı. (Bjola, Corneliu and Marcus Holmes. 2015. Digital Diplomacy: Theory and Practice. Routledge.) (Zhang, Juyan. 2013. "A Strategic Issue Management (SIM) Approach to Social Media Use in Public Diplomacy," American Behavior Scientist 57(9)) Öz sözləri ilə desək, Klinton "ənənəvi hökumət-hökumət münasibətləri çərçivəsindən kənara çıxma və dünyanın hər yerindən insanlarla birbaşa əlaqə yarada biləcək XXI Əsrin Dövlət Yaradıcılığı Platformasını idarə etmək istəyirdi.

ABŞ-dan sonra oxşar tendensiyalar digər dövlətlər tərəfindən izləndi. Eyni zamanda bunu da qeyd etməliyik ki, dünyada heç bir dövlət diplomatiyanın ənənəvi vasitələrindən əl çəkməyib - bağlı qapılar arxasında həll edilməli olan məsələlər də hələ də davam edir.

Məkan və zaman sərhədlərinin olmaması, məlumatların dərhal və geniş istifadəçi auditoriyasına yayıla bilməsi, həmçinin şəbəkədə təhlükələri vaxtında müəyyənləşdirmək və vəziyyətə nəzarət etmək üçün sürətli əlaqə imkanlarının olması rəqəmsal diplomatiyanın ən mühüm keyfiyyət xüsusiyyətlərindəndir. Qlobal informasiya cəmiyyətində sürətli informasiya toplamaq və geniş auditoriya ilə bölüşmək üstünlükləri siyasi liderlər və hökumət idarələri üçün yeni perspektivlər yaradır. Klassik ictimai diplomatiyadan fərqli olaraq rəqəmsal diplomatiya vasitəsilə daha çox məlumat əldə etmək, fərdlər və təşkilatlar arasında daha çox qarşılıqlı əlaqə yaratmaq mümkündür. (Chakraborty, 2013).

Xarici işlər nazirlikləri, səfirliklər və beynəlxalq təşkilatların nümayəndə heyətlərinin rəsmi internet saytlarının mövcudluğu artıq standart təcrübədir. Xarici işlər nazirliklərinin internet saytları öz xarici siyasətlərini izah etmək və digər dövlətlərin qəbul edilməz addımları və ya iddialarını təkzib etməyə xidmət edir (Barston, 2014). Bu gün dövlət və qeyri-dövlət qurumları vahid onlayn məkanda təsir və güc uğrunda rəqabət aparır. Ənənəvi diplomatiya formaları daxili və xarici siyasətdə üstünlük təşkil etməyə davam etsə də, hökumətlər texnologiyadan həm ölkə daxilində, həm də beynəlxalq mühitdə

ünsiyyət qurmaq və məlumat toplamaq üçün yeni vasitə kimi istifadə edirlər. Bu metod ölkənin xarici siyasət maraqlarını dəstəkləməyə və beynəlxalq auditoriyada əhatə dairəsini genişləndirməyə kömək edir. Nəticədə, rəqəmsal diplomatiya düzgün istifadə edildikdə ənənəvi diplomatiyanın effektiv həyata keçirilməsinə müsbət təsir göstərir. Artıq ölkələr ənənəvi diplomatik metodlardan kənarda da məlumat mübadilələrini reallaşıdır və siyasi gündəmlər təyin edə bilmirlər. Dövlət administrasiyasının nümayəndələri onlar üçün yaradılmış internet saytlarını mütəmadi olaraq izləyirlər, onlar tərəfindən imzalanmış bəyanatlar, söylənmiş fikirlərə sosial şəbəkələrdə jurnalistlər, bloggerlər və vətəndaşlar tərəfindən necə reaksiya verildiyini görə bilirlər.

ABŞ Dövlət Katibinin İctimai Əlaqələr üzrə keçmiş köməkçisi, Corc Vaşinqton universitetin professoru P.J.Crowleyə görə ənənəvi diplomatiya ilə də rəqəmsal diplomatiya arasında uçurum getdikcə genişlənir: ənənəvi diplomatiyada bağlı qapılar arxasında, ictimai diplomatiya, xüsusən də rəqəmsal diplomatiya isə ictimaiyyət üçün açıqdır. Twitter mikrobloqu rəqəmsal diplomatiyanın əsas platformasına çevrilmişdir. BBC, CNN, Əl-Cəzirə, RT və digər mühüm xəbər şəbəkələrində "... Twitter-dən öyrəndiyimiz kimi" sözləri ilə başlayan və ya bitən xəbərlərin olması artıq yenilik deyil, dünya liderlərinin, nazirlərin və diplomatların dördü üçün muntəzəm olaraq yenilənən şəxsi Twitter hesabları var. Onlar öz fikirlərini, çıxışlarını dərc edir, həmkarları və digər istifadəçilərlə ünsiyyət qururlar.

ABŞ administrasiyası sosial şəbəkələrin ən aktiv istifadəçisidir, onun ardınca Böyük Britaniya və Avstraliya, üçüncü yerdə isə İsveç hökuməti gəlir. Twitterin gücündən istifadə edən ən fəal siyasətçi İsveçin xarici işlər naziri Karl Bildtdir. 2013-cü ilin avqustunda Karl Bildt öz Twitter hesabı vasitəsilə Böyük Britaniyanın xarici işlər naziri Uilyam Heyqi Stokholma səfərə dəvət etdi. 2012-ci ildə dünya səhnəsində ölkələrini təmsil edən diplomatlar (əsasən müxtəlif ölkələrin ABŞ, BMT və Aİ-dəki səfirləri) arasında sorğu keçirilib. Onlara verilən sual "Niyə Twitterdən istifadə edirsiniz?" idi. "Twitter hökumət elitasının mövqeyini əhəliyə çatdırmağa və cavab almağa kömək edən iktirafli sürətli ünsiyyət platformasıdır" fikri ən çox səslənən cavablar sırasında idi.

Rəqəmsallaşma hətta "Tviplomatiya" kimi tanınan yeni, unikal şəbəkə növünün yaranmasına səbəb oldu. Tviplomatiya müasir dünyada insanların sadəcə Twitter-də bir-birini "izləmək" yolu ilə münasibətlər qurma üsullarına aiddir. Tədqiqatçılar son dövrlərdə bu münasibətlərin beynəlxalq münasibətlərə təsirlərini araşdırmağa başladılar. ABŞ-ın bir neçə illik embarqodan sonra Kuba ilə münasibətləri necə bərpa etməsi bu məsələyə dair maraqlı nümunə ola bilər. 26 may 2015-ci ildə ABŞ Dövlət Departamenti Twitter-də Kuba Dövlət Departamentini "izləmək" qərarına gəldi. Həmin gün Kuba da bu addıma eyni jestlə cavab verdi. Qeyd etmək vacibdir ki, bu onlayn əlaqə iki ölkə rəsmi olaraq bir-birini öz şəbəkələrinə qaytarmazdan 2 ay əvvəl baş verib. Bu hadisədən əvvəl ittifaqın yenilənməsi barədə söhbət getsə də, bu nümunə sosial medianın münasibətlərin qurulmasına necə imkan verdiyini göstərir. Bu vasitə ilə münasibətlərin normallaşması tendensiyası artıq beynəlxalq münasibətlərdə oxşar hadisələrin izlənilməsi ilə nəticələndi. Tviplomatiyanı öyrənən tədqiqatçılar kiçik ölkələrin dünya ilə münasibətləri yaxşılaşdırmaq üçün necə mübarizə apardıklarını araşdırarkən Perunun Twitter-də 509 dünya liderini izlədiyinin şahidi olublar.

Bu yeni texnologiyaların bir çox üstünlükləri ilə yanaşı bir sıra çətinlikləri də mövcuddur. Bu problemlərdən biri də ondan ibarətdir ki, yuxarıda göstərilən üstünlüklərdən bəziləri əslində praktikada istifadə olunmur. Məsələn, sosial şəbəkələr dövlət məmurlarına interaktiv üsulla öz təsirlərini genişləndirmək imkanı versə də, bütün liderlər bu fürsətdən yararlanmır. Qərb ölkələrinin sosial mediada istifadə edilən kommunikasiya strategiyalarını araşdırdığı tədqiqatlarda diplomatların əksəriyyətinin ölkələrindən kənardakı diplomatlarla ünsiyyət qurmadığını göstərən məyusedici nəticələr ortaya çıxdı. Tədqiqatlar nəticəsində məlum oldu ki, onlar daha çox biznes yönümlü qeyri-hökumət təşkilatlarını izləyirlər. Bu məlumat onu göstərir ki, dövlətlər və onların nümayəndələri hələ də sosial medianın tam potensialından istifadə edə bilmirlər.

Sosial media ilə bağlı əlavə araşdırmalar göstərir ki, bir çox aktorlar Twitter və ondan necə istifadə ediləcəyinə gəldikdə yanırlar. Məsələn, İndoneziya səfiri Cəlal Twitter hesabında böyük izləyici kütləsinə sahib olub, lakin sosial reytinglər onun daha az izləyicisi olan səfirlərdən daha az təsirli olduğunu göstərir. Bu o deməkdir ki, onun böyük auditoriyaya malik olmasına baxmayaraq, səfir Cəlal fəallığın artmasına və ya öz təsirinin genişlənməsinə səbəb olan tweetlər yazı bilmir.

Beynəlxalq praktikada belə vəziyyətlərə rast gəlinir. Dövlət və Hökumət rəsmiləri nə etdiklərinin fərqi varmıdan Twitter-dən istifadə edirlər və bu da bəzən xoşagəlməz halların yaranması ilə nəticələnir. Məsələn, İsveçin Xarici İşlər Naziri Karl Bildt belə düşünülməmiş tviti mediada böyük çaşqınlıq yaratdı: "Stokholmu tərk edərək Davosa gedirik. Mən bu axşam Ümumdünya Ərzaq

Proqramının şam yeməyini səbirsizliklə gözləyirəm. Qlobal aclıq aktual problemdir!" İzləyiciləri onun ifadəsinin mətnində problem aşkar etdiklərində Bildtin imici möhkəmlənmək əvəzinə daha da zədələndi.

Başqa bir misal isə Fransanın ABŞ-dakı səfirinin Donald Trampın prezident seçildiyi təqdirdə dünyanın axırının yaxınlaşması ilə bağlı yazdığı tviti göstərmək olar. Bu tvit ABŞ-da Trampa səs verənlərə qarşı böyük hörmətsizlik idi, ictimaiyyət tərəfindən qınandıqdan sonra səfir tərəfindən silindi. Əslində isə rəqəmsal diplomatiyanın əsas məqsədi sosial mediadan dövlət maraqlarını çatdırmaq və inkişaf etdirmək üçün daha asan bir yol kimi istifadə etməkdir.

Eyni zamanda, bu gün İKT-nin inkişafı müəyyən dərəcədə dövlət təhlükəsizliyi sistemində çətinliklər yaradır. Yaranan informasiya mühiti qlobal sistemdə qeyri-sabitlik və təhlükələrin yaranması faktoruna çevrilir. Rəqəmsal diplomatiya dövlət və xarici siyasət strukturlarını davamlı olaraq gərginlik vəziyyətində saxlayan əsas hədə vasitələrindən hesab olunur. İnformasiyanın qloballaşması nəticəsində yeni kommunikasiya texnologiyaları vasitəsilə terrorçu və ksenofob qruplar öz tərəfdarlarını cəlb edirlər, ekstremizm, terrorizmin kimi ideologiyaların yayılması sürətlənir. İnternet beynəlxalq siyasətdə qərarların qəbulu prosesini çətinləşdirir və bu prosesdə dövlətlərin nəzarət mexanizmlərini zəiflədir, nəticədə dövlət başqa dövlətlərdən və ya digər beynəlxalq aktorlardan, məsələn, terrorçulardan gələn gələn xarici təhlükələrə qarşı müdafiə oluna bilmir. 2015-ci ilin avqustundan 2017-ci ilin dekabrına qədər Twitter sosial şəbəkəsi terrorizmin təbliğatının qarşısını almaq üçün 1,2 milyon hesabı bağlamasına baxmayaraq, Twitter, Facebook və Youtube terror təbliğatına qarşı mübarizədə kifayət qədər sərt mövqedə olmadıqlarına görə bəzi dünya hökumətləri tərəfindən təzyiqlər və tənqidlərlə üzləşirlər.

Haker hücumları İnternetin icadından bəri mövcud olan bir riskdir. Bunun rəqəmsal diplomatiya üçün əsas təhlükə hesab edilməsi tamamilə doğrudur, çünki dünyanın bir çox dövlət başçıları, hökumətləri və diplomatları artıq onların qurbanı olub və çox vaxt karyeralarını riskə atıblar. Diplomatik opponentlər, o cümlədən dövlət və qeyri-dövlət aktorları konkret məqsədlər üçün onlara xidmət edəcək məlumatları çıxarmaq üçün dövlət sistemlərinə hücum etməyə çalışırlar [3, s.84]. Şəxsi məlumatlar ictimailəşdikdə, dövlətlərin və onların liderlərinin reputasiyasına xələl gələ biləcəyi üçün qlobal mühitə ciddi təsir göstərə bilər. 2016-cı ildə hakerlər Filippin Seçki Komissiyasının ölkənin 55 milyon vətəndaşının şəxsi məlumatlarını özündə əks etdirən bütün məlumat bazasını internetə yerləşdiriblər. Məxfilikdən çıxarılan şəxsi məlumatlara pasport nömrələri və yararlılıq tarixləri, habelə vətəndaşların barmaq izlərinin təsvirləri daxil edilib. Hakerlər öz hücumlarını Filippində mayın 9-na təyin edilmiş ümumi seçkilərə az qalmış başlayıb.

XXI əsr qlobal inkişaf dövründə dünyanın ən qüdrətli dövləti belə informasiya təhlükəsizliyi məsələlərində vahid həll yolunu tapa bilmir. Beynəlxalq böhranlarla bağlı məlumatlar radio və televiziyadan, internet resursları və sosial şəbəkələrdən dünyaya canlı yayımlanır. Sosial medianın yaranması diplomatiyada "məxfilik" elementini kölgədə qoyub. Diplomatlar artıq heç vaxt hədəf olmadıqları auditoriyaya belə fikirlərinin yayılmayacağına əmin ola bilmirlər, indi ictimaiyyətin diqqətindən kənarda qalmaq mümkün deyil. Sosial şəbəkələrdən istifadə edərək, diplomatik heyət və ümumiyyətlə siyasətçilər xarici siyasətlə bağlı məsələlərdə ictimai rəyi öyrənə və ictimaiyyəti yönləndirə bilərlər.

Rəqəmsal texnologiyalar, xüsusən də sosial şəbəkələr müasir dövlətlərin xarici siyasətinə və diplomatiyasına mühüm dəyişikliklər edərək həm yeni perspektivlər, həm də risklər gətirir. Qlobal şəbəkələrin zəmin yaratdığı siyasi etirazlara səbəb olan kibercinayətkarlıq və kiberterrorizm kimi problemlərə baxmayaraq, dünyanın heç bir inkişaf etmiş ölkəsinin diplomatiyasını onun təsirləri olmadan təsəvvür etmək olmaz. Odur ki, beynəlxalq ictimaiyyət, dövlətlərin hökumətləri və xarici siyasət idarələri üçün öz ölkələrinin maraqlarını beynəlxalq arenada təmin etmək, həmçinin rəqəmsallaşmanın gətirdiyi riskləri minimuma endirmək üçün ən son rəqəmsal texnologiyalardan və yeni imkanlardan istifadə etmək vacibdir. Lakin, texnologiya ondan düzgün şəkildə istifadə edənlərə böyük fayda verə biləcək bir vasitə olsa da, rəqəmsal diplomatiya diplomatların xarici ölkələrə birbaşa müşahidə üçün göndərilmə təcrübəsini və ənənəvi diplomatiyanı tamamilə əvəzləyə bilməz.

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Psychological sciences

SOCIO-PSYCHOLOGICAL TYPOLOGY OF ELECTORAL GROUPS OF UKRAINE

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The variety of aspects that can be considered as criteria for describing the electorate and, accordingly, for its typologization, leaves the electorate as an actual scientific problem, which in the context of political and psychological knowledge requires additional operationalization. A key feature of studies of the electorate and related phenomena is that the electorate is a large, dynamic socio-political group that is institutionalized immediately before the election and can be divided into subgroups or electoral groups.

Modern electoral studies, which are aimed at identifying groups in the electorate, no longer rely exclusively on the socio-demographic characteristics of voters. Researchers find an opportunity to study the electorate from the standpoint of socio-psychological features of voters and their personal traits. For example, the political typology of the Pew Research Center unites Americans into electoral groups based on their beliefs and views on politics (Pew Research Center, 2021), a group of British authors, researching the change in the attitude of voters to the exit of UK from the EU, finds a difference between electoral groups in the structure of sources of information and the level of life satisfaction (Alabrese et al., 2019), in the study of Swedish scientists J. Ekman and E. Amna, the typology of the electorate was derived based on the analysis of the level and forms of political participation and public activity of voters (Ekman, Amna, 2012).

After the so-called Big Data revolution, psychometric criteria for evaluating the electorate, on the basis of which voters can be classified into different groups, became widespread in electoral research. For example, the Cambridge Analytica company created psychograms of all adult Americans and divided the US population into 32 personality types based on a five-factor personality questionnaire developed by American psychologists R. McCrae and P. Costa using the theoretical developments of G. Eysenck and R. Kettel (Bezrukova, 2017).

Despite the significant practical work of Ukrainian and foreign authors in the field of segmentation of the electorate using the personal characteristics of voters, there is currently no single methodological model of this process, and each researcher independently determines the parameters by which electoral groups can be separated from the electorate.

We believe that the socio-psychological characteristics of voters are among the indicators that distinguish supporters of some political candidates from others and can be the basis for classifying voters into certain electoral groups. To confirm this hypothesis, we conducted a study aimed at defining the main electoral groups represented in Ukrainian society using the example of the city of Kyiv and the Kyiv region and identifying a difference between those groups based on the analysis of socio-psychological characteristics of voters.

As indicators for evaluating the electorate, we determined the socio-demographic features of voters, personal traits of voters, values and needs of voters, mechanisms and level of political-ideological self-determination, levels of political participation and activity, national identity, paternalism in the attitude towards the government institutions and attitude of voters towards social and political issues relevant at the time of the research.

The research was conducted in the fall of 2023 on the LimeSurvey platform and consisted of 10 blocks of questions: a questionnaire aimed at determining the socio-demographic characteristics of voters, an author's questionnaire to determine the attitude of the respondents to political issues relevant at the time of the research, a 16-factor questionnaire by R. Cattell (form C), questionnaire of Sh. Schwartz PVQ "Portrait of values" (modification of PVQ21), author's modification of the questionnaire "Integral index of social well-being" (E. Holovakha, N. Panina), "Questionnaire of mechanisms of political and ideological self-determination" (G. Tsyganenko), "Short questionnaire on the level of political participation" (L. Kiyashko, A. Krasnyakova) and political activity (L. Kiyashko, O. Polunin), the questionnaire "Components of national identity" (O. Hora), the author's Ukrainian adaptation of the

"Questionnaire on the level of paternalism in attitude towards the government institutions" (T. Stefanenko, O. Tikhomandrytska, E. Belinska).

The empirical sample consisted of 128 women and 66 men aged 18-25 y.o. (54 women, 36 men), 26-35 y.o. (20 women, 16 men), 36-45 y.o. (22 women, 6 men), 46-55 y.o. (26 women, 6 men), over 55 y.o. (6 women, 2 men).

The methods used in the study made it possible to evaluate the respondents and the selected groups on more than 90 indicators, which made it possible to single out exactly those indicators on which the groups differed the most. Political participation in the 2019 presidential elections, the electoral choice made in the 2019 elections, trust in the president of Ukraine now, and the assessment of the effectiveness of state authorities in domestic and foreign policy were taken as integral factors for distinguishing groups.

As a result, we managed to single out 9 electoral groups: convinced supporters of V. Zelensky, newly arrived electorate of V. Zelensky, negatively disposed electorate of V. Zelensky, disappointed electorate of V. Zelensky, electorate of P. Poroshenko who improved their attitude towards V. Zelensky, electorate, which gravitates towards P. Poroshenko, convinced supporters of P. Poroshenko, a group of scattered absenteeists and a newly arrived uncertain electorate.

The group of convinced supporters of V. Zelensky can be seen not only by the factors of electoral support for the president in 2019, high trust in him now and a positive assessment of the effectiveness of state authorities, but also by the manifestation of such personal traits as sociability, courage, dreaminess and radicalism, with high indicators such values as power, stimulation, hedonism and achievement. This group also has high level of national identity, average level of political participation and low level of political activity.

The group of the newly arrived electorate of V. Zelensky is characterized by a young age, a negative assessment of the effectiveness of state authorities in domestic politics, but high trust in the president. The group consumes news not so often, compared to others, and periodically views Russian entertainment content, hesitates with the question of attitude to the activities of the UOC MP (Ukrainian Orthodox Church of the Moscow Patriarchate) in Ukraine, consolidated by the manifestation of such personal traits as high self-control, courage, sensitivity, radicalism, high national identity. The main values are independence, achievement, hedonism and stimulation, at once the low value of tradition.

The group of negatively disposed electorate of V. Zelensky is not only inclined to negatively evaluate the effectiveness of state authorities, but also has less trust in the Armed Forces of Ukraine. Sadness is their dominant emotion in relation to Ukraine today. The group is more compromising on the issue of the time perspective of reconciliation with the Russians and is more tolerant of the activities of the UOC MP in Ukraine. The main personal characteristics are high normative behavior, radicalism, courage, sensitivity, anxiety and dreaminess, the main values are hedonism, security and stimulation, at the same time – low level of tradition. National identity is at the medium level, a high level of desire for guardianship and care is manifested as a factor of paternalism.

In the group of V. Zelensky's disappointed electorate, along with distrust of the president, there is a greater distrust of the Armed Forces of Ukraine and an unwillingness to support candidates with military experience in the elections; sadness as a key emotion in relation to Ukraine. The group is more compromising in terms of its readiness to cede temporarily occupied territories, in particular Crimea, for the sake of an immediate end to the war and on the issue of the status of the UOC MP in Ukraine. Personal traits characterizing the indicated group are radicalism, high self-control, dreaminess, anxiety, high value of tradition, low value of stimulation and power, average level of national identity and political-ideological self-determination.

P. Poroshenko's electorate, which has improved its attitude towards V. Zelensky, quite actively follows the news, absolutely trusts in the Armed Forces of Ukraine. Emotion of pride for Ukraine dominates sadness. These voters and periodically consumes Russian informational content. In terms of personal traits, they show emotional stability, high normative behavior, anxiety, sociability, in terms of value characteristics they gravitate towards the electorate of V. Zelensky, have a high national identity, political identification, at a low level of the scale of "attitude towards the law" and "avoidance of responsibility".

The electorate that gravitates towards P. Poroshenko is united not only by distrust of V. Zelensky and a negative assessment of the effectiveness of state authorities, respondents indicate sadness as the key emotion they feel when thinking about Ukraine today, they are more compromising on the issue of territorial concessions for the immediate end of the war. According to their personal characteristics, they are distinguished by dreaminess, courage, radicalism, sensitivity, high intelligence, among values,

hedonism, independence, security and power are highly manifested. They have high indicators of political participation and average political activity. They also have an average level of national identity and paternalism with low indicators on the scales of "avoidance of responsibility" and "attitude towards the law".

A group of convinced supporters of P. Poroshenko can be seen by their absolute distrust of V. Zelensky and a negative assessment of the effectiveness of state authorities in foreign and domestic policy. They also can be seen by active inclusion in the news agenda, their uncompromising attitude to reconciliation with the Russians, and their absolute denial of the thesis that Russians and Ukrainians are one people. The group exhibits personal factors of sensitivity, radicalism, low self-esteem and the value of independence and security. This is the only group in which political and ideological self-determination is visible at a high level. Their political identity is at a high level, political participation is high and political activity is low.

The newly arrived undecided electorate group is distinguished by its young age, hesitation to answer questions about trust in the president, low frequency of news consumption, sadness and disappointment among the dominant emotions regarding Ukraine today. Courage and emotional stability are among the personal traits, hedonism and security are among the values, and the value of conformity is at a low level. National identity at an average level with a negative attitude of its affective component, low political identification, low indicators of political participation and the lowest indicators of political activity among other groups.

The group of scattered absentees is visible not only by their non-participation in the presidential elections of Ukraine in 2019, it is the most educated electorate with the highest indicators of intelligence according to personal characteristics. Among other characteristics, demonstrated radicalism, courage, self-control, dreaminess, anxiety, the values of independence and security dominate. These voters are more compromising on the question of an acceptable scenario for the end of the war, a significant part of the group considers the option of exiting the position as of February 23, 2022, declares readiness to cede temporarily occupied separate areas of Donetsk and Luhansk regions and Crimea for the immediate end of the war, also among the members of this group the most opponents of the idea of restoring Ukraine to the status of a nuclear state.

The results of the study indicate the effectiveness of certain socio-psychological features for describing and differentiating electoral groups, however, this list is not universal and comprehensive. It is considered quite appropriate to continue the scientific search for characteristics by which it is possible to distinguish electoral groups and supplement the list of characteristics with such categories as, for example, political culture. The obtained results also do not provide an answer to the question of which of the identified characteristics can be considered as predictors of electoral choice. Approbation of the results of the study requires conducting a repeated electoral study on a large sample that will be representative of the electorate of Ukraine.

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THE PROBLEM AND PSYCHOLOGICAL CONTENT OF THE SPECIALIST'S PERSONALITY PROFESSIONAL DEVELOPMENT SELF-REGULATION

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ПРОБЛЕМА ТА ПСИХОЛОГІЧНИЙ ЗМІСТ САМОРЕГУЛЯЦІЇ ПРОФЕСІЙНОГО РОЗВИТКУ ОСОБИСТОСТІ ФАХІВЦЯ

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Проблема саморегуляції професійного розвитку особистості фахівця є на сучасному етапі однією з найбільш цікавих та важливих психологічних проблем, що потребує детального осмислення цілого ряду психологічних феноменів, що складають її зміст.

Актуальність проблеми саморегуляції професіогенезу особистості лікаря в умовах неперервної професійної освіти обумовлена необхідністю виявлення особистісних моделей саморегуляції професійного самоздійснення особистості. Це дозволить, з одного боку, лікарям задовольнити потреби у високому рівні розвитку професійної компетентності, а з іншого – потребу суспільства у кваліфікованих фахівцях у галузі медицини.

Здійснений у попередніх наших дослідженнях аналіз проблеми підготовки медичних кадрів показав, що професійний розвиток особистості лікаря є поетапним моментом індивідуально-особистісного розвитку фахівця в умовах неперервної професійної освіти і має свою специфіку у діяльності лікаря. З цією метою процес підготовки майбутнього лікаря має передбачати не лише професійний, а й особистісний розвиток фахівця, з врахуванням особливостей саморегуляції професіогенезу лікаря як на етапі додипломної, так і на етапі післядипломної підготовки.

Професійний розвиток неможливий без активності особистості фахівця, а тому процес саморегуляції професіогенезу особистості лікаря є умовою його професійного самоздійснення. Через це саморегуляція як цілісна система психічних засобів, за допомогою яких людина здатна керувати своєю цілеспрямованою активністю, стає не перевагою, а життєвою необхідністю.

Саморегуляція відноситься до фундаментальних категорій психології і вивчалась вченими різних психологічних шкіл (А. Маслоу, К. Роджерс, Г. Олпорта, В. Франкл та ін.). Водночас найбільш повно, як самостійний предмет дослідження, саморегуляція представлена у сучасних українських дослідженнях, які довели, що саморегуляція особистості формується за допомогою її поведінки, індивідуальних характеристик та становить собою цілісну систему психічних засобів, за допомогою яких людина здатна керувати своєю цілеспрямованою активністю (І.Д. Бех, М.Й. Боришевський, Ж.П. Вірна, Л.Г. Дика, С.Д. Максименко, В.О. Моляко, Л.А. Мойсеєнко, О.О. Прохоров, О.П. Саннікова, О.О. Сергієнко, О.Я. Чебикін). Як свідчать сучасні психолого-педагогічні дослідження, одним з найважливіших психологічних чинників, які впливають на ефективність самостійної діяльності особистості, є здатність до саморегуляції, а люди з розвинутою саморегуляцією досягають більшого успіху в роботі, навчанні, суспільному житті; вони є більш психологічно благополучними та професійно компетентними.

В залежності від визначення змісту поняття саморегуляції, наша увага концентрується навколо різних видів цього процесу. Зокрема, з огляду на нашу проблему саморегуляції професійного розвитку фахівця, цікавими та важливими є такі, як емоційна (І. В. Бринза, Я. Рейковський, О.П. Саннікова, О.Я. Чебикін, О.А. Чернікова), моральна (М.Й. Боришевський, Б. С. Братусь, Т.В. Кириченко, П.М. Якобсон), мотиваційна (О.Г. Ксенофонтова, В.І. Степанський, А.А. Файзуллаєв), особистісна (К.О. Абульханова-Славська, Л. Е. Орбан - Лембрик, І.І. Чеснокова), інтелектуальна (В. О. Моляко, О. К. Тихомиров) та ціннісно-смістова саморегуляція (Л.В. Долинська, І. С. Кон, В. Є. Семенов, В.А. Ядов).

У прикладному аспекті важливо відзначити, що саморегуляція як процес впливу на власний фізіологічний і психологічний стан, багато в чому залежить від бажання людини керувати

власними емоціями, почуттями й переживаннями і, як наслідок, – поведінкою; Зазначимо, що здатність до саморегуляції формується протягом життя, а значить, піддається формуванню й удосконаленню.

Питання саморегуляції особистості продовжують досліджуватися сучасними вченими (М. Боришевський, В. Іванников, О. Конопкін, Ю. Миславський, В. Моросанова, Г. Никифоров, О. Осницький, В. Татенко, Т. Титаренко, Н. Пов'якель та ін.), що дає нам підстави розглянути проблему саморегуляції професійного розвитку, спираючись на результати їхніх досліджень, зокрема – на необхідності урахування актуальних потреб, особистісно значущих цілей, життєвих відносин, установок у розвитку саморегуляції; стильової саморегуляції поведінки людини; її розуміння як професійно важливої властивості тощо. Так, Н.Н. Ярушкін під саморегуляцією особистості розуміє, насамперед, регуляцію особистістю своєї поведінки «у відповідності з ціннісно-нормативною системою її соціуму» і визначає її як регуляцію особистістю своєї поведінки «відповідно до власної ціннісно-нормативної системи для досягнення нового рівня взаємодії з соціумом»; Г.С. Нікіфоров визначає саморегуляцію як діяльність, що спрямована на приведення системи в стан, що дозволяє реалізовувати мету життєдіяльності.

Незаперечно цінність у дослідженні психології саморегуляції професійного розвитку становить науковий доробок, який має цілу низку підходів та напрямів до вивчення означеної проблеми, зокрема обґрунтування психічної регуляції та саморегуляції (І. Сеченов та І. Павлов), важливість системного дослідження психічної саморегуляції (П. Анохін). У контексті діяльнісного підходу (С. Рубінштейн) саморегуляція особистості є невід'ємною складовою принципу єдності свідомості та діяльності. Важливу роль у становленні сучасних уявлень про саморегуляцію відіграв суб'єктний підхід (К. Альбуханова-Славська), у рамках якого підкреслюється необхідність її розуміння як процесу.

Отже, сучасні тенденції розвитку психології саморегуляції є актуальними, втім, малодослідженими в питанні психології саморегуляції професійного розвитку фахівця.

З огляду досліджуваної нами проблеми, саморегуляція розглядається як системна якість, що виникає завдяки об'єднанню індивідуально-психологічних особливостей особистості в єдину психологічну систему, а її ефективність пов'язується з рівнем розвитку особистості фахівця.

Саморегуляція професійного розвитку – це системно-організований процес ініціації, побудови, підтримання і керування довільною активністю особистості, пов'язаною із досягненням нею власних цілей професійного вдосконалення. Важливо усвідомити, що саморегуляція професійного розвитку багато в чому залежить від бажання людини керувати власними професійними досягненнями, успіхами, мотивами тощо, вона піддається формуванню й вдосконаленню, відтак рівень психічної саморегуляції пов'язаний із підтриманням та мобілізацією психічної активності й полягає в здатності людини керувати власними діями й станами тощо.

Висновок. Проблема саморегуляції особистості, попри багаторічну історію вивчення, актуальність та значущість, вирізняється складністю, багатомірністю й неоднозначністю, зокрема це стосується питання саморегуляції професійного розвитку особистості фахівця у галузі охорони здоров'я.

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HOW RESTORING INTERNAL BALANCE CAN HELP IN CORRECTING STRESS?**Ongarbek D.A.****Serimuly B.***1st year undergraduates of «Almaty Technological University»***Ismailova R.B.***Candidate of Pedagogical Sciences, Almaty «Almaty Technological University»***Amankulov K.I.***Candidate of Pedagogical Sciences. Physics and Mathematics school.***Abstract**

The article examines the issues relevant to our reality about what is stress and psychological stability of a person on the impact of stress and depressive states on a person, ways to overcome them, the importance of developing the resources of psychological stability of a person as inner harmony with oneself and the surrounding space. Thus, the article suggests a number of ways to achieve inner harmony and resistance to external and internal stimuli.

More and more people are complaining about stress today. Any activity in which a person is involved places ever higher demands on each of us, we must achieve impeccable results in conditions of constant innovation and growing competition. The time during which we could rest and calm down or engage in our hobbies is either inexorably shortened or disappears altogether. The result: we feel squeezed out, we are irritable and unbalanced, and in the worst cases, physical malaise begins.

The term "stress" (from English stress — pressure, pressure, tension, reinforcement) is borrowed from the technique, where this word is used to denote an external force applied to a physical object and causing its tension, that is, a temporary or permanent change in the structure of the object.

1. Aaron Antonovsky: He developed the concept of "Social sustainability" (Sense of Coherence), which describes a person's ability to cope with stress by searching for meaning and understanding of his life.

2. Richard Lazarus: Lazarus was a well-known stress researcher and conducted research related to understanding how people assess the stress of quarrels and what strategies they use to cope with stress.

3. Susan Sausage: She studied the concept of "social support" and its impact on stress resistance.

4. Martin Seligman: He researched the field of psychological stability and developed the concept of "positive psychology", which includes the study of factors contributing to psychological stability and well-being.

5. Caroline Raines: This researcher studied strategies for managing and adapting to stress, including using positive self-esteem and resources to improve resilience.

The development of psychological stress is used to denote a wide range of human conditions that arise in response to a variety of extreme influences. Initially, the concept of stress arose in physiology to denote a non-specific reaction of the body ("general adaptation syndrome") in response to any adverse effect (G. Selye). Later it was used to describe the conditions of an individual in extreme conditions on the physiological, biochemical, psychological, behavioral levels. This term unites a wide range of issues related to the origin, manifestations and consequences of extreme environmental influences, conflicts, complex and responsible industrial activities, dangerous situations, etc.

How does stress arise?

Episodic stress can have quite an exciting and tonic effect. Think, for example, about doing sports: no one would think of fitness as the same stress as some busy morning in the office, when the phone rings every five minutes or new tasks pile on you. But any situation becomes oppressive stress at the moment when you feel that the load exceeds your strength. And this can happen for various reasons.

- *You have a lot to do, but you don't have much time.*
- *You want to do something especially well.*
- *Something unexpected happens and crosses out your original plans.*
- *You are facing a particularly difficult task.*
- *You are constantly interrupted and distracted.*
- *You think about other things, such as personal worries.*

- You feel that you are exhausted or even sick, the load seems too much for you.
- You need to make an important decision, but you lack the information that is necessary for this.
- Someone suddenly starts quarreling with you.

Internal demands and challenges from the outside threaten to engulf you and seem endless. As a result, you just turn into a robot and try to do more than you are able to do at all. Thus, you are putting an unbearable burden on yourself, your body reacts with the corresponding symptoms of stress, such as internal anxiety, irritability, headaches, palpitations, nervousness, dizziness, a state of fear, etc.

You can fight back against all this, but it's better not to bring yourself to such reactions. After all, no one is able to endure such loads for a long time, and sooner or later the body will give you clear alarms.

Many of life's problems have roots in the past. Grievances and moral traumas arising in a dysfunctional family, unresolved conflicts with parents and children, and many other problems can haunt a person for many years. Shame and guilt "bind" a person to his past. [3] Suppressed negative memories and emotions, sometimes artificially muted by alcohol or life worries, are an ongoing source of internal tension.

Life nowadays is also filled with internal stressors. The crisis of existence (existential crisis) worries both about its significance in life and the significance of life itself, certain stages and manifestations. Negative emotionality also predisposes to distress. A high level of emotional reactivity will constantly cause disorders, a sense of tension, fear, doom in the event of even minor life adversities. Life can become unbearable when most of the expectations and all the dreams do not come true. Frustration and frustration eventually lead to bitterness.

Internal worries and anxieties are very often intensified by premonitions of something bad. Anxiety, worries about future failures, misfortunes (real or imaginary, imaginary) can create more stress than actual failure. The fear of old age and death can obscure the joy of being, distort the positive meaning of life, make you perceive life in black tones.

When a person is mentally stressed, and the source of this tension — the conflicting image of an adverse event — becomes dominant in life, there is no need for any serious external influence to feel anxiety and stress. Internal tension can create all kinds of problems from constant bickering and quarrels to desperate actions. Therefore, when analyzing life stress in all its manifestations, it is necessary to pay attention to intrapersonal stressors.

There has been a significant increase in interest in studying the nature of psychological stress in the last two decades, which to a certain extent is explained by the intensification of research on the features of information processes in human activity, their role in regulating behavior, in the occurrence of specific functional states and psychoemotional health disorders.

S.J. Wozlin and S. Wozlin identified many strategies leading to hypersensitivity and adaptation. They identified strategies to avoid—focusing on the past; blaming parents for their own failures; helpless victim behavior.

Adaptive children and adults rely more on themselves, on their capabilities; they strive to improve the lives of their parents; consciously create a family and work hard on their cohesion. The authors systematized clinical observations and identified seven categories of adaptability:

- 1) insight — understanding that parents also have problems, their occurrence is not related to the child;
- 2) independence — some separation from family problems and careful, careful regulation of relationships in order to be involved in the problems of parents;
- 3) interaction — cultivating positive relationships with others;
- 4) initiative — finding ways to manage stress, using trial and error, repetition;
- 5) creative potential — the discovery of creative solutions to the problem and the active transformation of shortcomings into advantages;
- 6) humor — using humor to alleviate stress;
- 7) ethics — the separation of right and wrong and behavior based on morality.

Many authors agree that these factors underlie children's confidence in stressful situations, but note that the child is still vulnerable — some present the child as a blank slate, others indicate that with high stress the child shows signs of anxiety and depression. Thus, adaptability should be considered as a process of interaction between the environment and the individual, and not as a characteristic of the individual.

But the main thing in the analyzed problem is not only how a person withstands stress, but also what benefits he extracts from it, what he learns.

Not every person reacts to a stressful situation by reducing capacity, developing depression or psychosomatic disorders. In fact, most people in these conditions manage to maintain or quickly restore their working capacity and functional reliability, although all of them experience negative experiences, emotional excitement or mental stress to a greater or lesser extent. Individual differences in the direction, intensity of manifestations of reactions to stress, in their consequences are the subject of numerous studies: some of the authors explain them by the influence of personal characteristics, others by biological predisposition, others by external conditions, etc. It has been established that all these factors are likely to matter to one degree or another. And at the same time, despite the abundance of research in this area, there continues to be and even growing interest in the problems of manifestation and formation of resistance to stress, to the study of the mechanisms of regulation, the processes of its development, ways and means of countering — "coping", "overcoming" manifestations of stress.

What are you doing against stress?

How do you behave when you feel that stress is piling on you? Maybe one or the other method presented below will seem familiar to you:

- *You start working a little faster to gain time;*
- *You complain about your workload to your partner or friend (girlfriend);*
- *Do you indulge yourself with something especially delicious to motivate or reward yourself;*
- *Are you having a smoke break;*
- *Are you trying to hide your nervousness from others;*
- *You're taking a sedative.*

All these, of course, are only short-term solutions to the problem, if they are able to help at all, because with the next attack of stress they EITHER lose their effectiveness or require an increase in the "dose". You need an effective strategy for long-term stress management.

Anti-stress strategy

Anyone who is highly stressed should develop their own personal anti-stress strategy. Here it is important to identify personal stimuli — stressors, and then consistently eliminate them. At first glance, we distinguish two types of stressors:

- *external, such as time pressure, "orders from above" at work, an oppressive background situation with money, etc.;*
- *internal, such as a personal (inflated) sense of responsibility, fears of rivalry or loss, fear of not coping with anything.*

I offer several techniques and methods that can help to be in balance with yourself and feel inner harmony:

1) The "Here and now" technique. The essence of the "Here and now" principle in gestalt therapy is that in the process of awareness, a person tries to understand what is happening at the moment. What he does, feels, desires. Often during such work it turns out that a person avoids contact with the present by all means, tends to delve into memories or fantasize about the future. Let's take one of the examples, imagine a person who is at work, but all his thoughts are immersed in the family, in the house. He cannot work effectively and at the same time be close to his family. Thoughts that arise prevent him from concentrating his attention on work tasks, and vice versa in a home environment, thoughts about work prevent him from relaxing. When mastering the "Here and Now" technique, it will help you feel and feel yourself, concentrate your thoughts where you are at the moment.

2) The "Inner Observer" technique, observe yourself, your thoughts for some time. It is natural for a person to exaggerate a certain situation where he may be in a catastrophization installation. If you are visited by negative thoughts, then ask yourself the question, is this really the case, am I exaggerating? If the situation or problem is global in nature and you are unable to change anything, try to let it go. Ask yourself the following question: What am I doing to change this situation?

3) Responsibility for your borders. Why am I doing this? Or, what do I do so that I am treated like this? How do I organize myself?

4) The "Breathing" technique is one of the ways of mental and physical self-regulation.

5) Methods of stress neutralization: psychological – conversation, auto-training, meditation; physiological – massage, physical exercises, activity; biochemical – pharmacotherapy, phytotherapy; physical – bath, hardening, water treatments, light exposure.

6) Fill your mind with new and interesting, try to see, even in difficult situations, not only negative, but also positive.

Human thoughts are like breathing, without which we cannot exist. And in order for us to breathe freely and fully, we need to get rid of heavy and sad thoughts.

Let your life find inner harmony of soul and body!

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Technical sciences

FEATURES OF AERATED CONCRETE PRODUCTION BASED ON LOCAL RAW MATERIALS

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Abstract

In connection with the peculiarities of the production of aerated concrete based on local raw materials, literature reviews have been compiled. Their specificity has a huge impact on the properties and economic efficiency of cellular concretes due to the hardening conditions. Naturally hardened cellular concretes are made with a large consumption of cement; they require long stable (temperature below +15°C) warm moist (20-30 days) conditions. In accordance with this, normally hardened cellular concretes, which have no relative strength, are mainly used in the production of heat-insulating products. Steam treatment will speed up the hardening of cellular concrete products more, and we can make material of different sizes. In this production, the processing of aerated concrete is carried out according to a certain mode, with gradual heating of products with a high temperature period and gradual cooling. For the same reason, autoclaved cellular concrete is widely used.

One of the main prerequisites that contribute to the extraction of cellular concrete with minimal defects and rapid porosity is the unevenly distributed composition of aluminum powder, the interaction of large or weakly active aluminum particles due to the pressure generated in the process of gas formation during the strength of the binder.

Аннотация

Жергілікті шикізаттар негізіндегі газды бетонды өндіру ерекшеліктеріне байланысты әдебиеттік шолулар жасалды. Олардың ерекшелігі қатаю шарттарына байланысты ұялы бетондардың қасиеттері мен экономикалық тиімділігіне үлкен әсер етеді. Табиғи жолмен қатайған ұялы бетондар цементтің үлкен шығынымен жасалады; олар ұзақ тұрақты (температура +15°C-тан төмен) жылы ылғалды (20-30 күн тәртібінде) жағдайды қажет етеді. Осыған сәйкес, салыстырмалы түрде беріктігі жоқ қалыпты қатайтылған ұялы бетондар негізінен жылу оқшаулағыш өнімдер өндірісінде қолданылады. Бүмен өңдеу ұялы бетоннан жасалған бұйымдардың қатаюын неғұрлым тездетеді және әртүрлі өлшемдегі материал жасай аламыз. Аталған өндірісте газдалған бетонды өңдеу белгілі бір режим бойынша жүргізіледі, бұйымдарды біртіндеп қыздыра отырып температурасының жоғары кезеңі мен біртіндеп салқындату арқылы жасалады. Сол себепті де автоклавты ұялы бетон кеңінен қолданылады.

Ұялы бетонды минималды ақаулар мен тез кеуектілікті алуға ықпал ететін негізгі алғы шарттардың бірі алюминий ұнтағының біркелкі бөлінбеген құрамы, байланыстырғыш заттың беріктігі кезінде газ түзілу процесінде пайда болатын қысымға байланысты алюминийдің ірі немесе әлсіз белсенді бөлшектерінің өзара әрекеттесуі болып табылады.

Keywords: *non-autoclaved aerated concrete, dry mortars, durability, density, humidity, frost resistance, slump, water absorption, pores, structure, longevity.*

Түйін сөздер: *автоклавсыз газдалған бетон, құрғақ құрылыс қоспалары, беріктік, тығыздық, ылғалдылық, аязға төзімділік, шөгінділер, суды сіңіру, кеуектілік, құрылым, беріктік.*

Ұялы бетон жеңіл бетонның бір түрі болып табылады. Ұялы бетон байланыстырғыш зат су, қоспалар мен кремний диоксиді қоспасының кеуек түзгіштер арқылы алдын-ала қатайту нәтижесінде алынады. Портландцементті әдетте ұялы бетондарын дайындау үшін байланыстырғыш болып табылады. Цементсіз ұялы бетондар (газ және көбікті силикаттар)

өндірісінде арнайы агрегаттарда жоғары сортты сөндірілмеген әк қолданылады, белсенді кальций мен магний оксидтерінің мөлшеріне ерекше назар аударылады. Әктің жалпы белсенділігі 75% - дан аз болуы керек, MgO мөлшері 1,5% - дан аспауы керек. Ең көп жалпы кремний компоненті кварц құмы болып табылады және ол SiO_2 80% - дан аз. Газдалған бетонның қатаюын саз баяулатады және оның беріктігін төмендетеді. Органикалық қоспалар газдың бөліну реакциясына зиянды әсер етеді; газдалған бетонның органикалық қоспалардың болуы нашарлайды. Құм ұнтақтап ылғалданған әктің бір бөлігімен араластырып құмды шламды аламыз. Сондай-ақ, өнеркәсіп қалдықтары (электр станцияларында ұнтақталған домендік қож күлі) кеңінен қолданылады. Күлді қолдану ұсынылады, өйткені үйіндіден шыққан күл құрамы мен мөлшері бойынша біркелкі емес. Күлде белгілі (%) болуы керек: SiO_2 —кем дегенде 40, Al_2O_3 —артық емес 30, Fe_2O_3 —артық емес 15, MgO —артық емес.

Кеуек түзгіштік қасиет бұл ерітінді құрылымындағы байланыстырғыш заттар ісініп, онда ауа қуыстары пайда болады.

Бұл операцияны екі жолмен жүзеге асыруға болады:

- 1) химиялық, газ түзуші қоспалар енгізілгенде және қоспалаушы қоспаларға газдың бөлінуімен бірге жүретін реакциялар пайда болған кезде;
- 2) механикалық, ерітіндіні бөлек дайындалған байланыстырғыш және тұрақты көбікпен араластырғанда.

Өндірісте қолданылатын әдісіне байланысты, ұялы бетондар сәйкесінше газдалған бетондар мен көбік бетондар болып бөлінеді. Газ бетон қоспасы портланд цемент әк, кремнезитті компонент және газ түзуші қоспалар тұрады. Алюминий ұнтағы газ түзуші ретінде ең көп қолданылды, ол кальций гидроксидінің сулы ерітіндісімен әрекеттесіп, сутегін шығарады. Алюминий ұнтағы мен беттік активті зат қоспадағы аз мөлшерде ұнтақты біркелкі тарату үшін су суспензиясы түрінде қолданылады. Газдалған бетон байланыстырғыш, құмды қожды қоспалар газдалған бетон араластырғышқа түседі, онда 4-5 минут ішінде араластырылады; бұдан әрі дайындалған қоспаға алюминий ұнтағының сулы суспензиясы құйылады және ерітіндіні суспензиямен бірге араластырғаннан кейін, бетон қоспасы 2/3 биіктікте болатындай есеппен қалыптарға тола ұялы бетон массасы толтырылады.

Ұялы бетондар қатаю жағдайларына қарай мынадай түрлерге бөлінеді:

- 1) қалыпты жағдайда қатаятын ұялы бетондар;
- 2) 70-90°C температурада бұмен өңделген ұялы бетондар;
- 3) 0,8-1,3 МПа қысыммен 175-190° C температурада қаныққан автоклавтарда герметикалық жабық ұялы бетондар мен өңделген автоклавты ұялы бетондар.

Қатаю шарттары ұялы бетондардың қасиеттері мен экономикалық тиімділігіне үлкен әсер етеді. Табиғи жолмен қатайған ұялы бетондар цементтің үлкен шығынымен жасалады; олар ұзақ тұрақты (температура +15°C-тан төмен) жылы ылғалды (20-30 күн тәртібінде) жағдайды қажет етеді. Осыған сәйкес, салыстырмалы түрде беріктігі жоқ қалыпты қатайтылған ұялы бетондар негізінен жылу оқшаулағыш өнімдер өндірісінде қолданылады. Бұмен өңдеу ұялы бетоннан жасалған бұйымдардың қатаюын тездетеді, сонымен қатар кез келген өлшемдегі өнімдерді жасай аламыз. Автоклавты ұялы бетон кеңінен қолданылады. Автоклавты өңдеу белгілі бір режим бойынша жүргізіледі, бұйымдарды біртіндеп қыздыра отырып өңдеу ортаның температурасының жоғары кезеңі мен біртіндеп салқындату арқылы жасалады.

Ұялы бетон газдалған жасанды тас және сол майда кеуекті ұяшықтар жылу өткізгіштіктің бейнелі толтырғышының рөлін атқарады. Ұялы бетонның кеуекті құрылымының көлемдік салмағына, сондай-ақ технологиялық факторларға байланысты және көбінесе 0,8-2,0 мм аралығында болады. Кеуек көлемі, сондай-ақ кеуектілік сапасы (яғни, біркелкі таралуы, сипаты және кеуек мөлшері) ұялы бетондардың барлық негізгі қасиеттерін анықтайды [1]. Авторлар ұсынған [2,3] көбік бетонын дайындау әдісі қоспаны алдын-ала кешенді механикаландыруды қамтиды: портландцементтен, сұйық көбік түзетін концентраттан және суды төмендететін реагенттен, содан кейін құрғақ қоспаны сумен жауып, жылдамдықты араластырғышта араластырады. Қолданыстағы жеңіл бетондарға қарағанда тиімдірек болу үшін кеуекті агрегаттармен араласқан [4] құрғақ белсендірілген қоспасы әзірленді. Ұялы бетон өндірісінде қажетті беріктік пен орташа тығыздықтың төмен көрсеткішін алу үшін энергияны қажет ететін процесс қажет кремний диоксиді компонентін ұнтақтау [5]. Автоклавты қатайтатын газдыбетонды өндіру кезінде мынадай дисперсиялық көрсеткіштермен ұсақ толтырғышты (кварц құмын) пайдалану ұсынымы алынды: 60-90; 68-75, 17-20 және 13-18%

қатынасында алынған прибор ПСХ-2 үшін 180-220 және 310-340м²/кг. Бұл композициялар ұяшықтың жарыққа төзімділігін арттырады бетон бұйымдарын пайдалану кезінде және шөгуде деформациясын азайту [6-8].

Қалыптау әдістерінің әсері ұялы бетондардың сапасына газдалған бетон өндірісіндегі алғашқы маңызды технологияның бірі. Бұл кезеңде дайын өнімнің кеуектілігі қалыптасады, ол үшін газ шығару жылдамдық ережелерін сақтау қажет және қоспаның реологиялық сипаттамаларын арттыру керек. [8-10]. Авторлар [11,12] ұялы-бетон қоспаларын өндіруде соққы импульсін қолдану технологиясы мен жабдықтарын жасау саласындағы зерттеулерін сипаттайды.

Көрсетілген технология бойынша өндірілген газдалған бетонның орташа тығыздығы құю технологиясы бойынша дайындалған ұқсас құрамды газдалған бетонға қарағанда 10% - дан аз, бұл бірдей тығыздықтағы газдыбетонды жасау кезінде алюминий ұнтағының шығынын азайту себептерін құрайды. Су құрамының 15-25%-ға төмендеуі газдалған бетонның беріктік көрсеткіштерінің 25-50%-ға жақсаруына әкеледі. Автор соққы технологиясы қайталама өнімдерді және кондиционерлік емес шикізатты пайдалануда тиімдірек екеніне назар аударады [13,14]. Сонымен қатар атап айтатындай әдістердің бірі газдалған бетоннан жасалған бұйымдарды периферия мен көлденең қиманың беріктігі мен тығыздығының әртүрлі көрсеткіштерімен жасау [9-11]. Бұл әдістің мәні келесідей, ұялы бетон массасын құю жабық формада жүргізіледі, оның бүйір жоғарғы беттерінде үлкен тесіктер болуы. Газдыбетон өндірісінде пайда болатын "төмпешік" осы газды бетон бұйымдарын өндіру технологиясының кемшілігі деп санауға болады. Осы төмпешікті кесу және жою үшін біраз шығын қажет. Бұндай жұмыс немес шығындар үлкен автоматтандырылған кәсіпорындарда іске асырылғаны тиімді.

Сондықтан газдыбетонды "қақпақпен" қалыптау әдісі 50-ші жылдардың соңында ұсынылғанына қарамастан, әлі күнге дейін сұраныста. Ол автофреттаж әдісі деп аталып кетті. Берілген әдістегі қажетті қақпақ қатты және қалыпқа мықтап бекітілуі керек. Эксперименттік зерттеулер барысында қоспаны толық көлеммен толтырғаннан кейін, қоспадан қалыптың элементтері арасындағы саңылаулар арқылы мөлдір су шығатыны анықталды. Артық суды кетіру және газдыбетонды басу арқылы орнату оның беріктігін одан әрі арттыруға, өнімнің жылуды ылғалдылықты өңдеумен қатаю ұзақтығын қысқартуға ықпал етеді [9-11]. Ұялы бетон массасының булау механизмі келесідей: алюминий ұнтағының бір бөлігі кальций гидроксиді бөлшектерімен жанасу процесінде байланыс нүктелерінде сутегі кем дегенде 25-35°C температурада шығарыла бастайды. Алюминий ұнтағының молекулаларына іргелес микрондарда бұл көрсеткіш қозғалтқыштан максималды кернеуден асып кеткенше байланыстырғыш пластикалық массаға қысым жасайтын газ жасушалық бетон массасы кеуіп кетпейді. Цемент араласпасы бар құрам жүйесінде газ түзілуінің физика-химиялық процестері өте күрделі. Механизмнің жылдамдығы мен көлемі негізінен газ түзгішті ұнтақтау, климаттық орта және ортаның сутегі иондарының концентрациясына байланысты (РН) [12-14].

Қорыта келе ұялы бетонды минималды ақаулар мен тез кеуектілікті алуға ықпал ететін негізгі алғы шарт алюминий ұнтағының біркелкі бөлінбеген құрамы, байланыстырғыш заттың беріктігі кезінде газ түзілу процесінде пайда болатын қысымға байланысты алюминийдің ірі немесе әлсіз белсенді бөлшектерінің өзара әрекеттесуі болып табылады.

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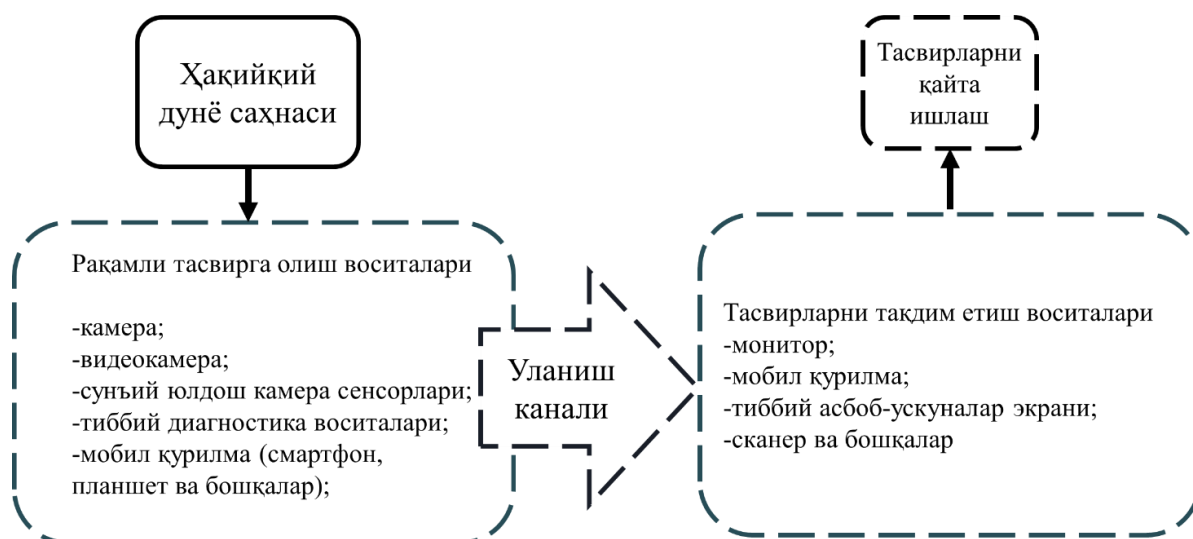
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REQUIREMENTS FOR DIGITAL IMAGE QUALITY**Mamatov Narzullo***Professor, Doctor of Technical Sciences, Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, National Research University, Tashkent, Uzbekistan***Jalelova Malika***PhD student, Karakalpak State University, Nukus, Uzbekistan***Samijonov Boymirzo***Student, Sejong University, South Korea, Seoul, Korea***РАҚАМЛИ ТАСВИР СИФАТИГА ҚЎЙИЛАДИГАН ТАЛАБЛАР****Маматов Нарзулло Солидждонович***Техника фанлари доктори, профессор**“Тошкент ирригация ва қишлоқ хўжалигини механизациялаш муҳандислари институти”**Миллий тадқиқот университети, Тошкент, Ўзбекистон***Жалелова Малика Моятдин қизи***Таянч докторант**Бердақ номидаги Қорақалпоқ давлат университети, Нукус, Ўзбекистон***Samijonov Boymirzo***Талаба**Сежонг Университети, Жанубий Корея, Сеул, Корея*

Тасвирга олишнинг турли воситалари орқали олинган рақамли тасвирлар архив ва маълумотлар базаларида қайд этилади. Айни пайтда инсонларни ижтимоий тармоқ, медиаплатформа ва бошқа технологиялардан тез-тездан фойдаланиши рақамли тасвирлар сони ва уларни сақлаш ҳажмининг ўсишига сабаб бўлмоқда. Бунда вақт ва компьютер хотира ҳажмини тежаш мақсадида ўта сифатсиз қайта ишлашга яроқсиз бўлган тасвирларни сақламаслик мақсадга мувофиқ бўлади. Бунинг учун тасвир сифатини баҳолаш усуллари тўлиқ ўрганиш, самарадорлиги юқори бўлган мезонларни ишлаб чиқиш зарур. Бу тасвир сифатига қўйиладиган талабларни тадқиқ қилиш ва ривожлантириш зарурлигини кўрсатади.

Рақамли тасвир сифатига қўйиладиган талаблар ундан фойдаланиш мақсадида кўра ўзаро фарқланиши мумкин. Сифат тушунчаси тасвирлардан фойдаланиш мақсадларига кўра одатда турлича талқин қилинади, яъни тасвир инсон идрокига ёки ахборот технологияларидан фойдаланган ҳолда муайян вазифаларни автоматик ҳал қилишга қаратилган бўлади. Бу эса тасвир сифатини аниқлашда таъсир кўрсатувчи омиллар аҳамияти ўзгартиради. Масалан, ерни масофадан туриб зондлаш шаҳар ёки архитектура иншоотини тасвирга олишда, тасвир сифати қанчалик юқори бўлса, тасвирга олинаётган объектлар, уларни геометрияси ва деталлари шунчалик аниқроқ узатилади. Бу каби талабларни қондириш учун юқори аниқлик, яхши рухсат ва контраст талаб этилади [1]. Шу билан бирга, портрет ва бадийий фотографиянинг бошқа турларида алоҳида деталларни маълум даражада хиралашиши ёки ноаниқлиги, шунингдек тасвир айрим жойларида контрастини пасайиши, ёрқинлиги ёки қорайиши махсус қўлланилиши мумкин. Тасвир сифатини баҳолаш инсонни тасвирни идрок этишининг визуал ва бадийий хусусиятлари билан боғлиқ бўлиши мумкин. Мазкур тадқиқот ишида рақамли тасвир сифати тушунчаси бадийий жиҳатларда эмас, балки уни рақамли тасвирида реал саҳна деталларини узатиш аниқлиги контекстида тадқиқ қилинган.

Рақамли тасвир сифатини баҳолаш босқичи тасвир маълумотлари билан ишлайдиган турли автоматлаштирилган тизимларда қайта ишлаш ва таҳлил қилишда муҳим ҳисобланади [2]. Шунинг учун рақамли тасвир сифати ўзгариши мумкин бўлган ҳолатлар ўрганилиши зарур. Қўйидаги расмда тасвир сифати ўзгариши мумкин бўлган босқичлари келтирилган.



1-расм. Рақамли тасвирни олиш схемаси

(Тасвир сифати ўзгариши мумкин бўлган босқичлар узиқ чизиқлар билан белгиланган)

Қуйидаги омиллар рақамли тасвир сифатига салбий таъсир кўрсатиши мумкин:

– тасвирга олиш воситалари соғломларининг аниқлиги ва тўғрилиги [3]. Масалан, рентгенографияда бемор рентген тасвири шаклланишида рентген тасвирга олиш воситасининг рентген нурларини узатиш параметрлари тўғри ўрнатилиши зарур. Акс ҳолда, тасвирдаги объект ўта қоронғи ёки ўта ёрқин бўлиш эҳтимоли катта бўлади.

– тасвирга олиш воситалари хусусиятлари. Масалан, камералардаги линзалар аниқлиги.

– рўйхатга олинган рақамли тасвир қайта тикланадиган восита хусусиятлари;

– маълумотларни узатиш каналлари [4]. Масалан, узатиш жараёнида маълумотларни йўқолиши (тасвирлардаги қора ёки кулранг чизиқлар, етишмаётган тасвир чизиқлари), ёзиб олиш каналларидаги шовқин ёки узатиш учун маълумотларни ҳаддан ташқари сиқиш тасвир муҳим тафсилотларини йўқолишига, шунингдек нотўғри контурлар пайдо бўлиши каби бузилишларга олиб келиши мумкин;

– компьютерда тасвирни қайта ишлаш натижаси.

Рақамли тасвирлар сифатига таъсир этувчи омиллар уларни қайси рақамли тасвир синфига тегишли эканлигига кўра бир-биридан фарқланади. Қуйидаги жадвалда рақамли тасвирларни айрим синфлари учун типик бузилишлар келтирилган.

1-жадвал

Тасвирларда учраши мумкин бўлган бузилишлар

Рақамли тасвир синфи	Бузилиш тури			
	Аниқлик	Ёрқинлик	Контраст	Ҳалақитлар ва уларни сабаблари
Сунъий йўлдош тасвирлари				
Пассив рўйхатга олиш тизимлари: радиодиапазон, мультиспектрал ва гиперспектрал тасвирлар	-	-	+	Мумкин бўлган бузилишлар: -импульсли шовқин; -булутлар ва баланд объектлардан соялар; -ер юзасининг турли хил топографияси туфайли қуёш нури тушишининг турли бурчаклари; -атроф-муҳит таъсири ва бошқалар
Фаол рўйхатга олиш тизимлари: -радар тасвирлари	-	-	+	-спекл ёки юқори частотали шовин кабилар
Тиббий тасвирлар				
Рентгенография	+	+	+	-объектни нотўғри чегаралари, нуқтали шовқин, соя кабилар

Компьютер томографияси (КТ)	+	+	+	-юқори контрастли зоналар, инсон ҳаракати натижасида юзага келадиган қўш контурлар;
Магнит-резонансли томография (МРТ)	+	+	+	-турли интенсивликдаги чизиқлар ва объект соҳта чегаралари
Ультратовушлит текширув тасвири (УЗИ)	+	+	+	-объектларни ноаниқ чегаралари ва спекл шовқин
Кўз тўр пардаси тасвири	+	+	+	-юқори ва паст контрастли соҳалар, чанг кўринишдаги шовқинлар
Фототасвир				
Мобил телефон орқали олинган тасвир	+	+	+	-юқори сенсор сезувчанлиги натижасидаги шовқин, ҳиралик, жуда қоронғи ёки ёруғ соҳалар
Фрактографик тасвир (фотоаппарат орқали олинган тасвир)	+	+	-	-турли фон, тасвирга олиш бурчаги ва пикселлар сонига боғлиқ ҳолда тасвирни бир қисми аниқ, бир қисми хира бўлиши
Портрет	+	+	-	-инсон ҳаракати ёки фокусни нотўғри ўрнатилганлиги натижасида хиралашган тасвир

Сунъий йўлдош тасвирларида иссиқлик эффектлари, детекторларни носозлиги, тизим электрон компонентлари орасидаги ўзаро таъсирлар, дискретлаш ва узатиш хатолари кабилар натижасида шовқинлар юзага келиши мумкин [5].

Инсон фаолиятида кенг қўлланиладиган тасвирларни яна бир тоифаси бу тиббий тасвирлар ҳисобланади. Айни пайтда тиббий тасвирлар клиник таҳлил ёки тиббий ташхис учун тана ички тузилмаларини ифодалаш, шунингдек маълум органлар ёки тўқималар функцияларини визуал ифодалаш қобилияти мавжудлиги сабабли кенг тарқалган. Бугунги кунда инсон танаси ҳолати ҳақида турли маълумотларни олишда тиббий тасвирлар кўплаб имкониятларни яратиб бермоқда [6]. Бироқ, тиббий тасвирга олиш воситаларидаги мавжуд камчиликлар ёки узатиш каналларидаги носозликлар тиббий тасвирлар контрасти паст бўлиши ёки турли шовқинлар кўшилган ҳолда шаклланишига сабаб бўлмоқда.

Кўп ҳолларда рақамли тасвирлар турли ҳалақитлар билан бузилган бўлади. Айниқса, назоратсиз ёки табиий тасвирга олиш шароитидаги дефокусланиш, хираланиш, шовқин, регистратор бузилиши, сиқиш артефактлари, проекцион бузилишлар, тасвир ёрқинлигини ўта юқори ёки ўта паст бўлиши, ишлов бериш объектига зарар етказиш ҳолатлари кўп учрайди. Тасвир сифатини баҳолаш орқали рақамли тасвирни бузилганлик даражасини аниқлаш мумкин. Тасвирлар сифатини баҳолашда одатда математик усулларга асосланган ёки эксперт ёндашувидан фойдаланилади:

Субъектив баҳолаш орқали тасвир табиати ҳақидаги айрим тасаввурлани олиш мумкин ва ундан тасвирларни автоматик қайта ишлаш жараёнларида фойдаланиб бўлмайди. Тасвирга ишлов бериш тартиб-қоидаларини ташкил қилишда компьютер технологиясидан фойдаланиш аниқроқ кўрсаткичларни тақдим этади ва улар автоматик ҳисоблаш ҳамда таққослаш имконини таъминловчи миқдорий ҳисоб-китобларни талаб қилади [7]. Шунинг учун тасвир сифатини миқдорий баҳолаш имконини берувчи объектив усулларни фойдаланиш мақсадга мувофиқ ҳисобланади.

Бугунги кунда тасвир сифатини баҳолашда ёрқинлик, контраст ва ранг тўйинганлик даражаси каби кўрсаткичлардан кенг фойдаланилади [8]. Ушбу кўрсаткичлар тасвирларни ҳар бирига нисбатан алоҳида тавсифлайди. Мазкур тадқиқот ишида тасвир ёрқинлиги, контрасти ва ранг тўйинганлигини баҳолаш мезонлари тадқиқ этилган.

1. Тасвир ёрқинлигини баҳолаш мезони [9] ишда батафсил ёритилган бўлиб, у қуйидагича баён этилади.

Фараз қилайлик, тасвир M та пикселдан иборат бўлсин. Тасвирни ҳар бир пиксели ёрқинлиги қуйидаги формула бўйича ҳисобланади:

$$Y_p = R_p + G_p + B_p \quad (1)$$

Ҳисобланган ёрқинлик қийматлари асосида қуйидаги формула асосида нормаллаштириш амалга оширилади:

$$m_p = \frac{Y_p}{\sum_{p=1}^M Y_p} \quad (2)$$

Тасвир ёрқинлигини баҳолаш қуйидаги формула асосида амалга оширилади:

$$F(\bar{m}) = -\frac{\sum_{p=1}^M m_p \ln m_p}{\ln M} \quad (3)$$

(3) кўрсаткич қийматини қанчалик катта бўлиши, тасвир сифатини шунчалик паст бўлишидан далолат беради.

2. Тасвир контрастини баҳолашни кулранг ва рангли тасвирлар учун алоҳида ишлаб чиқилган мезонлари мавжуд. Қуйида кулранг тасвир контрастини баҳолаш мезони RMS [10, 11] келтирилган:

$$k_{RMS} = \sqrt{\frac{1}{M} \sum_{i=1}^M (L_i - \bar{L})^2}, \bar{L} = \frac{1}{M} \sum_{i=1}^M L_i \quad (4)$$

бу ерда L_i – i пикселдаги ёрқинлик.

GCF (global contrast factor) контрасти [12] ишда келтирилган бўлиб, у қуйидагича аниқланади:

$$k_{GCF} = \sum_{s=1}^N w_s C_s \quad (5)$$

бу ерда w_s ва C_s мос равишда берилган s ўлчамли тасвир оғирликлари ва ўртача локал контрастини, N эса ҳисоблашдаги рухсат даражалари сонини ифодалайди.

s ўлчамли (i, j) пиксел учун локал контраст шу пикселни тўртта энг яқин қўшниси билан абсолют фарқ қийматларини ўртача қиймати сифатида ҳисобланади, яъни:

$$C_s = \frac{1}{W_s \times H_s} \sum_{i=1}^{W_s} \sum_{j=1}^{H_s} C_s(i, j) \quad (6)$$

бу ерда W_s ва H_s мос равишда s – тасвир эни ва бўйи.

RMS ва GCF кўрсаткич қийматларини юқори бўлиши тасвир контрастини юқори эканлигини билдиради.

3. Ранг тўйинганлиги ранг ва ахроматик ранг орасидаги фарқдир [6]. RGB тасвирда пиксел ранг тўйинганлиги ҳар бир пиксел ва ахроматик ранглар диагонали орасидаги масофа сифатида қуйидагича ифодаланиши мумкин:

$$h_p = \sqrt{R_p^2 + G_p^2 + B_p^2 - \frac{(R_p + G_p + B_p)^2}{3}} \quad (7)$$

(7) асосида q_p қийматлари ҳисобланади.

$$q_p = \frac{h_p}{\sum_{p=1}^M h_p} \quad (8)$$

Тасвир ранг тўйинганлиги мезони қуйидаги формула бўйича ҳисобланади:

$$E(\bar{q}) = \frac{\sum_{p=1}^M q_p \ln q_p}{\ln M} \quad (9)$$

(8) мезонни қўллашда тасвир турини инобатга олиш зарур, яъни у рангли ёки қора-оқ бўлиши мумкин. Бунда қора-оқ тасвир учун таққослаш усули ўзгаради ва сифатли тасвир учун бир жинслилик даражаси каттароқ бўлади. Чунки қора ва оқ ранглар орасидаги ахроматик ранглар диагоналича бўлган масофа энг катта бўлади.

Хулоса

Мазкур тадқиқот ишида рақамли тасвир сифатига қўйиладиган талаблар ва рақамли тасвир синфларида учрайдиган халақит турлари, уларни келиб чиқиш сабаблари ўрганилди. Тасвир сифатини баҳолаш орқали уни бузилганлик даражасини аниқлаш мумкин.

Тасвир сифатини баҳолаш муаммосини ҳал қилиш учун субъектив баҳоларга мос келадиган миқдорий баҳолашларни аниқлаш зарур. Бунинг учун тасвир сифатини белгиловчи тасвир ёрқинлиги, контрасти ва ранг тўйинганлиги каби параметрлар ўрганилди. Ушбу параметрларни баҳолаш учун мавжуд мезонлардан намуналар келтирилди. Олинган мезон қийматларини ҳисоблаш тасвир ёрқинлиги, контрасти ва ранг тўйинганлигини баҳолаш имкониятини беради. Бироқ, тасвир ёрқинлиги, контрасти ва ранг тўйинганлигини баҳолаш мезонлари тасвир турларни ҳар бирига нисбатан алоҳида тавсифлагани учун тасвир сифатини ҳар томонлама объектив баҳолаш имконини бермайди. Шунинг учун бугунги кунда рақамли тасвир сифатини баҳолаш учун функционаллашган ягона ёндашувни ишлаб чиқиш долзарб бўлиб қолмоқда.

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MAIN TASKS OF ENERGY MANAGEMENT OF INDUSTRIAL ENTERPRISES AND ENERGY STRATEGY FORMATION

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ОСНОВНІ ЗАДАЧІ ЕНЕРГОМЕНЕДЖМЕНТУ ПРОМИСЛОВИХ ПІДПРИЄМСТВ ТА ФОРМУВАННЯ ЕНЕРГЕТИЧНОЇ СТРАТЕГІЇ

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Abstract

Introduction. The development of retail energy markets is associated with two processes: functional specialization and diversification of the energy business, which is manifested in the creation of a large number of highly specialized energy service companies; and the growth of multifunctional companies that provide a complex of energy supply services in one "package". High energy costs in industrial production, energy security issues, constantly changing energy prices, and the need to transition to a resource-saving and low-carbon business model create risks and problems related to energy efficiency for enterprises. This especially applies to energy-intensive consumers who use expensive energy carriers and work in conditions of fierce competition.

The goal of the work. Provide a detailed description of the main tasks of energy management at industrial enterprises. Taking into account the listed tasks, perform work on the formation of an energy strategy.

Materials and methods. The factor of research is the theoretical method of analysis, which consists in fully delving into the issue of determining energy management tasks that arise at an industrial enterprise and developing an energy strategy of operation.

Анотація

Вступ. Розвиток роздрібних енергетичних ринків пов'язаний з двома процесами: функціональною спеціалізацією і диверсифікацією енергетичного бізнесу, що виявляється у створенні масової кількості вузькоспеціалізованих енергосервісних компаній; та зростання багатofункціональних товариств, які надають в одному «пакеті» комплекс послуг з енергопостачання. Високі витрати енергії на промисловому виробництві, питання енергетичної безпеки, ціни, що постійно змінюються на енергоносії, та необхідність переходу до ресурсозберігаючої та низьковуглецевої моделі ведення бізнесу, створюють для підприємств ризики та проблеми, пов'язані з ефективністю використання енергії. Особливо це стосується енергоємних споживачів, які використовують дорогі енергоносії та працюють в умовах жорсткої конкуренції.

Мета роботи. Надати розгорнуту характеристику основних задач енергетичного менеджменту на промислових підприємствах. Враховуючі перераховані завдання, виконати роботу з формування енергетичної стратегії.

Матеріали та методи. Фактором досліджень, виступає теоретичний метод аналізу, який полягає в повному поглибленні в питання визначення задач енергоменеджменту, що постають на промисловому підприємстві та розроблення енергетичної стратегії функціонування.

Keywords: Energy management; energy strategy; management of energy consumption costs.

Ключові слова: Енергетичний менеджмент; енергетична стратегія; управління витратами енергоспоживання.

Згідно Закону України «ПРО ЕНЕРГОЗБЕРЕЖЕННЯ», важливо наголосити на понятті енергозбереження, що являє собою діяльність (організаційна, наукова, практична, інформаційна), яка спрямована на раціональне використання та економне витрачання первинної та перетвореної енергії і природних енергетичних ресурсів в національному господарстві і яка реалізується з використанням технічних, економічних та правових методів.

Зважаючи на поставлені завдання в темі дослідження, варто розглянути, що являє собою енергетичний менеджмент. Це інструмент управління, що забезпечує постійне дослідження та генерацію інформації про розподіл та рівні споживання енергії, а також про оптимальне використання енергоресурсів. Також це процес моніторингу та контролю енергетичних активів для мінімізації споживання та максимізації ефективності та роботи.

Енергетичний менеджмент, як наука містить кілька напрямів: організація обліку енергоносіїв і забезпечення споживачів постійної інформацією про рівень споживання; моніторинг ринку передових технологій та енергоефективного обладнання; організація енергетичного аудиту; складання енергобалансів та розробка раціональних схем виробництва, транспортування, зберігання та споживання енергоносіїв з мінімальними втратами та фінансовими витратами на всіх рівнях.

Енергетичний менеджмент включає планування та експлуатацію установок виробництва та споживання енергії, а також розподіл та зберігання енергії. Метою є збереження ресурсів, захист клімату та економія коштів, а користувачі мають постійний доступ до необхідної їм енергії. А також поєднує більш складні дії, такі як створення фінансових прогнозів для введення в експлуатацію послуг відновлюваної енергії та внесення інших удосконалень для споживання чистої енергії та зниження витрат на енергію в найближчі роки.

Для енергетичного менеджменту промислових підприємств актуальними є два завдання. Перше відноситься до області мінімізації поточних витрат на паливо та енергоносії, розробки механізмів зниження енергоємності продукції та управління витратами. Другий напрямок пов'язано з виробленням раціональної поведінки при роботі на енергетичних ринках та формуванням відповідних енергетичних стратегій [1].

Щодо управління енергетичними витратами, як реакції на зріст вартості енергоносіїв, існують два підходи. Перший полягає в мінімізації енергетичних витрат підприємства при обмеженнях по продуктивності обладнання, якості продукції, безпеки та екологічності виробництва. Причому ціни на енергію та її постачальники однозначно задані споживачеві, а бажаний результат досягається переважно за рахунок різних енергозберігаючих заходів, а також зміни структури взаємозамінних енергоносіїв на користь дешевших. В особливих випадках йдуть на перегляд асортименту продукції за рахунок скорочення виробництва найбільш енергоспоживчих її видів.

Відмінною особливістю такого підходу є ослаблення зв'язку між керуванням енерговитратами та управлінням ефективністю основного виробництва. В підсумку сповільнюється впровадження прогресивних енергоспоживчих технологічних процесів та продуктових інновацій, консервуються рівень електрифікації виробництва [2]. Таким чином, підхід, заснований на мінімізації енергетичних витрат, обмежує можливості технічного розвитку підприємства, суттєво фіксує досягнутий рівень ефективності.

В основі другого підходу лежить принцип оптимізації енергетичних витрат підприємства, що впливає із критеріїв підвищення результатуючої ефективності (рентабельності) виробництва та конкурентоспроможності підприємства на ринках своєї продукції. Тут енергозбереження та зростання енергоефективності виробництва, поєднуються з впровадженням нових технологій. Причому процеси економії енергії не тільки не суперечать, а й взаємо обумовлюють та доповнюють одна одну. Хоча загальний розмір енерговитрат за цією концепцією в принципі може бути і більше, ніж у попередній, але технічний розвиток отримує нові імпульси, забезпечуючи реалізацію стратегічних цілей підприємства.

У той же час, практичне здійснення більш прогресивної та результативної концепції оптимізації енерговитрат, передбачає можливості пошуку та вільного вибору споживачем варіантів свого енергопостачання, цін на енергоносії, постачальників енергоресурсів та різних послуг пов'язаних з цим [3].

Раціональна поведінка промислового підприємства, визначається як прагнення максимально використовувати переваги та можливості енергоринків для скорочення витрат енергопостачання, підвищення рівня електрифікації виробництва та розвитку власного енергобізнесу за мінімізації відповідних загроз та ризиків.

У цьому підприємство має керуватися такими принципами раціонального поведінки: мотивація на зниження (оптимізацію) енергетичних витрат та моніторинг власного енергоринкового потенціалу [4].

Енергоринковий потенціал характеризує технологічні, економічні та організаційні передумови маневрування споживача на конкурентному ринку та ефективного управління ризиками. Введення цього поняття та відповідної характеристики підприємства, необхідно для визначення ринкового статусу споживача, мотивації до зниження енерговитрат та ведення енергобізнесу, готовності енергоменеджменту до активної роботи на ринках.

Можна зробити висновок, що чим більший енергоринковий потенціал підприємства, тим більший простір для активних дій і ширша можливість вибору енергетичних стратегій, варіантів їх комбінування, а стратегічний менеджмент набуває великої гнучкості. Іншими словами: гнучке позиціонування на енергетичних ринках з активним пошуком ефективних постачальників, а також відповідність системи управління енергетичним господарством підприємства умовам роботи на конкурентному ринку [5].

Виконання необхідних комплексних маркетингових досліджень, вибір енергетичних стратегій, розробка програм та проектів ефективного енергопостачання вимагають глибоких перетворень в енергоменеджменті більшості промислових підприємств, які претендують на активну роботу на конкурентних енергетичних ринках.

В результаті виникає потреба у розробці енергетичної стратегії промислового підприємства як інструменту реалізації принципу "раціональної поведінки". Таким чином, для промислових підприємств якісно змінюється логіка та методи прийняття управлінських рішень менеджментом.

Для різних підприємств можна виділити три базові стратегії, що відбивають розглянуті вище принципи раціональної поведінки на енергетичних ринках: стратегія покупця; стратегія споживача; комбінована стратегія [6].

Стратегія покупця, придатна для підприємств, які не мають власних енергогенеруючих установок і не збираються їх створювати, а також за наявності генераторів, що покривають тільки частина попиту електроенергію.

Технологія, що застосовується на деяких промислових підприємствах, що зумовлює високу електроємність продукції на рівні електрифікації виробництва, близькі до граничних значень. Стратегічною метою є «мінімізація енергетичних витрат» на основі підвищення енергоефективності та вибору певної оптимальної ціни на електроенергію, виходячи з умов технічної та комерційної надійності постачальників, і навіть стимулювання енергозбереження.

Це прагнення отримати гранично низькі ціни за наявності резервів економії електроенергії безперспективно з точки зору конкурентоспроможності витрат, оскільки, по суті, блокує інвестиції в раціоналізацію енергетики таких виробництв.

На інших підприємствах є технічні та економічні можливості використання взаємозамінних енергоносіїв та підвищення рівня електрифікації виробництва при заміщенні електроенергією високоякісного палива. Тому за рахунок інтегрального ефекту електрифікації, скорочуються інші елементи витрат, зростають продуктивність обладнання та якість продукції. Загалом економічна ефективність виробництва підвищується [7].

Цій нагоді відповідає мета стратегії, яка визначається як «оптимізація енергетичних витрат». Тут пошук ціни спрямований на підвищення економічної конкурентоспроможності електроенергії порівняно з енергоносієм, що витісняється. Отже, верхня границя необхідної ціни електроенергії визначається цінами на природний газ, тому вибір мінімально можливих цін електроенергії для цієї мети цілком виправданий.

Стратегія продавця, проектується під бізнес-процеси: виробництво та продаж на оптовому та роздрібному ринках електроенергії (потужності); виробництво та продаж на локальних ринках теплоенергії (потужності); надання технологічних послуг на оптовому ринку електроенергії (за договором із системним оператором ринку).

Ведення енергетичного бізнесу вимагає від підприємства наявності вільних (надлишкових по відношенню до власних потреб) генеруючих потужностей. Такі потужності можуть з'являтися внаслідок скорочення власного енергоспоживання, внаслідок активного енергозбереження та відповідних змін в обсязі та асортименті промислової продукції.

Комбінована стратегія носить назву "споживач-регулятор". Таке підприємство купує на різних ринках електроенергію та постачає на ринок технологічних послуг свій регулювальний

ресурс. У рамках стратегії, можуть бути реалізовані дві схеми: з маневреними технологічними агрегатами та з резервними електрогенераторами [8].

Маневрене обладнання, має володіти технічними можливостями розвантаження за споживаною потужністю у години системного максимуму (аж до повної зупинки), причому без шкоди для якості продукції. Попит на регульовальний ресурс маневреного обладнання підприємства, з'являється у системного оператора, зокрема, у разі виникнення дефіциту балансу генеруючих потужностей в енергосистемі та відсутності достатніх пікових потужностей.

Резервний генератор, оперативно вмикається до мережі підприємства, коли вартість виробництва електроенергії в нього стає нижчою від ринкової ціни в «піковий» період доби. І навпаки, підприємство купує пікову електроенергію за сприятливої цінової кон'юнктури, зупиняючи зазначений генератор. Це полегшує проходження системного максимуму. Крім того, він може бути включений у потужність загальносистемного резерву, що дає можливість для додаткової оплати технологічних послуг такого роду.

Слід зазначити при цьому, що будь-яка технологічна послуга на оптовому ринку оплачується лише у тому випадку, якщо вона представлена за командою системного оператора (звісно, за наявності відповідного договору між підприємством та оператором ринку) [9].

Висновки. Проведена вище робота, надала можливість охарактеризувати основні задачі енергоменеджменту на промисловому підприємстві до яких відноситься скорочення споживання паливно-енергетичних ресурсів, шляхом розробки механізмів зменшення споживання енергоносіїв та керувати витратами, а також раціональна поведінка об'єкту на ринках та розробка його енергетичної стратегії.

Останній фактор включає в себе аналіз економічно-технологічних особливостей виробництва, що визначають вибір типу базової стратегії, а також встановлення цілей та обґрунтування обсягів структури попиту на енергоносії та відповідні послуги, включаючи цінові пріоритети та обмеження.

Дана проведена характеристика задач енергетичного менеджменту та формування енергетичної стратегії на промислових підприємствах, досить важлива для України в період ситуації в якій вона перебуває, адже дозволяє значно покращити енергополітику, що призведе до економії паливно-енергетичних ресурсів.

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INVESTIGATION OF THE MATERIAL COMPOSITION OF Mn, Cr CONTAINING WASTE FROM PROCESSING PLANTS**Tazhiev Yeleussiz Bolatovich***PhD, Senior Lecturer of the Department of Metallurgy and Mineral Processing, Satbayev University, Kazakhstan***Zholdasbay Erzhan Esenbailuly***PhD, Associate Professor of the Department of Mining, Metallurgy and Natural Sciences, Zhezkazgan University named after O.A. Baikonurov, Kazakhstan***Kurmanseitov Murat Baurzhanuly***PhD, Leading researcher, Satbayev University, Kazakhstan***Daruesh Galamat Sultanbekuly***PhD, Senior Lecturer of the Department of Metallurgy and Mineral Processing, Satbayev University, Kazakhstan***ИССЛЕДОВАНИЕ ВЕЩЕСТВЕННОГО СОСТАВА Mn, Cr СОДЕРЖАЩИХ ОТХОДОВ ОБОГАТИТЕЛЬНЫХ ФАБРИК****Тажиев Елеусиз Болатович***Доктор PhD, Старший преподаватель кафедры «Металлургия и обогащение полезных ископаемых», Satbayev University, Казахстан***Жолдасбай Ержан Есенбайұлы***Доктор PhD, Доцент кафедры «Горное дело, металлургия и естествознания, Жезказганский университет им. О.А. Байконурова, Казахстан***Курмансейтов Мурат Бауыржанұлы***Доктор PhD, Ведущий научный сотрудник, Satbayev University, Казахстан***Даруеш Галамат Султанбекулы***Доктор PhD, Старший преподаватель кафедры «Металлургия и обогащение полезных ископаемых», Satbayev University, Казахстан***Abstract**

New data on the material composition of manganese and chromium wastes have been obtained. According to the granulometric composition, manganese waste is not homogeneous and contains particles of various sizes – from 1.31 mm to 269.26 microns. The content of manganese and iron is low and amounts to 16.32 and 4.68, respectively. In their composition, a significant up to 0.19% of the mass was found. the content of scandium.

In manganese waste, manganese is represented in them by brownite – $Mn_7O_8(SiO_4)$ and ferrite – $FeMnO_3$, the contents of which are 10.1% and 9.9%, respectively. Iron is mainly represented by hematite (4.6%).

It was found that the granulometric composition of chrome waste is not homogeneous and requires preliminary grinding for further processing. The chromium content in the waste is 50.6% by weight, which indicates the possibility of its direct use for further processing, without pre-enrichment.

New data on the forms of metals in chrome waste have been obtained. Chromium in the waste is represented as chromite. It was found that the base of chrome waste is represented by chrompicotite, a mineral of the chromspinelide group of composition, % wt.: Cr – $38.37 \div 46.58$; Fe – $10.2 \div 12.89$; Mg – $6.17 \div 7.18$; Al – $3.69 \div 4.64$; O – $31.91 \div 39.6$. Chromium oxide (Cr_2O_3) in them is represented as iron spinelides and magnesium – $FeO \cdot Cr_2O_3$ and $MgO \cdot Cr_2O_3$. It is shown that the rock-forming minerals in chrome waste are mainly represented by clinochrysotite and lizardite from the serpentine group, rhombic and hexagonal syngony. The elemental composition of the discovered minerals, % by weight: Fe – $1.67 \div 8.63$; Mg – $19.75 \div 27.72$; O – $46.37 \div 54.48$; Si – $15.28 \div 19.14$.

Аннотация

Получены новые данные по вещественному составу марганцевых и хромовых отходов. По гранулометрическому составу марганцевые отходы не однородны и содержат частицы различной крупности – от 1,31 мм до 269,26 микрон. Содержание марганца и железа низкое и составляет 16,32 и 4,68, соответственно. В их составе обнаружено значительное до 0,19 % масс. содержание скандия.

В марганцевых отходах марганец представлен в них браунитом – $Mn_7O_8(SiO_4)$ и ферритом – $FeMnO_3$, содержания которых составляют 10,1 % и 9,9 %, соответственно. Железо, в основном, представлено, гематитом (4,6 %).

Установлено, что по гранулометрическому составу хромовые отходы не однородны и требуют предварительного измельчения для дальнейшей переработки. Содержание хрома в отходах составляет 50,6 % масс., что указывает на возможность прямого его использования для дальнейшей переработки, без предварительного обогащения.

Получены новые данные по формам нахождения металлов в хромовых отходах. Хром в отходах представлен в виде хромита. Установлено, что основа хромовых отходов представлена хромпикотитом, минералом группы хромшпинелидов состава, % масс.: Cr – 38,37÷46,58; Fe – 10,2÷12,89; Mg – 6,17÷7,18; Al – 3,69÷4,64; O – 31,91÷39,6. Оксид хрома (Cr_2O_3) в них представлен в виде шпинелидов железа и магния – $FeO \cdot Cr_2O_3$ и $MgO \cdot Cr_2O_3$. Показано, что породообразующие минералы в хромовых отходах представлены, в основном, клинохризолитом и лизардитом из группы серпентинов, ромбической и гексагональной сингонии. Элементный состав обнаруженных минералов, % масс.: Fe – 1,67÷8,63; Mg – 19,75÷27,72; O – 46,37÷54,48; Si – 15,28÷19,14.

Keywords: manganese waste, chromium waste, elemental composition, phase composition, chrompicotite, minerals, metal forms.

Ключевые слова: марганцевые отходы, хромовые отходы, элементный состав, фазовый состав, хромпикотит, минералы, формы нахождения металлов.

Введение

Изыскание способа рациональной переработки мелких отходов от обогащения марганцевых и хромовых руд имеет принципиальное значение с технологической и экологической точки зрения [1-8]. Использование их в качестве дополнительного источника сырья (среднее содержание в них хрома до ~25%) для производства ферросплавов обеспечит ресурсосбережение первичного сырья и позволит достичь ощутимого экологического эффекта за счет освобождения занимаемых ими территорий.

Сегодня накопленные объемы марганцевых и хромовых отходов определяют критический уровень их влияния на грунтовые воды, водную флору и окружающую среду [9, 10, 11].

Мелкодисперсные отходы, образующиеся при подготовке сырья, содержат повышенные содержания железа и марганца, сопоставимые с их содержанием в кондиционном сырье. Широкомасштабное использование их в традиционной технологии практически невозможно и ограничено техническими условиями их использования. Сегодня накопленные объемы указанных отходов достигли таких масштабов, что вполне могут рассматриваться как вторичные сырьевые ресурсы для довольно крупного металлургического производства.

Мелкие отходы, образующиеся при сортировке исходного окучкованного сырья, не могут быть возвращены к переработке традиционными технологическими процессами. Подготовка к окучкованию мелких отходов сопровождается определенными издержками. Возвращение их в традиционный технологический цикл возможно постольку, поскольку они поддаются окучкованию с максимально низкими издержками подготовки.

Наиболее распространенный способ окучкования мелких рудных материалов, концентратов, а также мелкодисперсных отходов от обогащения руд – агломерация, которая реализуется при температуре 1450 °C. Мелкие частицы при такой температуре даже близко не подходят к состоянию размягчения, так как процесс обеспечивается при высоких температурах – 1600-1700 °C [12, 13]. Обычные агломерационные машины такие температуры не выдерживают. Сегодня агломерация не представляется эффективным, как с точки зрения технологии, так и с экологической стороны. Второй широко используемый способ подготовки

мелкодисперсного материала к переработке – окускование путем организации производства окатышей. Процесс требует значительных издержек: измельчения мелких отходов до дисперсного состояния, расход связующих материалов, использование дополнительного оборудования [10].

В научной литературе известно незначительное количество работ, посвященных решению вопроса переработки мелкодисперсных хром-, марганецсодержащих отходов [14, 15, 16]. Однако, в силу больших капитальных затрат и жестких требований, предъявляемых к экологии, связанных с большими выбросами парниковых газов, внедрение их в производство сдерживается и не находит широкого применения.

Специфика организации и разработки технологии для переработки хром-, марганецсодержащих отходов требует знания вещественного их состава, особенностей строения и других физико-химических характеристик.

В настоящей работе приведены результаты вещественного состава марганцевых отходов от обогащения марганцевых руд Джездинского ГОКа и хромовых отходов Донского ГОКа.

Методы исследования

Элементные составы определяли с помощью масс-спектрометра с индуктивно-связанной плазмой Agilent 7700 Series ICP-MS (США), методом оптической эмиссионной спектрометрии (Optima 2000 DV с индукционно-связанной плазмой фирмы «Perkin Elmer SCIEX»), гравиметрическим и химический методы анализа.

Рентгенофазовый анализ проб проводили с использованием прибора D8 Advance (Bruker AXS GmbH), α -Cu, напряжение на рентгеновской трубке 40/40. Обработка дифрактограмм проводилась с помощью программного обеспечения EVA. Расшифровки проб и поиск фаз осуществляли с помощью программы Search/match с использованием Базы данных карточек ASTM.

Кристаллооптические анализы проб проводили с использованием растрового электронного микроскопа и микроскопов Olympus BX-51 и Leica DM2500.

Результаты и их обсуждение

Элементный и фазовый состав марганецсодержащих отходов показаны в табл. 1, 2.

Таблица 1

Элементный анализ марганцевых отходов

Элементы	Содержание, % масс.	Элементы	Содержание, % масс.
O	44,64	K	0,258
Mn	16,32	Ca	16,631
Fe	4,68	Ti	0,167
Na	0,28	As	0,04
Mg	0,831	Cu	0,012
Al	1,38	Zn	0,072
Si	7,04	Pb	0,244
P	0,022	Sr	0,133
Cl	0,038	Ba	6,521
S	0,682	Pb	0,002

Таблица 2

Результаты полуколичественного анализа отходов

Минералы	Формула	Содержание, % масс.
Calcite	$\text{Ca}(\text{CO}_3)$	41,2
Quartz, syn	SiO_2	13,0
Braunite-1Q, syn	$\text{Mn}_7\text{O}_8(\text{SiO}_4)$	10,1
Bixbyite, ferrian	FeMnO_3	9,9
Baryte	BaSO_4	6,6
Pigeonite	$\text{Mg}_{0,69}\text{Fe}_{0,23}\text{Ca}_{0,08}\text{SiO}_3$	6,0
Dickite-2M1	$\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$	5,6
Hematite, syn	$\text{Fe}_{1,957}\text{O}_3$	4,6
Iron Manganese	Fe_3Mn_7	3,0

Как видно на рис.1 гранулометрический состав марганцевых отходов не однороден и содержит частицы различной крупности – от 1,31 мм до 269,26 микрон. В некоторых частицах обнаружено значительное до 0,19 % масс. содержание скандия.

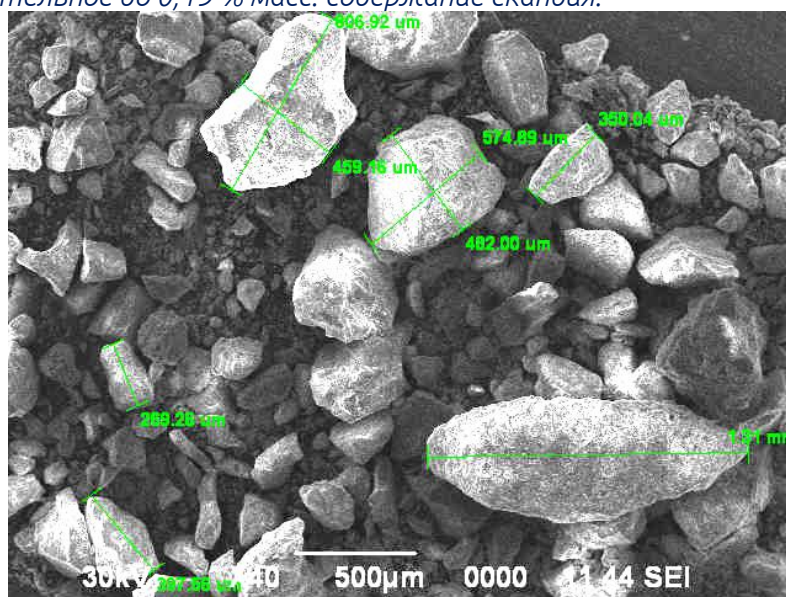


Рис.1 Результаты SEM-анализа

Установленный неоднородный гранулометрический состав марганцевых отходов с одной стороны, и низкое содержание в них марганца и железа с другой, вызывает необходимость проведения дополнительного их измельчения и обогащения.

Результаты фазового состава хромовых отходов представлен в табл.3.

Таблица 3

Полуколичественный состав хромовых отходов обогащения

Наименование	Формула	%
Хромит	$(\text{Fe}_{0,3031}\text{Mg}_{0,8996})(\text{Cr}_{0,656}\text{Al}_{0,28})_2\text{O}_4$	50,6
Клинохризолит	$\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$	38,2
Лизардит – 1Т	$(\text{Mg},\text{Al})_3(\text{Si},\text{Fe})_2\text{O}_5(\text{OH})_4$	8,6
Клинохлор	$\text{Mg}_{2,5}\text{Fe}_{1,65}\text{Al}_{1,5}\text{Si}_{2,2}\text{Al}_{1,8}\text{O}_{10}(\text{OH})_8$	2,6

На рис.2 представлены результаты минералогических исследований проб хромосодержащих отходов в режиме COMPO в иммерсионной среде.

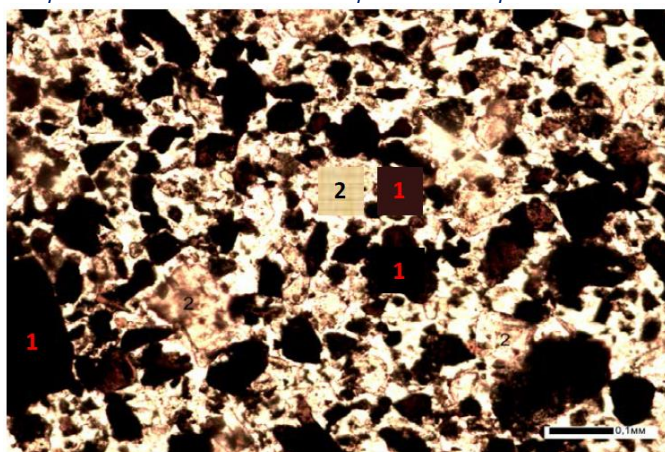


Рис.2. Фотография шлифа хромового отхода, 100х в режиме COMPO в иммерсионной среде

Основу матрицы шлифа представляет хромпикотит (точка 2), минерал группы хромшпинелидов, кубической и гексооктаэдрической сингонии. Установленный состав элементов в минерале варьирует в пределах, % масс.: Cr – 38,37÷46,58; Fe – 10,2÷12,89; Mg – 6,17÷7,18; Al – 3,69÷4,64; O – 31,91÷39,6.

Породообразующие минералы (точка 1) представлены, в основном, клинохризолитом и лизардитом из группы серпентинов, ромбической и гексагональной сингонии. Цвет от темно-зеленого до черного разной интенсивности. Показатели преломления непостоянные. В иммерсионном препарате минералы анизотропные. Элементный состав обнаруженных минералов, % масс.: Fe – $1,67 \div 8,63$; Mg – $19,75 \div 27,72$; O – $46,37 \div 54,48$; Si – $15,28 \div 19,14$.

Полученные результаты минералогических исследований хорошо согласуются с данными рентгенофазового метода анализа (табл.3).

SEM-EDS измерения микроморфологии и элементного состава минералов показали наличие в основной фазе множества типичных частиц неправильной формы: хромпикотита, гематита и металлического железа (85,14%) с включениями хрома (4,71%) и кремния (10,15%).

В фазе хромпикотита обнаружены включения металлической меди. EDS-анализ показывает в них 96,63% Cu и 3,37% Cr.

Результаты минералогических исследований и рентгенофазового анализа исследованных проб хромовых отходов показывают, что Cr_2O_3 в них в значительной степени связан в шпинелиды железа и магния – $FeO \cdot Cr_2O_3$ и $MgO \cdot Cr_2O_3$.

Полученные новые данные использованы в дальнейших расчетах для приготовления комплексной шихты на основе марганцевых и хромовых отходов, а также при изучении поведения компонентов отходов при низкотемпературном восстановительном обжиге шихты твердым углеродом.

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