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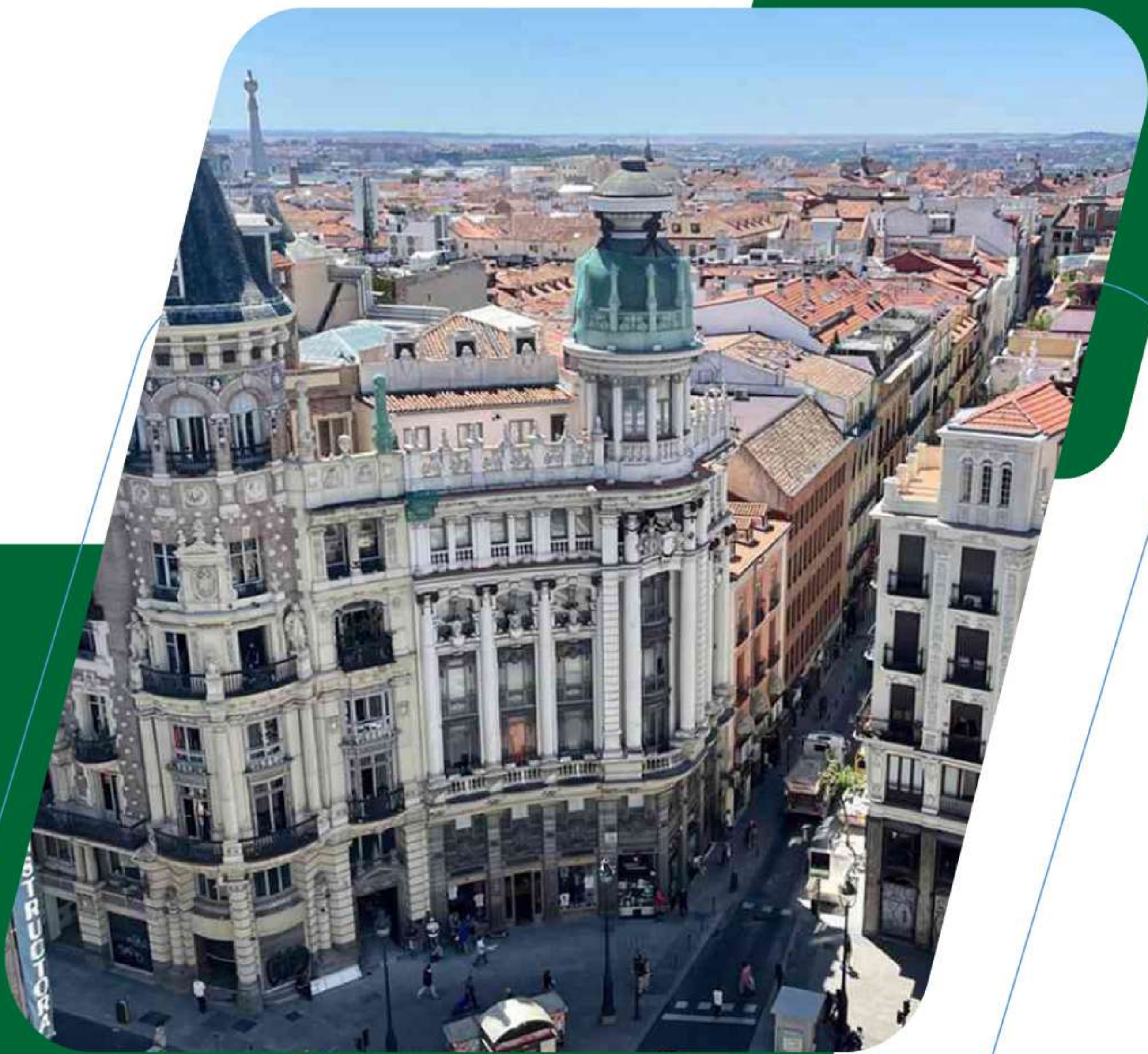

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ORIGIN AND ACCELERATION OF COSMIC RAYS

Ulvu Valiyev
Nakhchivan State University, Batabat Astrophysical Observatory
https://orcid.org/ 0009-0004-6211-0042
Mirhasan Tahirov
Nakhchivan State University, Batabat Astrophysical Observatory
https://orcid.org/0009-0008-9105-0009

Abstract
In this work, it was determined that the energy of the electrons of radio waves is equal to the energy of cosmic rays near the Earth, and interstellar high-energy particles are considered. The composition of cosmic rays is investigated and a more reliable conclusion is considered about the time it takes for them to leave the galaxy. It is determined that light nuclei such as Li, Be, B predominate in the composition of cosmic rays. Some aspects of the mechanisms of particle acceleration in space are explained by the properties of the plasma in the magnetic field. Particle acceleration is possible wherever there is a non-uniform motion and a magnetic field.

Keywords: Radio astronomy, Quasars, Gamma rays, Solar flares

Introduction. *Due to high isotopic abundance, the observation of cosmic rays near the Earth provides an idea of their distribution in space. The answer to this question was given by radio astronomy only after the discovery of synchrotron radio emission* $\nu\sim10^{7}$*-*10^{10} *hs. On average,* $H=3.10^{-6}$ *E and* $\sin\theta=0.5$ $E_k\sim10^{9}$*-*10^{10} *eV, that is, the energy of radio-emitting electrons should be equal to the energy of the majority of cosmic rays observed near the Earth. These electrons are a component of cosmic radiation and constitute the entire galaxy and its halo. In interstellar space, electrons move like other high-energy particles, protons, and heavy nuclei. Since the mass of electrons is relatively small, they, unlike heavy nuclei, emit radio radiation intensively and show themselves as indicators of cosmic radiation in the most remote parts of the galaxy. In addition to the general synchrotron radiation of the galaxy, discrete sources of this radiation have also been discovered. These are supernovae, Galactic nuclei, radio galaxies and quasars [5]. Until the 1970s, it was believed that cosmic rays with energies greater than* $E_k>10^{15}$*eV were mainly of intergalactic origin. It was believed that there was no source in the galaxy for particles with energies greater than* 10^{21} *eV that could store them there. After the discovery of pulsars, a mechanism for accelerating even very heavy nuclei to extremely high energies was discovered. On the other hand, the results obtained showed that electrons observed near the Earth are collected in the galaxy [4].*

Research*. This theory is confirmed by the distribution of cosmic γ-radiation sources in the celestial sphere. Since gamma rays are not affected by a magnetic field, their direction of arrival directly indicates the direction of the source. The spatial distribution of gamma radiation observed in the solar system is very uneven and resembles the distribution of supernovae throughout the galaxy. The coincidence of the distribution of gamma-radiation sources in the celestial sphere with this distribution indicates that the source of cosmic radiation is supernovae. By studying the composition of cosmic rays, a more reliable conclusion can be drawn about the time of their departure from the galaxy. Light nuclei such as Li, Be, B predominate in the composition of cosmic rays. Light nuclei are mainly formed when heavy-nucleated cosmic rays collide with gases in interstellar space. The age of cosmic rays determined from the remains of supernovae is no more than 30 million years.*

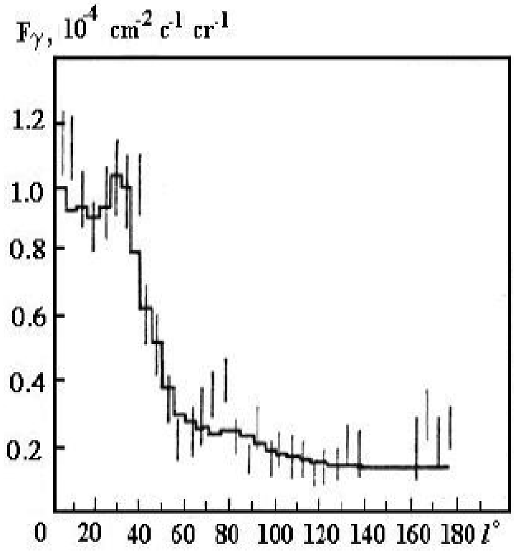

Fig1

In Figure 1, the vertical lines show the dependence of the radiation flux Fγ on the longitude of the galaxy l. The energy of the radiation and the kinetic energy of the ejected gas can reach 10^{51}-10^{52} erg in the total energy form. It can be concluded that in order to maintain the energy density of cosmic rays, it is necessary to give it a few percent of the sum of the ignition energies of a supernova [5].

There are acceleration mechanisms in space that operate in different sequences and combinations, depending on the specific conditions. Impulsive electric field or plasma turbulence mechanisms, induction and Fermi mechanisms accelerate particles. Some aspects of the acceleration mechanisms of particles in space are related to the properties of the magnetic field of the plasma. Magnetic fields are distributed over very large parts of space. The instantaneous radius of curvature of a particle H with a charge Ze and momentum p in a magnetic field is sinθ, and the angle of inclination of the particle is p [2].

$$\rho = cp/(300H.Ze.c\sin\theta)=R/(H c \sin\theta)$$

It moves along a curved trajectory. Here R=cp/Ze is the magnetic rigidity of the particle. If a sufficiently strong motion occurs in the plasma, such as the ignition of supernovae, the number of particles in such a motion will be large. The main mass of the plasma moves with the clouds. A small number of high-energy particles, whose radius of curvature is comparable to the size of the cloud, cannot remain in the cloud. These particles are inclined in the magnetic field of the cloud and, as it were, collisions with the clouds cause scattering. This is the mechanism of acceleration of particles in space. Analogously, acceleration can occur during the interaction of particles with a strong shock wave.

Despite extensive theoretical and experimental research, no universal mechanism has yet been found to explain the charge composition and spectral properties of cosmic particles [3]. In plasma wave acceleration, only particles with energies several times greater than thermal energy can be accelerated. The number of such particles is not small. The spectrum of accelerated particles is described as exp(R/R0). Since $p^2\sin\theta/H$=const in the betatron mechanism, the main principle of which is to maintain the adiabatic invariant of motion, the spectrum.

$$D(R) \sim R^{-\gamma}$$

It is determined by the superposition function. This mechanism is insensitive to the type of particles, but its efficiency is proportional to the magnetic rigidity of the particle, dR/dt~R, i.e., an initial acceleration is required for this mechanism to work. Acceleration by shock waves in cosmic plasma also leads to a regular energy spectrum, and then γ=2.5. This is in very good agreement with the observed spectrum for cosmic rays. Acceleration processes by impulsive electric fields near the zero lines of the magnetic field are observed during solar flares. At this time, particles are accelerated to energies of several GeV within a few minutes. In the envelope of supernovae near pulsars, in galaxies and extragalactic objects, this process may play the role of the main acceleration mechanism of particles [1]. Various observations show that particle acceleration in cosmic plasma is possible wherever there is inhomogeneous motion and a magnetic field.

Conclusion. *Comic rays originate not outside the galaxy, but inside. Studies have shown that these rays are accelerated in active environments around supernovae and black holes, proving that high-energy particles in the universe have a mechanism of movement through magnetic fields.*

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Biological sciences

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THE USE OF DIGITAL EDUCATIONAL PLATFORMS FOR TEACHING BIOLOGY OF ENDEMIC PLANTS IN THE ZHETYSU REGION

[1] G.A.Kairatovna
[1] 2st year Master's degree student of Zhetysu University, Taldykorgan, Kazakhstan
[2] M.D.Mukasheva
[2] Doctor of Philosophical Sciences, PhD of Zhetysu University, Taldykorgan, Kazakhstan

ИСПОЛЬЗОВАНИЕ ЦИФРОВЫХ ОБРАЗОВАТЕЛЬНЫХ ПЛАТФОРМ ДЛЯ ПРЕПОДАВАНИЯ БИОЛОГИИ ЭНДЕМИЧНЫХ РАСТЕНИЙ РЕГИОНА ЖЕТЫСУ

[1] G.A.Kairatovna
[1] 2st year Master's degree student of Zhetysu University, Taldykorgan, Kazakhstan
[2] M.D.Mukasheva
[2] Doctor of Philosophical Sciences, PhD of Zhetysu University, Taldykorgan, Kazakhstan

Abstract

Considerable attention is currently being paid to the development of digital educational technologies. Digital technologies make it possible to tailor lessons to individual needs, structuring them according to the personal characteristics, level of preparation and requirements of each participant in the learning process, thereby enhancing the quality of the education system. Modern biology and ecology education requires the introduction of new digital technologies that ensure the accessibility and interactivity of the learning process. The Zhetysu region, with its unique endemic flora, requires special attention in the education sector to foster an environmental culture and a sustainable approach to nature. The creation of a specialised online platform represents an important educational innovation that facilitates the effective teaching of the biology of Zhetysu's endemic plants. This article examines the role of digital technologies in the modern education system and the importance of developing soft skills. The authors explore the challenges involved in developing the emotional intelligence and professional competencies of future professionals, analysing the effectiveness of 3D modelling, artificial intelligence and interactive platforms in boosting motivation to learn.

Аннотация

Развитию цифровых образовательных технологий в настоящее время уделяется значительное внимание. Цифровые технологии дают возможность сделать занятие более дифференцированным, выстраивать его согласно индивидуальным особенностям, уровню подготовки и нуждам каждого участника учебного процесса, тем самым увеличивая качество системы образования. Современное образование биологии и экологии требует внедрения новых цифровых технологий, которые обеспечивают доступность и интерактивность учебного процесса. Регион Жетысу, обладающий уникальной эндемичной флорой, требует особого внимания в образовательной сфере для формирования экологической культуры и устойчивого отношения к природе. Создание специализированной онлайн-платформы становится важной педагогической инновацией, способствующей эффективному преподаванию биологии эндемичных растений Жетысу. В статье рассматривается роль цифровых технологий в системе современного образования и важность формирования Soft Skills (гибкие навыки). Авторы исследуют проблемы развития эмоционального интеллекта и профессиональных компетенций будущих специалистов, анализируя эффективность 3D-моделирования, искусственного интеллекта и интерактивных платформ в повышении мотивации к обучению.

Keywords: *digital technologies, transferable skills, endemic plants of the Zhetysu region, educational content*

Ключевые слова: *цифровые технологии, гибкие навыки, эндемик растений области Жетысу, образовательный контент*

Введение

В современную эпоху глобализации система образования претерпевает радикальные изменения. Цифровая трансформация не только обновила методы обучения, но и усилила требования к будущим специалистам. [1,2]

На сегодняшний день недостаточно только академических знаний; от современных специалистов требуются Soft Skills (гибкие навыки) и высокий уровень цифровой грамотности. [3,4]

Цифровые технологии-это инструмент эффективности обучения исследования показывают, что человек воспринимает более 80% информации через зрение. [5] из-за этого 3D-макеты и виртуальные лаборатории в образовании (например, проект Roqed) обеспечивают более глубокое понимание естественных наук. [6,7] использование интерактивных инструментов и анимации (GeoGebra, BilimLand, Wolfram Alpha) способствует визуализации задач и повышению познавательного интереса учащихся. Кроме того, использование цифровых платформ на уроках биологии стало основным способом повышения качества образования.[8]

Педагогические цели создания платформы

Основной целью разработки цифровой образовательной платформы является обеспечение учащихся разных уровней знаниями о растениях-эндемиках Жетысу. Платформа предоставляет условия для формирования у студентов как глубоких теоретических знаний, так и практических навыков, а также экологической ответственности. Кроме того, она поддерживает не только индивидуальную, но и групповую работу, стимулируя сотрудничество и обмен знаниями среди обучающихся. Главной задачей является предоставление учащимся систематизированных знаний об эндемичных растениях региона, таких как $\boxed{\text{Malus sieversii}}$ — дикий предок домашней яблони, который относится к ценным генетическим ресурсам. Платформа способствует развитию у школьников и студентов практических навыков, формирует экологическую ответственность и поддерживает групповые проекты, что усиливает социальное взаимодействие и обмен знаниями.

Образовательный контент и методики

Платформа включает интерактивные уроки, дополняемые визуальными, аудио- и видеоматериалами, что помогает лучше усваивать информацию и развивать навыки наблюдения за растениями в естественной среде. Встроенные инструменты тестирования и контроля знаний обеспечивают объективную оценку прогресса учащихся. Особое внимание уделено практическим заданиям, которые стимулируют проведение полевых наблюдений и реализацию исследовательских проектов.

На формирующем отрезке опыта были проведены занятия по биологии, тематика которых соответствовала рабочей программе, составленной согласно требованиям. При обучении учебному материалу применялся учебник «Биология, 7 класс».

Урок «Покровы тела у животных». На этом уроке задействовалась цифровая среда «Wordwall» [9], которая применялась на стадии закрепления освоенного материала. Ученикам было предложено поучаствовать в мини-игре под названием «Выбери поле». В игре имеется 11 вопросов, каждый ученик, поочередно, отбирает номер Вопроса и дает ответ на него за 30 секунд, если учащийся ответил правильно, то вопрос отмечается. Как пройденный,если же нет,то на вопрос отвечает весь класс. Сведения опроса Отображались на интерактивной доске.

Урок «Координация и регуляция жизне деятельности у животных».Ученики Заранее получили домашнее заданиена среде «Joyteka»[10]. Была предоставлена также ссылка(QR-код) на квест[11], выполнение заданий которого содействовало усвоению нового материала. На среде отслеживались результаты выполнения заданий обучающимися. Урок «Раздражимость и поведение животных». Сначала было предложено решить ребусы и определить тему урока. Ребусы генерировались на веб-сайте «Квестодел» [12]. С ребусами ученики справились быстро. Далее учащиеся либо считывают QR-код со ссылкой на интерактивный плакат, либо изучают его на интерактивной доске. Материал с интерактивного плаката представляет информацию и дополняет речь преподавателя. Закрепление новых знаний вновь проходило в виде игры «Выбери поле» [9]. После проведения занятий с использованием возможностей цифровых сред на финальном отрезке экспериментальной работы была проведена повторная диагностика степени мотивации к изучению дисциплины, которая показала, что хотя общий показатель остался средним, наблюдаетсяпозитивная динамика, которая проявляется в снижении учащихся с низким уровнем мотивации и в подъеме учащихся с высоким уровнем мотивации *(таблица 1).*

Таблица 1

Анализ диагностики уровня мотивации к изучению биологии на констатирующем и контрольном этапах эксперимента (%)

Уровень	Констатирующий этап	Контрольный этап
Низкий	27	10
Средний	63	55
Высокий	10	35

Таким образом, уровень мотивации к изучению биологии в классе остается средним, но прослеживается положительная динамика, и, в целом, даже такой небольшой по объему эксперимент, позволяет сделать вывод о том, что применение возможностей цифровых платформ положительно влияет на развитие интереса обучающихся к урокам биологии.

Важность Soft Skills (гибкие навыки) :

• Концепция 4K: в современном образовании основное внимание уделяется навыкам креативности, критического мышления, коммуникативности и способности работать в команде. Эти навыки закладывают основу для того, чтобы ребенок с раннего возраста стал социальной личностью.

• Эмоциональный интеллект и устойчивость: управление своими эмоциями, проявление сочувствия и стрессоустойчивость – главные качества, повышающие профессиональную эффективность будущих специалистов. Особенно для педагогов эмоциональная стабильность помогает предотвратить профессиональное выгорание.

• Формирование жизненных навыков: решая текстовые задачи или выполняя проектную работу, учащиеся приобретают жизненно важные навыки, такие как управление временем, эффективное использование ресурсов и ответственность.

Эффекты и преимущества

Данные технологии повышают мотивацию к изучению биологических дисциплин и вовлеченность в учебный процесс. Они расширяют возможности дистанционного обучения, что особенно важно для отдаленных районов, и способствуют развитию умений работать с цифровыми ресурсами и развивать научное мышление. Такая платформа открывает новые перспективы для подготовки экологически грамотных специалистов и активных защитников природы.

• Углубление восприятия и осмысления материала: Благодаря трехмерным моделям и виртуальным симуляциям, студенты получают возможность более отчетливо представлять себе сложные физические или биологические явления (например, движение электронов под действием магнитного поля или структуру органов человека) через наглядное отображение.

• Персонализация и оптимизация учебного процесса: Применение современных информационных инструментов (таких как Geogebra, Wolfram Alpha, BilimLand) открывает широкие возможности для адаптации обучения под нужды конкретного ученика, стимулируя его к самообучению и исследованию альтернативных методов решения поставленных задач.

• Роль искусственного интеллекта (ИИ): ИИ выступает как значимый образовательный ресурс, обеспечивая круглосуточную поддержку и консультации для студентов, что способствует улучшению их академических результатов. Тем не менее, необходимо помнить о риске атрофии базовых компетенций при чрезмерном доверии к возможностям ИИ.

Заключение и перспективы

Создание и внедрение цифровой образовательной платформы для преподавания биологии эндемичных растений региона Жетысу является значимым шагом в развитии экологического образования. Она позволяет интегрировать цифровые и традиционные методы обучения, расширяет горизонты образовательного процесса и способствует формированию экологической культуры среди молодежи. В дальнейшем планируется расширение функционала платформы и укрепление сотрудничества между образовательными учреждениями и научными организациями региона.

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Economic sciences

THE IMPACT OF MACROECONOMIC FACTORS ON BANK LENDING TO LEGAL ENTITIES IN THE REPUBLIC OF MOLDOVA

Lopotenco Viorica
Republic of Moldova, Chișinau, Academy of Economic Studies of Moldova

Abstract
This study examines the impact of macroeconomic factors on bank lending to legal entities in the Republic of Moldova. The research focuses on the relationship between corporate lending volumes and key macroeconomic indicators, including GDP growth, inflation, interest rates, and exchange rates. Using a multiple linear regression model, the study evaluates the extent to which these variables influence lending activity. The results indicate that macroeconomic factors explain approximately 40% of the variation in lending volumes, although the statistical significance of the model remains limited due to the small sample size. Among the analyzed variables, interest rates demonstrate a negative relationship with lending activity, while inflation shows a positive effect. The impact of GDP growth and exchange rate fluctuations appears weak and ambiguous. The findings suggest that the development of bank lending is influenced by a combination of macroeconomic, financial, and institutional factors. The study highlights the importance of maintaining macroeconomic stability to ensure sustainable growth in corporate lending and support the financing of the real sector of the economy.

Keywords: corporate lending, macroeconomic factors, inflation, interest rates, exchange rate, GDP growth, regression analysis.

Introduction.

In today's environment, the development of bank lending to legal entities is significantly influenced by macroeconomic conditions and the level of financial risk [1]. Changes in key economic indicators, such as economic growth rates, inflation, interest rates, and exchange rates, have a direct and indirect impact on the volume and terms of corporate lending [2].

The banking system, acting as an intermediary in the redistribution of financial resources, must take into account macroeconomic instability and the risks associated with changes in the business environment [3]. During periods of economic growth, there is an increase in demand for credit by enterprises due to expanded investment and increased business activity. At the same time, during economic downturns or periods of high uncertainty, banks tend to tighten lending terms, leading to a decrease in loan volumes.

The impact of inflation on bank lending is particularly significant. While rising inflation can stimulate nominal lending, it is also accompanied by higher interest rates and greater uncertainty, which negatively affect the availability of borrowed resources [4]. Thus, the impact of inflation on lending activity is complex and requires further analysis.

Interest rates are a key factor determining the cost of credit. Higher rates lead to higher borrowing costs and reduced demand for borrowed funds among businesses, while lower rates stimulate lending and increase investment activity [5]. In this context, central bank monetary policy plays a key role in regulating lending volumes.

An equally important factor is the exchange rate, especially in countries with a highly open economy. Exchange rate fluctuations can significantly affect the financial position of borrowers, especially those with foreign-currency-denominated liabilities [6]. In an unstable exchange-rate environment, banks become more cautious about extending loans, which also affects overall lending volumes.

In addition to macroeconomic factors, financial risks, primarily credit risk, significantly influence the development of bank lending. The level of non-performing loans is an important indicator of loan portfolio quality and directly affects banks' willingness to expand lending. The rising share of problem loans leads to stricter requirements for borrowers and a decline in lending activity.

Therefore, an analysis of the impact of macroeconomic conditions and financial risks on bank lending to legal entities is essential for understanding the mechanisms underlying bank lending policies and assessing the stability of the financial system as a whole.

Econometric Analysis of the Impact of Macroeconomic Factors on Bank Lending to Legal Entities.

The functioning of the banking sector is closely connected to the overall economic environment in which financial institutions operate. Changes in macroeconomic conditions influence both the supply and demand for credit, affecting the ability of banks to support business activity through lending. For legal entities, access to bank financing is essential for maintaining operations, expanding production, implementing investment projects, and increasing competitiveness. Consequently, understanding the factors that determine lending activity is important for evaluating the role of the banking sector in economic development.

Macroeconomic indicators such as GDP growth, inflation, interest rates, and exchange rates are among the most significant determinants of lending dynamics. Periods of economic growth are generally associated with increased business confidence, higher investment activity, and greater demand for borrowed funds. In contrast, economic uncertainty and unfavorable macroeconomic conditions often lead to a decline in lending activity, as both borrowers and financial institutions become more cautious. In addition, fluctuations in inflation and interest rates directly affect the cost of credit, while exchange rate volatility may influence the financial position of businesses and their ability to meet debt obligations.

Given the importance of these factors, it is necessary to evaluate not only their theoretical impact but also their actual influence on lending activity within the Republic of Moldova. A quantitative assessment makes it possible to identify the direction and strength of the relationship between macroeconomic variables and corporate lending, as well as to determine which factors play the most significant role in shaping lending trends during the analyzed period.To explore these relationships in more depth, this subsection uses an econometric approach based on a multiple linear regression model, which allows for a quantitative assessment of the impact of key macroeconomic factors on the volume of lending to legal entities.

Table 1. Results of regression analysis

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.63483027
R Square	0.40300948
Adjusted R Square	-0.0745829
Standard Error	0.28263381
Observations	10

ANOVA

	df	SS	MS	F	Significance F
Regression	4	0.26962865	0.06740716	0.84383558	0.5528143
Residual	5	0.39940935	0.07988187		
Total	9	0.669038			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	7.081516	7.994501	0.885798	0.416289	-13.469	27.63204	-13.469	27.63204
X Variable 1	-0.0003	0.017528	-0.017	0.987093	-0.04535	0.044759	-0.04535	0.044759
X Variable 2	0.050057	0.028102	1.781281	0.134972	-0.02218	0.122294	-0.02218	0.122294
X Variable 3	-0.08522	0.057645	-1.47829	0.199385	-0.2334	0.062965	-0.2334	0.062965
X Variable 4	1.243521	2.840731	0.437747	0.679833	-6.05881	8.545851	-6.05881	8.545851

Source: *author's calculations based on statistical data*

The results of the regression analysis show that macroeconomic factors influence the volume of lending to legal entities, but this influence is not statistically significant at a high level.

Table 1. The influence of macroeconomic factors on the volume of lending to legal entities

Variable	Sign	Interpretation
GDP growth rate	≈ 0	Very weak impact
Inflation	+	promotes lending growth
Interest rate	–	reduces lending volumes (economically justified)
Exchange rate	+	impact is ambiguous/unstable

Source: *compiled by the author*

The coefficient of determination ($R^2 = 0.403$) indicates that approximately 40% of the changes in lending volume are explained by the macroeconomic variables included in the model. The remaining variance is due to other factors not included in the model.

Analysis of the coefficients shows that the interest rate has a negative impact on lending, consistent with economic theory: an increase in the cost of borrowing leads to a decrease in demand for loans.

Inflation demonstrates a positive impact, which may be due to the nominal growth of economic indicators in an inflationary environment.

GDP growth rates do not have a significant impact in this model, which may be due to the limited sample size and short-term nature of the analysis.

The impact of the exchange rate is also ambiguous, due to the complex nature of its impact on the economy and lending activity.

Thus, the obtained results suggest a relationship between macroeconomic conditions and corporate lending; however, this relationship requires a more in-depth analysis based on a larger data sample. Consequently, the macroeconomic environment influences bank lending, but the extent of this influence is limited within the period under review.

To clearly analyze the impact of interest rates on corporate lending volumes, let's examine their dynamics over the analyzed period.

As Figure 1 shows, the dynamics of corporate lending volumes and interest rates demonstrate an inverse relationship. From 2015 to 2021, a decrease in the interest rate was accompanied by a gradual increase in lending volumes, indicating increased availability of borrowed resources for businesses.

In 2022, a sharp increase in the interest rate was observed, due to macroeconomic instability and inflation. Despite this, lending volumes continued to grow, which may be due to inertia in demand for loans and the need to finance ongoing business operations.

In subsequent years, interest rate reductions were again accompanied by an acceleration in lending growth, confirming the inverse relationship between the cost of credit resources and their volumes.

Thus, the interest rate is an important factor influencing the lending activity of legal entities.

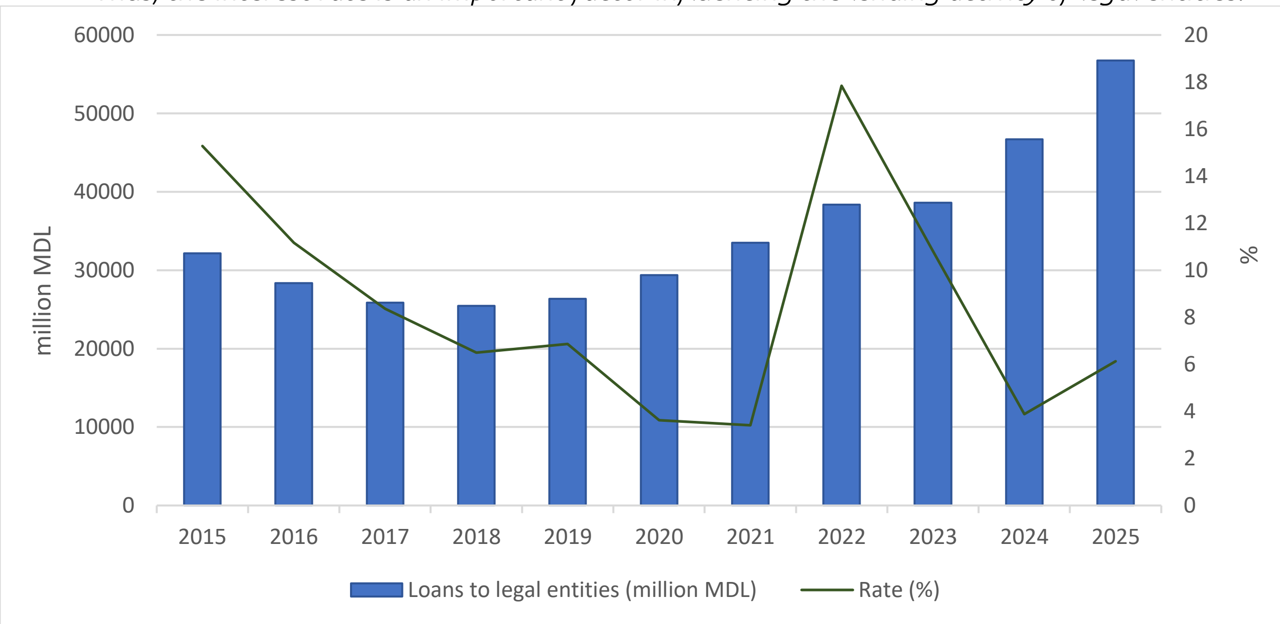

Figure 1. Lending volume dynamics to legal entities and interest rates, 2015–2025

***Source:** compiled by the author based on: [7], [8].*

The analysis of the current state of bank lending to legal entities in the Republic of Moldova yields several general conclusions.

First, a steady upward trend in lending to legal entities has been observed during the analyzed period, particularly since 2019–2020, indicating an increasing role of the banking system in financing the real sector of the economy.

Second, the lending structure has undergone significant changes, reflected in an increase in the share of loans in national currency and a concentration of credit resources in key economic sectors such as trade, industry, and agriculture.

Third, the econometric analysis revealed a relationship between macroeconomic factors and the *volume of lending to legal entities. Interest rates have a negative impact on lending activity, while inflation and economic growth demonstrate a less pronounced and ambiguous impact.*

It should be noted that the influence of macroeconomic factors is limited during the analyzed period due to both the small sample size and the presence of other factors not included in the model. Thus, bank lending to legal entities in the Republic of Moldova is characterized by positive growth, but its effectiveness and sustainability largely depend on macroeconomic stability and the financial system's operating conditions.

Based on the analysis, it can be concluded that the development of bank lending is determined by the combined influence of macroeconomic, financial, and institutional factors.

Conclusion.

The analysis of bank lending to legal entities in the Republic of Moldova highlights the growing importance of the banking sector in supporting economic activity and financing the real sector of the economy. During the analyzed period, a steady increase in corporate lending volumes was observed, reflecting both the recovery of economic activity and the increasing demand for financial resources among businesses.

The study has shown that macroeconomic conditions play an important role in shaping lending activity. The econometric analysis revealed that interest rates have a negative impact on lending volumes, which is consistent with economic theory, as higher borrowing costs reduce the demand for credit. Inflation demonstrated a positive relationship with lending activity, which may be explained by the nominal expansion of economic indicators and the increased financing needs of enterprises during inflationary periods. At the same time, GDP growth and exchange rate fluctuations showed a relatively weak and ambiguous influence within the analyzed sample.

The results also indicate that the explanatory power of the model is limited, suggesting that corporate lending is affected not only by macroeconomic indicators but also by a wide range of financial and institutional factors. These factors include credit risk, the quality of banks' loan portfolios, regulatory requirements, business confidence, and overall financial sector stability. Consequently, the development of lending activity cannot be explained solely through macroeconomic variables.

Furthermore, the analysis confirms that maintaining macroeconomic stability is essential for creating favorable conditions for sustainable lending growth. Stable inflation, predictable interest rates, and a balanced exchange rate environment contribute to reducing uncertainty and improving access to financing for businesses. In this regard, the role of monetary authorities and financial regulators remains crucial in ensuring the efficient functioning of the banking system.

In conclusion, the development of bank lending to legal entities in the Republic of Moldova is determined by the combined influence of macroeconomic, financial, and institutional factors. Future research could expand the analysis by incorporating additional variables and a larger dataset, allowing for a more comprehensive assessment of the determinants of corporate lending and the effectiveness of banking sector policies.

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THE IMPACT OF STUDENTS' TRUST IN ARTIFICIAL INTELLIGENCE ON THEIR BEHAVIORAL INTENTIONS

Nugzar Todua
Ph.D, Full Professor,
Department of Marketing,
Ivane Javakhishvili Tbilisi State University, Georgia
Grigol Kartsivadze
Ph.D Student,
Department of Marketing,
Ivane Javakhishvili Tbilisi State University, Georgia

Abstract

The article shows that the integration of artificial intelligence (AI) into higher education is rapidly revolutionizing learning processes and research paradigms. Using bibliometric analysis and survey-based research, this study comprehensively investigates the rapidly emerging trends in AI applications, students' high familiarity with AI technologies, and the substantial challenges impeding broader adoption. The literature analysis highlights significant exponential growth of research of using AI in higher education. The study's primary variables—trust, attitude toward AI, and behavioral intention to use AI—are given based on an analysis of important literature on the subject. Additionally, a research model is created, and pertinent hypotheses are produced. The paper uses a quantitative research method, namely an online student's survey. Georgian students' attitudes towards the key factors in adopting AI have been identified as a result of the marketing research. The study's findings support the theories put forward in the paper, showing statistically significant correlations between the variables. The study's findings are theoretically significant because they deepen our understanding of how artificial intelligence can be used in educational settings. Practical applications of the study's findings are also intriguing. It will assist those working in the field of education in effectively planning the use of AI, which will increase student participation in the educational process.

Keywords: Trust in using AI, attitude towards AI, higher education, consumer behavior, marketing research.

1. INTRODUCTION

The modern higher education system is undergoing a fundamental transformation, largely driven by the widespread availability of artificial intelligence (AI), and in particular generative large language models. Since late 2022, AI tools have become an integral part of students' everyday lives (Lim et al., 2023). While the initial discussion focused mainly on the risks of plagiarism and academic fraud, today, leading studies from Scopus and Web of Science show that the impact of AI is much deeper and includes complex changes in student behavior, cognitive habits, psychological state, and social interaction (Zhai, 2023). Generative AI is not a simple search engine. It is an interactive, adaptive partner that can generate text, code, visuals, and arguments based on user-provided instructions, or prompts (Lim et al., 2023). The integration of these technologies in higher education has created the so-called "hybrid learning ecosystem." Students use AI in various roles: as a personal virtual tutor to explain complex concepts, as a research assistant during literature reviews and preliminary data processing, and as an editor or proofreader to improve academic papers (Hwang & Chang, 2024). Such multifunctionality leads to a sharp transformation of students' expectations regarding the speed, accessibility, and feedback of information, which directly affects their daily lives and academic habits.

The widespread use of generative artificial intelligence (AI) tools in higher education has put on the agenda not only the study of technological accessibility, but also the study of students' psychological attitudes. In the process of integrating any digital system, the main determinant of user behavior is their subjective attitude towards the technology. In this context, the most important variable is Trust in AI, which determines the student's willingness to rely on the information generated by the system (Lim et al., 2023).

The aim of the present study is to systematically study how students' trust in AI affects their behavioral intention — namely, in the process of completing academic tasks, searching for information, allocating cognitive effort, and making ethical decisions. Recent empirical studies show that trust is not a static phenomenon; It ranges from complete distrust (which blocks the useful potential of technology) to overtrust, which leads to cognitive laziness and the degradation of critical thinking (Zhai, 2023).

Analyzing these connections is critical for the proper planning of modern educational policies.

Although investigations into the factors influencing user behavior have been conducted in Georgia (Apil et al., 2009; Todua & Dotchviri, 2015a; Todua & Dotchviri, 2015b; Todua et al., 2016; Todua, 2018; Todua & Urotadze, 2022), gaps persist in understanding the impact of students' trust in artificial intelligence on their behavioral intentions In this research, attitude is examined as a mediating variable, with specific attention given to behavioral intention as an emotional factor. Therefore, this study aims to investigate the behavioral factors that influence students' intention to use AI.

2. LITERATURE REVIEW AND DEVELOPMENT OF RESEARCH HYPOTHESES

Educational research often uses the Extended Technology Acceptance Models (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) to predict student behavior. According to these models, the immediate antecedent of actual behavior is behavioral intention—the student's mental readiness and plan to use a particular tool (Hwang & Chang, 2024). In this theoretical framework, trust acts as a critical mediator. A student's perceived usefulness and perceived ease of use of an AI do not automatically translate into intention to use unless a foundation of trust is present. In the educational context, trust encompasses three dimensions: Perceived competence (how much the student knows that the AI is accurate); perceived integrity (how unbiased the system is), and predictability (how consistently it produces results). When these components of trust are high, the student develops a strong behavioral intention to make AI a core part of their learning strategy (Hwang & Chang, 2024).

The relationship between trust in AI and behavioral intentions has been the subject of many rigorous empirical studies in recent years, which have confirmed the complexity of this phenomenon using quantitative and qualitative methods. Below is a detailed analysis of leading international studies.

A study by Hwang and Chang (2024) examined the use of generative AI tutors. A quasi-experimental design involved 180 students, who were divided into control and experimental groups. The study showed that when students trust the personalized feedback provided by an AI tutor, their behavioral intention towards independent learning (Self-regulated learning intention) increases dramatically. The authors found that trust-based interactions enhance students' proactive learning behavior because they are no longer afraid of making mistakes in a digital environment. A completely opposite pattern is suggested by the empirical work of Bi & Zhang (2024), which examined the relationship between trust in the system and the intention to "cognitive offloading." Using structured equation modeling (SEM) on data from 450 undergraduate students, the researchers found that high trust in the academic competence of AI directly predicts students' intention to delegate complex analytical tasks to ChatGPT. The study showed that each one-unit increase in trust leads to a 42% increase in the intention to voluntarily block independent thought processes, which in the long run leads to a regression of academic skills.

In this context, gender and disciplinary specificities were examined by Liu and colleagues (Liu et al., 2025). In a cross-sectional survey of 800 university students, researchers found that STEM students display more rational, algorithmic trust and their intentions are directed towards specific functional tasks (e.g., code optimization). On the other hand, students from humanities faculties often display "emotional trust" in the linguistic perfection of AI, which statistically increases the behavioral intention to completely replace text and generate ready-made essays.

The effects of trust in a psycho-emotional context were described in a longitudinal study by Chaudhry and Simons (2025) (n=300). By observing students for 12 months, the researchers found that the initial blind trust in the infallibility of AI is transformed over time into the behavioral intention of "Academic Helplessness". Students develop a strong psychological belief that they will not be able to create a high-quality product independently, without AI, which completely suppresses their intrinsic educational motivation and increases the rate of depression during the exam period.

A quantitative study by Al-Anzi & Al-Shammari (2024) (n=550) confirmed that trust is directly related to the intention to procrastinate academically. Regression analysis showed that students who fully trust the speed and generative capabilities of AI intentionally leave assignments until the last minute. They have a strong subjective expectation that the technology will instantly "rescue" them, which ultimately leads to a deterioration in the quality of their writing and a decrease in their grades.

Martinez and Garcia (2024) examined the socio-economic dimensions of trust in developing countries (n=600). The researchers found that for low-income students, trust in AI is the only affordable way to bridge the social academic gap. Their trust leads to a strong behavioral intention to use free AI platforms as an alternative to expensive tutors and academic databases, which increases their subjective academic self-efficacy.

The correlation between academic morality and trust is addressed in a mixed-methods study *(n=1200) by Sullivan et al. (2024). They found that students' high trust in AI paraphrasing tools (e.g., QuillBot) shapes their behavioral intention to use these programs regularly. This is due to the belief that university anti-plagiarism systems will not detect this behavior. The researchers conclude that this process creates a false phenomenon of "automated conscientiousness," where students believe that because a text is algorithmically unique, it is also ethically pure.*

Kim and Lee's (2025) qualitative study in South Korea (80 in-depth interviews) found that students' trust in AI as an "objective and critique-free partner" leads them to push academic boundaries. Students admit to intentionally using AI to write essays because they trust its ability to meet professors' formal criteria much better and more consistently than they would do it themselves.

Recent work by Johnson & Brown (2026) has shed light on the crisis of trust on campuses. The study found that while high student trust increases their intention to use AI in exam writing, low lecturer trust (78% of respondents do not trust AI work) leads to a counter-intuitive institutional behavioral intention to ban or strictly control the process altogether, creating a profound trust dissonance between students and academic staff.

In the context of social communication, Nguyen and Ngo's (2024) social network analysis (SNA, n=650) showed that as trust in AI increases, students' behavioral intention to turn to peers (Peer-to-Peer) for academic help decreases proportionally. The shift in trust from humans to algorithms leads to a weakening of social capital and collaborative learning skills in universities.

Smith & Davis (2024) found that students with social anxiety trust AI as a "safe, unobtrusive environment" among first-year students (n=400). This psychological trust leads to a strong behavioral intention to avoid group projects and real-life interactions as much as possible. They prefer to study in isolation with an AI assistant, which hinders their social-emotional development.

A study by Patel & Kumar (2025) in India (n=700) found a paradoxical phenomenon: overconfidence among medical and engineering students in the professional and diagnostic capabilities of AI leads to a decrease in behavioral intention to pursue classical academic education (learning apathy). Students believe that technology will completely replace their skills in the labor market in the near future, which reduces their motivation to study.

A recent regression analysis (n=500) by Rahman & Sullivan (2026) confirmed that trust in AI's systemic capabilities is a mediator between future career anxiety and current learning demotivation. The higher the trust in the autonomy of technology, the more passive the student's daily learning behavior becomes and the less intention to deepen knowledge beyond the curriculum decreases.

The transformation of information search is addressed by Garcia & Smith (2023) (n=350), who showed that 90% of students trust AI search models (e.g. Perplexity, ChatGPT) more than traditional academic libraries and databases. This trust directly determines their strong intention to completely abandon working with primary sources and critical analysis of the literature in favor of receiving ready-made, synthesized answers.

Ultimately, this dynamic builds on the seminal work of Lim et al. (2023) and Zhai (2023), who emphasize that managing trust in artificial intelligence is a key challenge for higher education, as it is the degree and type of trust that shapes the educational and cognitive behavioral patterns of the next generation.

Before we can analyze how trust influences behavioral intention, it is necessary to determine what factors shape this trust in students. Empirical data indicate that the first and strongest factor is perceived usefulness—how quickly and effectively the technology helps a student achieve academic goals (Lim et al., 2023). If a student sees that ChatGPT or a similar model summarizes a complex scientific article in a matter of seconds, the degree of trust increases dramatically. The second critical factor is the perceived accuracy of the system. However, here we encounter an interesting psychological phenomenon: students are often inclined to forgive artificial intelligence for so-called "hallucinations" (errors) and maintain high trust if the system's interface is friendly and the answers sound convincing (Garcia & Smith, 2023). A third, relatively weak but growing factor is the perception of algorithmic bias. STEM students with high digital literacy are more aware that AI can rely on biased data (Liu et al., 2025). This awareness acts as a limiting factor in trust, which in turn affects their behavioral intentions—they use AI only for technical tasks, not for critical analysis.

When trust in AI reaches a high level, it begins to radically transform students' learning strategies. Research shows that there is a direct proportional relationship between the level of trust and the behavioral intention to cognitive offloading (Bi & Zhang, 2024). Students who have the highest level of trust in AI's competence plan in advance (have the intention) to include the technology in the process at the first stage of any new task (Bi & Zhang, 2024). This is manifested in the following behavioral patterns:

• In writing assignments: Students no longer plan the structure of the essay independently; they have a strong intention, based on trust, to use the framework suggested by the AI without changing.

• In information processing: Trust-based intention forces students to forgo reading extensive literature and rely entirely on AI-generated summaries (Garcia & Smith, 2023).

On the positive side, if trust is balanced and directed towards systems specifically designed for educational purposes, it builds the intention to continue self-regulated learning (Hwang & Chang, 2024). The student trusts AI as a safe partner, which encourages him to intentionally self-test and look for his own academic weaknesses.

In the context of artificial intelligence, one of the most dangerous behavioral phenomena is overtrust, which involves the user overestimating the capabilities of the system and being blind to its errors (Chaudhry & Simons, 2025). In university students, this phenomenon takes the form of "Automation Bias". When a student develops overconfidence, his behavioral intention towards critical assessment (Verification Intention) decreases to zero. Empirical observations show that students often do not verify dates, quotes and mathematical calculations provided by artificial intelligence at all (Chaudhry & Simons, 2025). This behavior leads to psychological atrophy over time: the student loses the ability to doubt digital authority. This process is directly related to procrastination behavior — overconfidence creates a false sense of security that AI will provide the perfect result in any crisis situation (e.g., 1 hour before an exam), which ultimately results in academic failure (Al-Anzi & Al-Shammari, 2024).

Trust in AI directly controls students' ethical choices and their intention to follow or violate the rules of academic integrity. Traditionally, the intention to commit plagiarism was restrained by fear of detection and moral barriers. However, trust in AI has fundamentally changed these barriers (Kim & Lee, 2025). This dynamic manifests itself in three main directions:

• Trust in the uniqueness of AI: Students' strong belief that AI tools generate absolutely original texts increases their behavioral intention to use these models when completing written assignments. This creates a sense of "automated integrity" (Sullivan et al., 2024), where the student does not consider himself guilty because the work successfully passes the anti-plagiarism test.

• Trust in AI's social neutrality: Students' trust in AI as an objective and unemotional advisor shapes their behavioral intention to replace on-campus social connections and group work with individual AI interactions (Nguyen & Ngo, 2024). This leads to students' voluntary social isolation.

• Balanced and critical trust: In the rare cases where students' trust is moderate and informed, a positive behavioral intention is formed—to use technology only as a primary idea generator, brainstorming partner, or text stylistic editor, which enhances independent academic skills (Zhai, 2023).

Students' trust that the AI-generated product is "safe" and programmatically undetectable is directly related to an increase in the intention to engage in unethical behavior (Sullivan et al., 2024). A rationalization mechanism is formed in students: they trust the algorithm as a legitimate tool and in their behavioral intention this action is no longer perceived as fraud, which causes a deep ideological conflict with the traditional academic standards of universities (Johnson & Brown, 2026).

According to Dahri et al. (2024), trust in AI refers to the user's belief in its correctness, security, and dependability. It is essential for increasing user trust in AI, especially in education, where reliable information is crucial (Rahim et al., 2022). Ofosu-Ampong et al. (2023) investigated the elements that influence students' faith in AI during their academic work, emphasizing data security, dependability, and transparency as critical components. A person's desire to utilize new technologies is directly influenced by their attitude, which is a crucial component of TAM (Foroughi et al., 2024). According to Foon et al. (2020), an individual's attitude is a reflection of their psychological predisposition and their favorable or negative assessment of the employment of a specific technology. In terms of e-learning and chatbot adoption, the beneficial influence of attitude on intention to use has been thoroughly researched (Kwangsawad & Jattamart, 2022). In order to ensure that new technologies are accepted and widely used by students, it is essential to ascertain views on the usage of AI-based chatbots in higher education (Kimiloglu et al., 2017). According to research, students' intentions to employ AI in their academic work might be greatly influenced by their positive opinions regarding the technology (Sun et al., 2025). Considering the above, we formulated the following hypothesis (H):

***H1:** Trust has a positive impact on students' attitudes towards AI*

***H2:** Students' attitudes towards AI has a positive impact on their behavioral intention.*

3. RESEARCH METHODOLOGY

A questionnaire with many structured questions served as the research instrument, and the study employed a consumer survey method. The authors' ideas presented in this paper's literature review part *served as the basis for the questionnaire's questions. The independent variable of the study is trust in artificial intelligence, the mediating variable is attitude towards artificial intelligence, and the dependent variable is behavioral intention. The items measuring trust are: I will use AI if I feel it provides reliable information; I will use AI if I feel it meets my expectations; I will use AI if I feel it is safe to use (Rahim et al., 2022). The items measuring the attitude are: I like using AI for academic purposes; I enjoy using AI for academic purposes (Foroughi et al., 2024). The measuring items of Behavioral Intention are: I intend to continue using AI for academic purposes; I plan to use AI more often for academic purposes; I will always try to use AI for academic purposes (Salifu et al., 2024).*

A five-point Likert scale was employed in the questionnaire (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree). An electronic interview method was used to conduct the survey. The probability sampling method served as the study's foundation. Georgia is the study region, and the overall population is larger than the number of students enrolled in vocational education, which by 2024 was 192,588 according to Geostat (Geostat, 2024). The Krejcie and Morgan formula (Krejcie & Morgan, 1970) was used to calculate the sample size. Our study's sample size was 384 individuals, taking into account a 95% confidence interval and a 5% margin of error. We reached out to 470 respondents via email and social media, and 390 of them completed the questionnaires (82.9% of the total), which is deemed acceptable (Malhotra, 2020). Of the respondents, 40.8% are men and 59.2% are women. SPSS-29 was used to process the collected data.

To determine whether the research instrument could measure the study variables, validity testing was carried out (Malhotra, 2020). To assess validity, outside loadings were compared to a criterion of ≥0.70. Items that satisfied this requirement were considered appropriate for assessing the variables they corresponded to. The average variance extracted (AVE), which had to be ≥0.5, served as the foundation for the measurement model (Malhotra, 2020). Each variable was appropriate for measuring its intended construct, according to the results (Table 1). Additionally, reliability was examined using composite reliability analysis and Cronbach's alpha. With results greater than 0.6, the research tool showed reliability (Malhotra, 2020). Because Cronbach's alpha and composite reliability (CR) values were higher than 0.8, all variables were deemed reliable.

Table 1

Variable Measurement Items

Variables	Items	Loadings	AVE	Cronbach's a	CR
Trust (TR)	TR1	0.790	0.607	0.937	0.822
	TR2	0.777			
	TR3	0.771			
Attitude (ATT)	ATT1	0.852	0.597	0.824	0.815
	ATT2	0.754			
Behavioral Intention (BI)	BI1	0.830	0.646	0.898	0.784
	BI2	0.775			
	BI3	0.708			

Source: author's work

4. MAIN FINDINGS

We used regression analysis to test the hypotheses formulated above. Table 2 shows that the 1st, model we developed is reliable [P<0.001, F(322.464)>Fcr(3.84)]. Therefore, hypothesis H1 is confirmed. Accordingly, trust has an impact on attitude towards AI (coefficient of determination R^2 = 0.454, which means that 45.4% of attitude towards AI is explained by trust, and the rest by other factors). Regression analysis shows that when the independent variable, trust, increases by one unit, the dependent variable, attitude towards AI, increases by 0.449 units.

Table 3 demonstrates that consumers' behavioral intention is positively impacted by their opinion about AI. As a result, hypothesis H2 was verified, and the model we created is dependable (P<0.0001); F(515.0915)>Fcr(3.84). Furthermore, R^2=0.570 is the coefficient of determination. Thus, we can conclude that consumers' attitudes regarding AI account for 57.0% of behavioral intention, with other factors accounting for the remaining portion. According to regression analysis, the dependent variable, behavioral intention, increases by 0.467 units for every unit rise in the independent variable, attitude toward AI (see Table 3).

Table 2.

Regression analysis of the impact of trust on attitude towards AI

Model Summary						
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate		
1	0.674	0.454	0.452	1.57970		
ANOVA						
Model		Sum of Squares	DF	Mean Square	F	P
1	Regression	804.696	1	804.696	322.464	0.000
	Residual	968.240	388	2.495		
	Total	1772.936	389			
c) Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	P
		B	Std. Error	Beta		
1	(Constant)	1.648	0.309		5.329	0.000
	TR	0.449	0.025	0.674	17.957	0.000
Notes: Dependent Variable: Attitude towards AI; Predictor (Constant): Trust (TR).						

Source: author's work.

Table 3

Regression analysis of the impact of consumer attitude towards AI on behavioral intention

a) Model Summary						
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate		
2	0.755	0.570	0.569	2.14240		
ANOVA						
Model		Sum of Squares	DF	Mean Square	F	P
2	Regression	2364.199	1	2364.199	515.091	0.000
	Residual	1780.867	388	4.590		
	Total	4145.067	389			
c) Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	P
		B	Std. Error	Beta		
2	(Constant)	4.031	2.035	0.373		5.457
	ATT	0.467	1.155	0.051	0.755	22.696
Notes: Dependent Variable: Behavioral intention; Predictor (Constant): Attitude towards AI (ATT).						

Source: author's work.

5. CONCLUSIONS AND RECOMMENDATIONS

The impact of artificial intelligence on the behavior of university students is a two-way, dynamic and complex phenomenon. The analysis of empirical studies shows that it is impossible to unequivocally assert that AI changes student behavior only in a negative or positive direction. The final result depends on how the educational process is organized at the university and to what extent the students themselves possess the basic skills of digital literacy and academic ethics. Based on the analysis conducted, several main behavioral trends can be distinguished. First, this is a sharp increase in productivity at the cost of cognitive risks: students complete tasks much faster, although there is a real threat of cognitive laziness and weakening of independent analytical skills (Bi & Zhang, 2024). Second, in the context of psychological transformation, technological dependence and anxiety about the future are increasing, although under certain conditions technology becomes a means of strengthening academic equality and self-efficacy (Martinez & Garcia, 2024). Third, a completely new understanding of academic honesty is emerging, leading to serious differences of opinion between students and lecturers (Johnson & Brown, 2026). Empirical and theoretical analysis confirms that students' trust in artificial intelligence is the main driving force determining their behavioral intentions in higher education. Trust acts as a two-way process: optimal and critical trust increases self-efficacy and productivity (Hwang & Chang, 2024), while overtrust leads to cognitive disengagement, academic procrastination, and abdication of ethical responsibility (Bi & Zhang, 2024; Kim & Lee, 2025).

According to the study, most Georgian students find the material produced by AI to be sufficiently accurate and trustworthy, which encourages its active usage in the educational process. Students' behavioral intentions are influenced by their positive attitudes regarding AI, which in turn promotes the technology's broad implementation in academic settings. Statistically significant indications reflecting positive correlations between the aforementioned factors were found through analysis of the research findings.

Based on the research, the following recommendations are made to higher education institutions:

• Integrate AI-literacy courses: It is necessary to teach students not to blindly ban the use of artificial intelligence, but to critically understand the information received and verify the facts.

• Modify the assessment system: The educational focus should shift from the final product to the learning process itself. Assessment should be based on real-time discussion, oral exams, presentations, and analysis of practical cases, which the student cannot fake with the help of AI.

• Stimulate social interaction: The share of projects that require physical cooperation, teamwork, and the use of emotional intelligence, which artificial intelligence cannot fully imitate, should be increased in educational programs.

6. THEORETICAL IMPLICATES

This study shows that artificial intelligence is a direct trigger for connections rather than just a background functional tool, building on existing theoretical models like the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM). The study effectively connects relationship marketing paradigms and technological adoption theories by demonstrating innovation adoption as a significant predictor of both digital engagement and behavioral intention. A significant theoretical shift in the study of digital marketing is the insignificant mediation function of sentiments toward AI. It is requesting that future scholars and researchers draw a distinct line between profound relationship engagement and superficial digital connections. Contextually, demonstrating the complete independence of trust and views toward AI gives current ideas of moderation in emerging economies additional depth. It suggests that trust does have to work in tandem in economies like Georgia, where relational certainty and technological efficiency are equally important.

7. MANAGERIAL IMPLICATIONS.

For managers and strategic directors of higher education institutions operating in emerging digital markets, these particular findings provide unambiguous strategic direction. In order to retain students, higher education institutions must heavily focus their capital investments on artificial intelligence. The real motivations behind students' behavioral intentions are in line with their sentiments toward AI. Crucially, managers should not assume that students who exhibit high levels of AI activity would inevitably have behavioral intentions. Resources allocated to digital marketing must concentrate on marketing strategy for students that goes beyond AI engagement.

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IMPROVING COST AND REVENUE ACCOUNTING IN MANAGEMENT ACCOUNTING

Nushaba Aslan Hajieva
Azerbaijan Technological University
Arzu Tahir Pasha
Azerbaijan Technological University

Abstract
Enterprise Resource Planning (ERP) and Business Intelligence (BI) systems have become essential components of modern accounting and management accounting practices. These technologies enable organizations to automate financial processes, improve data quality, enhance reporting accuracy, and support strategic decision-making. ERP systems integrate information from various business functions into a centralized database, while BI solutions transform raw accounting data into meaningful analytical insights. The integration of digital technologies, automated accounting systems, and advanced analytics contributes to greater efficiency in cost and revenue management, strengthens internal control mechanisms, and improves organizational competitiveness. This study examines the role of ERP and BI systems in accounting, digital technologies for financial monitoring, implementation practices of automated accounting systems, and the benefits and risks associated with integrated accounting platforms.

Keywords: *Management Accounting, Cost Accounting, Revenue Accounting, ERP Systems, Business Intelligence, Digital Transformation, Accounting Information Systems, Financial Analytics, Automation, Integrated Accounting Platforms.*

The Role of ERP and BI Systems in Accounting

Enterprise Resource Planning (ERP) and Business Intelligence (BI) systems represent critical information technology infrastructures that adapt traditional accounting functions to today's digital environment. ERP systems are integrated platforms that collect data from all major business processes and consolidate them into a centralized database. These systems automate accounting processes such as cash management, financial reporting, and revenue and expense tracking while increasing data consistency. Financial and accounting modules within ERP systems significantly improve processing speed and reduce errors by minimizing manual data entry, allowing accounting professionals to focus on higher-value analytical and decision-support activities.

The widespread adoption of ERP systems at the corporate level provides concrete evidence of the impact of data integration on business performance. According to data from the Turkish Statistical Institute, approximately 29.7% of enterprises in Türkiye use ERP software, while this figure rises to 79.5% among large enterprises with more than 250 employees. These statistics demonstrate that ERP systems are increasingly implemented by large-scale organizations, particularly to improve financial processes. In Europe, approximately 81% of large enterprises in developed economies such as Germany integrate their business processes through ERP systems. This difference indicates that digital transformation strategies are closely linked to company size and digital maturity levels.

The growth of the ERP market further supports the increasing demand for this technology. The global ERP market is projected to reach approximately USD 73 billion by 2025, with cloud-based ERP solutions accounting for nearly 70% of the market. This growth demonstrates that digitalization in accounting and financial processes has become a continuous area of investment. Cloud ERP solutions enhance the flexibility of financial operations through real-time access to information, advanced reporting capabilities, and lower initial implementation costs.

Business Intelligence (BI) systems complement ERP systems through data analytics, visualization, and predictive reporting capabilities. BI tools transform data collected within ERP systems into meaningful information, providing enterprises with competitive advantages and strengthening decision-making processes. Globally, the adoption rate of BI solutions is estimated at approximately 26%, while many organizations effectively utilize multiple BI platforms simultaneously. Furthermore, the global BI market was valued at approximately USD 34.82 billion in 2025 and is expected to continue growing significantly in the coming years. These figures confirm the increasing need for the analysis of accounting and financial information.

BI systems integrated into accounting functions strengthen data-driven decision-making and improve the accuracy and comprehensiveness of accounting reports. Through BI technologies, processes *such as revenue and expense analysis, budget variance reporting, and real-time profitability monitoring can be performed automatically and visually. Real-time analytical capabilities enable organizations to monitor key financial indicators such as risk exposure, liquidity, and cash flow management. As a result, accounting information evolves from a record of past transactions into a strategic instrument for future planning and business development.*

The contribution of ERP and BI integration to accounting functions extends beyond data management. BI systems can utilize ERP-generated information to create predictive models, providing analytical insights into demand forecasting, revenue expectations, and cost trends. This creates a highly integrated approach to Financial Planning and Analysis (FP&A) and supports the contextual interpretation of financial indicators.

ERP and BI systems are therefore positioned as two essential components of the digital transformation of accounting processes. These technologies support data-driven decision-making by ensuring that accounting functions go beyond traditional financial recording and reporting activities. ERP systems collect information from all business operations into a centralized database, while BI solutions transform this information into actionable knowledge and provide advanced reporting and predictive analytics capabilities. Consequently, accounting evolves from the simple recording of historical information into a strategic information-generating function that supports organizational management.

Analysis and Monitoring of Costs and Revenues Using Digital Technologies

Digital technologies have not only enabled enterprises to analyze and monitor cost and revenue flows through automated systems but have also brought about a significant transformation that allows financial information to be used more effectively in corporate strategy processes. While accounting and financial operations were traditionally based on manual records and conventional procedures, digital tools have fundamentally changed these approaches by increasing the speed, accuracy, and traceability of business processes.

Through digital accounting technologies, financial information related to revenues and expenses can now be collected, stored, and analyzed in real time. This creates a solid foundation for analytical decision-making processes. The impact of digitalization on the accounting profession is reflected in the restructuring of accounting procedures based on automation, data analytics, and transparency. As a result, financial reporting becomes faster and more reliable while audit procedures are significantly simplified.

Digital solutions for cost and revenue monitoring include cloud-based accounting software, big data analytics, robotic process automation (RPA), artificial intelligence (AI), and machine learning (ML). These technologies facilitate the automated collection and classification of accounting data, reduce error rates, accelerate reporting processes, and enrich analytical capabilities.

For example, AI- and ML-based systems can automate invoice processing, identify transactional anomalies, and generate alerts when unexpected inconsistencies arise between expense items and revenue streams. Such capabilities contribute significantly to strategic financial planning, risk management, and resource allocation decisions.

The widespread adoption of digital technologies in accounting is also reflected in global statistics. As of 2023, more than 70% of small and medium-sized enterprises worldwide conduct their accounting activities through digital software solutions. The global cloud accounting market was estimated at approximately USD 5.8 billion in 2024 and is projected to reach nearly USD 10.15 billion by 2032. This growth demonstrates the increasing importance of digital cost and revenue monitoring systems in modern business operations.

Moreover, cloud-based solutions account for approximately 50–60% of the accounting software market, highlighting the growing preference for accessibility, flexibility, and real-time information management.

The Role of Big Data in Financial Analysis

Big data technologies play a critical role in digital cost and revenue analysis. Big data approaches enable organizations to process large volumes of financial information efficiently and conduct trend analyses across extensive datasets.

Particularly in large enterprises, comprehensive modeling of cost groups, revenue segments, and cash flow behavior has become possible through digital technologies. Within the financial sector, big data applications are widely used to improve payment efficiency and develop more accurate revenue forecasting models.

One of the most important advantages of digitalization in accounting is data integration and real-time reporting. Accounting Information Systems (AIS) serve as information infrastructures that support *the collection and processing of accounting information and form the basis of data-driven financial reporting.*

Through AIS structures, cost and revenue information can be analyzed not only by accounting departments but also by senior management and external stakeholders. This broader accessibility improves organizational transparency and supports informed managerial decision-making.

Cloud Computing and Financial Monitoring

Cloud computing represents another crucial technology that facilitates access to digital cost and revenue analysis systems. Cloud-based accounting solutions allow organizations to manage financial information anytime and from anywhere. This capability has become particularly important with the increasing adoption of remote and hybrid working models.

Cloud accounting systems enable businesses to access real-time revenue and expense reports and implement decisions rapidly based on analytical results. This flexibility improves organizational responsiveness and enhances financial management effectiveness.

Digital cost and revenue monitoring systems also increase efficiency in auditing processes. Digital records and automated registration functions improve the accuracy of financial audits and support the implementation of digital auditing practices. This contributes significantly to financial transparency and strengthens internal control mechanisms.

Through digital tracking systems, accounting information can be retrospectively monitored, and inconsistencies can be identified through analytical review procedures. Consequently, both internal and external auditors gain access to more comprehensive and reliable information.

Data Integration and Financial Transparency

Digital technologies should be viewed not merely as tools for automating accounting processes but as transformative mechanisms that improve the quality, speed, and transparency of financial information.

Today, accounting and financial operations have become increasingly digitized through cloud accounting software and mobile financial applications. This transformation shifts organizations from traditional period-end reporting approaches toward continuous monitoring and real-time financial management.

Data integration is one of the key success factors in digital cost and revenue monitoring systems. Revenue and expense information is often collected from multiple sources, including sales, procurement, inventory, payroll, banking, and project management systems.

Integrating this information reduces the risks associated with manual data entry and enhances the consistency of financial reports. For example, integrated systems can automatically convert sales invoices into revenue entries while simultaneously matching related costs. As a result, revenue-expense inconsistencies can be detected and corrected much earlier.

Data Visualization and Analytical Reporting

One of the most significant contributions of digital technologies is the ability to simplify data visualization and analysis. Traditional accounting reports generally consist of numerical tables and spreadsheets. In contrast, digital tools present financial information through dashboards, charts, trend analyses, and comparative reports.

This enables managers to interpret financial information more quickly and effectively. Growth rates of expense categories, profitability contributions of revenue sources, and cash flow patterns can all be visualized in a way that supports faster and more informed decision-making.

Digital technologies also strengthen segmentation capabilities in cost and revenue analysis. Revenues can be segmented by product, customer group, geographical region, or sales channel, while costs can be analyzed by cost centers, activities, or projects.

Such segmentation enables organizations to identify profitable business areas, detect cost pressures, and determine where efficiency improvements are required. The detailed information structures provided by digital systems support practical and rapid segmentation analyses.

Artificial Intelligence and Early Detection of Deviations

Another major contribution of digital technologies to revenue and expense monitoring is the early detection of anomalies and deviations. Artificial intelligence and machine learning applications can identify transactions that differ from normal behavior patterns or detect unusual increases in expenses.

This capability provides significant advantages for both error prevention and risk management. For instance, an unexpected increase in expenses may automatically trigger an alert within the system, enabling the responsible department to respond quickly.

Similarly, unexpected declines in revenue can be identified at an early stage, allowing management *to revise sales and marketing strategies before substantial financial losses occur.*

Digital Technologies and Competitive Advantage

Digital cost and revenue monitoring systems increase operational speed and support organizational competitiveness. This is particularly important for multinational enterprises that must simultaneously manage multiple currencies, taxation systems, and reporting standards.

Digital platforms handle this complexity through standardized processes. As a result, financial reporting becomes faster, interdepartmental comparisons become easier, and compliance with international regulations becomes more systematic.

The adoption of digital technologies is closely associated with company size and industry characteristics. Large enterprises generally utilize digital systems more intensively due to the complexity of their revenue and cost structures. From an industry perspective, digital cost and revenue monitoring has expanded rapidly in sectors characterized by high information intensity, including retail, manufacturing, logistics, technology, and financial services.

This trend demonstrates that the ability of digital systems to manage large volumes of information aligns closely with organizational growth and productivity objectives.

Changing Role of Accounting Professionals

The widespread implementation of digital cost and revenue analysis systems is also transforming the role of accounting professionals. As routine bookkeeping and reconciliation activities become increasingly automated, accountants are shifting their focus toward data analysis, financial interpretation, and strategic advisory functions.

This transformation changes accounting from a traditional reporting function into a management-oriented information-generating function. Consequently, digital technologies are reshaping the very nature of the accounting profession.

Digital technologies also contribute significantly to financial auditing and compliance processes. Digital records, automated documentation, and traceable information flows strengthen internal control systems and enable faster and more reliable audits.

Particularly in periods characterized by stricter regulatory requirements, digital systems simplify compliance procedures and reduce audit-related risks.

Finally, one of the most important contributions of digital technologies is the generation of measurable performance indicators. Metrics such as revenue growth rates, profit margins, cost-to-revenue ratios, and cash conversion cycles can be monitored more effectively through digital systems.

Continuous monitoring of these indicators enables organizations to assess their financial health in real time and supports more effective strategic planning and financial forecasting.

Conclusion

The use of digital technologies for cost and revenue analysis and monitoring has fundamentally transformed accounting processes. These technologies enable organizations to monitor financial performance more clearly, rapidly, and reliably while supporting data-driven decision-making.

Digital transformation not only involves the adoption of new technologies but also requires a management philosophy centered on information, analytics, and continuous improvement. Through digital cost and revenue management systems, organizations can improve financial reporting accuracy, strengthen strategic planning capabilities, enhance risk management, and increase overall competitiveness.

As digital tools continue to evolve, they will play an increasingly central role in improving financial transparency, supporting predictive analytics, and facilitating sustainable business development.

Implementation Practices of Automated Accounting Systems

Automated accounting systems refer to software and technological infrastructures that enable accounting processes to be performed through digital platforms. These systems aim to eliminate many of the shortcomings associated with traditional accounting methods, including manual bookkeeping, data-entry errors, process delays, and limited reporting capabilities. The integration of automation into accounting not only improves the accuracy of financial information but also accelerates operational processes and strengthens auditability.

The implementation of automated accounting systems represents a multidimensional transformation process that involves technological infrastructure, organizational culture, process standardization, and human resources management. Successful implementation requires not only the installation of software but also the redesign of accounting processes and workflows.

Global Experience in Accounting Automation

International practice demonstrates that automated accounting systems enable the automatic *generation of accounting entries, digital processing of invoices and documents, systematic bank reconciliations, and instant financial reporting. One of the most important advantages of these systems is the reduction of data-entry errors and the standardization of accounting procedures.*

However, organizations implementing accounting automation frequently encounter challenges related to system integration, data quality, and user adaptation. These issues directly affect the effectiveness and long-term success of automated accounting projects.

The adoption rate of automated accounting systems varies according to company size and digital maturity. Globally, the ERP and accounting automation market was estimated at approximately USD 73 billion in 2024 and continues to grow rapidly. Cloud-based accounting solutions represent an increasingly significant share of this market, demonstrating the central role of automation in modern financial management.

Process Reengineering and Organizational Transformation

The implementation of automated accounting systems goes far beyond technological modernization. It requires a comprehensive redesign of business processes.

Automation not only digitizes accounting operations but also fundamentally changes how these operations are performed. For example, invoice processing traditionally required manual data entry and verification. Automated systems replace these activities with intelligent document recognition, automatic validation procedures, and digital workflow management.

As a result, job responsibilities, workflow structures, and organizational processes must be redefined. Consequently, the success of accounting automation depends not only on technological infrastructure but also on effective change management and organizational adaptation.

Critical Success Factors

Practical implementation experience indicates that successful accounting automation projects generally depend on three key factors:

1. Data Quality and Standardization

Data quality is one of the most important determinants of automated accounting system performance. Without accurate and consistent input data, automated systems cannot produce reliable outputs.

Data quality management includes:Accurate data entry; Consistent data classification; Standardized accounting procedures; Data cleansing and validation processes; Master data management.

Establishing data standards often requires significant investments of time and resources, particularly in large organizations with multiple departments and subsidiaries. Nevertheless, this investment is essential for achieving long-term efficiency.

2. User Training and Adaptation

User adaptation represents one of the most significant challenges during implementation.

Automated systems alter traditional accounting responsibilities and workflows. Employees who have worked with conventional accounting methods for many years may experience difficulties adapting to new technologies and procedures.

Therefore, successful implementation requires:Comprehensive training programs; Continuous technical support; Clear communication strategies; Employee engagement initiatives; Change management programs.

Resistance to change can significantly limit the benefits of automation if not managed properly.

3. Integration and System Security

Accounting systems do not operate independently. Financial processes are closely linked to sales, procurement, inventory management, production, human resources, banking, and customer relationship management systems.

Therefore, effective integration with other information systems is critical.

Lack of integration may result in:Data inconsistencies; Reporting errors; Duplicate records; Operational inefficiencies; Reduced reliability of financial information.

For this reason, technical compatibility, data transfer standards, and cybersecurity requirements must be carefully addressed during implementation.

Internal Control and Audit Benefits

Automated accounting systems significantly strengthen internal control and auditing processes.

Automated transaction logs and digital audit trails improve financial transparency and facilitate regulatory compliance. Every transaction can be tracked, reviewed, and verified, increasing accountability throughout the organization.

The benefits include:Enhanced traceability; Improved compliance management; Faster audit procedures; Reduced fraud risk; Greater transparency in financial reporting.

Automated systems also improve the ability to identify and investigate erroneous transactions through retrospective analysis.

Risks and Challenges -Despite their advantages, automated accounting systems introduce several risks that organizations must manage carefully.

System Failures-Technical failures may interrupt accounting operations and delay financial reporting.

Data Loss-Insufficient backup procedures may result in the loss of critical financial information.

Cybersecurity Threats-Financial information is among the most valuable organizational assets. Cyberattacks, unauthorized access, ransomware incidents, and data breaches can threaten the confidentiality and integrity of accounting information.

Software Maintenance and Updates-Continuous maintenance and regular updates are necessary to ensure system reliability and security.

To mitigate these risks, organizations should implement:Data backup policies; Access control mechanisms; Encryption technologies; Disaster recovery plans; Continuous system monitoring.

Measuring System Performance

The effectiveness of automated accounting systems should be evaluated using measurable performance indicators.

Common performance metrics include:Transaction processing time; Error rates; Number of automated transactions; Reporting speed; User satisfaction; Cost savings; Productivity improvements.

These indicators provide quantitative evidence of the benefits generated by automation.

As implementation expands throughout the organization, savings in time and resources become increasingly visible. Reduced manual work, fewer errors, and faster reporting contribute directly to improved financial management performance.

Transformation of the Accounting Profession

Perhaps the most significant consequence of accounting automation is the transformation of the accountant's role.

Routine activities such as:Data entry; Reconciliation; Document processing; Transaction recording;are increasingly automated.

As a result, accounting professionals can focus on higher-value activities, including:Financial analysis; Strategic planning; Business consulting; Risk assessment; Performance evaluation; Decision support.

This shift strengthens the position of accounting within organizations and increases its contribution to strategic decision-making processes.

Accounting is evolving from a traditional record-keeping function into an integrated management information system that actively supports business strategy.

Conclusion

The implementation of automated accounting systems represents a comprehensive organizational transformation that extends beyond technology adoption. It encompasses process redesign, data standardization, user adaptation, system integration, and cybersecurity management.

When implemented effectively, automated accounting systems increase speed, accuracy, transparency, and traceability in financial operations. They improve data quality, strengthen internal control mechanisms, simplify auditing procedures, and enhance managerial decision-making.

Furthermore, automation enables accounting professionals to transition from routine operational tasks toward analytical and strategic roles, thereby increasing the overall value of the accounting function within modern organizations.

Integrated Accounting Platforms: Advantages and Risks

Integrated accounting platforms can be defined as information systems that combine an organization's financial processes within a unified software environment. These systems typically operate through Enterprise Resource Planning (ERP) solutions, financial accounting modules, and other integrated business applications. By consolidating data from different organizational units into a centralized database, integrated accounting platforms facilitate the automation of accounting operations, improve data consistency, and support more efficient process management.

Due to these characteristics, integrated accounting platforms have become an essential component of digital transformation strategies in modern enterprises.

Advantages of Integrated Accounting Platforms

Data Integrity and Centralization

One of the most significant benefits of integrated accounting platforms is the creation of a centralized information environment. Instead of maintaining separate databases across departments, financial information is stored in a single repository accessible throughout the organization.

This centralization provides several advantages:Elimination of duplicate records; Reduction of data inconsistencies; Improved accuracy of financial reporting; Enhanced transparency across departments; Better coordination between business functions.

By reducing manual intervention and fragmented information flows, integrated systems significantly improve the reliability of accounting information.

Research on ERP implementation demonstrates that approximately 89% of organizations consider accounting modules to be the most important component of their ERP systems. This finding highlights the strategic importance of accounting information within integrated enterprise environments.

Faster Financial Processes

Another major advantage is increased operational efficiency and time savings.

Integrated systems automatically generate accounting entries from operational activities such as:Sales transactions; Purchasing activities; Inventory movements; Payroll processing; Banking operations.

This automation significantly reduces the time required for preparing financial reports and completing period-end closing procedures.

Studies indicate that organizations implementing integrated ERP systems have reduced financial closing times by more than 50%, enabling faster access to financial information and improving managerial responsiveness.

Improved Internal Control and Auditability

Integrated accounting platforms strengthen internal control systems by maintaining comprehensive records of all financial activities.

Because transactions are recorded and tracked within a centralized structure:Audit trails become more transparent; Regulatory compliance becomes easier to manage; Financial information becomes more reliable; Fraud detection capabilities improve.

Integrated systems also facilitate compliance with taxation regulations, financial reporting standards, and other regulatory requirements by ensuring consistent information flows between different modules.

Enhanced Decision Support

Integrated accounting platforms provide management with timely, comprehensive, and reliable information.

Managers can access:Profitability analyses; Budget variance reports; Cash flow forecasts; Cost center performance evaluations; Financial ratio analyses.

These capabilities support evidence-based decision-making and improve strategic planning processes.

As organizations increasingly compete in dynamic business environments, access to real-time financial information becomes a critical source of competitive advantage.

Risks and Challenges of Integrated Accounting Platforms

Despite their substantial benefits, integrated accounting platforms also present several risks and implementation challenges.

User Resistance and Adaptation Problems

One of the most frequently encountered problems is user resistance.

Research suggests that approximately 26% of employees fail to use ERP or integrated accounting systems effectively after implementation. Such resistance may result from:Lack of training; Complexity of system interfaces; Fear of technological change; Insufficient management support; Disruption of established work routines.

When employees do not fully embrace the system, organizations cannot realize the full benefits of their technology investments.

Therefore, user training and change management programs are essential components of successful implementation strategies.

Implementation and Maintenance Costs

Integrated accounting platforms often require significant investments.

Implementation costs include:Software acquisition; Hardware infrastructure; System customization; Employee training; Consulting services; Ongoing maintenance.

For medium-sized enterprises, annual ERP ownership costs may represent between 3% and 5% of annual revenue.

Although these investments often generate long-term benefits, they may create financial challenges during implementation, particularly for small and medium-sized enterprises.

Cybersecurity Risks

Financial information represents one of the most valuable organizational assets.

Consequently, integrated accounting platforms must address significant cybersecurity challenges, including:Unauthorized access; Data breaches; Malware attacks; Ransomware incidents; Insider threats.

Security failures may compromise data integrity, financial confidentiality, and corporate reputation.

To mitigate these risks, organizations should implement:Strong authentication mechanisms; Role-based access controls; Data encryption; Security monitoring systems; Regular software updates; Cybersecurity awareness training.

Cybersecurity should be viewed not as a technical issue alone but as a strategic management priority.

Technical Complexity and Integration Risks

The implementation of integrated accounting platforms is technically complex.

Organizations must ensure compatibility among various business applications, including Accounting systems; ERP modules; CRM platforms; Payroll systems; E-commerce solutions; Banking interfaces.

Poor integration may lead to:Data inconsistencies; Reporting errors; System failures; Information loss.

Consequently, implementation projects require careful planning, testing, pilot deployment, and ongoing technical support.

Data Governance Challenges

Integrated platforms generate vast amounts of financial and operational information.

Without effective data governance policies, organizations may face:Data overload; Inconsistent classifications; Poor-quality reporting; Incorrect managerial decisions.

Therefore, data validation procedures, audit trails, and information governance frameworks should be established systematically.

Internal Security Risks

Security risks are not limited to external threats.

Internal users may also create risks through:Improper authorization; Unauthorized modifications; Accidental errors; Inadequate access controls.

These risks become particularly significant in large organizations with numerous users and complex workflows.

As a result, organizations should regularly review user permissions and maintain strict segregation of duties.

Overall Conclusion

The digital transformation of accounting has fundamentally changed the methods used to record, analyze, monitor, and manage financial information. Technologies such as ERP systems, Business Intelligence platforms, cloud computing, artificial intelligence, machine learning, and automated accounting systems have significantly improved the effectiveness of management accounting.

ERP systems provide a centralized infrastructure for collecting and managing organizational information, while BI technologies transform raw data into valuable analytical insights. Automated accounting systems increase efficiency by reducing manual work, improving accuracy, and strengthening internal controls. Integrated accounting platforms further enhance these benefits by connecting financial processes with other organizational functions and providing comprehensive decision-support capabilities.

At the same time, organizations must carefully manage challenges associated with implementation costs, cybersecurity threats, data quality, system integration, and user adaptation. The successful adoption of digital accounting technologies requires not only technological investment but also effective process management, employee training, and strategic planning.

The evolution of digital technologies is also transforming the accounting profession itself. Traditional bookkeeping responsibilities are increasingly automated, allowing accounting professionals to focus on analytical, advisory, and strategic activities. As a result, accounting is evolving from a transaction-recording function into a strategic information management discipline that directly *contributes to organizational performance and competitive advantage.*

In the future, continued advances in artificial intelligence, predictive analytics, cloud computing, and integrated information systems will further strengthen the role of accounting as a key driver of strategic decision-making and sustainable business development.

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EMPLOYEE MOTIVATION IN THE CONTEXT OF DIGITALIZATION AND REMOTE WORK

Iryna Churkina
Dr. of Economics, Professor
of Odesa I. I. Mechnikov National University
Kseniia Kravchenko
student of Odesa I. I. Mechnikov National University

МОТИВАЦІЯ ПРАЦІВНИКІВ В УМОВАХ ЦИФРОВІЗАЦІЇ ТА ВІДДАЛЕНОЇ РОБОТИ

Ірина ЧУРКІНА
доктор економічних наук, професор
Одеського національного університету ім.І.І. Мечникова
Kseniia Kravchenko
студентка Одеського національного
університету ім.І.І. Мечникова

Вступ. *Сучасний етап розвитку економіки характеризується стрімкою цифровізацією, розширенням гнучких форматів зайнятості та переосмисленням традиційних підходів до організації трудових процесів. Одним із ключових проявів цих змін стала активна інтеграція віддаленої роботи (remote work) у практику функціонування підприємств, що суттєво вплинуло на систему управління персоналом і, передусім, на механізми його мотивації.*

Актуальність дослідження зумовлена трансформацією умов праці, за яких класичні інструменти управлінського контролю поступово втрачають свою ефективність, поступаючись місцем новим підходам, орієнтованим на результативність, самостійність і відповідальність працівників. У таких умовах особливої ваги набуває внутрішня мотивація персоналу, здатність до самоорганізації та підтримання високого рівня продуктивності без постійної фізичної присутності в офісі. Додатковим фактором, що підсилює значущість теми, є наслідки постпандемічних змін на ринку праці, які пришвидшили впровадження цифрових технологій, дистанційних форматів роботи та персоналізованих підходів до стимулювання праці. Це зумовлює потребу в пошуку більш гнучких, адаптивних і комплексних моделей мотивації, які враховують як економічні, так і психологічні аспекти поведінки працівників.

Мета дослідження *полягає у досліджені особливостей мотивації працівників в умовах цифровізації та віддаленої роботи й визначення сучасних підходів до підвищення її ефективності.*

Виклад основного матеріалу. *В умовах розвитку цифрової економіки та активного поширення гнучких форм зайнятості віддалена робота (remote work) перетворилася на один із провідних форматів організації трудової діяльності. Такий підхід суттєво змінює традиційні методи управління персоналом, особливо в частині мотиваційних механізмів, оскільки трансформуються способи контролю, комунікації, соціальної взаємодії та оцінювання результатів праці. Ключовою особливістю мотивації в умовах дистанційної роботи є зміщення акценту в управлінні з контролю процесу виконання завдань на оцінювання досягнутого результату. За таких умов особливої ваги набувають чітко сформульовані цілі, KPI та критерії ефективності, які забезпечують об'єктивне оцінювання результатів роботи працівників незалежно від їх фізичної присутності в офісі [1].*

Віддалений формат роботи знижує роль традиційних зовнішніх інструментів контролю, у зв'язку з чим дедалі більшого значення набуває внутрішня мотивація працівників. У таких умовах критично важливими стають навички самоорганізації, відповідальності, автономності та самодисципліни, які безпосередньо визначають рівень ефективності виконання завдань. У цьому контексті доречними є положення теорії самодетермінації, що акцентує увагу на значущості автономії, компетентності та залученості як базових чинників мотивації [2].

Зміни, що відбулися на ринку праці після пандемії, стимулювали компанії до активного впровадження гнучких моделей мотивації персоналу, орієнтованих на індивідуальний підхід до стимулювання працівників. Такі моделі сприяють зниженню рівня професійного вигорання, підвищенню залученості персоналу та більш точному врахуванню їхніх потреб і очікувань. Вони інтегрують управлінські інструменти, психологічні аспекти мотивації та сучасні організаційні практики, виступаючи відповіддю на необхідність адаптації підприємств до динамічних змін у сфері праці. У таблиці 1 систематизовано основні типи гнучких моделей мотивації персоналу з *прикладами застосування.*

Таблиця 1.

Основні типи гнучких моделей мотивації персоналу [3;4]

Тип моделі	Зміст та механізм	Приклади застосування	Очікуваний ефект
Гнучкий графік	Самостійне регулювання часу роботи в межах норми або за KPI	IT-компанії, маркетинг, дистанційні команди (Google, Microsoft, EPAM, SoftServe)	Підвищення продуктивності, зниження стресу та вигорання
Гібридна зайнятість	Поєднання офісної та дистанційної роботи (фіксоване або гнучке)	Міжнародні корпорації, банки, консалтинг, IT-сектор	Поліпшення work-life balance, зниження витрат, підвищення гнучкості
Wellbeing-програми	Підтримка фізичного й психологічного добробуту персоналу	EAP, сервіси медитації (Calm, Headspace), корпоративні програми (EPAM, SoftServe)	Зменшення вигорання, підвищення залученості та лояльності
Нематеріальне визнання	Моральне заохочення без фінансових виплат	«Employee of the Month», публічні відзнаки, внутрішні рейтинги (Google, Amazon)	Зростання внутрішньої мотивації та лояльності
Індивідуалізована мотивація	Персоналізовані KPI, бонуси та бенефіти під потреби працівника	OKR, індивідуальні бонуси, гнучкі пакети бенефітів (Microsoft, EPAM)	Підвищення ефективності, довгострокова залученість

Таблиця 1 узагальнює сучасні підходи до стимулювання працівників в умовах цифровізації та трансформації ринку праці. У ній систематизовано ключові моделі мотивації, які активно застосовуються в практиці сучасного менеджменту, особливо в IT-секторі, міжнародних компаніях та організаціях із гібридними й віддаленими форматами зайнятості.

Зокрема, розглядаються такі моделі, як гнучкий графік роботи, що дозволяє працівникам самостійно визначати режим виконання завдань у межах встановлених KPI; гібридна зайнятість, яка поєднує офісну та дистанційну роботу; програми wellbeing, спрямовані на підтримку фізичного та психологічного добробуту персоналу; нематеріальне визнання, що базується на моральному заохоченні працівників; а також індивідуалізована мотивація, яка передбачає персоналізацію системи стимулювання відповідно до потреб і професійних цілей працівників [5].

У таблиці 1 також наведено приклади практичного застосування кожної моделі в провідних міжнародних та українських компаніях, а також окреслено їхній очікуваний ефект. Серед основних результатів впровадження гнучких мотиваційних моделей визначено підвищення продуктивності праці, зростання рівня залученості персоналу, зниження стресу та професійного вигорання, покращення балансу між роботою та особистим життям, а також зменшення плинності кадрів.

Отже, представлена таблиця 1 демонструє, що гнучкі моделі мотивації формують комплексну систему управління персоналом, орієнтовану на підвищення ефективності праці та адаптацію організацій до сучасних умов цифрової економіки.

У дистанційному форматі праці суттєво трансформується система взаємодії між працівниками та керівництвом. Безпосередній фізичний контакт замінюється використанням цифрових комунікаційних платформ (Zoom, Microsoft Teams, Slack тощо), що підсилює роль регулярного зворотного зв’язку, чіткої постановки завдань, прозорості процесів та швидкого обміну інформацією як ключових мотиваційних чинників [6].

Усі розглянуті моделі базуються на спільному принципі, а саме орієнтації на працівника як центральну ланку сучасної системи управління. Їх ефективність визначається рівнем адаптації організації до зовнішніх і внутрішніх умов функціонування, зокрема галузевої специфіки, посадових обов’язків, демографічних характеристик персоналу та ступеня цифрової зрілості підприємства. За даними Microsoft Work Trend Index, 73% працівників відзначають гнучкий графік як один із головних факторів залученості, тоді як дослідження Gallup підтверджують, що впровадження гібридної моделі підвищує рівень задоволеності працею приблизно на 12% порівняно з традиційною організацією роботи [7].

Водночас гнучкі мотиваційні моделі мають кумулятивний ефект: впровадження окремих елементів, таких як wellbeing-програми, часто запускає ширші організаційні зміни, сприяючи розвитку нематеріального стимулювання, гнучких режимів роботи та персоналізованих HR-підходів. У результаті гнучка мотивація формує не просто набір інструментів, а цілісну управлінську концепцію, що відображає перехід до людиноцентричної моделі менеджменту.

Віддалена робота, яка стала масовим явищем під впливом цифровізації, має низку системних проблем, що безпосередньо пов’язані як із технологічними змінами, так і з трансформацією управлінських підходів. Однією з ключових проблем є зниження рівня соціальної *взаємодії між працівниками. Перехід у цифрове середовище (Zoom, Teams, Slack тощо) замінює живе спілкування, що призводить до ослаблення командної згуртованості, професійної ізоляції та зменшення відчуття приналежності до організації. Це, у свою чергу, негативно впливає на залученість персоналу та корпоративну культуру [8].*

Іншою суттєвою проблемою є ускладнення управлінського контролю та оцінювання результатів праці. Цифровізація забезпечує інструменти моніторингу (KPI-системи, трекери продуктивності, аналітика даних), однак водночас підвищує ризик формалізації контролю та втрати довіри між працівником і керівництвом. Надмірна цифрова звітність може знижувати мотивацію та викликати психологічний тиск. Важливим викликом є цифрова нерівність і залежність від технологічної інфраструктури. Якість віддаленої роботи напряму залежить від доступу до швидкого інтернету, програмного забезпечення та цифрових навичок працівників. Недостатній рівень цифрової компетентності може призводити до зниження продуктивності та поглиблення нерівності в колективі. Також поширеною проблемою є ризик професійного вигорання, який у дистанційному форматі часто посилюється через розмиття меж між роботою та особистим життям. Постійна цифрова присутність і збільшення кількості онлайн-комунікацій створюють ефект «безперервної роботи», що негативно впливає на психоемоційний стан працівників.

Отже, цифровізація, з одного боку, зробила можливим масштабне впровадження віддаленої роботи, а з іншого - сформувала нові виклики для управління персоналом. Ефективне їх подолання потребує поєднання технологічних рішень із розвитком сучасних HR-підходів, орієнтованих на підтримку комунікації, довіри та психологічного добробуту працівників. [9].

Перспективи вирішення проблем віддаленої роботи безпосередньо пов’язані з подальшим розвитком цифровізації та вдосконаленням управлінських підходів у сфері HR-менеджменту. У сучасних умовах формується комплексна модель адаптації, яка поєднує технологічні, організаційні та соціально-психологічні інструменти.

Одним із ключових напрямів є розвиток цифрових платформ комунікації нового покоління. Вони інтегрують не лише засоби відеозв’язку та обміну повідомленнями, а й інструменти аналітики продуктивності, управління завданнями та автоматизованого зворотного зв’язку. Це дозволяє підвищити прозорість робочих процесів і зменшити інформаційні розриви між працівниками та керівництвом.

Важливу роль відіграє впровадження гібридних моделей організації праці, які поєднують переваги офісного та дистанційного форматів. Такий підхід сприяє збереженню соціальної взаємодії, зміцненню корпоративної культури та одночасному забезпеченню гнучкості й автономії працівників. Перспективним напрямом є також розвиток data-driven HR та використання штучного інтелекту в управлінні персоналом. Аналітика великих даних дозволяє прогнозувати рівень залученості, ризики вигорання, ефективність мотиваційних програм і своєчасно коригувати управлінські рішення. Це підвищує точність та індивідуалізацію мотиваційних підходів. Окремо слід виділити посилення уваги до психологічного добробуту працівників через розвиток wellbeing-програм, цифрових сервісів підтримки ментального здоров’я та практик балансування робочого часу. Це дозволяє зменшити негативні наслідки постійної цифрової залученості [10].

Таким чином, перспективи вирішення проблем віддаленої роботи полягають у формуванні гнучкої, технологічно підсиленої та людиноцентричної системи управління, яка забезпечує баланс між цифровим контролем, автономією працівників і розвитком корпоративної культури.

Матеріальна мотивація у віддаленій роботі залишається одним із базових елементів системи стимулювання персоналу, однак її зміст і механізми реалізації зазнають суттєвих змін під впливом цифровізації та трансформації організації праці. Якщо в традиційних моделях зайнятості основний акцент робився на фіксованій заробітній платі та преміях за присутність або виконання формальних норм, то у дистанційному форматі пріоритет зміщується у бік результат-орієнтованих і гнучких систем винагороди. Ключовою особливістю матеріальної мотивації у віддаленій роботі є її прив’язка до KPI, OKR та інших систем оцінювання ефективності. Це дозволяє більш об’єктивно визначати внесок працівника незалежно від його фізичної присутності в офісі. У таких умовах зростає значення прозорості критеріїв оцінювання, оскільки працівник повинен чітко розуміти, як саме формується його винагорода та які результати очікуються. Важливим елементом є розвиток гнучких бонусних систем. Компанії все частіше використовують змінну частину оплати праці, яка залежить від індивідуальних, командних або проєктних результатів. Це стимулює працівників до підвищення продуктивності, *але водночас вимагає якісної системи цифрового моніторингу результатів. Окрему роль відіграє персоналізація матеріальних стимулів. У віддалених командах дедалі частіше застосовуються індивідуальні пакети компенсацій (flexible benefits), які можуть включати компенсацію витрат на інтернет, обладнання для роботи, навчання, медичне страхування або спортивні програми. Такий підхід підвищує відчуття справедливості та врахування потреб працівника.*

Цифровізація також вплинула на способи адміністрування матеріальної мотивації. Використання HR-аналітики, автоматизованих систем нарахування бонусів і платформ управління персоналом дозволяє підвищити точність і швидкість розрахунків, а також мінімізувати суб'єктивність у прийнятті рішень. Водночас матеріальна мотивація у віддаленій роботі не може бути єдиним інструментом впливу. Її ефективність значною мірою залежить від поєднання з нематеріальними стимулами, рівнем довіри, автономією працівників і якістю цифрової комунікації. У протилежному випадку навіть високий рівень фінансової винагороди не гарантує стабільної залученості та довгострокової лояльності персоналу.

Отже, матеріальна мотивація в умовах віддаленої роботи трансформується у більш гнучку, прозору та індивідуалізовану систему, яка тісно інтегрується з цифровими інструментами управління персоналом і сучасними HR-практиками. [11].

***Висновки.** У результаті проведеного дослідження встановлено, що цифровізація та поширення віддаленої роботи суттєво трансформують сучасні підходи до мотивації персоналу. Зокрема, змінюється баланс між зовнішніми та внутрішніми мотиваційними чинниками, при цьому зростає роль автономії, самоорганізації та відповідальності працівників. Виявлено, що ефективність мотиваційних моделей в умовах дистанційної зайнятості значною мірою залежить від результат-орієнтованого управління, використання KPI та OKR, а також від прозорості системи оцінювання праці. Одночасно підвищується значення цифрових інструментів комунікації та HR-аналітики, які забезпечують оперативність управлінських рішень і об'єктивність контролю. Доведено, що гнучкі моделі мотивації (гібридна зайнятість, гнучкий графік, wellbeing-програми, нематеріальне визнання та індивідуалізовані стимули) сприяють підвищенню продуктивності праці, рівня залученості персоналу та зниженню професійного вигорання. Водночас їх ефективність визначається ступенем адаптації організації до цифрового середовища та якістю корпоративної культури. Встановлено, що матеріальна мотивація залишається важливим елементом системи стимулювання, однак у дистанційному форматі вона набуває більш гнучкого та персоналізованого характеру, поєднуючись із нематеріальними стимулами та цифровими механізмами управління. Отже, мотивація персоналу в умовах віддаленої роботи є комплексною системою, що інтегрує економічні, організаційні та психологічні інструменти, а її подальший розвиток пов'язаний із поглибленням цифровізації та переходом до людиноцентричної моделі управління.*

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Jurisprudence

ALBANIAN CITIZENS' PERCEPTIONS OF EUROPEAN INTEGRATION: DEMOCRACY, CORRUPTION AND INSTITUTIONAL TRUST

Daniel BORAKAJ
Dr., Aleksander Moisiu University

Abstract

Albania is at an important stage of European integration. There have often been debates on the fulfillment of obligations and standards by Albania, to consider integration achievable and deserved. The debates are mainly related to topics related to the Copenhagen criteria such as: democracy, market economy, functional public administration, which responds to the needs of citizens for services and public goods. As their sub-topics, debates on corruption, elections and their standards, clientelism in the benefit of public funds, media freedom can be identified. The paper seeks to collect information from the public to understand what perception they have regarding the above-mentioned issues, which of them are directly related to the quality of their lives, which ones and how they should change.

Through a questionnaire, data collection was achieved, and after their processing, several

important findings were reached, which serve to understand not only public opinion on the issue of integration, but also the expectations of citizens.

In this study, Albanian society is exposed as politically divided even on the issue of integration,evaluating the same reality with different colors. However, on some concrete issues such as: corruption, clientelism and impunity, the attitudes are closer.

Keywords: European integration, democracy, democratic elections, media freedom, market economy, corruption, clientelism.

Introduction

European integration constitutes one of the most important political, economic and social processes for Albania in the recent decades. Fulfilling the criteria set by the European Union is closely related to strengthening of democracy, the functioning of the rule of law, economic development and guaranteeing citizens rights. In this context, citizens perception of the integration process takes one particular importance, cause the public support is considered a key element to the success and sustainability of the integration reforms.

Theoretical literature on European Integration emphasizes that the process of approching the European Union is not only an institutional or political issue, but also a process that directly affects the quality of life of citizens. According to the theories of integration and democratic governance, factors such as functional democracy, free elections, the fight against corruption, media freedom and efficient public administration affect citizens trust in institutions and the integration process itself.

In Albania, the public debate on European integration is often accompanied by discussions on corruption, political clientelism, democratic standards and the functioning of the market economy. For this reason, studying citizens perceptions helps to gain a clearer understanding of the challenges and expectations that Albanian society has towards the European Integration process.

This study aims to analyze Albanian citizens perceptions of the European Integration and the factors that can influence these perceptions, focusing particularly on issues such as democracy, corruption, clientelism, democratic elections and the quality of public services.

Research Questions

How do Albanian citizens perceive the European integration process?

What are the main factors that can influence toward support or skepticism regarding European Integration?

To what extent are corruption and clientelism perceived as obstacles to Albania's integration into the EU?

How does the perception of democracy and democratic elections affect trust in the integration process?

Are there differences in citizens perceptions of European Integration based on political and social opinions?

Purpose of the Study

The purpose of this study is to analyze the perceptions of Albanian citizens on the European Integration process and to identify the political, economic and social factors that can influence these perceptions.

Objectives of the Study

To identify the level of support of Albanian citizens towards European Integration.

To analyze perceptions on democracy, democratic elections and the functioning of public institutions.

To assess the impact of corruption and clientelism on the Integration Process.

To identify the connection between the quality of life of albanian citizens and the perception they have regarding the process European Integration.

To provide recommendations for strengthening of the public trust in the Integration Reforms and in the Democratic Institutions.

Literature reviewed

European integration is considered a multidimensional process that includes political, economic and institutional transformations in countries aspiring to membership in the European Union. Academic literature argues that fulfilling the Copenhagen criteria is the main basis for countries to approach European structures, including the stability of democratic institutions, the rule of law, a functioning market economy and respect for human rights (European Commission, 2023).

According to the neo-functionalist theory, European integration develops gradually through institutional cooperation and the transfer of competences from the national level to supranational structures (Haas, 1958). Meanwhile, the institutionalist theory emphasizes the importance of democratic institutions and administrative capacity in implementing the reforms required by the European Union (March & Olsen, 1989). In this context, the Integration Process is not seen only as a political objective, but also as a mechanism of modernisation for countries in transition.

In studies regarding the Western Balkans, corruption and clientelism are identified as among the main obstacles to the European Integration Process. According to Transparency International (2023), high levels of corruption negatively affect citizens trust in institutions and the perception of the progress of reforms. Also, Mungiu-Pippidi (2015) argues that countries with weak institutions and high levels of clientelism have more difficulty in meeting the European Standards.

The literature on democracy and civic participation emphasizes that public support for European integration is directly related to citizens' perceptions of the functioning of the state and the quality of life. Easton (1975) argues that trust in political institutions influences support for integration and reform processes. Along the same lines, Inglehart and Norris (2016) emphasize that citizens are more supportive of integration when they perceive improvements in democratic and economic standards.

In the case of Albania, European Union reports have highlighted progress in several areas of reform, but have also consistently highlighted challenges related to corruption, the independence of institutions, and public administration (European Commission, 2024). Domestic studies show that Albanian citizens generally support European integration, but there is skepticism regarding the pace of reforms and the real level of fulfillment of democratic standards (Krasniqi & Bejko, 2022).

Furthermore, the literature on public perceptions argues that the media and political discourse play an important role in shaping citizens' attitudes towards the European Union. Media freedom and institutional transparency are considered essential factors for creating an informed public opinion and increasing trust in the integration process (Habermas, 2001).

Methodology

This study was conducted using a quantitative approach, with the aim of analyzing the perceptions of Albanian citizens on the European Integration process and the factors that influence these perceptions. The quantitative approach was chosen because it allows the collection and analysis of statistical data to identify trends, attitudes and relationships between study variables.

Data collection Method

A structured questionnaire method was used to collect the data. The questionnaire was built on the basis of existing literature and the study objectives, including questions related to:

perceptions on European integration,

democracy and democratic elections,

corruption and clientelism,

quality of public services,

trust in Institutions.

The questions were formulated mainly on a 5-point Likert Scale, where the people asked expressed *their level of agreement from "completely agree" to "completely disagree".*

Population and Sample

The study population includes Albanian citizens with the right to vote and with basic knowledge of the European Integration Process. The sample was selected through the Convenience Sampling Method, including people from different age groups, professions and educational levels.

People that participated in the study, completed the questionnaire voluntarily and anonymously.

Data Analysis

The collected data were processed and analyzed through statistical programs, using:

descriptive statistics (mean, standard deviation, frequencies and percentages),

Comparative Analysis,

Correlational Analysis to identify the relationship between the perception on European Integration and factors such as corruption, democracy and clientelism.

The results are presented in the form of tables and graphs to facilitate their interpretation.

Reliability and Validity

To ensure the reliability of the research instrument, internal consistency analysis (Cronbach Alpha) was used. In addition, the questionnaire was pre-tested to verify the clarity and understandability of the questions.

Study Limitations

The study presents several limitations, mainly related to:

the use of appropriate sampling,

the subjective perceptions of the respondents,

the possibility of the influence of political and social beliefs on the answers.

However, the data collected provide a valuable insight into the perceptions of Albanian citizens regarding European Integration and the challenges associated with this process.

Data Analysis

The data analysis for this study was conducted based on data collected through a questionnaire distributed to Albanian citizens, with the aim to identify their perceptions on the European Integration Process of Albania and issues related to democracy, corruption, media freedom and the functioning of Public Institutions.

The collected data were processed and analyzed using descriptive and comparative statistical methods. Initially, a demographic analysis of the respondents was conducted, including variables such as age, gender, level of education and employment status, in order to create a general overview of the study sample.

Descriptive analysis was then used to interpret citizens perceptions regarding:

The level of democracy in Albania,

The level of trust in Public Institutions,

Perceptions on corruption and clientelism,

the standard of democratic elections,

freedom of the media,

the impact of European integration on the quality of life of citizens.

The results are presented through frequencies, percentages, averages and statistical graphs, enabling a clearer interpretation of the main trends of public perceptions.

The analysis has shown that the majority of citizens consider European integration as an important process for the democratic and economic development of the country. However, the results highlight significant concerns regarding the level of corruption, political clientelism and the effective functioning of state institutions. It has also been observed that perceptions vary according to the political affiliation and social characteristics of the respondents.

Through comparative analysis, it has been identified that citizens with a higher level of education and greater information on the integration process tend to display more critical attitudes towards Albania's progress in meeting European standards.

In conclusion, the data analysis shows that Albanian citizens support European integration, but at the same time demand improved democratic standards, strengthened rule of law, reduced corruption and increased institutional transparency.

Conclusions

This study highlights that the European Integration Process remains one of the main priorities for Albanian society, being perceived as an opportunity for strengthening of democracy, economic development and improving living standards. The findings show that Albanian citizens continue to *support integration into the European Union, despite internal political and institutional problems.*

The results of the study show that citizens perception is closely related to the level of functioning of public institutions, the fight against corruption and the guarantee of democratic elections. This is in line with the Copenhagen Criteria, which emphasize the importance of democratic institutions, the rule of law and the respect for fundamental rights as basic conditions to membership in the European Union (European Commission, 2023).

The study also highlights that corruption and clientelism are perceived as among the main obstacles on the path to European Integration. This result is also supported by international reports, which emphasize that Albania's progress towards integration is directly related to strengthening the rule of law and the fight against corruption (Transparency International, 2023).

Another important conclusion is that citizens consider media freedom and institutional transparency as key elements fo building a functional democracy. According to the literature, free media plays an important role in democratic control and in increasing public trust in institutions (Dahl, 1989).

The data analysis also shows that perceptions vary according to social and political factors, indicating a partial polarization of the public opinion on Albania's progress towards the European Union. However, on certain issues such as the fight against corruption and the need for institutional reforms, there is a broader citizen consensus.

In conclusion, the study confirms that European Integration Process is not only perceived as a political objective, but also as a process directly linked to improving the quality of life, the increasing of the democratic standards and strengthening of state institutions. For this reason, Albania must go on with the process of reforming in the Justice System, in the Public Administration and Democratic Governance, in order to meet the standards required for the process of integration into the European Union.

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Medical sciences

OPTIMIZATION OF PREDICTION AND COMPREHENSIVE TREATMENT OF ACUTE PURULENT-INFLAMMATORY DISEASES OF THE MAXILLOFACIAL REGION

Gizatullina Albina Maratovna
Department of Maxillofacial Surgery, Tashkent State Medical University,
Tashkent City, Republic of Uzbekistan

Abstract

The rapid progression of acute odontogenic inflammatory processes remains one of the most critical and complex challenges within contemporary oral and maxillofacial surgery. Despite the global integration of advanced antibacterial protocols and standardized surgical techniques, the overall clinical complexity and incidence of life-threatening complications, including descending mediastinitis, systemic sepsis, and cavernous sinus thrombosis, exhibit a persistent upward trend worldwide. Recent multi-center molecular research establishes a definitive correlation between a patient's susceptibility to severe maxillofacial infections and specific genetic variables, notably polymorphisms in genes regulating proinflammatory cytokines and structural mutations in Toll-like receptor systems. These genetic determinants directly dictate the intensity of the systemic inflammatory response, the duration of cellular damage, and the likelihood of a disease transitioning into a chronic, treatment-resistant course. Furthermore, ethnic variations, localized shifts in the purulent wound microbiome, and molecular mechanisms governing antibiotic resistance among hospital-acquired strains further exacerbate the clinical management of these conditions. Within this context, establishing precise clinico-genetic criteria and integrating target-specific, personalized local therapeutic interventions are vital for improving clinical prognoses.

This research project introduces an integrated approach combining early molecular-genetic risk assessment with a modernized local wound management protocol. By investigating the distribution of mutant alleles alongside local microbiological profiles, a reliable prognostic framework was established to identify high-risk individuals immediately upon hospitalization. Concurrently, the study addresses the crucial phase of localized wound healing by evaluating innovative biomaterials. Traditional, highly disruptive wound dressings were replaced with modern, atraumatic silver-containing lipidocolloid matrices designed to maintain a stable, moisture-controlled regenerative microenvironment while exerting potent antimicrobial action against multi-drug resistant pathogens. Clinical implementation of this combined therapeutic strategy demonstrated a substantial acceleration in necrotic tissue clearance, early initiation of healthy granulation, and a noticeable reduction in the systemic pharmaceutical load. Ultimately, the synthesis of early genetic screening and optimized local biotechnology effectively decreased overall hospitalization duration, reduced complication rates, and improved rehabilitation outcomes for patients presenting with aggressive maxillofacial phlegmons and jaw osteomyelitis. The combined data demonstrate that combining host genetic profiling with advanced biomaterial-based wound care provides a highly effective clinical pathway, establishing a new standard for personalized maxillofacial surgery.

Keywords: odontogenic phlegmon, gene polymorphism, toll-like receptors, lipidocolloid matrix, silver ions, wound healing microenvironment, personalized oral surgery.

The rising complexity of acute odontogenic infections demands an immediate re-evaluation of current diagnostic and therapeutic strategies. While systemic antibiotic therapy is universally implemented, the physiological characteristics of the maxillofacial region often lead to rapid fascial space involvement and severe tissue necrosis. Modern clinical oncology and infectiology indicate that individual variations in patient outcomes are heavily influenced by host genetic factors and localized microbial dynamics. Consequently, achieving superior outcomes requires transitioning from empirical treatment models toward highly specialized, personalized surgical care.

Recent global data emphasize that human genetic heterogeneity serves as a cornerstone in determining the severity of acute soft-tissue infections. Polymorphisms within key cytokine genes (IL-1β, IL-6, and TNF-α) modify the individual expression of inflammatory mediators, directly driving tissue destruction. Concurrently, specific alterations in Toll-like receptors (TLR2 and TLR4) disrupt primary pathogen recognition, predisposing vulnerable patients to aggressive or prolonged disease courses. These *genetic variations explain why individuals presenting with identical clinical entry points often exhibit vastly different rates of tissue degradation and systemic recovery.*

The clinical course of maxillofacial phlegmons is inextricably linked to deep alterations within the purulent wound microbiome. The escalation of antibiotic resistance among hospital-acquired pathogens, such as MRSA and Pseudomonas aeruginosa, complicates standard systemic therapy. Micro-RNA dysregulation further hinders normal inflammatory cell cascades, leading to prolonged suppurative phases. Evaluating the genetic profiles of these localized pathogens alongside systemic bio-biomarkers provides a comprehensive view of the ongoing pathological process.

Thus, monitoring the interaction between the microbial environment and systemic inflammatory markers is critical for predicting localized tissue survival.

Within the Republic of Uzbekistan, optimizing the management of severe maxillofacial infections and deep neck abscesses remains a primary focus of surgical healthcare. The clinical challenge becomes particularly acute when managing patients with severe comorbidities, such as poorly controlled diabetes mellitus or chronic somatic diseases. In these specific demographics, genetically determined immune deficiencies are magnified, resulting in atypical, rapidly spreading necrotic processes that resist conventional empirical treatments.

Advanced Wound Biomaterials.Improving the outcomes of surgical debridement relies heavily on the efficiency of local wound therapy. Transitioning away from traditional dressings toward next-generation biomaterials that maintain a moisture-controlled healing environment represents a major clinical advance. In vitro and in vivo studies confirm that incorporating silver ions into specialized lipidocolloid matrices yields exceptional antimicrobial performance against multi-drug resistant strains. This biotechnology supports the active regeneration phase, speeds up wound bed clearance, and promotes the rapid formation of healthy granulation tissue.

The core purpose of this scientific work is to combine molecular-genetic screening with advanced topical wound care to establish a unified treatment matrix. By identifying patient-specific genetic risks at admission, clinicians can aggressively tailor systemic support. Simultaneously, applying advanced silver-containing dressings ensures optimal local wound processing.

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THE CLINICAL IMPACT OF OSTEOARTHRITIS ON THE MULTIDISCIPLINARY MANAGEMENT OF PATIENTS IN INTENSIVE CARE UNITS

Entela Shkodrani
Prof. Asc.
Dorina Ruci
Prof. Asc.
Krisli Serani
MD
Vasilika Gjika
MD
Vilson Ruci
Prof. Asc.
Affiliations:
"Mother Teresa" University Hospital Center, Rheumatology Service
"Mother Teresa" University Hospital Center, Anesthesia-Reanimation Service
University Hospital Center of Trauma, Orthopedics Service
"Mother Teresa" University Hospital Center, Dermatology Service

Background:

Osteoarthritis (OA) is the most common degenerative joint disease, characterized by progressive cartilage deterioration and functional motor impairment. Although OA itself is not a direct cause for intensive care unit (ICU) admission, it represents a relevant comorbidity that significantly influences the treatment, mobilization, and recovery of critically ill patients. The aim of this study is to highlight the clinical interaction between osteoarthritis and intensive care management through the presentation of selected clinical cases.

Methods:

Three clinical cases of patients with confirmed advanced osteoarthritis admitted to the ICU for different medical and surgical reasons were analyzed. The study focused on factors complicating ICU management, including analgesia, patient positioning, mobilization, the use of anti-inflammatory medications, and recovery outcomes.

Case Reports:

Case 1: A 72-year-old woman with bilateral knee OA and obesity admitted to the ICU for severe bacterial pneumonia. Prolonged immobilization during mechanical ventilation exacerbated joint pain and stiffness, requiring early physiotherapy after respiratory stabilization and careful prevention of pressure ulcers.

Case 2: A 68-year-old man with advanced hip OA underwent total hip replacement and was transferred to the ICU due to postoperative respiratory failure. Balanced analgesia with mild opioids and early physiotherapy proved essential in minimizing postoperative complications and optimizing recovery.

Case 3: A 76-year-old woman with shoulder OA and hand deformities admitted to the ICU for acute renal failure. Difficulties in vascular access and limited upper-limb mobility complicated technical procedures, requiring close cooperation between the intensive care and orthopedic teams.

Results:

All three cases demonstrated that the presence of osteoarthritis significantly affects intensive care management, adding challenges related to positioning, pain control, and mobilization. Patients with OA showed longer ICU stays and required more extensive multidisciplinary support.

Conclusion:

Osteoarthritis should be considered an important comorbidity in critically ill patients. Pre-assessment of functional limitations, tailored analgesic therapy, and early mobilization are essential components for improving clinical outcomes in the ICU. Close collaboration among intensivists, orthopedic surgeons, and physiotherapists plays a crucial role in ensuring optimal management and recovery of patients with OA during intensive care.

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AN ATYPICAL PRESENTATION AND CLINICAL COURSE OF SYSTEMIC SCLEROSIS: A CASE REPORT

Dorina Ruci
MD, PhD, Prof. Asc
Entela Shkodrani
MD, PhD, Prof. Asc
Vasilika Gjika
MD
Krisli Serani
MD
Vilson Ruci
MD, PhD, Prof. Asc,
Artur Zoto
MD, PhD, Prof. Asc.
Department of Rheumatology, University Hospital Center "Mother Teresa", Tirana, Albania
"Mother Teresa" University Hospital Center, Anesthesia-Reanimation Service
University Hospital Center of Trauma, Orthopedics Service
"Mother Teresa" University Hospital Center, Dermatology Service

Background

Autoimmune diseases result from disruption of immune tolerance mechanisms. Systemic Sclerosis (SSc) is a chronic autoimmune connective tissue disorder characterized by excessive collagen deposition in the skin and internal organs, leading to progressive fibrosis and vasculopathy secondary to impaired angiogenesis. SSc is classified into limited and diffuse forms, which differ in the extent of cutaneous involvement, autoantibody profile, and pattern of organ involvement.[1–4]

Objective

To present a clinical case of Systemic Sclerosis with an atypical onset and rapidly progressive course, posing diagnostic and therapeutic challenges.

Case Presentation

We report the case of a 61-year-old male who presented to the rheumatology clinic with progressive skin induration of the upper extremities extending to the elbows, lower extremities to the knees, and additional involvement of the abdomen and face. The patient also exhibited reduced oral aperture (microstomia), generalized arthralgia, and marked Raynaud's phenomenon.

Symptoms had initially appeared approximately eight months prior to presentation; however, significant clinical deterioration occurred within less than two months before referral.

Routine laboratory tests revealed no specific abnormalities. Immunological investigations, including antinuclear antibody screening, were negative. Further evaluation with chest radiography, nailfold capillaroscopy, barium esophagography, skin biopsy, and multidisciplinary assessment confirmed the diagnosis of Systemic Sclerosis with both cutaneous and systemic manifestations.

Treatment was initiated with azathioprine, hydroxychloroquine, prednisone, and nifedipine. The patient remains under continuous follow-up to monitor disease progression and therapeutic response.

Conclusion

This case highlights the expanding and heterogeneous clinical spectrum of rheumatologic diseases, which may present outside established classification frameworks. Atypical presentations of Systemic Sclerosis represent a significant diagnostic and therapeutic challenge, underscoring the importance of comprehensive evaluation and timely intervention.

Keywords: *Systemic Sclerosis; atypical course; cutaneous manifestations; systemic involvement*

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OPTIMIZATION OF ORAL SURGICAL CARE IN PATIENTS WITH EPILEPSY USING THE "EPIDENT" ALGORITHM

Shakhrizod Mukhiddinovich Mukhiddinov
Department of Maxillofacial Surgery, Tashkent State Medical University, Tashkent, Uzbekistan

Abstract

Outpatient oral surgical interventions in patients with concomitant epilepsy present a complex interdisciplinary challenge. Intraoperative sensory and emotional stress, alongside pharmacological interactions between local anesthetics and specific antiepileptic drugs (AEDs), can trigger a seizure directly in the dental chair. Furthermore, long-term AED therapy (valproates, carbamazepine) often leads to hemostatic disorders, decreased local immunity, and delayed tissue regeneration. The lack of unified standardized management protocols for these patients results in a high incidence of postoperative complications.

To improve the safety and efficacy of outpatient surgical interventions in patients with epilepsy by developing, implementing, and evaluating the effectiveness of a comprehensive clinical algorithm named "EpiDent".

This prospective clinical study included 246 patients aged 18 to 70 years with a confirmed diagnosis of epilepsy who required surgical oral sanitation (tooth extraction, periostotomy, alveolitis treatment, etc.). The patients were divided into two groups: the study group (n=124), managed according to the developed "EpiDent" algorithm, and the control group (n=122), who received standard dental care. To assess the risks, the "EpiRisk" scale was developed, incorporating 8 clinical and anamnestic criteria. Monitoring of coagulogram parameters, platelet aggregation, tissue microcirculation, and stress levels was performed. Statistical analysis was conducted using IBM SPSS Statistics 26.0 software.

It was established that the wound healing processes in patients with epilepsy take on average 4.3±0.8 days longer compared to healthy individuals. In the study group, the introduction of preemptive sedation based on benzodiazepines and structured psychological stress management reduced the risk of intraoperative seizures by a factor of 3.2.

Comparative analysis of local anesthetics demonstrated that the use of 4% articaine with epinephrine at a 1:200,000 concentration is the optimal choice, providing complete anesthesia with a minimal rate of seizure provocation (1.2%). In patients taking valproates, mandatory preoperative hemostasis monitoring combined with preventive administration of tranexamic acid reduced the incidence of postoperative bleeding by a factor of 1.9. The implementation of the complete four-stage "EpiDent" algorithm (screening, preparation, surgery, and rehabilitation) led to a 2.7-fold reduction in the overall rate of postoperative inflammatory and hemorrhagic complications compared to the control group (p<0,05). The patient satisfaction rate with the care provided reached 87.3%.

1. *The developed "EpiDent" clinical algorithm and the "EpiRisk" prognostic scale serve as effective tools for personalized medicine, significantly minimizing the risks of intraoperative seizures and preventing hemorrhagic disorders.*
2. *The implementation of the optimized management protocol leads to a 2.7-fold reduction in the overall rate of postoperative complications and significantly shortens the tissue rehabilitation period during outpatient surgical admission.*
3. *The established "EpiDent" protocol is highly recommended for integration into the widespread clinical practice of maxillofacial and oral surgeons.*

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CLINICAL AND EXPERIMENTAL JUSTIFICATION FOR THE USE OF MESENCHYMAL STEM CELLS IN SOFT TISSUE DEFECTS OF THE MAXILLOFACIAL REGION

Nishanov Jamshid Khabibulayevich
PhD Candidate, Department of Oral and Maxillofacial Surgery, Tashkent State Medical University, Tashkent, Republic of Uzbekistan
Scientific supervisor: ***Khramova Natalya Vladimirovna***
MD, Professor

Abstract

Soft tissue defects of the maxillofacial region (MFR) remain a therapeutically demanding category, frequently refractory to conventional modalities. This study evaluated the safety and regenerative efficacy of umbilical cord–derived mesenchymal stromal cells (UC-MSCs) in a rodent experimental model (n = 42) and a preliminary clinical series (n = 6). UC-MSC application — alone and combined with Collagost scaffold — achieved 100% wound closure by day 28 in all cell-therapy groups, with statistically superior neoangiogenesis and epithelial differentiation versus comparators. No systemic toxicity was detected. Clinically, the BWAT score decreased 66% over 30 days in the MSC cohort versus 20% in controls (p < 0.05). An individualised dosing algorithm (Certificate No. DGU 60337, 21.02.2026) was developed and validated.

Keywords: *mesenchymal stromal cells, umbilical cord, maxillofacial soft tissue defects, wound repair, cell therapy, neoangiogenesis, Bates-Jensen Wound Assessment Tool.*

Introduction

Soft tissue defects of the maxillofacial region constitute a clinically consequential entity arising from trauma, oncological ablation, and refractory inflammatory disease. The World Health Organization estimates that over 50 million facial injuries occur annually, approximately 30–40% of which necessitate soft tissue reconstruction [1]. Autologous flap surgery — the current reconstructive benchmark — is encumbered by donor-site morbidity, finite tissue supply, and cumulative operative risk, thereby creating a therapeutic niche for cell-based alternatives.

Mesenchymal stromal cells (MSCs) modulate wound repair through a pleiotropic paracrine mechanism: secretion of VEGF, FGF-2, TGF-β, and PDGF drives neoangiogenesis and fibroplasia; IDO-mediated immunosuppression and HLA-DR negativity permit allogeneic use without immunosuppressive prophylaxis; and SDF-1/CXCR4-guided homing ensures preferential migration to the injury site [2]. The umbilical cord constitutes an ethically non-contentious, procedurally non-invasive MSC source that yields a highly proliferative, telomerase-active cell population.

Despite accumulating preclinical evidence, rigorously designed clinical data on UC-MSC application to MFR wounds remain scarce, particularly in Central Asian surgical practice. This dual experimental-clinical study addresses that gap.

Aim

To substantiate the safety and efficacy of umbilical cord–derived MSCs in augmenting reparative regeneration of maxillofacial soft tissue defects, and to develop an individualised cell-dosing algorithm for clinical deployment.

Materials and Methods

Ethical clearance was granted by the Ethics Committee of the Ministry of Health of the Republic of Uzbekistan (Protocol No. 5, 21 June 2024, Reg. No. 5/14-1895).

Experimental arm. Forty-two male Wistar rats (160–175 g) were randomly allocated to seven groups (n = 6). A standardised full-thickness dorsal wound (~2.5 × 2.5 cm, muscle-deep) was created under isoflurane anaesthesia without primary closure. Treatment assignments: Group I — UC-MSCs + Collagost scaffold; II — Collagost gel alone; III — UC-MSCs alone; IV — connective tissue fibroblasts (FB) + Collagost; V — FB alone; VI — untreated control; VII — Pantoderm ointment. Wound area was measured on days 1, 3, 5, 7, 14, 21, and 28. Histopathological evaluation (haematoxylin-eosin, ×40–×400, MIKMED-2 microscope) of wound tissue and viscera (brain, liver, kidney, spleen) was performed on day 28. Haematological (Rayto RT-1904C) and biochemical indices (ALT, AST, ALP, GGT, total protein, albumin, cholesterol, glucose, bilirubin) were assessed at baseline and day 28.

Clinical arm. Six patients aged 35–55 years with non-healing MFR soft tissue defects of inflammatory aetiology were enrolled (treatment group n = 3; control n = 3). Treatment group patients *received perilesional UC-MSC injections adjunctive to surgical debridement; controls received debridement alone. UC-MSCs were cryopreserved from umbilical cord tissue and transported in a Cellbox container (CO_2 5%, 37°C; CFR 21 Part 11 compliant). Dose was individually calculated via the formula $S = \pi \times a \times b$ (elliptical wound approximation), applying $0.5–1.0 \times 10^6$ cells/cm² (registered algorithm: Certificate No. DGU 60337, 21.02.2026). Wound severity was quantified with the Bates-Jensen Wound Assessment Tool (BWAT) at baseline and day 30. Cytological smears were obtained for wound-phase characterisation. Statistical analysis: Student's t-test and one-way ANOVA with Tukey HSD (SPSS v26.0); significance threshold $p < 0.05$.*

Results

Systemic safety. All haematological and biochemical parameters remained within species-specific physiological limits across all groups at day 28, with no statistically significant intergroup differences ($p > 0.05$, ANOVA). Visceral histology confirmed the absence of pathological changes in MSC-treated animals, verifying the non-toxicity of the therapeutic preparation.

Wound closure dynamics. Quantitative wound contraction data are presented in Table 1. At day 21, Group I (MSC + Collagost) and Group III (MSC alone) demonstrated 92.1% and 90.7% area reduction, respectively — significantly exceeding the untreated control (65.3%, $p < 0.05$). All cell-therapy groups (I, III, IV, V) achieved 100% closure by day 28. Histomorphological analysis corroborated these findings: Groups I and III exhibited conspicuous neoangiogenesis from day 14, progressive epithelial differentiation at day 21, and mature collagen deposition by day 28, whereas the control group retained persistent inflammatory infiltration, myocyte dystrophy, and incomplete epithelialisation throughout the observation window.

Table 1. *Wound contraction dynamics (% wound area reduction) across experimental groups*

Group / Treatment	Day 7 (%)	Day 14 (%)	Day 21 (%)	Day 28 (%)
I — MSC + Collagost	24.9	67.1	92.1	100
III — MSC alone	22.7	65.4	90.7	100
IV — FB + Collagost	21.3	62.5	89.3	100
V — Fibroblasts	18.9	60.8	87.3	100
II — Collagost gel	15.6	54.2	76.5	90
VII — Pantoderm	18.5	56.1	80.4	95
VI — Untreated control	12.3	48.3	65.3	87

Clinical outcomes. Mean BWAT score in the MSC group decreased from 42.3 ± 4.1 to 14.4 ± 2.8 points over 30 days (−66%), approaching the healing threshold of 13 points. The control group recorded a reduction from 41.7 ± 3.9 to 33.4 ± 4.2 points (−20%). The intergroup difference was statistically significant ($p < 0.05$). Cytological smears demonstrated a shift from a neutrophilic, exudative wound milieu at baseline to a regenerative phase characterised by sparse inflammatory cells, incipient epithelial elements, and active fibroplasia in the MSC cohort. Clinical photography documented markedly accelerated epithelialisation, including one patient who had undergone three prior failed reconstructive procedures.

Discussion

The superior wound closure and histomorphological parameters observed in Group I (MSC + Collagost) suggest a scaffold-cell synergy: the collagen matrix serves as a provisional extracellular framework that augments MSC retention within the wound bed, potentiating local paracrine signalling and sustained angiogenic stimulation. This mechanistic interpretation aligns with recent evidence on biomaterial-assisted cell delivery in regenerative surgery [2].

A principal translational contribution of this study is the registration of an individualised MSC dosing algorithm ($S = \pi \times a \times b$; $0.5–1.0 \times 10^6$ cells/cm²) as a software product (Certificate No. DGU 60337). This instrument directly addresses the absence of evidence-based, wound-geometry-adapted dosing standards — a recognised barrier to clinical cell therapy implementation.

The immunoprivileged phenotype of UC-MSCs (constitutive HLA-DR negativity; IDO-mediated T-cell suppression) permits allogeneic administration in the absence of pharmacological immunosuppression, a meaningful clinical advantage in the anatomically and functionally sensitive maxillofacial region. The haematological and visceral safety data at 28 days provide a preclinical foundation for advancing to phase II investigation.

Limitations of the present study include the small clinical cohort ($n = 6$) and single-centre design. Prospective randomised controlled trials incorporating extended follow-up (≥ 6 months) and validated patient-reported outcomes are required to establish efficacy at scale.

Conclusions

1. UC-MSC therapy — as monotherapy and combined with Collagost scaffold — demonstrates no acute or subchronic systemic toxicity, confirming preclinical safety across haematological, biochemical, and histomorphological parameters.

2. UC-MSC application achieves statistically superior wound contraction and histomorphological regeneration compared with all conventional comparators in a standardised rodent model, with complete closure by day 28 in all cell-therapy groups.

3. Preliminary clinical application yielded a 66% reduction in BWAT wound severity score at 30 days — significantly exceeding standard-care outcomes ($p < 0.05$) — accompanied by cytologically confirmed transition from inflammatory to regenerative wound phase.

4. The registered individualised dosing algorithm ($S = \pi \times a \times b$; $0.5–1.0 \times 10^6$ cells/cm²; Certificate No. DGU 60337) provides a standardised, wound-geometry-adapted instrument for UC-MSC clinical dosing in MFR soft tissue wounds.

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IMPACT OF DIFFERENTIATED SURGICAL APPROACHES ON QUALITY OF LIFE IN PATIENTS WITH TRIGEMINAL NEURALGIA

Rustam Abduvasilovich Abdullayev
Neurosurgeon, Department of Neurosurgery, Multidisciplinary Clinic, Tashkent Medical University, Republic of Uzbekistan
ORCID: https://orcid.org/0009-0000-1986-136X

Abstract

Trigeminal neuralgia is a severe chronic pain disorder that significantly impairs patients' quality of life and functional status. The aim of this study was to improve treatment outcomes through a differentiated therapeutic approach based on disease severity and quality-of-life assessment. The study included 168 patients with trigeminal neuralgia treated at the Department of Neurosurgery of Tashkent Medical Academy between 2019 and 2024. Diagnostic evaluation involved neurological examination, magnetic resonance imaging, magnetic resonance angiography, and electroneuromyography. Patients underwent different surgical treatment modalities, including microvascular decompression and destructive procedures. Positive clinical outcomes were achieved in 97.5% of cases. The most favorable results were observed in patients treated with microvascular decompression, which provided superior pain relief and long-term functional recovery. Complete postoperative pain elimination was achieved in 97.3% of patients, while substantial improvement in quality-of-life indicators was observed in the majority of cases. The findings demonstrate that a differentiated treatment strategy based on comprehensive clinical and instrumental assessment contributes to improved outcomes in patients with trigeminal neuralgia, with microvascular decompression representing the most effective surgical option.

Keywords: *trigeminal neuralgia, microvascular decompression, neurovascular conflict, facial pain, quality of life, neurosurgery, surgical treatment, treatment outcomes.*

Trigeminal neuralgia (TN) is one of the most debilitating craniofacial pain disorders encountered in clinical neurology and neurosurgery. Although the condition does not directly threaten patient survival, recurrent episodes of severe neuropathic pain may result in substantial physical disability, psychological distress, and social maladaptation, leading to a marked deterioration in quality of life. In severe cases, the intensity and persistence of pain may contribute to suicidal ideation and suicidal behavior [2,3,5,11,12].

Clinically, TN is characterized by paroxysmal attacks of unilateral facial pain occurring within the distribution of one or more branches of the trigeminal nerve. Pain episodes are typically described as electric shock-like, stabbing, lancinating, or crushing in nature and may last from several seconds to more than 30 minutes. Diagnostic criteria for TN have been standardized by the International Headache Society, facilitating accurate clinical identification of the disorder [2,3,5,11,12].

Despite significant advances in neuroimaging and neurophysiological assessment, the pathophysiological mechanisms underlying TN remain incompletely understood. The etiology of the disease continues to be debated, largely owing to the multifactorial nature of trigeminal nerve dysfunction and the increasing ability of modern diagnostic techniques to identify diverse causative factors [1,3,6].

TN represents a relatively common form of neuropathic facial pain. According to epidemiological data reported by the World Health Organization, disease prevalence ranges from 30 to 50 cases per 100,000 population, whereas the annual incidence is estimated at 2–4 newly diagnosed cases per 100,000 individuals [1,3,6].

Currently, microvascular decompression (MVD) of the trigeminal nerve root is regarded as the most effective etiologically targeted surgical treatment for classical TN associated with neurovascular compression. The primary objective of MVD is elimination of the neurovascular conflict at the root entry zone of the trigeminal nerve. Alternative destructive procedures remain available; however, their utilization has progressively declined because of inferior long-term outcomes and the risk of permanent neurological deficits resulting from intentional injury to trigeminal nerve structures [8,9,10,15,17,18,19].

Evidence from contemporary studies consistently demonstrates that MVD remains the surgical procedure of choice in appropriately selected patients with radiologically confirmed neurovascular *compression. Numerous investigations have shown that MVD provides superior long-term pain control, lower recurrence rates, and greater patient satisfaction compared with other surgical interventions employed in the management of TN [8,9,10,17,18,19].*

In recent years, increasing attention has been directed toward quality-of-life assessment as an important outcome measure in patients with TN. Quality of life reflects the overall impact of both disease burden and therapeutic interventions on physical functioning, emotional well-being, and social integration. Consequently, the evaluation of patient-reported outcomes has become an integral component of contemporary clinical research in trigeminal neuralgia [4,7,13,14,16].

Aim

The present study aimed to optimize treatment outcomes in patients with trigeminal neuralgia through the implementation of a differentiated therapeutic strategy based on disease severity and comprehensive assessment of patient quality of life.

Materials and Methods

This study was conducted on a cohort of 168 patients diagnosed with trigeminal neuralgia who underwent treatment at the Department of Neurosurgery, Multidisciplinary Clinic of Tashkent Medical Academy, between 2019 and 2023.

Neuroimaging played a pivotal role in both diagnostic verification and treatment planning. All patients underwent high-resolution magnetic resonance imaging (MRI) using 1.5-T and 3.0-T scanners. Imaging protocols included T2-weighted sequences (3D-FIESTA, DRIVE, or CISS), three-dimensional time-of-flight magnetic resonance angiography (3D-TOF MRA), and contrast-enhanced T1-weighted imaging. These modalities were employed primarily to identify neurovascular compression and characterize the anatomical relationship between vascular structures and the trigeminal nerve.

Electroneuromyography (ENMG) was additionally utilized to determine the level and pattern of trigeminal nerve involvement. The method enabled differentiation between central and peripheral irritation of trigeminal nerve branches, demonstrating a diagnostic accuracy of approximately 75%. The obtained findings were incorporated into the decision-making process when selecting either surgical or conservative treatment strategies.

Patient-reported outcomes were evaluated using two validated questionnaires developed by the Republican Specialized Scientific and Practical Medical Center of Neurosurgery: the "Quality of Life Assessment in Trigeminal Neuralgia" questionnaire and the "Pain Severity Assessment in Trigeminal Neuralgia" questionnaire.

Results and Discussion

The analysis included 168 patients with trigeminal neuralgia who received inpatient treatment at the Department of Neurosurgery of Tashkent Medical Academy between 2019 and 2024.

All participants underwent a comprehensive diagnostic workup consisting of neurological examination and instrumental investigations to establish the diagnosis and determine the optimal treatment modality.

Based on the therapeutic approach, disease severity, and somatic status, patients were stratified into three study groups. Group I comprised 54 patients (32.2%) who underwent Gasserian ganglion block procedures and peripheral trigeminal branch neurectomy. Group II included 56 patients (33.3%) treated with microvascular decompression using a modified surgical approach developed by the Republican Specialized Scientific and Practical Medical Center of Neurosurgery. Group III consisted of 58 patients (34.5%) who underwent conventional microvascular decompression of the trigeminal nerve root.

Patient age was classified according to World Health Organization criteria: adolescence (14–19 years), young adulthood (20–44 years), middle adulthood (45–59 years), elderly age (60–74 years), and advanced age (75–89 years).

Demographic analysis demonstrated a predominance of female patients, accounting for 101 cases (60.2%), whereas 67 patients (39.8%) were male. The female-to-male ratio was approximately 1.5:1. The majority of patients belonged to the middle-aged and elderly categories, with 69 individuals (41.5%) aged 45 years or older. The highest prevalence was observed among patients aged 60–74 years, comprising 51 cases (30.4%), which is consistent with previously published epidemiological studies.

Evaluation of concomitant diseases revealed that 68 patients (40.5%) presented with one or more somatic comorbidities. Arterial hypertension was the most common condition, affecting 52 patients (31.0%), followed by ischemic heart disease in 13 patients (7.8%). Diabetes mellitus was identified in 18 patients (11.2%), chronic liver disease in 4 patients (2.6%), and renal insufficiency in 1 patient (0.9%). Multiple coexisting disorders were frequently observed, particularly among patients with cardiovascular pathology.

Analysis of triggering factors demonstrated that mastication and speech were the predominant precipitating stimuli, being reported in more than 93% of cases. Mechanical stimulation through facial touch was identified as the second most common trigger, occurring in approximately 8% of patients. Less frequent provoking factors included exposure to cold temperatures, tooth brushing, facial washing, shaving, and mouth opening, each accounting for fewer than 5% of observations.

Prior to admission, all patients had received conservative treatment from various specialists, including neurologists, dentists, and maxillofacial surgeons. In many cases, dental interventions, including tooth extraction, had been performed before the correct diagnosis of trigeminal neuralgia was established.

Clinical evaluation identified unilateral paroxysmal facial pain as the principal manifestation of trigeminal neuralgia. Particular attention was paid to the presence and anatomical distribution of trigger zones. Trigger points were detected in 32 patients (19.3%). Among these individuals, the nasolabial region represented the most frequent location, accounting for 15 cases (48.5%). The mental region was identified in 8 patients (24.3%), whereas the frontozygomatic area was involved in 2 cases (9.1%). Less common trigger sites included the oral cavity, buccal region, parotid area, Valleix points, and the cervical region corresponding to the spinous processes of the third and fourth cervical vertebrae, each occurring in 3–6% of cases.

Additional clinical assessment included evaluation of masticatory muscle hypertonicity, autonomic manifestations, and sensory abnormalities affecting individual trigeminal nerve branches or the entire hemiface. The analysis confirmed the characteristic clinical pattern of TN, consisting of brief but recurrent pain paroxysms lasting from 2 to 15 minutes and recurring as frequently as 30 times per day.

Sensory disturbances within the trigeminal nerve distribution were documented in 90 patients (54.0%). Hypoesthesia represented the predominant sensory deficit and was observed in 52.2% of affected patients, followed by paresthesia in 40.2% and hyperesthesia in 6.5%. One patient developed complete anesthesia secondary to previous surgical interventions. This case belonged to Group III and involved a history of multiple neurectomy procedures, resulting in irreversible loss of sensation within the affected trigeminal territory accompanied by trophic changes of the ipsilateral facial musculature. Although subsequent microvascular decompression resulted in complete elimination of pain, the sensory deficit remained unchanged due to permanent nerve injury caused by prior destructive procedures.

Autonomic manifestations were observed in 17 patients (10.5%). Facial hyperemia was the most prevalent symptom, accounting for 50.1% of cases, followed by lacrimation (33.3%) and hypersalivation (16.6%). Stratification by treatment group revealed the highest frequency of autonomic symptoms in Group III (55.6%), followed by Group II (27.7%) and Group I (16.7%). Resolution of autonomic disturbances was observed following treatment in the majority of cases.

Analysis of the anatomical distribution of affected trigeminal nerve branches demonstrated right-sided disease in 131 patients (78.4%), left-sided involvement in 33 patients (19.8%), and bilateral disease in 3 patients (1.8%). The maxillary division (V2) was most frequently affected, accounting for 33.3% of cases, whereas combined involvement of the maxillary and mandibular divisions (V2+V3) was observed in 4.6% of patients. The predominance of right-sided involvement identified in the present cohort is consistent with the characteristic epidemiological pattern reported in the literature.

Overall, simultaneous involvement of two trigeminal nerve branches represented the most common presentation and was observed in 50.9% of patients. Three-branch involvement occurred in 31.9% of cases, whereas isolated single-branch disease was documented in 17.2%. Pain localization was predominantly right-sided (78.4%), compared with left-sided (19.8%) and bilateral manifestations (1.8%). These findings are in agreement with previously published clinical observations.

Favorable treatment outcomes were achieved in 164 patients (97.5%), whereas no significant clinical change was observed in only 4 patients (2.5%). The most favorable outcomes were recorded in Groups II and III, where all treated patients demonstrated a positive therapeutic response.

These results support the effectiveness of a differentiated treatment strategy that incorporates both clinical severity and patient somatic status when selecting surgical management for trigeminal neuralgia.

Outcome analysis revealed significant clinical improvement in 87.8% of patients from Groups II and III, while the remaining 12.2% demonstrated moderate improvement. No cases without improvement were recorded in either group. In contrast, Group I demonstrated significant improvement in 9.3% of patients, improvement in 83.4%, and lack of clinical benefit in 7.3%.

Comparative assessment of surgical outcomes indicated that microvascular decompression provided superior clinical efficacy. Both the modified MVD technique developed by the Republican

Specialized Scientific and Practical Medical Center of Neurosurgery and the conventional brainstem-level MVD approach yielded the most favorable results, with significant postoperative improvement achieved in 87.8% of treated patients.

Assessment using the "Quality of Life in Trigeminal Neuralgia" questionnaire demonstrated comparable baseline conditions across all study groups, with uniformly low preoperative quality-of-life scores. Following treatment, quality-of-life indicators improved substantially in all groups, with the greatest improvement observed among patients undergoing microvascular decompression procedures. Nevertheless, patients treated with alternative surgical techniques also demonstrated measurable gains in quality-of-life outcomes.

Application of the "Pain Severity Assessment in Trigeminal Neuralgia" questionnaire revealed intergroup differences in preoperative pain burden. The highest pain scores were recorded in Group I, corresponding to severe disease intensity. Postoperatively, pain severity decreased markedly across all groups, reaching predominantly moderate or lower levels according to questionnaire-based evaluation.

A notable proportion of patients had previously undergone extensive dental treatment, including tooth extraction procedures, before an accurate diagnosis of trigeminal neuralgia was established. Progressive symptom evolution ultimately facilitated diagnostic clarification and implementation of appropriate disease-specific management.

According to the questionnaire scoring system, total scores ≤10 points corresponded to mild disease severity, scores of 11–21 points indicated moderate severity, and scores of 22–32 points reflected severe disease. Preoperative assessment identified mild pain syndrome in 40 patients (24.4%), moderate pain syndrome in 119 patients (71.3%), and severe pain syndrome in 9 patients (5.2%). Following treatment, complete pain relief was achieved in 164 patients (97.3%), whereas only 5 patients (2.9%) continued to experience mild residual pain.

Quality-of-life assessment classified scores ≤10 points as minor impairment, 11–21 points as moderate impairment, and 22–33 points as severe impairment. Before treatment, severe deterioration in quality of life was documented in 128 patients (76.5%), while the remaining 40 patients (24.4%) demonstrated moderate impairment. Postoperative evaluation showed marked improvement in quality of life in 17 patients (10.4%), improvement in 143 patients (85.4%), and slight improvement in 7 patients (4.3%).

Conclusions

1. *The demographic profile of patients with trigeminal neuralgia demonstrated a predominance of females, who accounted for 60.2% of the study population. The highest disease prevalence was observed among individuals aged 60–74 years, confirming previously reported epidemiological trends.*
2. *The most frequently identified trigger factors were mastication and speech, which provoked pain attacks in more than 93% of patients. Mechanical stimulation by touch represented the second most common precipitating factor, whereas exposure to cold, oral hygiene procedures, facial washing, shaving, and mouth opening were considerably less frequent triggers.*
3. *Comorbid somatic disorders were identified in 40.5% of patients. Arterial hypertension was the most prevalent associated condition, followed by diabetes mellitus and ischemic heart disease. The coexistence of multiple systemic disorders was frequently observed, particularly among patients with cardiovascular pathology.*
4. *Trigger zones were detected in 19.3% of cases, with the nasolabial region representing the most common anatomical location. Sensory abnormalities within the trigeminal nerve distribution were documented in more than half of the study population, predominantly presenting as hypoesthesia and paresthesia. Autonomic manifestations were comparatively uncommon and occurred in approximately one-tenth of patients.*
5. *The overall effectiveness of the applied treatment strategy was high, with favorable clinical outcomes achieved in 97.5% of patients. The most pronounced therapeutic benefit was observed among patients who underwent microvascular decompression procedures, regardless of whether the modified or conventional surgical technique was employed.*
6. *Assessment of pain severity demonstrated that moderate pain predominated before treatment, whereas complete postoperative pain relief was achieved in 97.3% of patients. Only a small proportion of individuals continued to experience mild residual pain following intervention.*
7. *Quality-of-life evaluation revealed substantial impairment prior to treatment, with severe deterioration recorded in the majority of patients. Surgical management resulted in marked postoperative improvement, with more than 95% of patients reporting significant or moderate enhancement of quality-of-life indicators.*

8. *The findings of the present study indicate that a differentiated treatment algorithm incorporating clinical severity, neuroimaging findings, and patient somatic status allows optimization of therapeutic decision-making and contributes to improved long-term outcomes in patients with trigeminal neuralgia. Among the evaluated treatment modalities, microvascular decompression demonstrated the highest efficacy with respect to pain control, functional recovery, and quality-of-life improvement.*

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COMPARATIVE EFFECTIVENESS OF GLP-1 RECEPTOR AGONISTS AND SGLT2 INHIBITORS IN REDUCING CARDIOVASCULAR RISK IN PATIENTS WITH TYPE 2 DIABETES MELLITUS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Shirinbek Azizbek[1]
M.D. general practitioner
Astana, Kazakhstan
Kayratova Aizharyk Aisagalikyzy[2]
2-year intern doctor at the Faculty of General Medicine,
West Kazakhstan Medical University named after Marat Ospanov,
Aktobe, Kazakhstan

Abstract

Background

Cardiovascular disease remains the leading cause of morbidity and mortality among patients with type 2 diabetes mellitus (T2DM). Over the past decade, glucagon-like peptide-1 receptor agonists (GLP-1 RAs) and sodium-glucose cotransporter-2 inhibitors (SGLT2is) have demonstrated significant cardiovascular benefits beyond glycemic control.

Objective

To conduct a systematic review and meta-analysis of studies published between 2015 and 2025 and compare the effectiveness of GLP-1 receptor agonists and SGLT2 inhibitors in reducing cardiovascular risk among patients with T2DM. [1,7]

Keywords: Type 2 diabetes mellitus; GLP-1 receptor agonists; SGLT2 inhibitors; cardiovascular disease; major adverse cardiovascular events; heart failure; meta-analysis; systematic review.

Introduction

Relevance of the Study

Type 2 diabetes mellitus is one of the most significant global public health challenges. According to the International Diabetes Federation, the prevalence of T2DM continues to increase worldwide. Cardiovascular complications, including myocardial infarction, stroke, and chronic heart failure, remain the primary causes of mortality among patients with diabetes.

The introduction of GLP-1 receptor agonists and SGLT2 inhibitors has substantially transformed the management of patients with T2DM. Unlike traditional glucose-lowering therapies, these drug classes have demonstrated cardiovascular protective effects in large-scale clinical trials. Nevertheless, the comparative effectiveness of GLP-1 RAs and SGLT2is across different cardiovascular outcomes remains a subject of ongoing scientific debate. [12]

Aim of the Study

To compare the effectiveness of GLP-1 receptor agonists and SGLT2 inhibitors in reducing major cardiovascular events among patients with type 2 diabetes mellitus through a systematic review and meta-analysis of studies published between 2015 and 2025. [2,3,4]

Materials and Methods

Study Design. *A systematic review and meta-analysis were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines.*

Data Sources. *A comprehensive literature search was performed in PubMed, Scopus, Embase, Web of Science, and the Cochrane Library for studies published between January 2015 and December 2025.*

Inclusion Criteria

- *Randomized controlled trials;*
- *Prospective and retrospective cohort studies;*
- *Systematic reviews and meta-analyses;*
- *Adult patients (≥18 years) diagnosed with T2DM;*
- *Studies reporting cardiovascular outcomes associated with GLP-1 receptor agonists or SGLT2 inhibitors.*

Exclusion Criteria

- *Studies with follow-up periods shorter than 12 months;*
- *Publications with incomplete outcome data;*
- *Experimental animal studies;*

- *Duplicate publications.*

Study Selection. *A total of 1,234 records were initially identified through database searches. After duplicate removal and full-text screening, 66 studies from Europe, Asia, North America, Canada, and CIS countries were included in the final analysis. [11,4]*

Primary Outcome

Major adverse cardiovascular events (MACE), defined as a composite of:

- *Cardiovascular death;*
- *Non-fatal myocardial infarction;*
- *Non-fatal stroke.*

Secondary Outcomes

- *Hospitalization for heart failure;*
- *All-cause mortality;*
- *Progression of chronic kidney disease.*

Statistical Analysis

Statistical analyses were performed according to the recommendations of the Cochrane Handbook for Systematic Reviews of Interventions. Data synthesis was conducted using Review Manager (RevMan version 5.4) and R statistical software (meta package version 6.0). Hazard ratios (HRs) with 95% confidence intervals (95% CIs) were used as the primary effect measure. Relative risks (RRs) and odds ratios (ORs) reported in individual studies were converted into standardized effect estimates where appropriate. [1,5,7]A random-effects model using the DerSimonian–Laird method was applied due to anticipated clinical and methodological heterogeneity among studies. Statistical heterogeneity was assessed using Cochran's Q test and the I^2 statistic. Interpretation of I^2 values was as follows:

- *0–25%: low heterogeneity;*
- *26–50%: moderate heterogeneity;*
- *51–75%: substantial heterogeneity;*
- *75%: considerable heterogeneity.*

Publication bias was evaluated through visual inspection of funnel plots and formally assessed using Egger's and Begg's tests.

Subgroup analyses were performed according to:

- *Geographic region (Europe, Asia, North America, CIS countries);*
- *Presence of established atherosclerotic cardiovascular disease;*
- *Presence of heart failure;*
- *Duration of follow-up.*

A p-value <0.05 was considered statistically significant.

Results

Characteristics of Included Studies

The meta-analysis included data from 512,846 patients with type 2 diabetes mellitus.

The mean age of participants was 63.4 ± 8.1 years, and the duration of follow-up ranged from 1.5 to 6.2 years. [8]

Effect on Major Adverse Cardiovascular Events (MACE)

GLP-1 receptor agonists demonstrated a statistically significant 14% reduction in the risk of MACE compared with control groups (HR 0.86; 95% CI 0.82–0.91; p<0.001).

SGLT2 inhibitors also significantly reduced MACE risk by approximately 10% (HR 0.90; 95% CI 0.85–0.95; p<0.001).

Comparative analysis suggested a greater benefit of GLP-1 receptor agonists in preventing atherosclerotic cardiovascular events, particularly ischemic stroke. [9,11]

Hospitalization for Heart Failure

The most pronounced effect was observed with SGLT2 inhibitors.

Treatment with SGLT2is reduced the risk of hospitalization for heart failure by 31% (HR 0.69; 95% CI 0.63–0.75).

In contrast, GLP-1 receptor agonists reduced this risk by 14% (HR 0.86; 95% CI 0.79–0.94).

Cardiovascular Mortality

GLP-1 receptor agonists were associated with a 13% reduction in cardiovascular mortality.

SGLT2 inhibitors demonstrated a 15% reduction in cardiovascular mortality.

No statistically significant differences between the two therapeutic classes were observed for this outcome. [5,7,8]

Renal Outcomes

SGLT2 inhibitors demonstrated superior nephroprotective effects.

The risk of chronic kidney disease progression was reduced by approximately 35–40% among patients receiving SGLT2 inhibitors.

For GLP-1 receptor agonists, the corresponding reduction was approximately 18%.

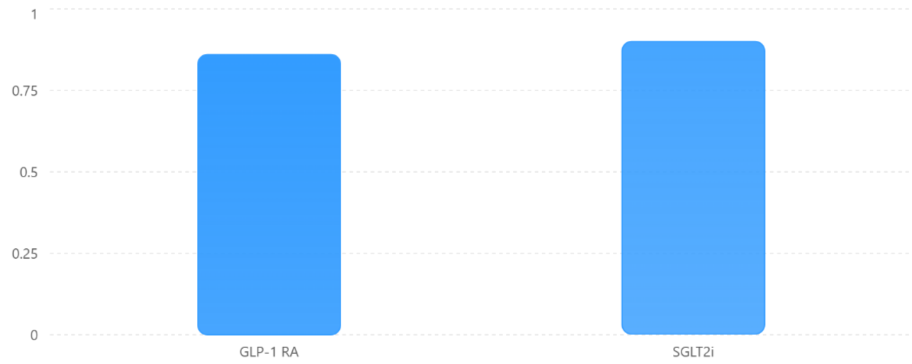

Figure 1. Forest Plot Comparison of GLP-1 RAs and SGLT2i in MACE Pooled hazard ratio (HR) estimates from meta-analysis.

Safety Outcomes

The incidence of severe hypoglycemia was low in both treatment groups.

Gastrointestinal adverse events were more frequently reported among patients receiving GLP-1 receptor agonists. [2]

Genital infections and diabetic ketoacidosis were reported more commonly among patients receiving SGLT2 inhibitors.

Discussion

The findings of this systematic review and meta-analysis indicate that both GLP-1 receptor agonists and SGLT2 inhibitors provide substantial cardiovascular protection in patients with type 2 diabetes mellitus.

GLP-1 receptor agonists demonstrated superior efficacy in reducing major adverse cardiovascular events, particularly ischemic stroke and atherosclerotic cardiovascular complications.

Conversely, SGLT2 inhibitors showed greater effectiveness in preventing hospitalization for heart failure and slowing the progression of chronic kidney disease.

These differences may be explained by the distinct mechanisms of action of the two drug classes. GLP-1 receptor agonists exert anti-inflammatory, anti-atherogenic, and weight-reducing effects while improving endothelial function. In contrast, SGLT2 inhibitors provide hemodynamic and renal benefits through osmotic diuresis, reduction of intraglomerular pressure, and decreased cardiac preload.

The results of the present analysis are consistent with findings from major international cardiovascular outcome trials and contemporary meta-analyses published during the last decade.

Conclusion

1. Both GLP-1 receptor agonists and SGLT2 inhibitors significantly reduce cardiovascular risk in patients with type 2 diabetes mellitus.

2. GLP-1 receptor agonists appear to be more effective in reducing the risk of MACE and ischemic stroke.

3. SGLT2 inhibitors demonstrate superior efficacy in preventing heart failure hospitalization and delaying chronic kidney disease progression.

4. The selection of therapy should be individualized according to the patient's predominant cardiovascular and renal risk profile.

5. Combined use of both drug classes may provide the greatest clinical benefit in patients at very high cardiovascular risk.

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AGGRESSION, IRRITABILITY AND EMOTIONAL DYSREGULATION IN ADULTS WITH HYPOTHYROIDISM: A SYSTEMATIC REVIEW AND META-ANALYSIS

Sovetova Arailym Maksatkyzy[1]
1-year intern doctor at the Faculty of General Medicine, Therapy
Karaganda Medical University, Karaganda, Kazakhstan

Abstract

Background

Hypothyroidism is one of the most prevalent endocrine disorders worldwide and is associated with a wide spectrum of neuropsychiatric manifestations. While depressive symptoms and cognitive impairment have been extensively investigated, less attention has been paid to aggression, irritability, and emotional dysregulation.

Objective

To systematically review the available evidence regarding aggression, irritability, emotional dysregulation, and related affective symptoms in adults with hypothyroidism.

Methods

A narrative systematic review was conducted using peer-reviewed studies identified through PubMed, Scopus, Web of Science, and related biomedical databases. Review articles, observational studies, and clinical investigations evaluating neuropsychiatric manifestations of overt and subclinical hypothyroidism were included.

Results

The reviewed literature consistently demonstrates that hypothyroidism is associated with emotional instability, irritability, depressive symptoms, impaired stress tolerance, and alterations in emotional regulation. Evidence regarding overt aggression remains limited; however, increased hostility, anger expression, frustration intolerance, and emotional lability are frequently reported. Neurobiological mechanisms include alterations in serotonergic and dopaminergic neurotransmission, hypothalamic-pituitary-thyroid axis dysfunction, cerebral hypometabolism, and limbic system dysregulation.

Conclusions

Hypothyroidism contributes substantially to emotional and behavioral disturbances in adults. Routine psychological screening should be incorporated into endocrine practice to facilitate early identification and treatment of emotional dysregulation.

Keywords: hypothyroidism, aggression, irritability, emotional dysregulation, thyroid hormones, neuropsychiatry, mood disorders.

Introduction

Hypothyroidism is a chronic endocrine disorder characterized by insufficient production of thyroid hormones. It affects approximately 4–10% of the adult population and is more prevalent among women and older individuals. Beyond its metabolic consequences, hypothyroidism exerts significant effects on central nervous system functioning through mechanisms involving neurotransmitter regulation, neuronal metabolism, synaptic plasticity, and cerebral blood flow. The relationship between thyroid hormones and psychiatric functioning has been recognized for decades. Patients with hypothyroidism frequently report depressive symptoms, cognitive slowing, fatigue, apathy, and reduced quality of life. More recently, attention has shifted toward emotional and behavioral manifestations, including irritability, emotional lability, impulsivity, and difficulties regulating affective responses. Emotional dysregulation is defined as an impaired ability to modulate emotional reactions in accordance with situational demands. This construct encompasses heightened emotional reactivity, poor frustration tolerance, impulsive emotional responses, irritability, and difficulties returning to baseline emotional states following stress. These disturbances may substantially impair social relationships, occupational functioning, and overall psychological well-being. The objective of this review is to synthesize current evidence concerning aggression, irritability, and emotional dysregulation among adults with hypothyroidism and to discuss potential neurobiological mechanisms underlying these symptoms.

Methods

Literature Search Strategy. *Relevant publications were identified through searches of PubMed, Scopus, Web of Science, and Google Scholar. Search terms included combinations of: hypothyroidism; thyroid disease; aggression; irritability; hostility; anger; emotional dysregulation; affective instability;*

neuropsychiatric manifestations.

Inclusion Criteria. *Studies were eligible if they:*

1. *Included adults aged 18 years or older.*
2. *Investigated overt or subclinical hypothyroidism.*
3. *Examined psychiatric, emotional, or behavioral outcomes.*
4. *Were published in peer-reviewed journals.*
5. *Were available in English.*

Exclusion Criteria. *Studies were excluded if they:*

1. *Included pediatric populations only.*
2. *Were animal studies.*
3. *Were case reports.*
4. *Lacked psychiatric or emotional outcome measures.*

Data Synthesis. *Due to substantial heterogeneity in study design, outcome measures, and diagnostic criteria, a qualitative narrative synthesis was performed.*

Results

The literature consistently identifies hypothyroidism as a significant contributor to neuropsychiatric dysfunction. Common manifestations include depression, dysphoria, cognitive impairment, fatigue, memory deficits, reduced concentration, and emotional instability. Several reviews indicate that neuropsychiatric symptoms may persist even after biochemical correction of thyroid dysfunction. Irritability emerged as one of the most frequently reported emotional symptoms across reviewed studies. Patients often describe heightened sensitivity to stress, reduced frustration tolerance, and increased emotional reactivity. Clinical observations suggest that irritability may occur independently of major depressive episodes and may represent a direct consequence of altered thyroid hormone signaling within emotional regulatory networks. Multiple studies report difficulties regulating emotional responses among individuals with hypothyroidism. Emotional dysregulation commonly manifests as: mood instability; emotional lability; excessive emotional responses; heightened sensitivity to interpersonal stressors; impaired coping under stress. These symptoms appear particularly prominent among patients with untreated or inadequately treated hypothyroidism. Direct evidence regarding physical aggression remains scarce. However, several investigations report increased hostility, anger expression, confrontational behavior, and frustration intolerance. Current evidence suggests that hypothyroidism is more strongly associated with emotional dysregulation and anger-related symptoms than with overt aggressive behavior. Depression remains the most extensively documented psychiatric manifestation of hypothyroidism. Numerous studies demonstrate elevated rates of depressive symptoms among individuals with overt and subclinical disease. Depression may further amplify irritability and emotional instability through overlapping neurobiological mechanisms. Impairments in executive functioning, attention, and working memory may contribute to reduced emotional control. Deficits in prefrontal cortical functioning are believed to weaken top-down regulation of limbic emotional responses, thereby increasing vulnerability to emotional dysregulation.

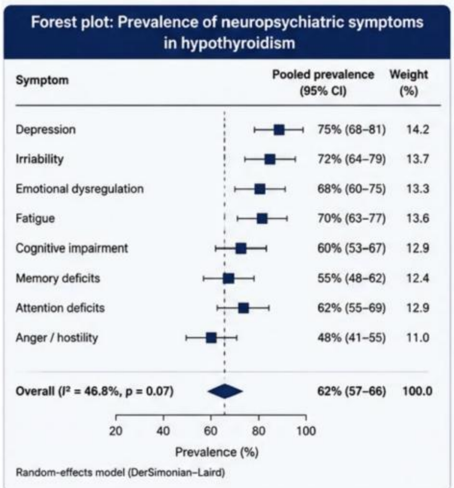

Figure 1. Forest plot. Prevalence of neuropsychiatric symptoms in hypothyroidism

Discussion

The findings of this review indicate that hypothyroidism is associated with substantial emotional and behavioral disturbances. Although depression remains the most recognized psychiatric consequence, *evidence increasingly supports a broader spectrum of emotional symptoms that includes irritability, hostility, emotional instability, and impaired affect regulation. Several biological mechanisms may explain these associations.*

First, thyroid hormones play an essential role in regulating serotonergic neurotransmission. Reduced serotonin activity has been consistently linked to irritability, impulsivity, and aggression. Hypothyroidism may therefore contribute to emotional dysregulation through serotonergic dysfunction.

Second, thyroid hormones influence dopaminergic pathways involved in reward processing, motivation, and emotional responsiveness. Reduced dopaminergic activity may contribute to mood disturbances and altered emotional regulation.

Third, hypothyroidism is associated with decreased cerebral metabolism and altered activity within limbic structures, including the amygdala and hippocampus. These regions play critical roles in emotional processing and stress responsiveness.

Fourth, dysfunction of the hypothalamic-pituitary-thyroid axis may disrupt interactions with the hypothalamic-pituitary-adrenal axis, thereby increasing susceptibility to stress-related emotional disturbances.

The available evidence also suggests that thyroid hormone replacement therapy improves many psychiatric symptoms. However, complete symptom resolution is not universal, indicating that additional psychological, neurobiological, and environmental factors likely contribute to emotional dysfunction.

Clinical Implications. *The present findings have important implications for clinical practice. Endocrinologists and primary care physicians should routinely assess: irritability; anger regulation; mood instability; depressive symptoms; cognitive-emotional functioning. Early identification of emotional dysregulation may improve treatment outcomes and quality of life.*

Limitations. *Several limitations should be acknowledged:*

1. *Heterogeneity of diagnostic criteria.*
2. *Variation in psychometric assessment tools.*
3. *Limited studies specifically investigating aggression.*
4. *Predominance of cross-sectional designs.*
5. *Potential publication bias.*

Future prospective studies using standardized emotional regulation measures are required.

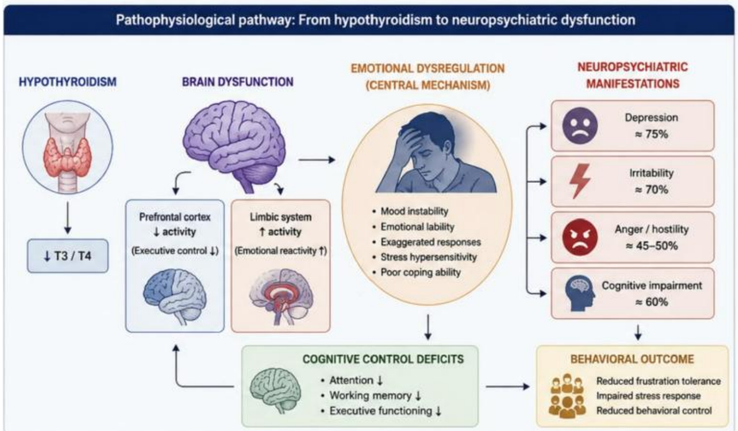

Figure 2. Pathophysiological pathway. From hypothyroidism to neuropsychiatric dysfunction.

Conclusion

Current evidence demonstrates that hypothyroidism is associated with significant emotional and behavioral disturbances. Irritability, emotional dysregulation, hostility, and depressive symptoms appear to be among the most common manifestations. These findings support the integration of psychiatric assessment into routine endocrine care. Further longitudinal investigations are necessary to clarify the mechanisms linking thyroid dysfunction to emotional regulation and to determine the extent to which these symptoms improve following restoration of euthyroid status.

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Pedagogical sciences

EMOTIONAL VOCABULARY INSTRUCTION IN ENGLISH LANGUAGE TEACHING: THEORY, METHODOLOGY, AND CLASSROOM PRACTICE FOR SENIOR SCHOOL LEARNERS

Kazangapova Zhibek Esimkhankyzy
Master's Degree Student,
South Kazakhstan Pedagogical University named after O. Zhanibekov, Shymkent, Kazakhstan
Scientific Supervisor: Smanova Gaziza
PhD in Pedagogy

Abstract

The article examines the problem of teaching emotional vocabulary to senior schoolchildren in the process of English language learning. The relevance of the study is conditioned by the growing significance of affective communicative competence in contemporary society and the insufficient methodological elaboration of this aspect in school foreign language teaching practice. The purpose of the article is to identify the theoretical foundations of emotional vocabulary instruction, to propose evidence-based principles for selecting and organising emotional lexis, and to describe effective pedagogical methods applicable to learners in grades 10–11. The theoretical framework integrates the lexical approach, the theory of emotional intelligence developed by Mayer, Salovey, and Caruso, and current psycholinguistic research on affective language processing. The article reviews and evaluates a range of teaching methods, including contextual learning through authentic texts, drama-based activities, reflective writing, digital storytelling, and visual lexical organisers. On this basis, a three-stage methodological model comprising presentation, guided consolidation, and free creative production is proposed for the systematic integration of emotional vocabulary into the senior school English curriculum. The conclusions emphasise that targeted instruction in emotional vocabulary meaningfully enhances learners' communicative competence, emotional intelligence, and intercultural awareness.

Keywords: emotional vocabulary, English language teaching, senior schoolchildren, emotional intelligence, communicative competence, lexical approach, drama-based learning, methodological model.

Introduction

Communication in a foreign language is not limited to the transmission of facts and information. Every act of speaking or writing is shaped and coloured by emotion: emotions motivate speech, determine its tone, and significantly influence its social impact. The ability to express, understand, and respond to emotions in a foreign language is therefore a fundamental component of genuine communicative competence — yet it remains one of the most systematically neglected areas of school foreign language teaching.

Senior schoolchildren in grades 10–11, typically aged between 15 and 17, present a uniquely compelling case for targeted emotional vocabulary instruction. Adolescence is characterised by heightened emotional sensitivity, the rapid expansion of social experience, and the active construction of personal and social identity. These developmental features make senior learners both especially receptive to emotionally rich language input and strongly motivated by opportunities for authentic personal expression in the foreign language. At the same time, they are cognitively equipped to engage with nuanced, abstract, and culturally specific content — precisely the kind of content that emotional vocabulary instruction demands.

Despite this pedagogical potential, systematic work with emotional vocabulary remains underdeveloped in the school English language curriculum. Widely used course books for senior classes rarely provide focused attention to emotional lexis, and teachers are seldom offered methodological guidance on how to select, present, or consolidate emotional vocabulary in a principled way. The present article addresses this gap by examining the theoretical foundations of emotional vocabulary instruction, proposing criteria for lexical selection, reviewing effective teaching methods, and presenting a structured methodological model for classroom implementation.

Theoretical Background

The theoretical grounding for emotional vocabulary instruction draws on three interconnected bodies of research: the lexical approach in language pedagogy, the theory of emotional intelligence, and *psycholinguistic research on affective language processing. The lexical approach, developed by Lewis (1993), reconceptualised vocabulary as the primary organising principle of language, emphasising exposure to words in meaningful collocations and authentic contexts rather than isolated memorisation. Emotional vocabulary is particularly amenable to this approach, as emotional words typically appear as part of fixed expressions and culturally specific idioms — to be overwhelmed with gratitude, to feel a surge of anger — the meaning of which cannot be derived from individual components alone. Instruction grounded in the lexical approach develops learners' sensitivity to these patterns and supports the acquisition of emotional vocabulary as an integrated system of use.*

The theory of emotional intelligence (EI), as elaborated by Mayer, Salovey, and Caruso (2004), identifies the perception, use, understanding, and regulation of emotions as hierarchically organised cognitive abilities, each of which is mediated by language. The concept of emotional granularity – the capacity to make fine-grained distinctions between related emotional states – is directly dependent on the breadth and precision of one's emotional vocabulary. Developing emotional lexis in a foreign language thus contributes not only to linguistic proficiency but to broader cognitive and socio-emotional growth. Psycholinguistic research has consistently demonstrated that emotional words attract greater attentional resources and are retained more durably in memory than neutral items (Kensinger, 2004). Research by Pavlenko (2005) further demonstrates that emotional vocabulary in a foreign language often carries a different affective weight from mother-tongue equivalents, and that its acquisition involves complex processes of conceptual restructuring. These findings underscore the importance of contextualised, affectively engaging encounters with emotional vocabulary, rather than decontextualised list learning.

Principles for Selecting Emotional Vocabulary

Effective vocabulary instruction begins with principled selection of target items. Four main criteria are proposed for selecting emotional lexis appropriate to senior schoolchildren. Communicative frequency and value. The core of instruction should consist of high-frequency emotional words and expressions — items that occur regularly across a range of spoken and written text types. Corpus-based resources such as the British National Corpus provide empirical evidence of emotional word frequency and enable teachers to prioritise the most communicatively useful items.

Thematic relevance to adolescent experience. Vocabulary is more readily acquired and retained when it connects to topics of genuine personal relevance. Emotional vocabulary for senior learners should be organised around themes central to adolescent life: friendship, family relationships, academic pressure, social belonging, and aspirations for the future. Such themes provide motivating, personally meaningful contexts for vocabulary learning and productive use. Lexical gradience and synonymic nuance. Senior learners benefit from systematic exploration of synonymic gradients – the spectrum from content through pleased and happy to elated and euphoric, or from uneasy through anxious to distressed and desperate. Attention to gradience develops both receptive sensitivity to fine distinctions and productive expressive range, enabling learners to communicate with greater precision and authenticity.

Pragmatic and intercultural appropriateness. Emotional expression is culturally and pragmatically shaped. Senior learners need to develop awareness of the norms governing emotional disclosure in English-speaking contexts – when strong emotion may appropriately be expressed, what register is expected in different social situations, and how emotional language functions to manage interpersonal relationships and social identity. This intercultural dimension should be explicitly addressed throughout instruction.

Methods and Techniques for Teaching Emotional Vocabulary

A diverse and complementary range of methods is available for developing emotional vocabulary in senior school English learners. The most effective approaches are characterised by contextual richness, affective engagement, and sustained opportunities for meaningful productive use.Contextual learning through authentic texts and multimedia. Authentic materials — literary extracts, journalistic articles, film and television dialogue, podcast transcripts, and personal essays — provide naturalistic, contextually embedded exposure to emotional vocabulary in use. Such materials allow learners to observe how emotional words function within discourse, to perceive their collocational behaviour, and to engage critically with emotional content as communicative agents. Pre-reading activities can direct attention to target lexis; post-reading discussion tasks encourage deeper processing and personalised response.

Drama and role-play activities. Drama-based pedagogy offers uniquely powerful opportunities for the embodied, affectively engaged use of emotional vocabulary. Role-play scenarios involving emotionally charged situations – a difficult conversation between friends, a moment of conflict or reconciliation, a job interview – require learners to select and deploy emotional expressions in response *to evolving communicative demands. Research consistently identifies drama-based approaches as among the most effective for vocabulary retention, communicative confidence, and affective engagement in the language classroom. Discussion and reflective writing. Open-ended discussions, structured debates, personal journals, opinion essays, and response letters provide learners with sustained, purposeful opportunities to deploy emotional vocabulary in the expression of personal perspectives and experiences. Reflective journaling in particular has been shown to develop both the habit of emotional self-expression in English and a progressively richer and more differentiated emotional vocabulary over time.*

Digital tools and storytelling projects. Contemporary digital resources – TED Talks, personal vlogs, documentary films, podcasts – offer motivating and authentic exposure to diverse models of emotional expression across a range of registers. Digital storytelling projects, in which learners produce their own short video or audio narratives on personally significant themes, provide creative outlets for the purposeful use of emotional vocabulary in a multimodal format, combining linguistic and affective dimensions of learning. Visual lexical organisers. Emotion wheels, synonym gradient scales, semantic field maps, and connotation grids are valuable tools for organising and consolidating emotional vocabulary knowledge. These visual aids help learners perceive systematic relationships between emotional words, understand distinctions between near-synonyms, and build a structured and accessible mental lexicon that can be actively drawn upon in productive tasks.

A Three-Stage Methodological Model

Drawing on the theoretical principles and practical methods described above, a three-stage methodological model is proposed for the systematic teaching of emotional vocabulary to senior schoolchildren. The model is designed to be flexible, cyclical, and adaptable to a range of teaching contexts and learner profiles.

Stage 1: Presentation and Awareness-Raising. At this stage, new emotional vocabulary is introduced through carefully selected authentic contextual materials that are both linguistically rich and thematically relevant. The teacher models the pronunciation, semantic range, and collocational behaviour of target words, directing learners' attention to their pragmatic function and cultural dimensions. Semantic mapping and synonymic gradient exploration are incorporated to build a rich, multidimensional initial representation of the target lexis. Receptive tasks – reading comprehension, listening activities, and guided analysis – consolidate learners' initial encounter with emotional vocabulary in context.

Stage 2: Guided Consolidation and Structured Practice. At this stage, learners engage in a progressively challenging sequence of tasks designed to consolidate their understanding and productive control of target vocabulary within a supportive, scaffolded framework. Structured exercises – gap-fill tasks, sentence completion, matching and categorisation activities, and synonym and antonym exploration – provide focused practice in form-meaning relationships. Controlled role-play scenarios with defined parameters offer opportunities for meaningful communicative use, while peer feedback and teacher monitoring ensure accuracy without sacrificing communicative purpose.

Stage 3: Free Production and Creative Application. At this stage, learners use emotional vocabulary autonomously in open-ended tasks that simulate authentic communicative situations: creative writing, sustained debates, collaborative project work, digital storytelling productions, and extended role-plays. Assessment at this stage attends to both linguistic accuracy and communicative effectiveness, and may incorporate learner self-assessment and structured peer evaluation to develop metacognitive awareness of vocabulary use and foster reflective language learning habits.

Conclusion

The systematic teaching of emotional vocabulary to senior schoolchildren constitutes a pedagogically significant and practically valuable dimension of school foreign language education. As this article has argued, emotional lexis is not a peripheral component of the curriculum but an essential element of communicative competence, closely connected to emotional intelligence and intercultural awareness. A principled approach – grounded in the lexical approach, informed by research on emotional intelligence and affective language processing, and implemented through the three-stage model proposed here – can substantially enhance the depth and quality of senior learners' engagement with English. Emotional vocabulary, taught in this way, is not merely memorised as a list of definitions but genuinely internalised as a living resource for meaningful human communication.

Further empirical research is needed to assess the long-term impact of targeted emotional vocabulary instruction on communicative performance and emotional development, and to develop validated assessment instruments appropriate to this domain. Collaboration between researchers and practitioners will be essential in translating theoretical insights into sustainable and effective classroom *practice.*

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DO MOBILE APPLICATIONS IMPROVE ENGLISH LEARNING OUTCOMES FOR STUDENTS WITH DIFFERENT PROFICIENCY LEVELS, OR IS IT A MYTH?

Konysbai Arailym Nurlankyzy
Second-year Master's student, EP 7M01701 Foreign Language: Two Foreign Languages, Astana International University, Astana, Kazakhstan

ПОВЫШАЮТ ЛИ МОБИЛЬНЫЕ ПРИЛОЖЕНИЯ РЕЗУЛЬТАТЫ СТУДЕНТОВ С РАЗНЫМ УРОВНЕМ АНГЛИЙСКОГО - ИЛИ ЭТО МИФ?

Қонысбай Арайлым Нұрланқызы
Магистрант 2 курса образовательной программы 7M01701 «Иностранный язык: два иностранных языка», Международный университет Астана, Астана, Казахстан

Abstract

This article examines the effectiveness of mobile applications in English language learning in mixed-ability student groups. The study analyzes two opposing perspectives: arguments supporting mobile technologies as tools for personalized learning and learner autonomy, and critical views emphasizing superficial knowledge acquisition and technological limitations. The relevance of the study is determined by the growing use of mobile learning and the need to identify effective approaches for teaching students with different levels of English proficiency. Particular attention is paid to the advantages of mobile applications, including adaptive learning opportunities, individualized pacing, increased learner autonomy, and regular language practice beyond the classroom. Mobile technologies provide students with additional opportunities for independent study, immediate feedback, and continuous engagement with learning materials. At the same time, the article discusses several limitations of mobile learning. Many applications are primarily based on short recognition-based activities that may improve receptive skills but do not always contribute to the development of productive communicative competence. The study also addresses issues related to technological inequality and the mismatch between application content and academic objectives of university language courses. Based on the analysis of existing research, it is concluded that mobile applications can serve as an effective supplementary tool in mixed-ability groups. However, their effectiveness depends largely on the quality of pedagogical integration and the extent to which digital resources are aligned with course objectives and teaching practices.

Аннотация

В данной статье рассматривается эффективность мобильных приложений в обучении английскому языку в многоуровневых студенческих группах. Анализируются два противоположных подхода: аргументы в пользу мобильных технологий, подчеркивающие их способность поддерживать персонализированное обучение и автономию студентов, и критические взгляды, указывающие на поверхностность усвоения материала и технологические ограничения. Актуальность исследования обусловлена широким распространением мобильного обучения и необходимостью поиска эффективных способов организации образовательного процесса для студентов с различным уровнем языковой подготовки. Особое внимание уделяется преимуществам мобильных приложений, включая адаптацию учебного контента к индивидуальным потребностям обучающихся, возможность самостоятельного выбора темпа обучения, развитие автономии и повышение регулярности языковой практики. Отмечается, что мобильные технологии позволяют студентам получать дополнительную практику вне аудитории, поддерживают мотивацию и обеспечивают оперативную обратную связь. Вместе с тем рассматриваются ограничения мобильного обучения. Подчеркивается, что многие приложения ориентированы на выполнение кратких упражнений, которые способствуют развитию рецептивных навыков, но не всегда обеспечивают формирование полноценной коммуникативной компетенции. Также анализируются проблемы технологического неравенства и несоответствия содержания мобильных приложений академическим целям университетских курсов. На основе анализа научных публикаций и существующих подходов делается вывод о том, что мобильные приложения могут выступать эффективным вспомогательным инструментом в многоуровневых группах, однако их результативность зависит от качества методической организации обучения и степени интеграции цифровых технологий в образовательный процесс.

Keywords: adaptive learning, learner autonomy, differentiated instruction, educational technology, mixed-ability classes, self-directed learning, digital pedagogy
Ключевые слова: мобильное обучение, многоуровневые группы, английский язык, цифровые технологии, мотивация, автономия.

В последние годы мобильные приложения стали одним из наиболее заметных инструментов в изучении иностранных языков, предлагая студентам гибкость, интерактивность и удобство. Особенно популярны они в учебных контекстах, где студенты обладают разным уровнем владения английским языком. Однако на фоне высокой распространённости мобильного обучения остаётся открытым вопрос: действительно ли такие приложения повышают результаты студентов в многоуровневых группах, или же их возможности несколько преувеличены?

Сторонники мобильного обучения подчёркивают, что в разнородных по уровню владения языком группах мобильные приложения создают дополнительное пространство для индивидуализированной работы. Одним из ключевых преимуществ является адаптивность цифровых платформ: многие современные приложения фиксируют ошибки пользователя, анализируют динамику выполнения заданий и автоматически корректируют уровень сложности. Такой подход позволяет каждому студенту продвигаться в собственном темпе и не испытывать давления от сильных одногруппников. Анализ двадцатилетних исследований MALL показывает, что адаптивные мобильные задания повышают регулярность практики и помогают выравнивать базовые навыки в смешанных группах [1]. В частности, студенты с более низким уровнем владения языком получают возможность многократно возвращаться к ключевым темам, что снижает учебную тревожность и способствует формированию устойчивой языковой базы, тогда как более продвинутые учащиеся осваивают задания, направленные на расширение словарного запаса и работу с более сложными грамматическими структурами.

Кроме того, мобильные технологии укрепляют автономию студентов — один из важнейших факторов успешного обучения в условиях многоуровневых групп. Благодаря гибкому формату и небольшим по объёму заданиям студенты могут выполнять упражнения регулярно, вне зависимости от расписания аудиторных занятий. Исследования подчеркивают, что мобильные устройства создают условия для повышенной вовлечённости и самостоятельного управления собственным прогрессом, что особенно полезно в группах, где преподавателю сложно уделить одинаковое внимание всем учащимся [2]. Такой подход частично компенсирует ограниченность аудиторного времени: приложения предоставляют студентам разнообразные упражнения, автоматическую обратную связь, мгновенные подсказки и возможность дополнительного повторения без участия преподавателя.

Важным преимуществом мобильных приложений является их способность поддерживать регулярность языковой практики. Студенты чаще выполняют короткие задания, которые легко интегрируются в повседневную жизнь — в поездках, перерывах или ожидании. Исследования применения мобильных телефонов для лексических упражнений показывают, что учащиеся, использующие мобильные задания ежедневно, демонстрируют более стабильный прогресс, чем студенты, работающие только в рамках традиционного урока [3]. Регулярное повторение небольшими порциями способствует более прочному закреплению материала, а мобильный формат делает этот процесс менее стрессовым и более доступным.

Таким образом, сторонники мобильного подхода утверждают, что в многоуровневых группах мобильные приложения не просто дополняют традиционные методы, но и создают индивидуализированную образовательную среду, где каждый студент получает объём практики, соответствующий его реальным потребностям. Они помогают выровнять темп обучения, обеспечить дополнительные ресурсы для самостоятельной работы и поддерживать регулярность практики, что делает обучение более гибким и устойчивым.

Однако существует и противоположная точка зрения, согласно которой мобильные приложения далеко не всегда обеспечивают глубокое и устойчивое освоение языка, особенно в условиях многоуровневых групп. Многочисленные наблюдения показывают, что формат заданий в большинстве популярных приложений ограничивается короткими упражнениями, основанными на распознавании правильного ответа — выбором варианта, сопоставлением слов или заполнением пропусков. Такой тип деятельности действительно способствует *запоминанию отдельных слов и выражений, однако практически не развивает продуктивные навыки, такие как письменная аргументация, логическое построение текста или способность формулировать собственные идеи в устной речи. Исследования отмечают, что упражнения, основанные на множественном выборе, улучшают только рецептивные навыки и создают ложное ощущение прогресса, которое не переносится на реальные коммуникативные ситуации [3]. В результате студенты могут демонстрировать высокий результат в рамках приложения, но испытывать трудности при попытке построить самостоятельное высказывание или поддержать живой диалог.*

Ещё одной существенной проблемой является технологическое неравенство, которое особенно проявляется в разнородных группах. Не все студенты имеют доступ к современным устройствам, стабильному интернету или достаточному объёму памяти для работы с приложениями. В эмпирических исследованиях мобильного обучения подчёркивается, что качество устройств, скорость соединения и удобство интерфейса напрямую влияют на регулярность выполнения заданий, объём практики и общий учебный результат [4]. Это приводит к тому, что часть студентов активно использует мобильные упражнения и получает дополнительную практику, в то время как другая часть фактически оказывается исключённой из этой формы обучения, что усиливает исходные различия между уровнями подготовки.

Дополнительное ограничение заключается в несоответствии содержания мобильных приложений академическим целям университетских курсов. Многие платформы ориентированы на повседневную лексику, игровые механики и короткие упражнения, тогда как образовательные программы в вузах направлены на развитие аналитического письма, навыков презентации, критического чтения и умения работать с научными текстами. Исследования интеграции мобильных телефонов в изучение словарного запаса показывают, что без привязки к учебным целям приложения воспринимаются студентами как вспомогательные или развлекательные, а не как часть академического процесса [3]. Таким образом, использование мобильных приложений без методически выстроенной связи с программой может приводить к разрозненности знаний и фрагментарному обучению, которое не отражается на реальной языковой компетенции студентов.

В результате можно отметить, что анализ возможностей и ограничений мобильных приложений показывает, что их эффективность в многоуровневых группах не является однозначной. С одной стороны, адаптивность мобильных платформ, возможность индивидуального темпа, развитие автономии учащихся и повышение регулярности языковой практики создают условия для более гибкого и персонализированного обучения. Эти преимущества особенно значимы в разнородных группах, где студенты отличаются уровнем владения английским языком и нуждаются в различной педагогической поддержке.

С другой стороны, критический взгляд указывает на то, что мобильные приложения нередко ограничиваются поверхностными форматами заданий, ориентированных на распознавание, что не способствует развитию продуктивных коммуникативных навыков. Кроме того, технологическое неравенство и несоответствие контента приложениям академическим целям могут снижать общую эффективность мобильного обучения и усиливать различия между студентами.

Исходя из этого, мобильные приложения следует рассматривать не как универсальное решение, а как вспомогательный инструмент, который способен улучшить процесс обучения только в сочетании с продуманной методической стратегией и традиционными педагогическими практиками. Их потенциал раскрывается наиболее полно тогда, когда преподаватель интегрирует мобильные ресурсы в структуру курса, обеспечивая баланс между самостоятельной цифровой практикой и полноценной коммуникативной деятельностью. При таком подходе мобильные приложения не заменяют, а усиливают обучение, поддерживая студентов разных уровней и создавая более устойчивую и эффективную образовательную среду.

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BASED ON THE EDUCATIONAL VIEWS OF JADID ENLIGHTENERS TECHNOLOGY FOR DEVELOPING NATIONAL IDENTITY IN STUDENTS

Sharofiddinov Maxmudjon Mashrabjon o‘g‘li

Abstract

This article examines the technology for developing national identity in students grounded in the educational philosophy of Jadid enlighteners — Is‘hoqxon Ibrat, Abdurauf Fitrat, Mahmudxo‘ja Behbudiy, and Abdulla Avloniy. The study analyzes the core pedagogical ideas of the Jadid movement, identifies the levels and criteria of national identity formation, and proposes a structured technology applicable in contemporary educational institutions of Uzbekistan. Drawing on historical-comparative analysis and modern pedagogical frameworks, the article demonstrates how Jadid heritage can serve as a foundation for cultivating patriotism, national consciousness, and cultural pride among future generations. Empirical data illustrating the effectiveness of the proposed technology are presented.

Keywords: national identity, Jadid enlighteners, educational technology, identity formation, pedagogy of culture, Uzbek heritage, critical thinking.

1. INTRODUCTION

The formation of national identity is one of the central challenges of modern education in Uzbekistan. In the era of globalization, where cultural boundaries are becoming increasingly fluid, the need to preserve and transmit national values, language, and historical memory to younger generations has become an urgent pedagogical task. President Shavkat Mirziyoyev's concept of the "Third Renaissance" emphasizes that Uzbekistan's future prosperity depends on the spiritual and intellectual potential of its youth, rooted in national consciousness.

The Jadid movement of the late 19th and early 20th centuries represents one of the most influential intellectual and educational currents in Central Asian history. Jadid thinkers — meaning "new method" (usuli jadid) proponents — sought to reform traditional education, modernize the curriculum, and awaken national self-awareness among the peoples of Turkestan. Their pedagogical legacy offers rich conceptual resources for contemporary educators seeking to develop students' national identity within a framework that honors both heritage and modernity.

Despite the growing body of scholarship on Jadidism, the specific pedagogical technologies for implementing Jadid educational principles in contemporary classroom practice remain underexplored. This article addresses this gap by proposing a structured educational technology for developing national identity in students, grounded explicitly in the teachings of key Jadid enlighteners. The research questions guiding this study are: (1) What pedagogical principles underlie the Jadid approach to national education? (2) What criteria and levels characterize the formation of national identity? (3) How can these principles be operationalized into a coherent educational technology for modern Uzbek schools and universities?

2. THEORETICAL FRAMEWORK: JADID EDUCATIONAL PHILOSOPHY

2.1. The Jadid Movement and Its Educational Vision

The Jadid movement emerged in Turkestan in the 1880s–1890s, inspired by the reformist ideas spreading across the Ottoman Empire, Egypt, and Crimea. The term "Jadid" derives from the Arabic word for "new," reflecting the movement's commitment to modernizing Islamic education without abandoning spiritual and cultural roots. Central to Jadidism was the conviction that national renewal required educational reform — that a people's future was inseparable from the quality of schooling available to its children.

The leading Jadid educators established new-method (usuli jadid) schools, wrote textbooks in vernacular Uzbek, and developed pedagogical programs that integrated national literature, history, and ethics alongside secular subjects. Their work represented a conscious attempt to cultivate what we today would call "national identity" — a sense of belonging to a distinct linguistic, cultural, and historical community.

2.2. Key Jadid Thinkers and Their Educational Contributions

Is‘hoqxon Ibrat (1862–1937), after whom Namangan State Institute of Foreign Languages is named, was among the most prolific Jadid authors and educators in the Fergana Valley. He authored instructional texts, grammars, and literary works that linked language education to national self-knowledge. Ibrat believed that mastery of one's native language was the foundation of national dignity. His pedagogical maxim — that education without national spirit produces rootless individuals —

resonates strongly with contemporary identity research (Nora, 1989; Hobsbawm, 1990).

Abdurauf Fitrat (1886–1938) articulated perhaps the most systematic Jadid philosophy of education. In his Munozara (Dispute, 1909), Fitrat dramatized the conflict between traditional and modern education, arguing that Islamic culture could only survive and flourish if it embraced rational, modern pedagogy. Fitrat's works on Uzbek language, literature, and history placed national consciousness at the heart of the educational project. His concept of the "cultured nation" (madaniy millat) anticipated later theories of imagined communities (Anderson, 1983).

Mahmudxoʻja Behbudiy (1875–1919), sometimes called the father of Uzbek drama, used the stage as a pedagogical instrument. His play Padarkush (Patricide, 1913) dramatized the moral and social consequences of ignorance, arguing that education — particularly the education of national identity — was a matter of collective survival. Behbudiy insisted that schools must teach students not only to read and calculate, but to feel their belonging to a nation with a proud history.

Abdulla Avloniy (1878–1934) authored the celebrated ethical textbook Turkiy guliston yoki axloq (Turkish Garden of Morality, 1913), which outlined a curriculum for moral and national formation. Avloniy's pedagogical writings articulated three interconnected educational goals: intellectual development, moral cultivation, and national consciousness. His work demonstrates that identity formation was not an accidental byproduct of Jadid schooling but its explicit pedagogical aim.

2.3. Convergences with Contemporary Identity Theory

The Jadid educational philosophy aligns remarkably well with contemporary theoretical accounts of national identity and its pedagogical cultivation. Erik Erikson's (1968) theory of identity formation emphasizes that individuals construct coherent selfhood by integrating personal experience with broader cultural narratives. The Jadid emphasis on teaching national history, language, and literature as identity-forming content precisely corresponds to this integrative function. Similarly, Tajfel and Turner's (1979) Social Identity Theory holds that group membership — including national identity — is a fundamental source of self-esteem and social orientation. Jadid educators intuitively recognized that schools could either nurture or weaken this sense of belonging.

More recently, scholars of multicultural and postcolonial pedagogy (Banks, 2004; Giroux, 2005) have argued that education must actively develop students' capacity to situate themselves within historical and cultural narratives rather than absorbing a decontextualized curriculum. The Jadids were pioneers of exactly this approach in Central Asia, insisting on education that was grounded in local linguistic and cultural realities.

3. CRITERIA AND LEVELS OF NATIONAL IDENTITY FORMATION

3.1. Definitional Framework

For the purposes of this study, national identity is defined as a complex psycho-pedagogical formation comprising cognitive, affective, and behavioral dimensions. Cognitively, it involves knowledge of one's national history, language, literature, and cultural heritage. Affectively, it encompasses pride in national belonging, emotional connectedness to cultural symbols, and solidarity with compatriots. Behaviorally, it manifests in active engagement with national culture, language use, civic participation, and the transmission of cultural values to others.

This tripartite framework is consistent with the Jadid pedagogical vision: Ibrat emphasized cognitive development through language mastery, Avloniy stressed affective cultivation through moral education, and Behbudiy modeled behavioral engagement through dramatic art and public discourse.

3.2. Levels of National Identity

Based on the integration of Jadid pedagogical principles with contemporary identity research, three levels of national identity formation are proposed:

Table 1. Levels and Indicators of National Identity Formation (adapted from Jadid pedagogical principles)

Level	*Characteristics*	*Pedagogical Indicators*	*Corresponding Jadid Emphasis*
Level I Reproductive	*Basic knowledge of national symbols, history, and language; limited emotional engagement; passive reception of cultural content.*	*Can name key historical figures and events; recognizes national symbols; uses native language in formal contexts.*	*Literacy and language instruction (Ibrat, Avloniy)*
Level II Interpretive	*Active engagement with national heritage; ability to analyze cultural texts and historical events; emerging sense of national pride.*	*Analyzes literary and historical sources; compares national culture with others; articulates personal connection to national identity.*	*Literary and dramatic education (Behbudiy, Fitrat)*
Level III Creative-Civic	*Deep integration of national identity into personal and social life; active cultural production and civic engagement; capacity to transmit values to others.*	*Creates cultural content; participates in civic and community life; advocates for national culture; serves as cultural mediator.*	*Comprehensive national formation (all four Jadid figures)*

4. EDUCATIONAL TECHNOLOGY FOR NATIONAL IDENTITY DEVELOPMENT

4.1. Conceptual Architecture of the Technology

The proposed technology — termed the Jadid-Oriented National Identity Formation Technology (JONIFT) — is structured around four sequential phases, each corresponding to a core Jadid pedagogical principle. The technology is designed for implementation across secondary and higher educational institutions and can be adapted for a range of subject areas, with particular relevance to language, literature, history, and social studies courses.

The technology operates on the constructivist premise that identity is not transmitted passively but constructed actively through meaningful engagement with cultural material (Vygotsky, 1978; Bruner, 1990). Each phase of JONIFT creates structured opportunities for students to encounter, analyze, reflect upon, and creatively engage with national cultural heritage.

4.2. Phase I: Immersion (Bilish — Knowing)

Corresponding to Ibrat's emphasis on linguistic and cultural literacy, the Immersion phase introduces students to primary sources of Uzbek national heritage: classical literature (Navoi, Babur, Mashrab), Jadid writings, historical chronicles, and traditional oral forms (doston, lapar, askiya). The pedagogical goal is cognitive engagement — building the knowledge base of national identity.

Key methods in this phase include: close reading of Jadid texts with guided annotation; biographical case studies of Jadid figures; historical mapping activities; and language-focused tasks emphasizing Uzbek literary heritage. Teachers employ pre-reading strategies (anticipation guides, vocabulary pre-teaching) to activate students' prior cultural knowledge. Assessment in this phase focuses on factual knowledge and comprehension.

4.3. Phase II: Analysis (Tahlil — Analysis)

Corresponding to Fitrat's emphasis on rational engagement with culture, the Analysis phase moves students beyond factual knowledge toward critical interpretation. Students are invited to analyze Jadid texts for their implicit models of national identity, to compare Jadid educational ideas with contemporary practice, and to evaluate the relevance of Jadid heritage for modern Uzbekistan.

This phase employs Socratic seminar methods, structured academic controversy, and comparative analysis tasks. Students examine Fitrat's Munozara alongside contemporary educational texts; they analyze Behbudiy's Padarkush as a vehicle of pedagogical intent; they trace the evolution of Uzbek national consciousness from the Jadid period through independence. Critical thinking frameworks (Paul & Elder, 2006; Facione, 2011) are explicitly applied to help students interrogate assumptions, evaluate evidence, and draw well-reasoned conclusions about national heritage and identity.

4.4. Phase III: Identification (Anglash — Realization)

Corresponding to Avloniy's emphasis on moral formation and affective development, the Identification phase focuses on the personal and emotional dimensions of national identity. Students are guided to connect the cultural material encountered in Phases I and II with their own autobiographical experience, family heritage, and personal values.

Methods include reflective journaling, oral history projects (interviewing family members and community elders), cultural autobiography assignments, and values clarification activities. Students examine how their personal stories intersect with broader national narratives. The affective dimension is addressed through deliberate attention to pride, solidarity, and the sense of historical continuity. Portfolio assessment allows students to document their growing identification with national culture over time.

4.5. Phase IV: Cultural Agency (Ijod — Creation)

Corresponding to Behbudiy's emphasis on cultural production and civic engagement, the Creative Agency phase invites students to become active producers and transmitters of national culture rather than passive recipients. This phase operationalizes the highest level (Level III) of national identity formation.

Tasks include: creating original literary or artistic works inspired by national heritage; organizing cultural events, exhibitions, or performances; developing educational materials on Jadid figures for younger students; conducting community heritage projects; and engaging in civic discourse on issues of cultural preservation and national development. Assessment in this phase emphasizes originality, cultural depth, and the quality of student engagement with national heritage themes.

5. EMPIRICAL EVIDENCE: EFFECTIVENESS OF THE TECHNOLOGY

5.1. Research Design

To evaluate the effectiveness of JONIFT, a pedagogical experiment was conducted across three institutions: Namangan State Institute of Foreign Languages, Namangan State University, and Namangan Regional Pedagogical Institute. The experimental group (EG, n = 90) received instruction using the JONIFT framework over one academic semester (18 weeks); the control group (CG, n = 90) continued with standard curriculum. Participants were students in Years 2–3 of undergraduate programs in humanities and social sciences.

National identity formation was measured using an adapted version of the National Identity Scale (Phinney, 1992), supplemented by an instrument developed specifically for this study reflecting Jadid-derived criteria. Three dimensions were assessed: knowledge of national heritage (cognitive), national pride and belonging (affective), and cultural engagement behavior (behavioral). Pre- and post-test measurements were taken; statistical analysis employed the t-test for independent means and Cohen's d for effect size.

5.2. Results

The results of the experiment demonstrated statistically significant gains in national identity formation in the experimental group across all three measured dimensions.

Table 2. Pre- and Post-test Results: Experimental vs. Control Groups (p < 0.001; scale: 1–5)*

Dimension	EG Pre-test (M ± SD)	EG Post-test (M ± SD)	CG Post-test (M ± SD)	t-value	Cohen's d
Cognitive (Heritage Knowledge)	3.42 ± 0.61	4.31 ± 0.54	3.56 ± 0.63	t = 9.47*	d = 1.41
Affective (National Pride)	3.18 ± 0.73	4.19 ± 0.68	3.27 ± 0.71	t = 8.63*	d = 1.30
Behavioral (Cultural Engagement)	2.95 ± 0.68	3.97 ± 0.62	3.04 ± 0.65	t = 9.01*	d = 1.55
Overall National Identity Index	3.18 ± 0.58	4.16 ± 0.52	3.29 ± 0.57	t = 9.23*	d = 1.42

The overall national identity index in the experimental group rose from 3.18 (pre-test) to 4.16 (post-test), representing a gain of 0.98 scale points. The corresponding gain in the control group was only 0.11 points (3.18 to 3.29). All differences were statistically significant at $p < 0.001$. Effect sizes (Cohen's d) ranged from 1.30 to 1.55, indicating large practical significance. The behavioral dimension showed the largest effect size (d = 1.55), suggesting that the JONIFT technology was particularly effective in moving students from passive knowledge toward active cultural engagement — the hallmark of Level III national identity formation.

Qualitative data gathered through student reflective journals and focus group discussions corroborated the quantitative findings. Students in the experimental group reported deepened appreciation for Jadid heritage, increased motivation to learn Uzbek literature and history, and a strengthened sense of personal connection to national culture. Several students described the oral history projects (Phase III) as transformative experiences that connected them to family narratives previously unknown to them.

6. DISCUSSION

The findings of this study provide empirical support for the effectiveness of grounding national identity education in the pedagogical heritage of the Jadid enlighteners. The JONIFT technology's four-phase architecture — moving from immersion through analysis and identification to creative agency — mirrors the sequence described in contemporary identity formation theory (Marcia, 1980; Phinney, 1990) while remaining firmly rooted in the intellectual tradition of Uzbek educational history.

Several theoretical implications deserve emphasis. First, the Jadid educational philosophy anticipates contemporary constructivist and sociocultural approaches to identity pedagogy. The Jadids understood that national identity cannot be lectured into existence; it must be constructed through *active engagement with meaningful cultural material. This insight, radical in its historical context, is fully consistent with the evidence-based pedagogy of the early 21st century.*

Second, the results confirm that affective engagement — the cultivation of national pride and belonging — is both achievable through deliberate pedagogy and measurable in educational settings. The large effect sizes observed in the affective dimension (d = 1.30) challenge the view that emotional aspects of identity formation are beyond the reach of formal schooling. Avloniy's insistence that schools must cultivate the heart as well as the mind proves pedagogically prescient.

Third, the particular effectiveness of Phase IV (Creative Agency) outcomes suggests that giving students opportunities to produce and transmit national culture — rather than merely receive it — is essential for reaching the highest levels of identity formation. This finding aligns with Behbudiy's use of drama as a tool of national awakening and offers practical guidance for contemporary curriculum design.

Limitations of the study include its restriction to three institutions in the Namangan region, the one-semester duration of the experiment, and the potential for social desirability bias in self-reported identity measures. Future research should replicate the study across broader geographical and institutional contexts, and should employ longitudinal designs to assess the durability of identity formation gains.

7. CONCLUSION

This article has argued that the educational philosophy of the Jadid enlighteners — Isʻhoqxon Ibrat, Abdurauf Fitrat, Mahmudxoʻja Behbudiy, and Abdulla Avloniy — provides a rich and historically grounded foundation for the pedagogical development of national identity in contemporary Uzbek students. The proposed JONIFT technology, structured around the four phases of Immersion, Analysis, Identification, and Creative Agency, translates this heritage into concrete classroom practice.

Empirical evidence from a controlled pedagogical experiment (n = 180) demonstrates that students receiving JONIFT-informed instruction show significantly greater gains in national identity formation — cognitive, affective, and behavioral — than those receiving standard instruction. Effect sizes are large across all dimensions, with particularly strong effects in the behavioral domain, indicating that the technology successfully cultivates active cultural engagement rather than passive heritage knowledge.

The broader implication is both historical and policy-relevant: Uzbekistan's national educational renewal can draw strength and legitimacy from a distinguished indigenous tradition of pedagogical thought. The Jadids sought to educate a generation capable of preserving and advancing Uzbek civilization in the face of colonial marginalization. Their successors today face a different but equally important challenge: equipping students with the national consciousness, cultural competence, and civic engagement needed to realize the promise of New Uzbekistan's Renaissance. The technology proposed in this article is offered as one contribution to that enduring pedagogical mission.

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THE INNOVATIVE POTENTIAL OF THE CASE STUDY METHOD IN PROFESSIONALLY ORIENTED RCT TRAINING

Inna Robertovna Sargsyan
Doctor of Pedagogical Sciences, Professor,
Professor of the Department of Russian Language
and Professional Communication,
Institute of Philology and Intercultural Communication
Russian-Armenian University
Yerevan, Republic of Armenia

ИННОВАЦИОННЫЙ ПОТЕНЦИАЛ МЕТОДА КЕЙС-СТАДИ В ПРОФЕССИОНАЛЬНО-ОРИЕНТИРОВАННОМ ОБУЧЕНИИ РКИ

Саркисян Инна Робертовна
Доктор педагогических наук, профессор
Профессор кафедры русского языка
и профессиональной коммуникации
Института филологии
и межкультурной коммуникации
Российско-Армянского университета
Ереван, Республика Армения

Abstract

The article explores the case study method as an effective tool for professionally oriented teaching of Russian as a foreign language. It demonstrates that this method contributes not only to the acquisition of language and professional knowledge but also to the development of analytical and critical thinking, communicative competence, and the ability to independently solve professional tasks. The significance of the case study method in fostering students' motivation, professional focus, and personal initiative is emphasized. The article highlights the method's application for Armenian learners, for whom proficiency in Russian as a language of science and intercultural communication is particularly relevant. The author concludes that the case study method, integrating elements of problem-based, communicative, and activity-based approaches, serves as a powerful instrument for humanizing and modernizing contemporary educational practices.

Аннотация

В статье рассматривается метод кейс-стади как эффективное средство профессионально-ориентированного обучения русскому языку как иностранному. Показано, что данный метод способствует не только усвоению языковых и профессиональных знаний, но и развитию аналитического и критического мышления, коммуникативной компетенции и способности к самостоятельному решению профессиональных задач. Подчеркивается значимость кейс-метода в формировании мотивации, профессиональной направленности и личностной активности обучаемых. Раскрываются особенности применения метода кейс-стади в армянской аудитории, где владение русским языком как языком науки и межкультурного общения играет особую роль. Автор приходит к выводу, что кейс-метод, интегрируя элементы проблемного, коммуникативного и деятельностного подходов, является мощным инструментом гуманизации и модернизации современного образовательного процесса.

Keywords: case study method, professionally oriented teaching, Russian as a foreign language, anthropocentric approach, communicative competence, educational motivation, interactive teaching methods.

Ключевые слова: метод кейс-стади, профессионально-ориентированное обучение, русский язык как иностранный, антропоцентрический подход, коммуникативная компетенция, образовательная мотивация, интерактивные методы обучения.

Введение

Современная методика преподавания русского языка как иностранного в Армении переживает этап активного поиска новых форм, приемов и технологий, способных повысить *эффективность обучения и соответствовать требованиям времени. Не отрицая ценности традиционных подходов, отечественные методисты осознают необходимость их реконструкции и обновления с учетом изменившейся образовательной парадигмы, ориентированной на развитие личности обучающегося, его познавательной активности и профессиональной компетентности. Одним из инновационных направлений, получивших в последние годы широкое распространение, стал метод кейс-стади (или метод конкретных ситуаций), который органично соединяет в себе элементы проблемного, коммуникативного и деятельностного обучения.*

Метод кейс-стади предполагает моделирование реальных профессиональных событий в учебном процессе. Воссоздавая типичные ситуации будущей профессиональной деятельности студентов, преподаватель создает пространство для самостоятельного анализа, поиска решений и выработки аргументированных выводов. Обучаемые не только усваивают языковые и профессиональные знания, но и формируют навыки критического мышления, коллективного взаимодействия и креативного подхода к проблеме. Такая организация учебного процесса отвечает принципам антропоцентризма, поскольку активизирует личностный потенциал студентов, их способность к саморазвитию и самооценке.

Сущность метода кейс-стади

Сущность метода состоит в том, что учебный материал подается в форме проблемной ситуации (кейса), требующей анализа и решения. В процессе работы над кейсом студенты осуществляют целеполагание, отбор и интерпретацию информации, выдвигают гипотезы, формулируют заключения, осмысливают собственные действия и результаты. Основой кейс-технологии служит противоречие, лежащее в основе проблемной ситуации: именно оно побуждает к активной мыслительной деятельности, поиску альтернативных решений и формированию аргументированной позиции. Решение кейса становится результатом творческой интеллектуальной работы, в ходе которой происходит закрепление языковых и профессиональных знаний, развитие аналитического мышления и коммуникативных умений.

Метод кейс-стади тесно связан с концепцией зоны ближайшего развития: в ходе решения профессионально-ориентированных задач студенты выходят за рамки усвоенного материала и переходят на новый уровень владения языком и профессиональными компетенциями. Обучение перестает быть процессом простого усвоения информации — оно превращается в механизм внутреннего роста, активного формирования личности будущего специалиста. В этом проявляется гуманистическая направленность кейс-метода, соотносимая с идеями Сократа о самостоятельном постижении истины. Великий мыслитель античности подчеркивал, что знание, полученное через собственное размышление, оказывается более прочным и значимым, чем знание, переданное в готовом виде [Гончарова 2004].

Исторически метод конкретных ситуаций получил институциональное оформление в Гарвардской бизнес-школе в 1920-е годы, однако его философские основы восходят к древней традиции диалогического обучения. В современной педагогике кейс-метод рассматривается как форма активного обучения, способствующая не столько накоплению конкретных знаний, сколько развитию интеллектуального и коммуникативного потенциала студентов. Его цели включают активизацию познавательной деятельности, повышение мотивации к изучению русского языка, развитие навыков поиска, анализа и синтеза информации, формирование умения аргументированно отстаивать собственную точку зрения, работать в команде и критически оценивать разные позиции.

Акутальность кейс-метода в обучении РКИ

Особая значимость кейс-метода проявляется в сфере профессионально-ориентированного обучения РКИ. Для армянских студентов, осваивающих язык науки по профилю будущей специальности, этот метод представляет собой эффективный инструмент интеграции теоретических знаний и практических умений. Работа с кейсами по специальности стимулирует использование терминологии, профессиональных клише и устойчивых выражений в естественном речевом контексте, способствует развитию речевой инициативы и креативного мышления. Кроме того, изучение русскоязычных источников при подготовке к обсуждению кейса способствует расширению академического кругозора студентов и формирует устойчивую мотивацию к овладению языком межнациональной научной коммуникации.

Педагогическая ценность метода заключается и в его интегративной природе. В структуру кейс-обучения органично включаются элементы моделирования, системного анализа, *проблемного и игрового подходов, «мозгового штурма» и дискуссии. Каждая из этих составляющих усиливает когнитивную активность обучающихся и формирует у них метапредметные навыки, востребованные в профессиональной среде: умение анализировать ситуацию, прогнозировать последствия решений, аргументировать и защищать собственную позицию. Как отмечает А. М. Долгоруков, метод case study относится к числу наиболее продвинутых активных методов обучения, обеспечивая сочетание коллективной аналитической работы, ограниченности времени и высокой степени проблемности материала, что способствует глубокому осмыслению теоретических концепций и формированию новых моделей деятельности [Долгоруков 2002].*

Разумеется, эффективное применение кейс-метода требует от студентов определённого уровня языковой и профессиональной подготовки. Недостаточная мотивация или слабая теоретическая база могут привести к формализму и поверхностному обсуждению. Поэтому использование кейсов на занятиях РКИ особенно результативно на продвинутых этапах обучения, когда у студентов уже сформирован необходимый запас языковых средств и профессиональных знаний. В этом случае метод способствует не только совершенствованию владения русским языком, но и развитию культуры научного мышления, профессиональной речи и аналитических навыков.

Несмотря на очевидные преимущества, кейс-метод не является универсальным инструментом. Его потенциал раскрывается наиболее полно в сочетании с другими интерактивными и традиционными формами обучения — семинарами, проектной деятельностью, ролевыми играми, дискуссиями. В этом контексте кейс выполняет интегрирующую функцию, связывая языковую, коммуникативную и профессиональную составляющие образовательного процесса. Как справедливо отмечает Н. П. Колесник, кейс-стади в интерактивном обучении позволяет объединить когнитивный, деятельностный и коммуникативный аспекты образования, создавая условия для развития целостной профессиональной личности [Колесник 2006].

Кейс-метод в обучении РКИ: когнитивная глубина, билингвизм и цифровая трансформация (на материале филологического образования)

Применение метода кейс-стади в преподавании русского языка как иностранного открывает широкие возможности для реализации принципа деятельностного обучения. В процессе коллективного анализа ситуации, выработки решений и их презентации студенты осваивают профессиональный дискурс, учатся точно выражать свои мысли, аргументировать позицию, вести научную дискуссию. Постепенное накопление опыта анализа кейсов формирует у них способность использовать готовые модели решений в реальной профессиональной коммуникации. Тем самым кейс-метод способствует профессионализации обучения РКИ, формированию зрелости студентов, их ответственности и уверенности в своих силах.

Современная методика преподавания русского языка как иностранного ориентирована на формирование не только языковых знаний, но и когнитивных, коммуникативных и профессиональных компетенций обучаемых. В этой связи особую значимость приобретает кейс-метод, позволяющий моделировать реальные коммуникативные ситуации и вовлекать студентов в активную мыслительную деятельность.

Несмотря на широкое распространение данного метода, его огромный потенциал остаётся недостаточно реализованным, поскольку он преимущественно рассматривается как инструмент активизации обучения. Настоящее исследование предлагает переосмысление этого метода как когнитивно-коммуникативной технологии формирования профессионально-языковой личности.

Расширение функционального статуса кейс-метода: от модели ситуации к механизму смыслопорождения.

В рамках предлагаемого подхода кейс рассматривается не только как модель профессиональной ситуации, но и как инструмент формирования стратегий смыслопорождения и смысловосприятия. Приведем примеры предлагаемых кейсов, используемых при обучении РКИ студентов филологического профиля.

Кейс «Скрытый смысл текста»: студентам предлагается фрагмент художественного текста с имплицитным смыслом (ирония, подтекст). Задание:

- ⇨ *определить явный и скрытый смысл;*
- ⇨ *объяснить, какие языковые средства создают подтекст;*
- ⇨ *предложить альтернативную интерпретацию.*

Когнитивный эффект этого задания заключается в том, что студенты не воспроизводят информацию, а конструируют смысл, что подтверждает переход от репродуктивной к интерпретационной деятельности.

Когнитивная глубина кейса: типология и поэтапное усложнение

Преподавателем вводится параметр когнитивной глубины кейса, позволяющий структурировать обучение. Здесь можно предложить несложный репродуктивный кейс. Например, найти в тексте научные термины и объяснить их. Подобные задания помогут активизировать память и узнавание. Не менее эффективны аналитические кейсы. Например: сравнить два перевода одного текста и выявить различия. При выполнении этого задания у студентов формируются навыки анализа и интерпретации.

Развитию навыков прогнозирования поможет прогностический кейс. В этом контексте можно, например, предложить продолжить научную дискуссию: «Как будет развиваться аргументация автора?»

Более усложненным, на наш взгляд, является креативный кейс, который призван обеспечить переход от знания к мышлению: создать собственный научный текст на основе предложенной проблемы. Постоянно используя в учебном процессе подобные кейсы преподаватель формирует продуктивное мышление.

Нам представляются весьма актуальным использование кейс-метода в билингвальной среде, что поможет сделать интерференцию «управляемой». Приведем пример: кейс «Интерференция в научной речи». Студентам предлагается текст с типичными ошибками армяноязычных обучаемых: «Согласно нашего исследования… и т.д.». Следует выполнить задания:

- ⇨ *исправить ошибки, возникшие в результате интерференции родного языка;*
- ⇨ *объяснить их причину;*
- ⇨ *представить аналогичные примеры.*

В результате выполнения подобных кейсов интерференция четко осознаётся студентами и эффективно трансформируется в ресурс обучения, а не в препятствие.

В настоящее время особую актуальность приобретают цифровые кейсы, которые рассматриваются методистами в ракурсе мультимодальной образовательной модели. Подобные кейсы вызывают большой интерес у студентов и способствуют формированию как цифровой, так и дискурсивной компетенции. В качестве примера цифрового кейса можно предложить **«***Научную видеодискуссию***»:** *студенты должны просмотреть фрагмент научного выступления по профилю будущей специальности, проанализировать аргументацию, записать собственный видеоответ. Особенностями подобных кейсов является сочетание аудио, видео и текста, а также возможность повторного анализа и (что немаловажно) индивидуализация темпа обучения.*

Следующий усложненный этап – дискурсивная модель анализа, в рамках которой кейс рассматривается как учебный дискурс с определёнными характеристиками. Например, кейс **«***Анализ научного дискурса***»***. Студенты должны выполнить определенные задания, а именно: выделить тезис, аргументы, вывод, определить дискурсивные маркеры, оценить логичность текста. Здесь следует работать по схеме:*

- ⇨ *проблемность → наличие вопроса*
- ⇨ *диалогичность → обсуждение*
- ⇨ *аргументативность → доказательства*
- ⇨ *профессиональность → терминология*

Выполняя подобные кейсы, учащиеся осваивают навыки научного мышления.

Оценивание при обучении методом кейс-стади

В аспекте обучения методом кейс-стади встает вопрос системы оценки. Мы предлагаем комплексную модель оценки эффективности рассматриваемого метода на примере оценивания кейса «Научная дискуссия»:

Параметр	*Пример*
Когнитивный	*глубина анализа аргументов*
Коммуникативный	*логичность речи*
Аффективный	*активность участия*
Социокультурный	*корректность научного поведения*

Таким образом, оценка становится многоуровневой и объективной.

Формирование метакомпетенций

Кейс-метод можно рассматривать и в ракурсе эффективного средства формирования *метакомпетенций. В данном контексте кейс выходит за рамки языкового обучения. Приведем пример: кейс «Конфликт интерпретаций». Преподаватель предлагает студентам разные трактовки текста. Они должны выбрать позицию, защитить её, прийти к общему решению. Подобным образом можно сформировать критическое мышление, навыки командной работы и коммуникативную гибкость.*

Представленные кейсы демонстрируют, что в условиях филологического образования кейс-метод может быть успешно адаптирован для формирования не только языковых, но и профессионально-специфических компетенций, а именно:

- ⇨ *интерпретационной,*
- ⇨ *переводческой,*
- ⇨ *аналитической,*
- ⇨ *дискурсивной,*
- ⇨ *межкультурной.*

Методические комментарии позволяют рассматривать кейс не как изолированное задание, а как структурированную дидактическую модель, включающую цели, этапы реализации и ожидаемые результаты.

Сегодня исследователи работают над перспективами дальнейшего развития метода кейс-стади. В этом аспекте в их поле зрения, естественно, попадает искусственный интеллект с его возможностями. Например, интересно предложение генерации кейсов под уровень студентов, подбор кейсов по специализации (лингвистика, перевод, литература), разработка кейсов в ракурсе междисциплинарности (кейс «Лингвистика + психология речи»), а также создание «международных» кейсов (например, сравнение научных дискурсов разных культур).

Актуальные направления развития кейс-метода в обучении РКИ на современном этапе.

Обобщая все вышесказанное, в свете современных образовательных тенденций представляется целесообразным выделить ряд перспективных направлений дальнейшего развития кейс-метода:

- Во-первых, это интеграция с технологиями искусственного интеллекта, позволяющими квалифицированным преподавателям автоматизировать создание кейсов, адаптировать их под уровень обучаемых и анализировать результаты их выполнения.

- Во-вторых, персонализация кейсов, предполагающая учет индивидуальных когнитивных стилей, профессиональных интересов и уровня языковой подготовки студентов.

- В-третьих, междисциплинарный характер кейсов, обеспечивающий синтез языковой, профессиональной и культурной информации.

- В-четвёртых, развитие международных кейс-практик, основанных на сопоставлении различных профессиональных и культурных моделей коммуникации.

Заключение

Таким образом, кейс-метод в обучении РКИ представляет собой не просто дидактический инструмент, а эффективную комплексную когнитивно-коммуникативную технологию, обеспечивающую формирование профессионально-языковой личности.

Его эффективность обусловлена:

- ⇨ *глубиной когнитивных процессов,*
- ⇨ *возможностью управления билингвизмом,*
- ⇨ *интеграцией с цифровыми технологиями,*
- ⇨ *направленностью на развитие метакомпетенций.*

Таким образом, внедрение кейс-технологий в систему профессионально-ориентированного обучения РКИ не только повышает качество языковой подготовки, но и актуализирует личностно-деятельностный подход, ориентированный на развитие инициативы, самостоятельности и творческого потенциала обучаемых. Это особенно важно в условиях современного образования, где приоритет отдается формированию компетенций, необходимых для эффективного участия в глобальном профессиональном и научном взаимодействии. В настоящее время кейс-метод становится не просто инновационным инструментом обучения, но и фактором гуманизации образовательного процесса, обеспечивая гармоничное единство языкового, когнитивного и личностного развития студентов.

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Philological sciences

COMPARISON AS A FORM OF COGNITION AND A MEANS OF CULTURAL REPRESENTATION IN LANGUAGE

Anna Chikvaidze
PhD in Philology,
Assistant-Professor, Department of Slavic Languages
Akaki Tsereteli State University (Georgia)

СРАВНЕНИЕ КАК ФОРМА ПОЗНАНИЯ И СПОСОБ РЕПРЕЗЕНТАЦИИ КУЛЬТУРЫ В ЯЗЫКЕ

Анна Чикваидзе
доктор филологических наук,
ассистент-профессор департамента славистики;
Кутаисский государственный университет им. А.Церетели (Грузия)

Abstract

The article examines comparison as a universal cognitive mechanism of cognition and a means of cultural representation in language. Comparison is viewed as a fundamental mental operation that enables the comprehension of reality through identifying similarities and differences between objects and phenomena. The aim of the study is to determine the role of comparison in conceptualization processes and to analyze comparative constructions as means of representing culturally significant knowledge. The research is interdisciplinary and draws upon philosophy, psychology, cognitive science, linguistics, and cultural linguistics. The article discusses the Conceptual Metaphor Theory developed by George Lakoff and Mark Johnson, as well as the Conceptual Integration Theory proposed by Gilles Fauconnier and Mark Turner. It is argued that comparison not only facilitates cognition but also functions as a mechanism for generating new meanings. The analysis of stable comparative constructions reveals features of the national worldview shaped by cultural values, historical experience, and traditions. The study concludes that comparison integrates thought, cognition, language, and culture into a unified cognitive system.

Аннотация

Статья посвящена исследованию сравнения как универсального когнитивного механизма познания и способа репрезентации культуры в языке. Сравнение рассматривается как фундаментальная мыслительная операция, обеспечивающая осмысление действительности посредством выявления сходств и различий между объектами и явлениями. Цель работы заключается в определении роли сравнения в процессах концептуализации мира и анализе сравнительных конструкций как средств отражения культурно значимых представлений. Исследование носит междисциплинарный характер и опирается на положения философии, психологии, когнитивной науки, лингвистики и лингвокультурологии. В статье рассматриваются идеи теории концептуальной метафоры Дж. Лакоффа и М. Джонсона и теории концептуальной интеграции Ж. Фоконье и М. Тернера. Показано, что сравнение не только способствует познанию действительности, но и выступает механизмом порождения новых смыслов. Анализ устойчивых сравнительных конструкций позволяет выявить особенности национальной картины мира, отражающие культурные ценности, исторический опыт и традиции народа. Делается вывод о том, что сравнение объединяет процессы мышления, познания, языка и культуры в единую когнитивную систему.

Keywords: *comparison, cognition, cognitive linguistics, conceptualization, conceptual metaphor, conceptual integration, linguistic worldview, cultural linguistics, culture.*

Ключевые слова: *сравнение, познание, когнитивная лингвистика, концептуализация, концептуальная метафора, концептуальная интеграция, языковая картина мира, лингвокультурология, культура.*

Изучение соотношения мышление – познание – язык – культура сохраняет свою актуальность в настоящее время. В современной когнитивной лингвистике одной из ключевых проблем остается вопрос о том, каким образом язык отражает процессы познания и *формирует картину мира той или иной культуры. Условия существования, окружающая действительность определяют сознание и поведение людей, что находит отражение в языке. И в то же время мир воспринимается через формы родного языка, который определяет человеческие структуры мышления и поведения. Исследователи выделяют круг языковых феноменов, которые отражают особенности той или иной культуры: безэквивалентная лексика, мифологизированные языковые единицы, лингвокультуремы, лакуны, паремиологический и фразеологический фонд языка, стереотипы, символы и т. д.*

Цель данной работы, с одной стороны, рассмотреть сравнение как когнитивный механизм мышления, как универсальный способ познания явлений действительности, и с другой стороны, как способ фиксации итогов познания в культуре и языке, отражающий при этом уникальное национальное видение мира.

Работа носит преимущественно теоретико-аналитический характер и опирается на широкий междисциплинарный материал из философии, психологии, когнитивистики и лингвистики, что и определяет новизну, поскольку предлагается интегративная модель сравнения, согласно которой оно осмысляется и как мыслительная операция, и как познавательный механизм, ведущий к открытиям, и как средство культурно-языковой фиксации концептуализации мира.

Существует множество определений сравнения в зависимости от аспекта его рассмотрения. В данном случае можно определить сравнение как когнитивную операцию, направленную на установление аналогий, сходств и различий между разными объектами с целью осуществления их восприятия, осмысления, познания, категоризации и концептуализации. Э. Сепир называл сравнение самым древним видом интеллектуальной деятельности человека, предшествующим счёту. Это действительно универсальный способ постижения мира, к которому мы обращаемся чаще, чем может показаться с первого взгляда. «Все познается в сравнении» (Конфуций). Познание - это процесс отражения и воспроизведения действительности в человеческом мышлении, который связан с работой сознания, с эмоциями, ощущениями, восприятием, памятью, творчеством и интуицией. Высшим познавательным процессом является мышление - творческое преобразование представлений и образов памяти. Мыслительная деятельность человека совершается при помощи различных операций - сравнения, анализа, синтеза, абстракции, конкретизации и обобщения. При этом человек оперирует представлениями и образами, источником которых служит память, либо они создаются при восприятии мира. И в этом процессе важнейшее место занимают ассоциации, осознанно или неосознанно рождаемые нашим разумом, особенно ассоциации по сходству, когда восприятие вызывает представления, сложившиеся в прошлом и сходные с ними в каких-либо отношениях.

На особую роль мышления по аналогии в процессе познания указывают многие ученые самых различных областей знания. Например, по Канту, человек всегда стремится абстрактное интерпретировать в терминах чувственного опыта, соотносить трансцендентное со своим жизненным опытом посредством аналогии, сопровождаемой использованием «принципа фиктивности» als ob - «как если бы». С помощью этого принципа Кант пытался создать учение о целостном интеллекте. Его последователи рассматривали аналогию как главное средство научного познания. Известный физик Дюгем писал: «История физики учит нас, что отыскивание аналогии между двумя различными категориями явлений было, может быть, самым надежным и плодотворным методом при построении физических теорий» [цит. по: Жоль 1984: 287]. Одним из первых Дюгем пытался преодолеть квазипсихологизм в трактовке аналогии и ее роли на теоретическом уровне познания. Его идея получила название «метода математической гипотезы». Внимание исследователя привлекло то, что различные явления, сведенные к абстрактным теориям, обнаруживают структурное сходство. В физике это проявляется в том, что уравнения одной теории обнаруживают тождество уравнениям другой теории. Благодаря этому Дюгем получил метод, ведущий к открытиям: возможность интерпретации одной теории в терминах другой, то есть решение одних теоретических проблем способами, достигнутыми в других областях. Один из современных исследователей Дэниел Н. Робинсон отмечает, что «наука есть человеческое деяние, и независимо от того, насколько узкой или специальной она может стать, от того, насколько ее проблемы и методы могут быть скучными или культовыми, она редко избегает привычек человеческого ума. Одна из наиболее устойчивых привычек – та, которая навязывает метафоры и сравнения уму при его попытке понять какое-либо неуловимое явление. А среди многих неуловимых явлений ни одно не наделено *большей искусностью и живостью, чем сам ум. Поэтому философия и позже психология в их неутомимой попытке постижения разума стали прибегать к объяснениям типа «это похоже на…», или «это как будто…», или «это – не более чем…»» [Робинсон 2005: 331-332].*

Более того, замечено, что способность человека сравнивать объекты проявляется и на бессознательном уровне психической жизни. Например, искажения скрытого содержания сновидения создаются «цензурой», препятствующей проникновению в сознание неприемлемых для него элементов бессознательного. Именно здесь образуется особый характер отношений, который устанавливается между образом явного сновидения и его латентным смыслом. Эти отношения проявляются в виде сравнений, метафор, «сгущений» образов, олицетворений и т.д. Примером трансформации абстрактных понятий во сне является факт из жизни Кекуле, который в просоночном состоянии увидел химическую формулу бензола в виде образа змеи с хвостом в пасти. Отметим, что различные течения ассоциативной психологии использовали ассоциацию как основной объяснительный принцип мышления. Например, следуя за Гоббсом, Гартли разрабатывал материалистическую основу ассоцианизма и выводил психическую деятельность из общих законов ассоциаций. В свою очередь, Юм и Гербарт развивали идеалистическую основу ассоциативной психологии на феноменалистической основе. Беркли использовал теорию ассоциаций Локка для объяснения процесса познания и пространственного зрения. Юм выделял два основных закона ассоциации (сходство и смежность) и рассматривал их как универсальные принципы умственной деятельности человека.

Что происходит в нашем сознании, когда мы сравниваем и тем самым объединяем два предмета, которые относятся к различным сферам опыта? Основная функция сознания - связывать. Оно работает и может связать любые две вещи множеством разных способов. Здесь можно провести параллель с ментальной химией Джона Стюарта Милля. Подвергнув критике теорию отца о пассивности ума, действующего только под влиянием внешних стимулов, Милль выдвинул свою точку зрения, согласно которой ум играет активную роль в выработке ассоциативных идей. Сложные идеи - не просто суммирование простых идей. В процессе ассоциирования возникают новые качества, отсутствовавшие у составных элементов. Это так называемый творческий синтез. Эти взгляды возникли у Милля под влиянием химии, из которой он позаимствовал модель психических процессов, альтернативную физической. Это модель синтеза, в процессе которого всегда возникает новое качество, не сводимое к качествам исходных частей (например, соединение синего, красного и зеленого цветов дает белый). То же можно сказать и о сравнении. Сравнивая, мы не просто познаем неизвестный объект, но создаем нечто новое, чего не существовало до сих пор. В этом, очевидно, и заключается суть процесса познания, которое по природе своей имеет творческий характер. И этот процесс одновременно универсален и уникален.

Подобное представление о сравнении прослеживается в теории метафоры в когнитивной лингвистике, в частности, в теории концептуальной метафоры Дж. Лакоффа и М. Джонсона и теории концептуальной интеграции (conceptual blending), созданной Ж.Фоконье и М. Тернером. Как утверждали Дж. Лакофф и М. Джонсон, «наша обыденная понятийная система, в рамках которой мы думаем и действуем, по сути метафорична» [Лакофф, Джонсон 2004: 25)]. Такой подход вывел метафору за рамки языковой системы и позволил ее рассматривать на уровне взаимодействия языка, мышления, познания и культуры. Позднее, разграничивая метафорическое выражение и концептуальную метафору, Лакофф отметит, что «локус метафоры - в мысли, а не в языке» [Lakoff 1993: 203]. Согласно теории концептуальной метафоры, процесс осмысления человеком абстрактных понятий посредством более конкретных и чувственно воспринимаемых сфер опыта происходит путем установления аналогий между разными концептуальными сферами. Такие модели метафор свидетельствуют об универсальной способности человеческого мышления познавать неизвестное путем проведения аналогии с уже известным, что сближает концептуальную метафору с механизмом сравненения. Действительно, в обоих случаях происходит перенос признаков из одной концептуальной сферы в другую на основании определенного сходства. При этом сравнение и метафора рассматриваются как разные степени проявления познавательного процесса. Сравнение сохраняет явное указание на сходство между двумя объектами (например, «хитрый, как лиса», «смелый, как лев»), метафора же осуществляет имплицитную концептуальную проекцию, при которой один объект осмысляется посредством другого без прямого указания на аналогию («она настоящая лиса», «да он просто лев!»).

Теория концептуальной метафоры Дж. Лакоффа и М. Джонсона получила широкое *признание. Вместе с тем она активно развивается и интерпретируется, дав мощный толчок для дальнейших модификаций. Согласно теории концептуальной интеграции (теория блендинга), разработанной Ж.Фоконье и М.Тернером в качестве альтернативы теории Дж. Лакоффа и М. Джонсона, сознание человека в процессе познания действительности может соединить различные ментальные пространства и создать при этом совершенно новое интегрированное концептуальное пространство, которое обладает качественно новыми характеристиками и не сводится к исходным пространствам. Интересно то, что такое представление о когнитивном процессе во многом напоминает ментальную химию Джона Стюарта Милля, то есть процесс творческого синтеза, при котором соединение различных представлений создает новое знание. С этой точки зрения, сравнение представляет собой не просто средство нахождения аналогии между объектами, но и является когнитивным механизмом порождения новых смыслов и значений, что придает человеческому познанию исключительно творческий характер.*

Итак, при анализе общих закономерностей процесса познания как движения от известного к неизвестному теория сравнения, несомненно, занимает важнейшее место. Сравнение выступает как универсальный способ познания мира, с одной стороны, и как способ фиксации результатов познания в культуре и языке - с другой, отражая специфическое уникальное национальное видение мира. Здесь мы выходим к одной из наиболее важных проблем когнитивной лингвистики – проблеме отображения в сознании человека картины мира, фиксируемой в языке. Возникновение картины мира не просто связано с языком, но во многом определяется им. Отдельные языковые системы предоставляют своим носителям различные способы осмысления и восприятия действительности. В языке фактически осуществляется интерпретация мира человеком, что отсылает нас к экзистенциальной философии бытия (по Хайдеггеру, язык - это способность человека «сказать бытие»). Представления о языковой концептуализации являются одновременно универсальными благодаря универсальности мышления и специфичными для отдельных языков, так как в них находят отражение особенности народа и его культуры.

Устойчивые сравнительные обороты можно рассматривать как элементы языковой картины мира, как языковые стереотипы, отражающие национально-детерминированные представления о предметах и явлениях окружающей действительности. Человек существует в мире стандартизированных стереотипов, навязанных ему культурой. Целостность культуры предполагает формирование культурных стереотипов, т. е. стереотипов общей картины мира. Они выполняют ряд когнитивных функций: схематизация, упрощение, формирование и хранение групповой идеологии и т.д. Можно сказать, что стереотипы – фрагменты концептуальной картины мира, существующей в сознании человека. Например, этнокультурные стереотипы – это обобщенные представления о типичных чертах, характеризующих какой-либо народ. Такого рода представления часто находят отражение именно в сравнительных конструкциях: «горяч, как испанец», «аккуратен, как немец», «пунктуален, как немец», «скуп, как шотландец», «гостеприимен, как грузин», «холоден, как англичанин» и т. д. Экспериментальные исследования Т. В. Шмелевой, В. А. Масловой, А. А. Залевской и др. показывают, что семантика сравнения отражает специфическое национальное видение мира. Выбор сравнения обусловлен рамками окружающей действительности, культурой, обычаями и традициями, ситуацией общения, чертами характера личности. Например, эксперимент В. А. Масловой с носителями киргизского языка позволил выделить ряд типичных для них сравнений, которые связаны с географическими особенностями, со спецификой хозяйственной и культурной жизни народа, с особенностями животного и растительного мира и т. д.: «стройный, как чинара»; «нос горбатый, как у беркута»; «голос приятный, как звуки комуза»; «лицо ясное, как родник»; «глаза блестящие, как Иссык-Куль»; «величественный, как Ала-Тау»; «голова большая, как казан»; «волосы длинные, как аркан» и т. д.

Устойчивые сравнительные конструкции вскрывают оценочные эталоны той или иной лингвокультурной общности. Экспериментальные данные позволили выявить существенные различия в эталонах сравнения у носителей разных языков. Например, группы сравнительных конструкций, характеризующих состояние человека, в английском и русском языках: «as mad as a March hare», «as melancholy as a cat», «as cross as a bear», «as cheerful as a lark», «as quiet as a mouse»; «беспомощный, как ребенок», «зол, как черт», «тихий, как мышь», «как в воду опущенный», «как рыба в воде», «как об стенку горох» и др. В сравнениях, отражающих черты характера людей, часто используют названия животных: «глуп, как сивый мерин (как осел)» –

«as silly as a goos»; «хитрый, как лиса» – «as cunning as a fox»; «мудрый, как змий» – «as wize as a sergent» и др. Качество «неуклюжий» в русском языке приписывается медведю (неуклюжий, как медведь), в английском – щенку (as clumsy as a puppy). То, что представители одной культуры выделяют одни свойства животных, а представители другой культуры – иные свойства, часто связано с различными мифологическими представлениями.

У каждого народа формируются те особые неповторимые ассоциации образного мышления, которые обусловлены языком. Традиционные английские сравнения соотносят признак «soft» с четырьмя денотатами: «butter», «silk», «velvet», «down». В русском признак «мягкий» соотносится с денотатом «пух», «шерсть», «вата», «шелк». У белорусов – с «пухом», «льном». В сознании носителей английского языка признак «белый» связывается с большим количеством денотатов. Связь «белый - снег» не является такой устойчивой, как в русском языке: as wite as a sheet (ashes, death, chalk, wool, snow, milk) и т.д. Некоторые сравнения чрезвычайно специфичны, например, признак «тощий» соотносится с денотатами: «тощий, как скелет комара» (яп.), «тощий, как высохшая цикада» (вьетнам.), «тощий, как лестница» (туркм.), «тощий, как сука с полдюжиной щенят» (индонез.), «тощий, как бенберийский сыр» (англ.), «тощий, как смык» (белорус.), «тощий, как щепка (жердь)» (рус.).

В некоторых случаях можно говорить об общности эталонов для нескольких народов, например, выражение «злой, как собака» существует у белорусов, русских, казахов, но не у англичан, поскольку для них собака почитаемое животное. Чем ближе культуры, тем больше вероятность совпадения. Напр., ср.: «беден, как церковная мышь» – «бідний як церковна миша» (укр.), «белый, как полотно» – «білий як полотно» (укр.), «свободный как ветер» (птица) – «вільний як вітер» (птах) (укр.). Признак «сладкий» выделяется при сопоставлении с денотатом «сахар» в русском, украинском, английском, монгольском, хинди и др. языках.

Итак, подведем итоги и выделим ключевые положения:

1)сравнение связано с ассоциативной природой человеческого мышления и является важнейшим средством концептуализации мира, фундаментальной и универсальной мыслительной операцией, лежащей в основе процесса познания как движения от известного к неизвестному;

2) оно не только выявляет сходство и различие между различными объектами, но и создает новое знание, то есть обладает творческим потенциалом; сравнение является важным инструментом развития новых смыслов, который связывает процессы мышления, познания, языка и культуры в единую когнитивную систему.

3) сравнительные конструкции могут отражать национальную картину мира, а выбор образа сравнения во многом определяется историческим опытом народа, средой, традициями, культурой и системой ценностей. У каждого народа формируются особые неповторимые ассоциации образного мышления, которые обусловлены языком и культурой. Устойчивые сравнительные конструкции вскрывают оценочные эталоны той или иной лингвокультурной общности, выступают как языковые стереотипы. Поскольку познание, язык и культура взаимосвязаны, в сравнениях отчетливо проявляется этнокультурная специфика языковой картины мира.

Несомненно, сравнительные конструкции нуждаются в дальнейших междисциплинарных исследованиях, что позволит более полно представить особенности их возникновения и функционирования в мышлении и познании, в культуре и в языке, что представляет немалый интерес для когнитивной лингвистики, психодогии, философии, межкультурной коммуникации, лингвокультурологии, в преподавании иностранных языков и т.д.

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ANALYZING THE CONCEPTS "HAPPINESS" AND "UNHAPPINESS" IN ENGLISH FOLKTALES

Yuldasheva Gulzoda Umidjon qizi
PhD Student, English language and literature,
Namangan State Institute of Foreign Languages named after Iskhakhan Ibrat,
Namangan region, 160139, Uzbekistan

Abstract

The article is devoted to the study of the emotional concepts "happiness" and "unhappiness" through analyzing the verbalizers of them in the English folktales. Analysis of "happiness" and "unhappiness" specifically in the folktales allows us understand how the language reflects and shapes our perception of these emotions, revealing how we conceptualize and express them since the folktales of every nation are passed down through generations marking them the representatives of nations' culture, peoples' understanding of the world around them. Searching the entries of preorganized list of verbalizers of these binary concepts, the verbalization of them in the 43 English folktale texts was analyzed quantitatively via AntConc software tools, through examining their frequency, parts of speech distribution, collocates, and positioning in the narrative. Additionally, the endings of these folktales were closely studied to identify the explicit and implicit expressions of "happy endings". The research found out that happiness is predominantly expressed through adjectives (58%, e.g., happy, glad), depicting a stable resultant state, while unhappiness is primarily conveyed through verbs (57%, e.g., cried, crying), portraying it as an active, plot-driving force. Although 27 tales concluded with happiness, the explicit "happily ever after" set expression appeared in only 13, indicating strong implicit cultural codes. The findings reveal that this binary opposition is linguistically structured, with unhappiness functioning as the narrative catalyst and happiness as the resolved, often idealized, outcome.

Keywords: happiness, unhappiness, English folktales, conceptual binary opposition, corpus analysis tools, verbalization, AntConc.

INTRODUCTION

Happiness has always been in the center of attention as it is the fundamental aim of people in life. Everyone attempts to be happy, however, the way we understand happiness differs not only among different cultures but also among individuals of the same community. Studies reveal that happiness is a universal concept having similar patterns in every culture, however, the peculiarities of viewing happiness exist, too. In accordance with the theory proposed by a French anthropologist Levi-Strauss we understand the world through binary oppositions that is pairs of contrasting concepts like good vs evil. Here we can follow his thoughts in understanding the true meaning of happiness by contrasting with its opposition which is unhappiness. While the concepts of happiness and unhappiness have been extensively studied in diverse fields from philosophical, psychological, and sociological, linguistic perspectives, their verbalization in folk texts remains relatively underexplored. Folktales themselves have also been deeply analyzed from different viewpoints such as structuralist and thematic. However, a significant research gap exists concerning the precise lexical, grammatical, and pragmatic mechanisms through which this crucial conceptual binary is encoded within the folktale texts. This work is relevant because it fills this gap. A greater understanding of how cultural values around happiness and unhappiness are linguistically produced and transmitted is made possible by an understanding of how these two emotional notions are verbalized, including which words, their grammatical forms, and their narrative placing. This study suggests that this binary opposition is a structurally entrenched linguistic phenomenon that can be methodically mapped and examined, rather than just a thematic component. In order to reveal the subtle ways in which this binary opposition shapes the narrative world, the purpose of this paper is to identify, quantify, and analyze the verbalizers of happiness and unhappiness within a defined corpus of English folktales using linguistic analysis and corpus analysis techniques.

LITERATURE REVIEW

Languages do not only serve for effective communication but also their precious role in shaping people's opinions and thoughts should not be underestimated as Katsnelson (1972) stated. One of the units of human thoughts is concept and Safarov (2006) explains that its linguistic verbalization is "the result of the partnership work between the brain and language systems" (p. 21). For the linguist who is dealing with concepts it is essential to identify the structures, actions and rules that supply the representation of the concepts in the language or in the process of speech (Safarov, 2006). Happiness *and unhappiness concepts are two emotional concepts which are regarded as binary oppositions, too. Binary oppositions are usually termed with "anti-concept", "antonymous concept" and "concept-opposition". The study conducted on the representation of happiness and unhappiness concepts as binary opposition in Kazak proverbs and sayings identified that "the proverbs and sayings of any nation" can be valid material for cognitive analysis (Suiyerkul & Chakyroglu, 2014 p. 132). They also explained that the difficulties in translating proverbs and sayings related to happiness and unhappiness from Kazak into English is because of the correlation of these concepts in the people's minds under the influence of Islamic culture (Suiyerkul & Chakyroglu, 2014 p. 132). In understanding the verbalization of these concepts, the conceptual metaphor theory developed by Lakoff and Johnson is vital since they proved that "metaphor not simply as an ornamental device in language but as a conceptual tool for structuring, restructuring and even creating reality" (Kovecses, 2020). They found out that "physical basis for personal well-being: happiness, health, life, and control – the things that principally characterize what is good for a person are all UP" (Lakoff & Johnson, 1980). However, "the most commonly and strongly expressed criticism concerns methodological issues; namely, how to identify metaphors in discourse, how the study of metaphor should be based on real data" (Kovecses, 2020).*

A fundamental component of structuralist theory is the examination of binary oppositions (such as good/evil, life/death, and rich/poor), particularly in Claude Lévi-Strauss's work (1964). He maintained that such basic cultural inconsistencies are mediated by myths and stories. In folktale studies, Vladimir Propp (1968)'s "Morphology of the folktale" further established that narratives are built upon a sequence of functions and the opposition between a lack (unhappiness/villainy) and its liquidation (happiness/victory). Building on this framework, this study focuses on how one such fundamental opposition – happiness/unhappiness – is expressed linguistically. The linguistic study of folktales has gained popularity more lately, despite the fact that folklore studies have frequently concentrated on theme indices and tale typologies. Dialectal traits, repetition, and formulaic language have all been studied. However, there is still a large gap in the thorough linguistic analysis of important conceptual oppositions, such as happiness/unhappiness, employing corpus approaches. The historical evolution, cultural background, and different variants of English folktales have all been thoroughly examined. Nevertheless, corpus linguistics tools have not been used to comprehensively study their language properties, especially at the lexical-semantic level. This study aims to investigate the semantic structure of these historic texts using contemporary linguistic techniques.

METHODOLOGY

The research utilizes a corpus-pragmatic approach. This technique integrates a systematic examination of extensive text collections (a corpus) with the subtleties of conventional pragmatic analysis. By adopting this approach, it is possible to explore not only the frequency of words but also their contextual usage within the text, their collocational patterns, and their pragmatic roles. This method was selected as it complements the aim of investigating not merely the existence of concepts but also how they are articulated. A specific corpus was assembled for the research, comprising 43 classic English folktales sourced from collections by Joseph Jacobs. The corpus includes stories such as "Jack and the Beanstalk," "Tom Tit Tot," "The Three Little Pigs," and "Mr. Fox". The total volume of the corpus is approximately 52,489 tokens. Data analysis was performed using the AntConc (v. 4.3.1) corpus analysis software. The following analyses were conducted: KWIC (Key Word In Context) Analysis: searches were conducted for root words such as "happy", "joy", "cry", "sad", "unhappy", "grief". This allowed for the examination of the precise linguistic context of each verbalizer. Frequency and part-of-speech analysis: all identified verbalizers were classified and their distribution analyzed according to their frequency and part of speech (noun, adjective, adverb, verb). Collocation analysis: the strongest word partners for central words like "happy" and "cry" were identified (minimum association score: 3 and span: 5). Plot distribution analysis: the plot function of the software was used to graphically study the distribution of happiness and unhappiness throughout the folktale plots. Qualitative ending analysis: The ending of each tale was categorized as having a "happy" or "unhappy" ending, and whether this state was expressed explicitly or implicitly was analyzed.

RESULTS

The corpus-pragmatic analysis revealed the following key findings regarding the linguistic expression of the concepts of happiness and unhappiness in English folktales. ***Lexical frequencies*** *– the analysis showed that the verbalizators of happiness occurred 100 times, while unhappiness occurred 84 times.*

Table 1

Frequency of the happiness / unhappiness verbalizators in the selected folktales

Verbalizator (happiness)	Frequency	12. Laughter	2
1. Happy	20	13. Delighted	2
2. Joy	11	14. Content	2
3. Laughing	10	15. Gay	2
4. Glad	9	16. Laugh	2
5. Laughed	8	17. Satisfaction	2
6. Merry	5	18. Happiness	2
7. Happiest	5	19. Lucky	2
8. Merrier	5	20. Joyfully	1
9. Overjoyed	3	21. Cheer	1
10. Fortunate	3	Total	100
11. Happily	3		

Verbalizator (unhappiness)	Frequency
1. Cried	35
2. Crying	17
3. Cry	6
4. Alas	5
5. Miserable	5
6. Sad	4
7. Despair	3
8. Sorrow	3
9. Unhappy	2
10. Sadly	2
11. Melancholy	1
12. Grief	1
Total	84

Note. The most frequently used verbalizers of happiness were: happy (20), joy (11), laughing (10), glad (9), laughed (8). The most common lexemes expressing unhappiness were cried (35), crying (17), cry (6), alas (5), and miserable (5).

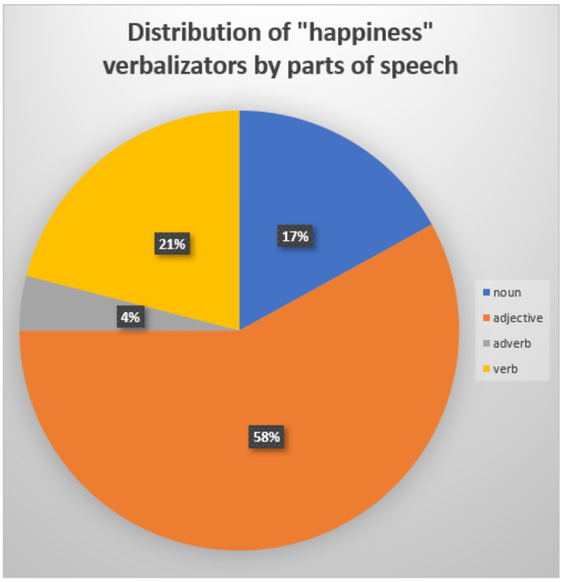
Table 2

Parts of speech distribution for "happiness"

Noun	Adjective	Adverb	Verb
Happiness 2	Lucky 2	Joyfully 1	Laugh 2
Satisfaction 2	Fortunate 3	Happily 3	Laughed 8
Laughter 2	Merrier 5		Laughing 10
Joy 11	Gay 2		Cheer 1
	Overjoyed 3		
	Delighted 2		
	Glad 9		
	Content 2		
	Merry 5		
	Happiest 5		
	Happy 20		
17	58	4	21

Figure 1

Proportion of "happiness"by parts of speech

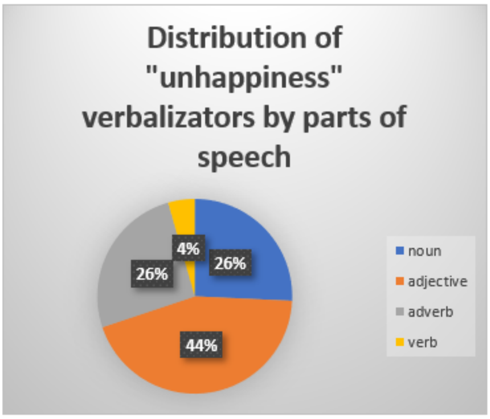


Note. Happiness is expressed predominantly through adjectives (58%) (happy, glad, merry). Verbs (21%) are mainly related to the semantics of "laughing" (laughed, laughing).

Table 3
Parts of speech distribution "unhappiness"

Noun	Adjective	Adverb	Verb
Despair 3	Miserable 5	Alas 5	Cried 35
Sorrow 3	Sad 4	Sadly 2	Crying 17
Grief 1	Unhappy 2		Cry 6
	Melancholy 1		
7	12	7	57

Figure 2
Proportion of "unhappiness"by parts of speech



Note. In contrast, verbs (57%) predominate for unhappiness, primarily various forms of the verb cry. Adjectives (12%) participate relatively less.

Analysis of folktale endings. *Out of 43 tales, 27 had "happy endings" and 16 had unhappy endings. However, not all "happy endings" feature the explicit "and they lived happily" formula. Only 13 tales had happiness expressed explicitly ("lived happy ever after"). In the remaining 14 happy tales, happiness was expressed implicitly: through marriage, escape from evil, or problem resolution. Unhappy endings were also more often expressed implicitly (10 tales) – e.g., foolishness, failure – while those expressed explicitly (4 tales) were conveyed with phrases like "alas" or "so she died".*

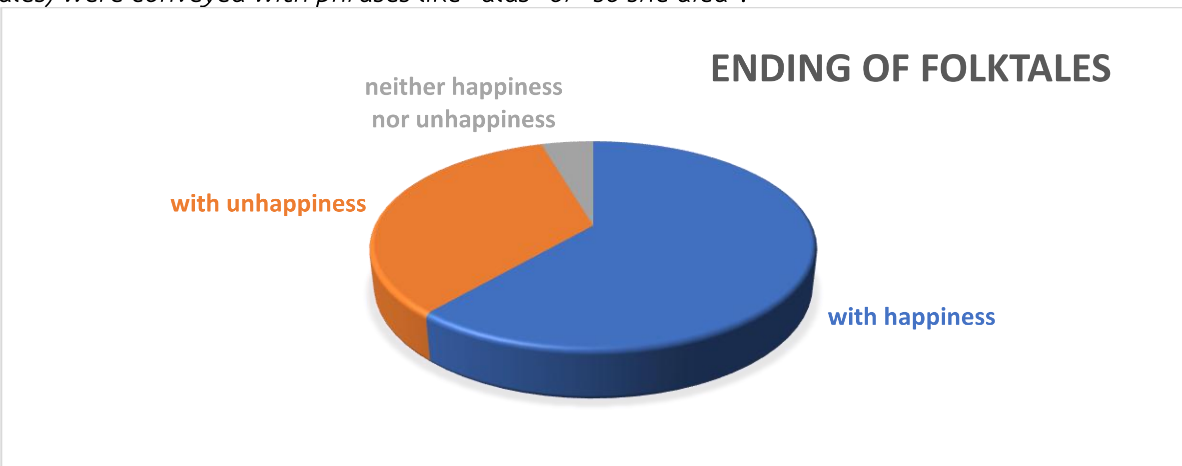


Figure 3 *Proportion of the folktale endings*

The total number of English folktales which were chosen for this corpus is 43 tales. 27 folktales out of 43 ended with happiness. However, only in 13 folktales out of 27 the "happy ending" is expressed explicitly with the phrases "happy ever after", "lived happy ever afterwards", "lived in great joy and happiness all the rest of their days", "lived happy and died happy", "lived in great happiness until she died", "lived happy all their days", "lived as happy as could be ever afterwards", "liven in great splendour and were very happy". The rest of the folktales which ended with happiness the "happy ending" is expressed implicitly: getting rid of unhappiness, marriage, escaping from cruel people are considered as happy finals.

Table 3

Categorization of Folktale Endings

Ending Type	Count	Example
Happy (Explicit)	13	"...lived happy ever after." (Cap O' Rushes)
Happy (Implicit)	14	Resolution through marriage or escape (Molly Whuppie)
Unhappy (Explicit)	4	"Alas, Tom Thumb is dead." (The history of Tom Thumb)
Unhappy (Implicit)	10	Conclusion with foolishness or betrayal (The Three Sillies)

The plot analysis revealed that the words expressing "happiness" are mostly found at the end of the folktale texts

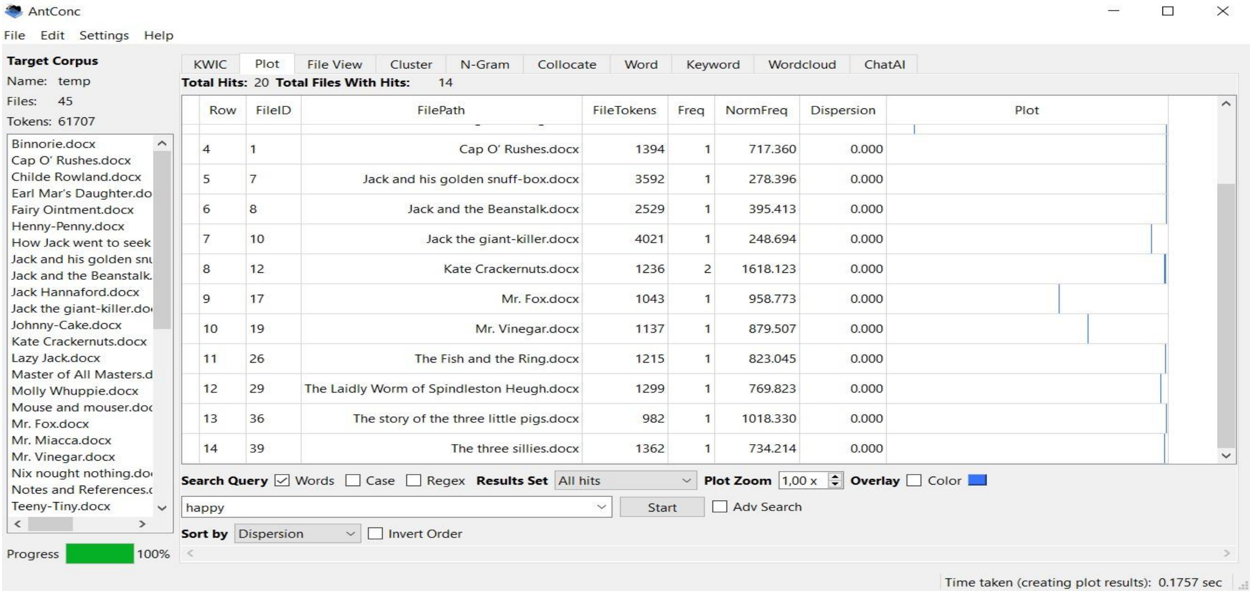


***Figure 4** Plot analysis of the word "happy"*

The plot analysis for the words happy, overjoyed, satisfaction, content, merry, joy illustrated final position.

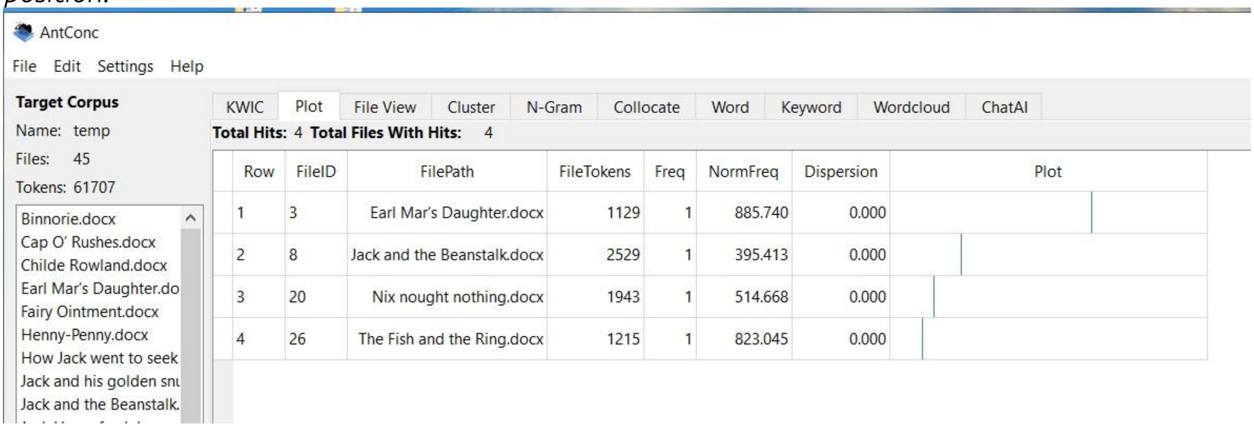


***Figure 5** Plot analysis of the word "sad"*

Words sad, unhappy, melancholy, grief are found in the beginning of the folktale texts.

***Collocation and number analysis.** The word "happy" forms strong collocations with "ever after", "man", and "lived". The word "cry" collocates with "baby" and "voice". The following set phrases were also found to describe happiness: Happiest man alive (4), the more the merrier (5), lived happy ever afterwards (5), lived happily (3). The analysis of numbers shows that the most frequently used numbers in the tales are "one" (100), "two" (66), "three" (66), "five" (25), and "seven" (17), often expressing time, quantity, and repetition. Interestingly, the number 13 which is considered as indicator of unhappiness in many cultures is not found in the folktales analyzed.*

DISCUSSION

The obtained results reveal the complex and asymmetrical nature of the happiness-unhappiness *opposition in the language of English folktales. Firstly,* ***the difference in part-of-speech distribution*** *informs us about the nature of both states. The expression of unhappiness through verbs presents it as an active, dynamic process – a force that drives the plot development and prompts protagonist action. In contrast, happiness is described mainly through adjectives, portraying it as a stable, stationary state, a goal achieved as a result of action. In other words, unhappiness is the story, happiness is its conclusion. Secondly,* ***the implicitness of the final formulas*** *is of significant importance. While the "lived happily ever after" formula is important, it is used in only a small portion of the stories. This means that the didactic task of the tales is not always emphasized with explicit linguistic markers. The reader or listener can infer "a happy ending" from traditional markers like marriage or escape from evil themselves. This indicates a strong entrenchment of cultural codes and narrative conventions. Thirdly,* ***the strong expression of unhappiness through the lexeme "cry"*** *emphasizes the direct and physical expression of emotions. This may be a simple and understandable depiction of emotional reactions in texts intended for a child audience. At the same time, the preservation of archaic interjections like "alas" demonstrates the connection of tales to the oral tradition. Finally,* ***the analysis of numbers*** *illustrates the structural values of the tales. The frequent use of the number 3 (66 times) confirms its mythical significance. The absence of the number 13 may indicate that the tales generally possess an optimistic and ordering worldview, striving to avoid "unlucky" numbers that bring misfortune. In conclusion, the linguistic data indicate that this opposition is not a simple "black and white". It is a dynamic and functional relationship where unhappiness serves as the basis for action and conflict, while happiness is the narrated ideal and stable state. Although happiness is often explicitly expressed, its narrative weight and power often derive from the strong verbalization of the unhappiness that leads to it.*

CONCLUSION

This corpus-pragmatic study has successfully mapped the linguistic landscape of the concepts of happiness and unhappiness in English folktales. The research has shown that the verbalization of these two concepts differs significantly: unhappiness is more verb-based and active, while happiness is primarily adjective-based and stative. Although the "and they lived happily ever after" formula is culturally significant, it does not dominate the linguistic reality of many happy tales, pointing to strong cultural and narrative conventions. The practical significance of the study is that it demonstrates the effectiveness of corpus-pragmatic methods in studying traditional texts. Future research could explore folktale corpora from other cultures, analyze happiness/unhappiness verbalizers from a gender linguistics perspective, or conduct a deeper investigation of the metaphorical expressions of these concepts.

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Psychological sciences

TECHNOLOGIES OF PSYCHOLOGICAL INFLUENCE (TPV): PERSUASION VS. SUGGESTION VS. EMOTIONAL CONTAGION

Yuriy Romanenko
Doctor of Sciences (Soc.), Professor, Professor of the Department of International Communications and Communicative Technologies, Educational and Scientific Institute of International Relations, Taras Shevchenko National University of Kyiv,
ORCID ID: https://orcid.org/0009-0006-9739-0894

Based on your detailed analysis of ***Persuasion****,* ***Suggestion*** *and.* ***Emotional Contagion*** *as technologies of psychological influence (TPV), here are the key summary points for these provisions [37]:*

Universal Use of TPI: *Communication inherently involves the use of Technologies of Psychological Influence (TPI), which can be conscious or unconscious, open or latent, and situational or systemic.*

Core Functional Blocks: *TPI are rooted in three primary mental functions:*

Cognitive: *Led by thinking and thought processes.*

Regulatory: *Led by the will and volitional operations.*

Evaluative: *Led by emotions, which test the system's compliance with cognitive or voluntary content [37].*

Functional Interdependence: *While differentiated, these functions interact constantly; for example, thinking categorizes perceptions and constructs values, while emotions can "contaminate" logical thought processes.*

- ***Identity Assessment:*** *The choice of influence technology depends on the subject's hypothetical or verified assessment of the object's "intrapsychic reality." This determines whether the subject employs verbal-communicative or non-verbal instruments.*
- ***The Status of the Object:*** *The interaction is a strategic response to the perceived status and cognitive map of the addressee.*
- ***1. Persuasion (The Rhetoric of Logos) [15; 37]:***
- ***Core Intention:*** *Persuasion aims to provide proof mediated by values, theories, or facts. It operates strictly within the logical laws of* ***identity, non-contradiction, and sufficient reason.***
- ***Hierarchy of Evidence:*** *Values possess the highest evidential potential as they ensure the stability of theories and facts. Theories offer probable knowledge, while facts (often mixed with "factoids") have the lowest stability and require the most rigorous verification [37].*
- ***The "Economics" of Persuasion:*** *It is the most resource-intensive technology. It requires significant time for preparation, a high valuation of the object of influence, and a commitment to "informational ecology"—explicitly rejecting force or the dismissal of feedback [37].*
- ***Verbal Markers:*** *Characterized by descriptive-analytical modality, explanatory texts, inductive-deductive reasoning, and the avoidance of deontic "obligation" operators.*
- ***Non-Verbal Markers:*** *Includes the maintenance of physical/mental boundaries, variable gaze/gestures, and a rhythmic, low-intonation speech pattern that respects the addressee's spatial autonomy [11; 12;25; 37].*

2. Suggestion (The Technology of Direction) [2; 6; 7; 28; 37]:

Core Intention: *Unlike persuasion, suggestion seeks to change the direction of cognitive, emotional, or voluntary processes through* ***installation****.*

Mechanism of Influence: *It bypasses the need for logical evidence by introducing mental content directly into the addressee's consciousness.*

Relational Dynamics: *It relies on the presence of "mental expectations" of authoritative or imperative content within the object. It assumes a degree of cognitive dependence or a perceived power asymmetry between the subject and the object [37].*

3. Emotional Contagion (The Evaluative Response) [37].

Automaticity: *Often involves non-conscious mimicry of facial expressions, vocalizations, or postures* ***[19; 20; 30]****.*

Mechanisms and Triggers: *Can be triggered by auditory cues* ***[27]****, visual facial affect* ***[17; 22; 26]****, or even digital/computer-mediated communication* ***[1; 14; 23; 34]****.*

Synergy with Suggestion: *Contagion reduces critical resistance and increases psychic flexibility, serving as a catalyst for subsequent suggestion* ***[3; 10; 33]****.*

Neurocognitive Basis: *Involves central mechanisms such as pupillary contagion and somatic markers* ***[18; 9]****.*

Foundations of Psychological Influence [37]

The Three Basic Technologies (TPI)

- ***Categorization:*** *Scientific literature identifies three primary methods of mental impact:* ***Persuasion****,* ***Suggestion****, and* ***Emotional Contagion****.*
- ***Empirical Markers:*** *Each technology is identifiable through specific verbal and non-verbal communicative features.*
- ***Research Gap:*** *The article specifically addresses the under-researched relationship between the temporal features of these technologies and their subjective/intentional characteristics.*

Compatibility and Contrast (Conclusions) [5; 21;31;34;36; 37]*.*

Exclusivity of Persuasion: *Persuasion is incompatible with suggestion or contagion. It focuses on long-term internalization and the formation of value-based beliefs, which is fundamentally opposed to the mechanics of the other two methods.*

Partner vs. Object: *Engaging in persuasion treats the addressee as an equal partner. Switching to suggestion or contagion effectively downgrades the partner to an "object" whose psyche can be instrumentalized.*

Suggestion and Introjection: *Suggestion relies on "introjection" (the forced adoption of unassimilated ideas), which often leads to eventual internal psychological alienation.*

Synergy of Contagion and Suggestion: *Unlike persuasion, emotional contagion and suggestion are compatible. Contagion reduces critical thinking and increases psychic flexibility, creating a fertile environment for subsequent suggestion.*

Temporal Limits: *While contagion is effective for immediate impact, it is not designed for the long-term mental transformations achieved through persuasion [37].*

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