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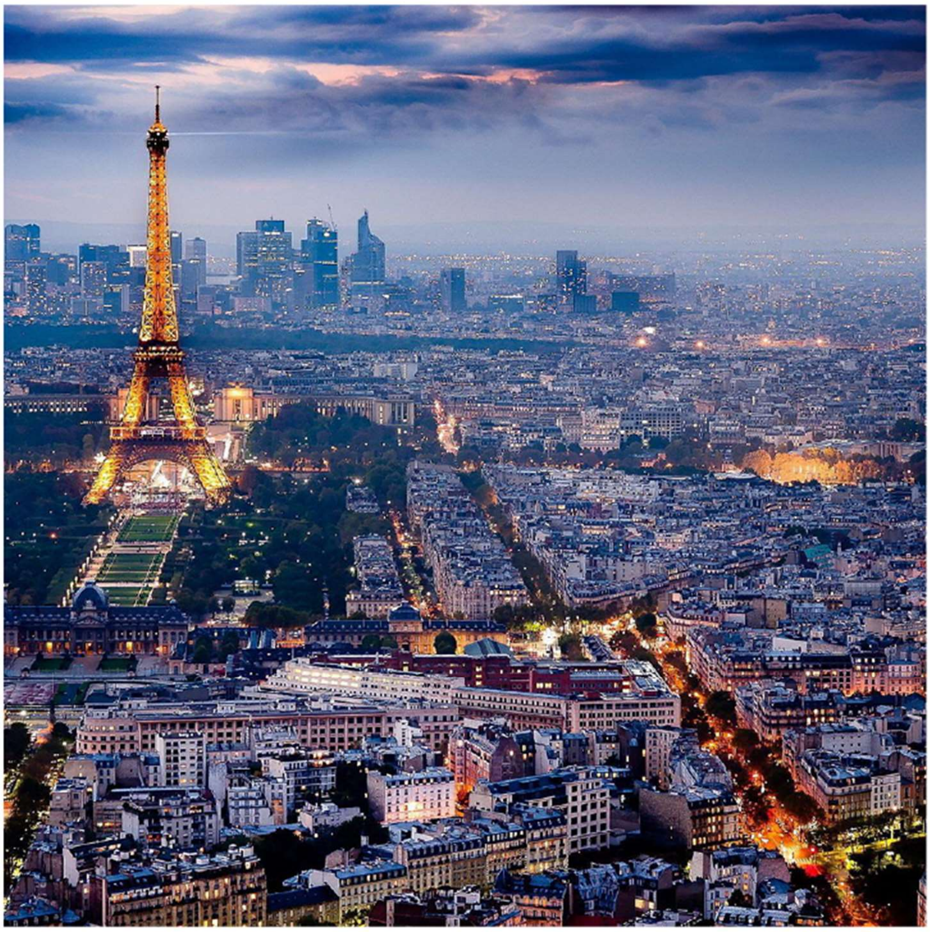

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Организационная культура как фактор стратегического развития организации

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Социально-экономические преобраззования в Казахстане свидетельствуют о непрерывном процессе зарождения, развития и распада большого числа организаций.

Сложный характер рыночных реформ изменил акценты в современном управлении организациями. Бюрократические, авторитарные и технократические инструменты руководства в условиях дефицита времени, информации и людей оказались по большей части неэффективными. Выбранный когда-то давно технократический способ существования, хотя еще доминирует, но во многом уже исчерпал себя. Современные теории гуманного управления – это попытка и возможность перейти к гармоничному способу существования, основанному, прежде всего, на развитии личности и определении ее места в мире. Такой подход предполагает новое видение управленческих отношений руководителей, их ориентацию на раскрытие потенциала человеческого капитала.

В настоящее время круг проблем, затрагиваемых при исследовании организаций, непрерывно расширяется. Выделились в отдельные направления исследования организации информационных потоков в управлении; исследование организации механизма выдвижения, принятия и изменения целей; мотивации деятельности управленческого персонала и организационных отношений. Активно изучается и исследуется влияние последствий внедрения достижений научно-технического прогресса на организационные изменения, исследуются и разрабатываются механизмы влияния организационной культуры на реализацию краткосрочных и долгосрочных стратегических целей организации.

Любая организация вне зависимости от ее размеров и сферы деятельности является не только технико-экономической, но и социальной системой, что непременно предполагает возникновение трудностей в разработки внедрения и реализации стратегий перспективного развития, и последующую реализацию необходимых организационных изменений. Не последнюю роль при этом играет, уже сложившаяся в организации организационная культура. Ее можно признать, и это подтверждают последние исследования, основным показателем, необходимым для правильного понимания и управления организационным поведением людей, работающих в организации, организации в целом.

Проблематика изучения организации как культурного феномена не является чем-то новым для социологии и восходит к традициям М. Вебера, Т. Парсонса, К. Левина. Однако само введение термина «организационная культура» и его детальная проработка датируется недалеким прошлым, фокусирование внимания на исследованиях этого социального феномена датируется концом 1970-х годов. С этого момента определились различия в подходах к исследованию организационной культуры.

В целом концепции организационной культуры условно можно разделить на две большие группы. Первая рассматривает организационную культуру как атрибут организации, предполагая возможность влиять на ее формирование. Этот подход условно называется «рационально- прагматическим».

Второй трактует организационную культуру как обозначение самой сути организации, то, чем она по существу является; этот подход часто ассоциируется с «феноменологической моделью организации».

В основе первого, рационально-прагматического подхода лежит положения, разработанные Э. Шейном. Организационная культура, по его мнению, представляет собой интегрированный набор базовых представлений, которые данная организационная группа изобрела, случайно раскрыла, позаимствовала или достигла каким-либо иным путем, как попытка решения проблем адаптации организации к внешней среде и внутренней интеграции, которые в свою очередь, достаточно эффективно послужили организации, чтобы быть признанными, действенны- ми и достаточными для их закрепления и передачи новым поколениям членов организации.

Организационная культура может проявляться на нескольких уровнях. Первый, самый доступный, составляет видимые культурные артефакты, к которым можно отнести такие ее проявления как применяемая технология и архитектура, использование пространства и времени, устойчивые способы поведения членов организации, язык, лозунги, или все, что можно ощущать и воспринимать через чувства человека. Все эти проявления легко обнаружить, и они доступны для наблюдения и описания. При этом гораздо труднее ответить на вопрос, почему в данной организации они приняли такую форму.

Второй уровень – уровень организационных ценностей. В отличие от культурных артефактов, ценности не видны непосредственно: их обнаружение требует серьезной исследовательской работы. Но культура определяется не декларируемыми ценностями, а, как правило, неосознанными «базовыми представлениями», которые составляют третий уровень организационной культуры. Базовые представления определяют то, как члены группы воспринимают окружающее, что они делают, думают, чувствуют.

Представители первого подхода – Э. Шейн, Т. Питерс, Р. Уоттермен – формирование организационной культуры связывают с процессами, происходящими внутри организации, то есть формирование организационной культуры рассматривается как итог внутренних процессов, протекающих в организации, в той или иной степени управляемых.

Второе направление исследований организационной культуры (феноменологическое) восходит к теоретическим разработкам Д. Сильвермана и П. Бергера. Так, Д. Сильверман делает попытку переосмыслить взаимосвязь правил организационного поведения и организационных целей. Он предлагает отказаться от взгляда на организацию как инстанцию, предопределяющую поведение работника, а сосредотачивает внимание на том, как участники используют формальные правила для определения и интерпретации своего поведения и поведения окружающих.

Правила поведения вырабатываются самими членами организации. Они составляют некую конвенциальную реальность, в которой живут и действуют ее члены. Формальные правила действуют в социальных ситуациях, посредством постоянной интерпретации их значений в каждом контексте принятия решения.

Деятельность, которая выглядит организованной согласно правилам, на самом деле представляет собой продукт практической деятельности членов организации, и в лучшем случае демонстрирует, что то, что они делают, соответствует установленным правилам.

Организационную культуру, таким образом можно определить в виде совокупности «признанных в организации ценностей, убеждений, норм и форм поведения» [1, с. 55] разделяемых всеми членами организаций. Носителями организационной культуры являются люди, работающие в организации. Именно они создают тот порядок вещей, те системы отношений и те образцы поведения, которые складываются в организации в тех или иных обстоятельствах. Только они создают те «неписаные» правила, определяющие, как должны работать и вести себя люди в данной организации. При этом речь идет об убеждениях и ценностях, которые в большей или меньшей степени разделяются подавляющим большинством членов организации.

Содержание работы, личность руководителя и стиль руководства, которого он придерживается в своей работе, особенности психологического климата в трудовом коллективе – эти и другие факторы оказывают свое влияние на организационную культуру конкретного подразделения. Организационная культура будет соответствовать выбранной стратегии, если она будет соотнесена с восприятием, мышлением и мотивами работников организации, поскольку организационная культура зарождается в первую очередь в головах людей.

В свою очередь, организационно-культурные ценности могут оказывать существенное влияние и на мотивацию, и взаимодействие в процессе труда, и текучесть кадров в организации, и, в конечном счете, на эффективность деятельности работников.

В организационной культуре наиболее интересен механизм ее влияния на поведение и работу членов организации. Являясь ядром организационной культуры, ценности могут быть как позитивными, ориентирующими людей на такие образцы поведения, которые поддерживают достижение организационных целей, так и негативные, которые отрицательно влияют на организационную эффективность.

В основе организационной культуры лежит и система отношений, это те отношения, которые формируют и определяют поведенческие нормы и рабочее поведение членов организации (например, отношение персонала к работе, отношения руководства к работникам, отношения между работниками в организации).

Еще один аспект организационной культуры – поведенческие нормы, это те требования к поведению работников, которые воспринимаются ими как некий свод правил, определяющих, каким должно быть «правильное», «должное» поведение членов организации в тех или иных стандартных ситуациях.

Нельзя не сказать о действиях и поведении работников, направленных на достижение конкретных результатов или выполнение порученных заданий. Это наблюдаемое проявление организационной культуры, ее внешняя сторона. Именно по действиям и поведению работников можно судить о том, каково в целом состояние организационной культуры, способствует ли она эффективной работе организации, поддерживает ли стратегию развития, способствует ли успеху проведения различных организационных изменений.

Для формирования организационной культуры, которая бы поддерживала стратегию организационного развития, руководство предприятия должно предпринять ряд шагов.

Во-первых, чтобы организационная культура «работала» на повышение эффективности организации, она должна поддерживать стратегию и миссию.

Во-вторых, необходимо изучить уже сложившуюся организационную культуру. Ее изучение является предпосылкой успешного изменения. Прежде, чем изменять, необходимо знать, что и как изменять. Необходимо найти ответ на вопрос о том, что из себя представляет сегодняшняя организационная культура, какой должна быть организационная культура, чтобы она поддерживала разработанную стратегию организационного развития и изменений.

В-третьих, нужно проанализировать документы, регламентирующие деятельность организации. Культура организации находит свое отражение и в документах (планах, программах, приказах, распоряжениях, положениях), и хотя живая культура больше отражается в представлениях и ценностях работников и руководителях, чем в документах, пренебрегать этим источником не стоит.

В-четвертых, обязательным должно быть изучение сложившихся в организации правил и традиций. Изучение действующих в организации традиций, формальных и неформальных правил должно быть направлено на определение того. Какое влияние они оказывают на рабочее поведение персонала, и в какой степени они поддерживают выработанную руководством стратегию выбранного организационного развития.

И, наконец, в-пятых, особенно важным является изучение сложившейся в организации практики управления. Сложившаяся в организации практика управления является важным источником информации о преобладающей организационной культуре. Поскольку не всегда сложившаяся организационная культура способствует эффективной работе персонала.

Таким образом, организационная культура может выступать в качестве действенного инструмента, который обеспечивает настрой персонала на высокую производительность и высокое качество в работе. Формирование и поддержание такой культуры, которая бы повышала бы отдачу от людей, работающих в организации, способствовала повышению ее эффективности и конкурентоспособности, – это одна их важнейших стратегических задач высшего руководства.

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Reinforced Concrete Arch Structures

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Keywords: arch, shell, reinforced concrete, reinforcement, reliability

Annotation: This paper explores the structural and technological characteristics of reinforced concrete arched roof systems, tracing their historical development, geometric configurations, reinforcement specifics, and contemporary application trends. The advantages of arch structures such as spanning wide areas without supports, high seismic resistance, and long service life are thoroughly examined. The article presents notable case studies from Georgia, where arched coverings have been effectively employed in public and touristic infrastructure. It also outlines recommendations for efficient construction processes and defect prevention, highlighting the engineering and economic viability of reinforced concrete arch systems in modern construction practice.

1. Introduction

In the architectural and construction space, roof systems represent one of the fundamental elements, serving not only a structural function but also significantly influencing the functionality and aesthetics of a building. Of particular interest are reinforced concrete arched coverings, whose application has played a crucial role both in historical and modern construction practices. The arch shape naturally aligns with the principles of static load distribution and enables the covering of large-span spaces using minimal material and ensuring high structural stability.

In the context of modern construction technologies, arch systems have gained special significance due to their versatile applications and engineering advantages. The benefits of reinforced concrete as a material—such as strength, monolithic nature, and durability—when combined with the geometric advantages of the arch, offer highly efficient structural solutions. These systems are commonly found in public, industrial, and transport infrastructure projects where large interior spaces need to be covered without intermediate supports.

This article aims to examine the structural characteristics of reinforced concrete arched coverings, the technological processes involved in their construction, geometric variations, reinforcement specifics, and methods for preventing common structural defects. It also highlights current trends in their application, which are important both for engineering design and practical construction.

1. History and Development Stages of Arch Systems

The use of arched coverings can be found throughout various stages of human history, from Roman aqueducts to modern monolithic structures. The invention of concrete and the development of reinforcement technologies made it possible to expand, strengthen, and simplify arch systems. In the early 20th century, engineering advancements enabled the construction of wide-span arches using both pre-stressed and conventional reinforced concrete.

3. Structural Characteristics

The structural characteristics of reinforced concrete arched coverings determine their efficiency, deformation flexibility, and long-term durability. By their nature, arched systems differ from flat roof structures in that the main load is transferred through compressive forces. This allows for better weight distribution and reduces bending moments typically found in roof slabs.

Load Distribution and Operational Principle

An arch, as a structural element, absorbs loads and distributes them in a compressive manner toward the supports. This compressive action is the main advantage of an arch. Unlike standard beams, in arches the forces follow the so-called "thrust line," which helps reduce the risk of cracking in the concrete.

Geometry and Its Impact on the Structure

The geometry of the arch whether circular, parabolic, or elliptical directly influences structural flexibility and performance:

- A circular arch is simple in construction but does not fully align with the thrust line, resulting in additional bending moments.
- A parabolic arch ideally fits uniformly distributed loads and works almost entirely under compression throughout its length.
- Elliptical and hyperbolic arches are often used in architecturally distinctive or functionally optimized projects where high structural performance is needed.

Height-to-Span Ratio of the Arch

The effectiveness of an arch largely depends on its height-to-span ratio. The following recommendations are commonly applied in practice:

- Height-to-span ratio = 1:4 to 1:6 (standard values)
- Low-rise arches generate stronger horizontal forces.
- High-rise arches are generally less economical from a structural standpoint.

Stability and Long-Term Durability

Arched reinforced concrete coverings are distinguished by their structural stability — they can withstand both vertical and horizontal loads. They are less affected by external forces such as earthquakes or wind, provided that the support system and anchors are properly designed. With appropriate reinforcement and bracing, arches can have a service life of 80–100 years, requiring only minimal maintenance.

Construction Technology

The construction process of reinforced concrete arched coverings requires detailed planning, high-quality temporary structures, and strict adherence to accurate geometric forms. The successful implementation of an arch greatly depends on the precision of the technological sequence, the integration of structural design with construction practice, and the quality of materials used.

Preparatory Works

Arch construction begins with the determination of precise geodetic reference points and the accurate positioning of support structures. It is essential to properly reinforce the foundation and supports, as arches transfer significant horizontal forces to these elements.

Additional steps include:

- Clearing the construction site and inspecting the soil conditions (especially in support zones);
- Mobilizing temporary beams and collapse-prevention systems;
- Ensuring timely delivery of required materials and proper storage conditions.

Formwork Assembly

One of the key stages in arch construction is the installation of the formwork system. The formwork must ensure the precise geometry of the arch and possess sufficient strength to withstand both the weight of the concrete and the dynamic loads generated during the construction process.

The types of formwork used may include:

- Wooden structures — commonly used for small- or medium-sized arches;
- Metal formwork — offers greater stability and is reusable;
- Monolithic or modular templates — custom-made for specific projects.

The formwork must be tightly assembled, securely fixed, and thoroughly protected at contact points with the steel reinforcement.

Reinforcement Installation

The placement of reinforcement is carried out within the formwork, based on architectural and engineering drawings. The rebar is fixed on spacer supports to maintain the required concrete cover, especially in the lower and upper zones. It is essential to ensure proper bonding strength between rebars, adequate spacing, and the correct alignment of anchors.

The reinforcement includes:

- Longitudinal reinforcement along the axis of the arch;
- Transverse reinforcement in the support areas;
- Special reinforcements at the arch joints.

Concrete Pouring

Concrete pouring begins from the central point and gradually progresses toward the edges to avoid uneven loading and prevent deformation of the formwork.

After pouring, vibration is performed (using mechanical or rod vibrators) to ensure proper compaction and eliminate air pockets.

Curing and Hardening

Curing begins shortly after concrete placement — the concrete is kept moist and protected from drying to ensure optimal strength development. The curing period typically lasts 7–14 days, after which the formwork can be removed in stages.

Key requirements include:

- Maintaining at least 90% humidity during the first 7 days;
- Preventing surface cracks caused by premature drying;
- Using sealing covers or polyethylene sheets for moisture retention.

Formwork Removal and Inspection

Formwork removal begins only after the concrete has reached ≥70% of its design strength. The process starts from the center of the arch and continues toward the edges.

After removal, visual and ultrasonic inspections are conducted to detect cracks, stiffness, and possible deformations in the arch.

Once the inspection is complete, the arch is connected to other structural elements — walls, columns, or adjacent roofing systems.

Reinforcement Specifications and Details

Reinforcing arched concrete coverings is a critical stage that determines the mechanical strength, deformability, and crack resistance of the structure. In an arch, reinforcement works in conjunction with compressive forces to compensate for tensile stresses and ensure the monolithic integrity of the covering.

Main specifications include:

- Longitudinal reinforcement — placed along the arch axis, especially in the lower (tensile) zone. This reinforcement handles the primary operational stresses.
- Transverse reinforcement — distributed periodically along the arch to strengthen the concrete shell and form a cohesive system.
- Additional reinforcement at supports — concentrated forces at the supports require enhanced reinforcement, often in double layers.
- Inclined or shaft reinforcement — applied in highly stressed sections as additional stabilizers.

Types and parameters of reinforcement:

- Rebar diameter ranges from 12–25 mm, depending on project requirements.

- Minimum concrete cover on the rebar: 20–30 mm, depending on the level of environmental aggressiveness.

Contemporary Use of Arched Roof Structures

In modern construction, arched roof structures continue to maintain their relevance from both structural and aesthetic perspectives. In contemporary architectural projects, they serve not only as efficient solutions for spanning large interior spaces but also as distinctive visual elements that enhance the identity of a building. Their elegant form, combined with structural logic, enables architects and engineers to create spacious environments with fewer supports and increased spatial flexibility.

Arched Roof Structures in Georgia

1. Tbilisi Sports Palace

Constructed in the 20th century, the Tbilisi Sports Palace remains in active use today. Its roof is implemented using a reinforced concrete arch system, making it one of the earliest large-scale arched concrete structures in Georgia. The building showcases the long-term durability and effectiveness of such systems.

2. New Market and Exhibition Pavilions (Expo Georgia)

While earlier pavilions were built with heavy frame-type structures, the newer buildings at Expo Georgia utilize lightweight composite systems that combine reinforced concrete and metal in arched forms. This solution provides open, flexible interior spaces suitable for multifunctional use.

3. Gudauri Cable Car Stations and Tourist Infrastructure

Terminal buildings and tourist facilities in the mountain resort of Gudauri frequently employ arched roofing systems. Their design offers high resistance to snow and wind loads while creating spacious interiors with minimal structural elements—an economically efficient solution.

Additionally, modern trends emphasize energy efficiency: arched roofs increasingly incorporate thermal insulation and solar panels to enhance sustainability.

Conclusion

Reinforced concrete arched coverings represent one of the most important structural forms in modern civil engineering. Their defining characteristic—covering large spans without intermediate supports—combines functional strength with architectural elegance.

It is evident that arched systems offer multiple advantages: high seismic resistance, fire resistance due to the nature of concrete, and a long service life with minimal maintenance requirements.

When designed with careful attention to reinforcement, load behavior, and construction technology, arched coverings provide not only structural efficiency but also economic benefits.
In present-day practice, their application remains highly relevant across a range of sectors, including sports halls, transportation hubs, exhibition centers, churches, and industrial buildings. The arch form adapts equally well to both classical and innovative architecture, making it a preferred solution among leading architects and engineers around the world—especially when aesthetic excellence must be achieved without compromising structural integrity.
Nonetheless, the success of arched roof structures depends heavily on the coordinated collaboration of architects, structural engineers, and builders. Accurate consideration of materials, loads, environmental conditions, and reinforcement detailing is essential for long-term performance.
Future developments—such as 3D concrete printing, high-strength composites, and biomimetic design approaches—are expected to elevate the structural possibilities of arched roofs to new levels. In this context, arched concrete coverings not only retain their engineering significance but are also gaining renewed architectural life in the spaces of the 21st century.

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Sustainability Issues of Tushetian Towers

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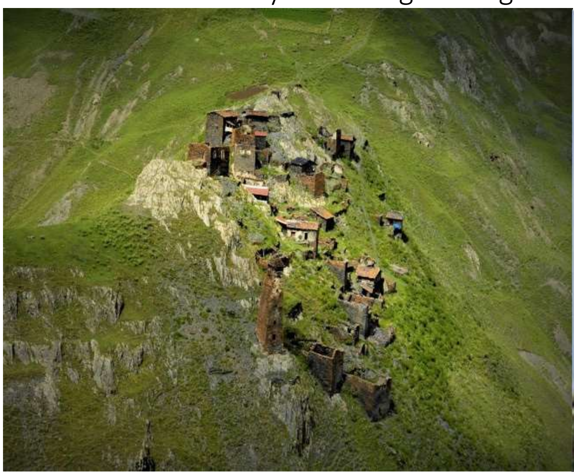
Keywords: stability, strength, defensive tower, residential fortress-tower.

Summary: Tusheti is a kind of deposit of tangible and intangible cultural heritage of Georgia. It still has the historical traditions that form the basis of Tusheti culture. The Tusheti landscape is a harmonious blend of nature and human activity, it is widely known for its landscape architecture, settlements scattered on the slopes of the mountains. Basically, 7 types of buildings can be distinguished: defensive tower, residential fortress-tower, residential house, agricultural building “boseli”, khati or shrine, church and tombs. The towers ensured the defense and security of Tusheti from attacks by neighboring tribes.

Introduction:
Tusheti represents a treasure trove of Georgia’s tangible and intangible cultural heritage. Historical traditions that form the foundation of Tushetian culture still thrive here. The Tushetian landscape is a harmonious blend of nature and human activity, renowned for its landscape architecture and settlements scattered across mountain slopes. Seven main types of structures can be identified in Tusheti: defensive towers, residential fortresses, residential houses, agricultural buildings ("boseli"), chapels or shrines, churches, and tombs. These towers ensured Tusheti’s defense and safety from neighboring tribes’ attacks.



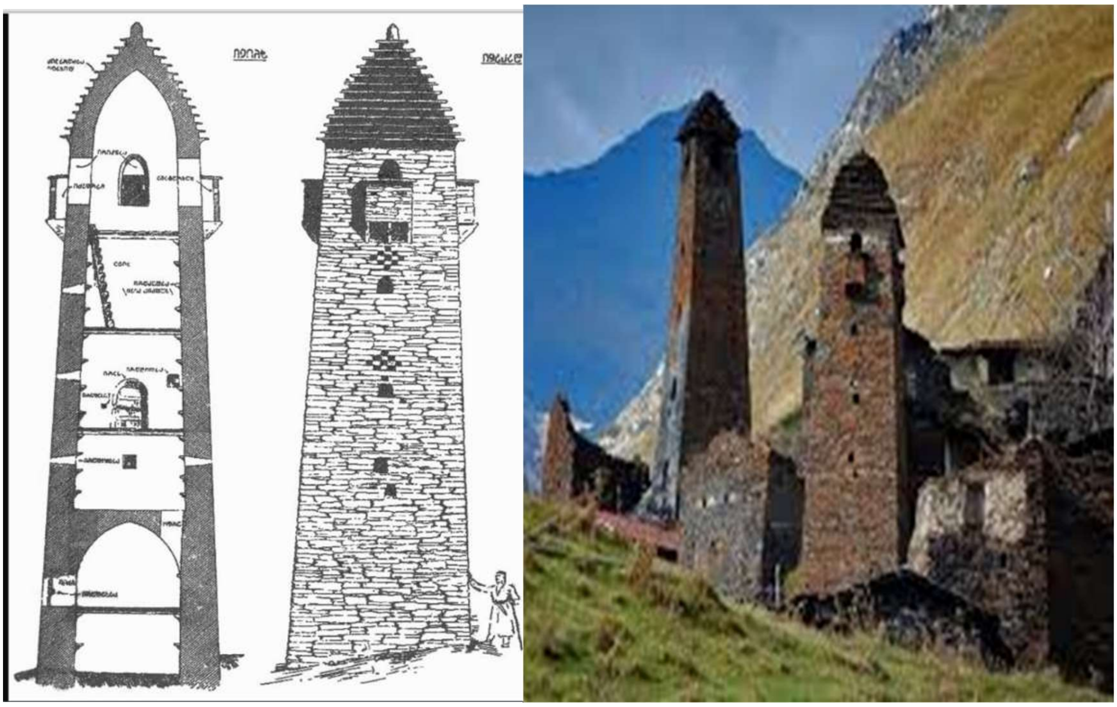

Historical Background:
The earliest fortifications in the South Caucasus date back to the 3rd millennium BC. Structures with characteristics of towers were built as early as the 1st century AD. These include residential and military types. The construction of Tushetian towers peaked in the 12th–13th centuries, while construction techniques were refined the most between the 15th and 17th centuries.
From ancient times, as evidenced by archaeological findings in Shenako, settlements prioritized natural fortifications and clustered layouts. Examples of such fortified villages include Old Diklo, Hegho, Tsaro, and Indurta. To this day, Tusheti’s villages retain 17th–18th-century defensive and

signal towers, where the population took refuge and collectively defended themselves from invaders.

Construction and Features of Towers:

A typical Tushetian tower was built on a square base of 6–12 meters and stood between 10 and 25 meters high, depending on its function. The walls were made of stone blocks, with thickness decreasing as the tower rose to ensure stability. The foundation was a monolithic base with an arched form to maintain structural integrity and balance. The entrance was located on the second floor, accessible by a retractable ladder, enhancing security. Wooden beams and planks separated the floors, and an internal drainage system protected the towers from water damage. Exterior walls were often adorned with religious petroglyphs, such as depictions of the sun, human limbs, and animals. Defensive towers commonly featured Golgotha crosses.

Construction rituals accompanied tower building. Folk songs and tales emphasize the role of "master builders," who led the teams constructing these structures. Some villages specialized in tower building. Interestingly, scaffolding was not used during construction. Many researchers agree that tower construction often came at the cost of workers' and craftsmen's lives. Clients rewarded successful builders with an ox, and constructing a family tower required the equivalent of 50–60 cows.



Residential and Mixed-Use Towers:

Residential towers consisted of 2–4 floors with square or rectangular bases measuring 8–12 meters in length. The walls' thickness decreased with height, ranging from 1.2 meters at the base to 0.7 meters at the top. The ground floors housed livestock, while the upper floors were living spaces for families. Some towers had mixed-use functions, serving both as residences and defensive structures. These towers were smaller but broader than earlier defensive towers and featured embrasures and slots for pouring hot liquids on attackers. Mixed-use towers generally had five floors, with the top floors equipped with battlements and firing slits.

Signal and Watchtowers:

Military watchtowers and signal towers were built strategically to monitor bridges, roads, and mountain passes. Signal towers were often erected on hard-to-reach cliffs, ensuring visibility of

the next tower in the chain. These towers were located near rivers or springs, allowing water to be supplied through concealed channels. Signal towers had decorated entrances and windows, often inscribed with the owner's name and embellished with petroglyphs.
Military towers were taller than residential ones, with heights of 20–25 meters and square bases measuring 5–6 meters. To prevent attackers from setting them on fire, the exterior lacked wooden details. Doors and windows were placed in the least accessible locations, often on the second floor, with access via ladders. Openings in the upper sections allowed defenders to pour boiling water or oil on attackers. These towers typically featured stepped pyramid-shaped roofs.

Adaptations in the 13th–14th Centuries:
As inter-mountain aggression increased, residential towers were strengthened, combining residential and defensive functions. Compared to older towers, these hybrid structures were smaller but broader and included battlements and slots for pouring hot liquids. These five-story towers had bases of 8.0 by 9.0 meters, stood 11 meters tall, and had walls 75 centimeters thick on the lower floors.
Unique Examples:
The Kesalo fortress towers are particularly notable. Built using dry masonry and slate, some researchers believe the first structures in this area date back to the 5th century, during King Gorgasali's reign. Later reconstruction was associated with frequent Lezgin raids. Twelve fortress towers once stood in Kesalo; today, only seven remain, and their survival is attributed to the exceptional craftsmanship of past builders, who erected such structures in challenging conditions.

Conclusion:
The builders of these architectural monuments continue to inspire awe. Using only stone and dry masonry, without modern durable construction materials, they created structures that withstand the test of time and amaze all who see them.

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Анализ парковой инфраструктуры города Астана и предпочтений горожан в её использовании

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Аннотация
В статье рассматривается современное состояние парковой системы города Астаны как важнейшего компонента формирования комфортной и устойчивой городской среды. Проведен обзор крупных и малых зеленых зон с указанием их площади, местоположения и функционального наполнения. Особое внимание уделено уникальности каждого парка, наличию малоархитектурных форм, инфраструктуре и уровню благоустройства. В рамках исследования подготовлен социологический опрос, целью которого является выявление частоты посещения парков жителями города, наиболее востребованных зеленых пространств, а также удовлетворённости их состоянием. Предполагается, что полученные данные позволят определить степень вовлеченности населения в использование рекреационных зон и выявить наиболее популярные парки Астаны. Результаты опроса лягут в основу градостроительных рекомендаций по дальнейшему развитию системы общественных зеленых пространств в городе.

Ключевые слова Астана, парковая инфраструктура, общественные пространства, зеленые зоны, урбанистика, социальная активность, градостроительный анализ, социологический опрос, комфортная городская среда, предпочтения жителей

Analysis of the park infrastructure of Astana and the preferences of citizens in its use

Abstract

The article examines the current state of the park system of Astana as the most important component of the formation of a comfortable and sustainable urban environment. A review of large and small green areas is conducted, indicating their area, location and functional content. Particular attention is paid to the uniqueness of each park, the presence of low-architecture forms, infrastructure and the level of improvement. As part of the study, a sociological survey was prepared, the purpose of which is to identify the frequency of visits to parks by city residents, the most popular green spaces, as well as satisfaction with their condition. It is assumed that the data obtained will determine the degree of involvement of the population in the use of recreational areas and identify the most popular parks in Astana. The survey results will form the basis for urban planning recommendations for the further development of the system of public green spaces in the city.

Keywords

Astana, park infrastructure, public spaces, green areas, urban studies, social activity, urban development analysis, sociological survey, comfortable urban environment, residents' preferences.

Астана — столица Республики Казахстан, расположенная в северной части страны, на берегу реки Есиль. Город занимает территорию ~797,3 км² и является одним из крупнейших административных, культурных и деловых центров Центральной Азии. Население города на 2025 год составляет более 1,3 миллиона человек.

Особенностью Астаны является контраст между высокоплотной современной застройкой и сохранением природного компонента в структуре городской среды. Это делает наличие и развитие парков особенно актуальным.

На территории города Астаны действует более 30 общественных парков и зеленых зон различного масштаба.

Таблица 1

Система парков и зеленых зон Астаны.

Тип	Количество	Средняя площадь	Примеры
Крупные городские парки	6	30–100 га	Центральный парк, Ботанический сад, Парк Первого Президента
Средние районные парки	~10	5–15 га	Экопарк «Жетысу», Парк «Столичный», Парк в районе Байтерек
Небольшие скверы и зеленые зоны	>15	до 3 га	Скверы у ТРЦ, набережные, аллеи

В рамках подготовки статьи был проведён социологический опрос среди жителей города Астаны с целью выявления наиболее посещаемых парков и частоты их использования. Опрос проводился в социальной сети Instagram с охватом активных пользователей различных возрастных групп. В качестве основы для анализа были выбраны крупнейшие и знаковые парки города, обладающие развитой инфраструктурой и значением в структуре городской среды.

Таблица 2.
Преимущества и недостатки крупнейших общественных парков города Астаны

Парки	Плюсы	Минусы
1. Центральный парк	- Удобное расположение; - Большая площадь (80 га); - Наличие зрелых деревьев и естественного ландшафта; - Разнообразие активности; - Историческая значимость.   	-Изношенная инфраструктура в отдельных зонах; -Сезонность использования; -Недостаточное освещение в вечернее время; - Скудное зонирование для спокойного отдыха; -Ограниченное количество общественных туалетов и питьевых фонтанов.   
2. Ботанический сад	- Современная инфраструктура; -Экологическая и образовательная ценность; - Просторная территория (92 га); - Качественное благоустройство; - Доступность и транспортная связность.   	-Ограниченные функции активного отдыха; -Малое количество естественной тени; - Высокая посещаемость в выходные дни; - Не всегда работают питьевые фонтаны и уборные; - Ограничения по доступу к некоторым участкам.  
3. Парк Первого Президента	Значительная площадь (57 га); Хорошая визуальная связь с главными символами столицы; - Тихая атмосфера.   	- Сезонность эксплуатации; -Недостаток инфраструктуры; -Малая посещаемость молодёжью и детьми.  
4. Парк «Жетысу»	- Разнообразные зоны активного отдыха; - Детская инфраструктура с инклюзивным оборудованием; - Благоустроенный зелёный фон и навигация; - Удобное местоположение;   	-Аттракционы создают шумовую нагрузку; -Ограниченное число общественных туалетов; - Периодические проблемы с инфраструктурой;   

5. Парк «Жеруйык»	-Историческая ценность и зелень; -Удобное расположение и доступность; - Бесплатный вход и зимний каток;   	- Шум и визуальный дискомфорт от аттракционов и киосков; - Нехватка удобств и уборка территории; - Ограниченная зона для тихого отдыха;  
6. Триатлон-парк	- Спортивная специализация; - Большая площадь (~42 га); - Высокое качество благоустройства; - Популярность среди спортсменов и любителей ЗОЖ;   	- Мало тени; - Узкая функциональная направленность - Ограниченное количество туалетов и питьевых фонтанов - Перегруженность в часы массовых мероприятий  
6. Парк влюбленных	- Живописное расположение; - Художественная концепция; Тихая атмосфера (за пределами праздников); - Центр города;   	- Малая площадь (~13 га); - Мало теневых зон и укрытий; - Ограниченная инфраструктура для активного отдыха; - Скромное ночное освещение;  
8. Парк у Вечного огня (парк Победы)	-Историко-мемориальное значение; -Тенистые аллеи с большими деревьями; -Спокойный характер пространства; -Поддержка чистоты;	- Функциональная ограниченность; - Малая площадь (~7 га); - Неудобная навигация для новых посетителей; - Ограниченная доступность для маломобильных граждан;

С целью выявления особенностей использования парковых пространств и оценки удовлетворённости состоянием зеленых зон в Астане был проведён социологический опрос среди жителей города. Опрос проходил в формате онлайн-анкетирования в социальной сети

Instagram. В опросе приняли участие 110 респондентов, среди которых были представители различных возрастных и социальных групп.

Респондентам было предложено ответить на три ключевых вопроса. Первый касался частоты посещения парков в течение недели. Согласно полученным данным, 25 % участников указали, что посещают парки очень часто, 32 % — часто, 27 % — редко, и 16 % — очень редко. Эти данные демонстрируют, что более половины горожан (57 %) активно пользуются парковой инфраструктурой, что подтверждает значимость зеленых зон в структуре городской жизни.

Во втором вопросе предлагалось указать, какие парки города наиболее предпочитаемы для посещения. Результаты распределились следующим образом: Триатлон-парк оказался самым популярным — его выбрали 47 % респондентов. Ботанический сад набрал 37 %, Центральный парк — 34 %, Парк Первого Президента — 17 %, Экопарк «Жетысу» — 19 %, Парк «Жеруйык» — 11 %, Парк влюбленных — 19 %, и Парк Победы — 16 %. Эти цифры отражают разнообразие предпочтений горожан, с доминированием парков, которые предлагают развитую спортивную или природно-рекреационную инфраструктуру.

Третий вопрос был направлен на определение степени удовлетворенности состоянием парков. Ответы распределились следующим образом: 48 % респондентов заявили, что довольны состоянием парков, 41 % выбрали вариант относительно доволен, 3 % выразили высокую степень удовлетворенности, а 7 % указали, что недовольны состоянием парковых зон. Таким образом, большая часть опрошенных оценивает текущее состояние парков как удовлетворительное, однако доля тех, кто выразил недовольство или только относительное удовлетворение, указывает на наличие определённых проблем и нерешённых задач в организации и содержании зеленых пространств.

Анализ данных опроса подтвердил значимость парковой инфраструктуры в жизни горожан Астаны и выявил как положительные тенденции, так и существующие проблемы. Парки столицы пользуются устойчивым спросом: более половины респондентов посещают их регулярно (часто или очень часто), что подчёркивает важную роль зеленых зон в формировании благоприятной и здоровой городской среды. Наибольшей популярностью пользуются парки, сочетающие возможности для активного отдыха с высокими эстетическими и природными качествами: триатлон-парк, Ботанический сад и Центральный парк. Эти пространства востребованы благодаря развитой инфраструктуре, многофункциональности и масштабности территории.

С учётом выявленных проблем развитие парковой системы Астаны сегодня требует комплексного подхода, который позволит повысить комфортность и функциональность зелёных пространств. Важно уделить внимание увеличению плотности озеленения, созданию теневых аллей и навесов, что можно реализовать за счёт высадки деревьев, формирования зелёных каркасов и использования малых архитектурных форм с защитной функцией от солнца. Эти меры сделают прогулки в парках более приятными и безопасными даже в самые жаркие дни.

Кроме того, необходимо работать над повышением функциональной насыщенности мемориальных и монументальных парков. Такие пространства могут сохранять свой особый характер, но при этом быть дополнены зонами для тихого отдыха, арт-объектами, небольшими культурными площадками и маршрутами для занятий спортом. Всё это позволит расширить возможности их использования без ущерба для мемориальной ценности.

Большую роль играет и развитие санитарно-бытовой инфраструктуры. Установка современных общественных туалетов, питьевых фонтанов, зон для переодевания у катков и спортивных площадок позволит повысить удобство пребывания в парках для всех категорий посетителей. Важно также продумать внутреннее зонирование территорий таким образом, чтобы активные и шумные зоны не мешали тем, кто приходит в парки за тишиной и уединением.

Особого внимания требует обеспечение безбарьерной среды и развитие инклюзивной инфраструктуры. Парки должны быть удобны для маломобильных граждан, семей с детьми и людей с ограниченными возможностями здоровья. Для этого необходимо создавать доступные маршруты, инклюзивные детские и спортивные площадки. Существенным аспектом улучшения качества парков остаётся обновление навигации и информационных указателей, что сделает зелёные зоны более понятными и дружелюбными как для жителей, так и для гостей города. Реализация таких комплексных мер позволит паркам Астаны стать по-настоящему комфортными и многофункциональными пространствами, которые будут способствовать укреплению здоровья, социальной коммуникации и созданию привлекательной городской среды.

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DIGITAL TRANSFORMATION OF THE CONSTRUCTION INDUSTRY IN KAZAKHSTAN: PROSPECTS AND CHALLENGES

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Abstract. This article examines the digital transformation of Kazakhstan's construction industry, focusing on both the systemic advancements driven by state policy and the practical challenges faced by industry stakeholders. With the introduction of mandatory Building Information Modeling (BIM) for complex projects and significant investments in digital infrastructure, Kazakhstan has taken notable steps toward integrating advanced technologies in construction. The study explores key platforms such as BIM 360, e-QURYLYS, AutoCAD, and Lira-SAPR, analyzing their role in improving project coordination, cost control, and real-time monitoring. Despite progress, the sector remains unevenly digitalized, with smaller firms encountering barriers related to financing, connectivity, and workforce readiness. The article identifies five core factors influencing digital adoption: company size, geographic location, leadership support, availability of skilled personnel, and cost-benefit perception. By assessing both governmental initiatives and private sector readiness, this research highlights the opportunities and limitations of Kazakhstan's digital construction agenda.
Keywords: *digital transformation, construction industry, digital project management.*

Introduction

Over the last decade, digital transformation has reconfigured many industries, and construction—once reliant on entrenched methods—now confronts extensive changes [1]. Because emerging solutions span Building Information Modeling (BIM), IoT sensors, and diverse software systems, the pace of adoption differs among market participants. Some Kazakh developers employ AutoCAD for detailed 2D/3D drafting or Lira-SAPR for structural analysis, reflecting the ongoing push toward more specialized digital tools.

The 2024 law on digitalization, signed by President Kassym-Jomart Tokayev, imposes data standards, and it fosters anti-fraud measures while guiding 280 million US dollars into technology accelerators and venture funds. Because BIM is now mandatory for advanced projects, many firms harness unified data environments to reduce errors. Smaller enterprises beyond Almaty or Astana face tighter budgets, which slows staff training [2].

Several companies localize cost references to align with modeling requirements, yet device calibration and software integration still hinder IoT adoption. If data repositories remain fragmented, advanced analytics cannot fully streamline scheduling and resource forecasts. Platforms like e-QURYLYS unify key reporting channels for diverse public entities and serve as a centralized monitoring tool for state projects [3].

This article aims to provide a thorough examination of the adoption of digital technologies in Kazakhstan's construction market by addressing the national policy landscape, legislative undertakings, technological innovations, and the specific obstacles that impede the widespread use of digital solutions. The analysis presented here draws upon a combination of state-level policy documents, industry surveys, and academic studies. It also reviews real-world initiatives, such as the introduction of platforms like e-QURYLYS, the establishment of data-driven management centers for major public-works projects, and the role of AI-based analytics for risk reduction. Although the Kazakh construction industry occupies a distinctive position in Central Asia, insights gleaned from this case can serve as instructive lessons for other nations undertaking similar digital transformations within inherently complex and capital-intensive sectors.

1. Literature review

BIM is frequently cited as the bedrock of digital construction management since it fosters a detailed three-dimensional representation of each structural element. When utilized effectively, it can incorporate temporal factors (4D) and cost parameters (5D), thus enabling an integrated perspective on scheduling, budgeting, and resource allocation [4]. The 2023 introduction of mandates on BIM for specified project types has led to a surge of activity among local vendors and international software providers seeking to customize products for the Kazakh market. Autodesk's Revit stands out as a recognizable BIM tool that is well-known among major domestic construction firms. In parallel, local software developers have adapted certain functionalities to meet the unique requirements of the Kazakh regulatory environment, including the integration of standard cost references and local construction norms.

Moreover, IoT-based technologies are rapidly gaining traction in Kazakh construction because of their potential to supply real-time data regarding equipment usage, workforce location, safety alerts, and site conditions like temperature or humidity. Projects that deploy IoT sensors can effectively track and analyze material consumption rates, allowing more precise inventory control. They can also monitor safety indicators such as air quality or structural stability, which can be critical in large-scale infrastructure developments exposed to harsh winter conditions and heavy machinery. To link these data streams with management dashboards, new software solutions are emerging that display information in an intuitive format, enabling timely decision-making and faster response to urgent issues. However, full-scale adoption of IoT remains in its infancy for many local contractors, as they wrestle with device procurement, sensor calibration, and integration with existing project management systems [5].

AI-driven predictive analytics provide a powerful complement to BIM and IoT, equipping stakeholders with the ability to forecast potential delays, cost overruns, or structural vulnerabilities based on historical data. In multi-year megaprojects, even a small miscalculation can lead to substantial financial risk, and AI algorithms can reduce this uncertainty by identifying subtle patterns in cost estimates, resource scheduling, or site logistics. Kazakh authorities, as part of broader digital reforms, have highlighted the importance of advanced analytics to push the envelope in project planning, especially for state-led projects that involve highways, airports, and major residential complexes. Plans are also underway to construct a supercomputer that would be available to private firms and research institutions, thereby offering higher computational capabilities. Notwithstanding these prospects, challenges persist in data collection and curation. Many companies retain isolated spreadsheets or local data repositories, which complicates the extraction of consistent historical trends and hinders the seamless integration of AI models [6].

Kazakhstan has also witnessed the emergence of platforms tailored specifically to local project requirements, sometimes under direct government sponsorship. e-QURYLYS, managed by the Ministry of Industry and Infrastructure Development, stands as a principal solution for monitoring construction activities at all stages. The platform aggregates technical supervision and monthly status reports from projects across the country, which fosters transparency and accountability. While such digital tools focus on centralizing project data and promoting real-time updates, adoption rates still differ substantially depending on the size, capital reserves, and tech-savviness of the contracting firm or public entity [7].

In tandem with BIM-centric workflows, AutoCAD, Lira-SAPR, Kompas-3D, and Revit figure prominently in the Kazakh construction market. Each plays a distinct role, ranging from drafting and structural analysis to fully integrated BIM processes. AutoCAD remains a staple for 2D and 3D drafting, while Lira-SAPR focuses on comprehensive structural evaluations and stress calculations. Kompas-3D, developed with an emphasis on mechanical and engineering design, is also adapted for certain construction tasks in Kazakhstan. Meanwhile, Revit handles multiple aspects of BIM, integrating architectural, structural, and MEP components in a unified model. Although these software solutions differ in scope, they all support the broader drive toward digital transformation in the built environment [8]. Table 1 below provides a concise comparison of these four software solutions commonly employed in Kazakhstan.

Table 1.

Comparative overview of selected design and analysis software in the kazakh construction sector

Software	Core Functionalities	Relevant Features for Kazakhstan
AutoCAD	2D/3D drafting, documentation, and design tools	Widely used for standard drawings; integrates well with local drafting norms
Lira-SAPR	Structural analysis, stress and load calculations	Tailored for engineering tasks; recognized by local regulators for structural compliance
Kompas-3D	Parametric 3D modeling, mechanical design, and drafting	Useful for industrial and construction equipment modeling; local tech support available
Revit (Autodesk)	BIM platform for architectural, structural, and MEP design	Mandatory for certain BIM-driven projects; integrates with local cost databases

Although various digital tools are now available in Kazakhstan, many construction companies continue to face obstacles in assimilating them. Successful digital integration entails not only purchasing new software licenses but also transforming organizational structures, job roles, and workflows. Large construction conglomerates, especially those operating in Kazakhstan’s leading urban centers, generally exhibit higher technological maturity. They maintain dedicated digital project management offices, employ specialized BIM experts, and invest systematically in staff training. Conversely, small and medium-sized enterprises frequently rely on dated paper-based processes and traditional cost-estimation methods. Some show reluctance in adopting digital tools due to concerns about return on investment or a lack of clarity regarding the immediate benefits [9].

Moreover, the organizational culture in construction can be resistant to change. Field supervisors accustomed to well-established routines sometimes mistrust new systems that require real-time data entry or reliance on mobile devices at the job site. This skepticism is further exacerbated if management fails to provide consistent training or if workforce members see few tangible improvements within the initial months of implementation. As a result, pockets of resistance often emerge within otherwise progressive organizations. When top-level managers champion digitalization while middle managers remain unconvinced, the implementation process can stall [10].

The deployment of digital solutions typically requires significant upfront investments in software, hardware upgrades, network infrastructure, and staff retraining. Even cloud-based platforms that offer subscription pricing can impose costs that smaller organizations find burdensome, especially in a cyclical sector where payment timelines from clients are variable. Businesses that lack stable financing structures often face difficulties in committing to multi-year digital transformation programs. Although state incentives and a willingness to invest in national digitalization efforts are rising, the distribution of these funds across industries is still uneven. Infrastructure disparities between major cities and remote areas also amplify the challenge, since investments in connectivity upgrades or advanced server equipment can outweigh initial project budgets.

On the other hand, firms that persist with outdated manual processes often encounter hidden or indirect costs they do not readily quantify. Delays in data entry, inaccurate resource estimates, or suboptimal procurement strategies may lead to cost overruns, which, when examined closely, may exceed the price of adopting certain digital tools. Nonetheless, many project owners in Kazakhstan prioritize short-term savings over long-term efficiency gains, thus stalling more ambitious modernization agendas.

Digital construction methods typically demand specialized technical skills and managerial competencies. BIM managers, for instance, must possess knowledge not only in software usage but also in interdisciplinary coordination, parametric modeling, and data extraction. Likewise, site managers need to handle advanced digital checklists or IoT dashboards. Surveys conducted by the Kazakh Center for Information Modeling indicate that only about 46% of major companies have provided specialized digitalization training for their staff, leaving a sizable portion of the workforce unprepared to operate in a fully digital environment [11].

Furthermore, educational programs designed to produce future construction professionals often lag behind industry needs. Universities and technical institutes may introduce fundamental CAD or design classes but neglect comprehensive BIM curricula or advanced data analytics modules. The result is a skills mismatch that forces companies to allocate additional resources to train recruits in modern construction technologies. Even professionals who are technologically literate in certain areas (such as 2D drafting) may struggle to make the leap to integrated 3D or 4D modeling platforms because of a lack of systematic training in the complexities of digital project coordination.

Table 2 summarizes selected factors that influence digital readiness within Kazakh construction companies, alongside their observed relevance as revealed by recent market studies.

Table 2.

Determinants of digital readiness in Kazakh construction enterprises

Factor	Observed Influence on Digital Adoption
Size of the Company	Larger enterprises typically possess more robust technical capacity and greater investment readiness; smaller firms often lack resources for digital infrastructure and training.
Geographic Location	Companies based in Astana and Almaty benefit from stronger connectivity and access to training institutions, whereas rural firms face infrastructural and educational limitations.
Management Commitment	Active leadership involvement in digital strategy leads to faster implementation and resource allocation; lack of executive buy-in correlates with project stagnation.
Skilled Workforce Availability	The presence of trained BIM coordinators, engineers, and data analysts accelerates tool integration; talent shortages hinder scalability of digital initiatives.
Perceived ROI	Firms oriented toward long-term efficiency gains are more inclined to adopt digital systems early; cost-sensitive organizations often delay due to unclear immediate benefits.

Although Kazakhstan has introduced BIM requirements for complex projects, enforcement remains uneven. Different agencies often impose overlapping regulations or rely on incompatible reporting systems, making it difficult to standardize digital processes across the sector. Outdated or contradictory norms still exist, and while ISO-based classification systems have been proposed, national standards occasionally diverge from international ones—creating confusion for foreign partners and investors [12].

Consistent data protocols are essential for integrating models from different contributors. Without them, errors multiply, workflows become redundant, and some firms revert to manual methods. Standardization, therefore, is not a formality but a prerequisite for meaningful digital progress. Digital tools now allow construction teams to document every stage of a project. Teams can upload defect images, annotate them on 3D models, and instantly notify subcontractors. Such centralized platforms enhance traceability, reduce delays, and ensure accountability [13].

IoT technologies also improve on-site safety. Sensors detect environmental risks and monitor worker compliance. With real-time data, managers can address hazards such as structural instability or extreme temperatures. Aggregated analytics across multiple sites expose recurring problems and inform policy improvements.

As digital systems proliferate, roles in construction evolve. Site supervisors must now work with live dashboards and cloud platforms. BIM managers combine technical, managerial, and design competencies. This shift has prompted universities and companies to rethink training: new curricula increasingly cover BIM modeling, AI planning tools, and advanced cost estimation.

Achieving sector-wide transformation requires coordination. Government agencies should enforce standards consistently and offer incentives for SMEs. Industry groups can lead upskilling efforts, while universities must align technical education with emerging digital demands. Private firms—both domestic and international—should ensure their solutions are tailored to Kazakhstan’s legal, geographic, and infrastructural conditions.

2. Materials and Methods

This study adopts a qualitative and exploratory research methodology to evaluate the current state, barriers, and potential of digital transformation in Kazakhstan's construction industry. Given the evolving nature of technological integration within the sector and the lack of uniform statistical datasets, a mixed-methods approach incorporating document analysis, case studies, and expert interviews was selected to ensure a comprehensive perspective.

2.1 Research Design

The research is structured into three primary phases:

(1) legislative and policy analysis,

(2) evaluation of digital tools and platforms, and

(3) assessment of adoption drivers and constraints across enterprises of varying sizes and locations.

This triangulation strategy enables cross-validation and enhances the reliability of findings.

Figo. 1
Summary of Research Design and Methods

Component	Description	Details
Research Methodology	Qualitative, exploratory	Mixed-methods: document analysis, case studies, interviews
Phases	1) Legislative and policy analysis 2) Evaluation of digital tools 3) Adoption drivers and constraints	–
Primary Data	Semi-structured interviews	15 stakeholders; including BIM coordinators, project managers, software developers, ministry oficials
Secondary Data	Policy documents, literature reports	2024 Law on Digitalization, official BIM guidelines, market reports
Analytical Method	Thematic analysis	NVivo coding

2.2 Data Sources

Primary data were collected from semi-structured interviews with 15 stakeholders across the construction value chain, including BIM coordinators, project managers, software developers, and officials from the Ministry of Industry and Infrastructure Development. These interviews were conducted between November 2023 and February 2024 in Almaty, Astana, and Shymkent.

Secondary data consisted of policy documents, including the 2024 Law on Digitalization, official BIM guidelines, and strategic government roadmaps. Industry white papers, market reports from international firms such as PlanRadar, and journal publications on digital construction were also examined.

Fig. 1.
Summary of Interview Participants

Sector	Position	Number
Excavation	BIM Coordina-	3
Software	Project Manager	2
Ministry of Industry and Infrastructure Development	Software Developer	2
	Expert	2
	Official	1
Academia	Research Fellow	3
	Professor	2

2.3 Analytical Framework

Thematic analysis was employed to interpret qualitative data. Key themes were pre-identified based on prior literature—such as technological readiness, digital skill gaps, ROI perception, and infrastructure access—but additional categories emerged inductively through interview coding. NVivo software was used to code transcripts and organize content hierarchically to identify recurrent trends and contradictions.

2.4 Platform Evaluation Metrics

To assess the functionality and adoption of digital tools like e-QURYLYS, BIM 360, Revit, AutoCAD, and Lira-SAPR, the following metrics were applied:

- User Accessibility: including training requirements, language localization, and UI complexity.
- Integration Capacity: with existing workflows and datasets.
- Data Transparency: in terms of real-time monitoring, audit trails, and multi-user collaboration.
- Compliance: with national standards and interoperability with international norms.

Software usability feedback was gathered through surveys and observational visits to five construction companies using different platform combinations.

2.5 Case Selection

Three contrasting case studies were selected based on geographic location, project scale, and organizational maturity:

- Case A: A large public infrastructure project in Almaty using full-scale BIM and IoT integration.
- Case B: A medium-sized private contractor in Shymkent transitioning from manual workflows to hybrid digital systems.
- Case C: A rural SME near Aktobe still reliant on paper-based processes.

These cases allowed for comparative analysis across different stages of digital maturity, highlighting enabling factors and persistent bottlenecks.

2.6 Limitations

While qualitative insights provide deep context, generalizability is limited due to sample size and regional focus. Furthermore, access to proprietary software data was restricted, and some participants exhibited response bias due to affiliations or perceived government oversight.

Nevertheless, by integrating multiple data types and ensuring participant anonymity, this study maintains a high level of methodological rigor and transparency.

3. Results and Discussion

3.1 Adoption Trends and Platform Usage

The data collected from interviews and case studies reveal a fragmented yet progressively evolving digital ecosystem within Kazakhstan's construction industry. While large-scale enterprises and public projects, particularly those in Astana and Almaty, show considerable digital maturity, smaller firms remain in a transitional phase, often limited by financial, infrastructural, and human capital constraints.

The most commonly adopted platforms are BIM 360 and Revit, largely due to their compliance with government requirements and compatibility with local cost estimation modules. AutoCAD continues to be prevalent for drafting and early-phase design tasks, while e-QURYLYS is indispensable for state-monitored projects. However, the Lira-SAPR system, though robust for structural analysis, is less widely integrated due to training barriers and its limited interoperability with BIM ecosystems.

Survey responses indicate that approximately 62% of firms use BIM tools regularly, yet only 29% integrate them fully into project lifecycles. Among SMEs, less than 15% have established digital workflows extending beyond AutoCAD. The disparity suggests that platform adoption is heavily influenced by organizational size, client requirements, and geographic accessibility to IT support services.

3.2 Organizational Readiness and Workforce Skills

Organizational readiness emerged as a decisive factor in the successful implementation of digital technologies. Firms with dedicated digital transformation units or in-house BIM coordinators reported higher success rates in aligning software tools with project requirements. Conversely, entities lacking strategic IT planning often faced repeated delays in implementation, frequent rework due to data inconsistencies, and low employee morale regarding technological change.

Skill availability remains a critical bottleneck. Even in technologically advanced firms, the ability to recruit and retain qualified BIM managers, data analysts, and IoT specialists is limited. Of the 15 organizations interviewed, only 7 had initiated structured in-house training programs. Many respondents cited the absence of university-level digital construction curricula as a major contributor to the talent gap.

Additionally, linguistic challenges in software interfaces and documentation—most of which are in English or Russian—create friction for Kazakh-speaking staff in rural areas, reinforcing regional inequalities in adoption rates.

3.3 Policy Impact and Compliance Issues

Kazakhstan's 2024 digitalization legislation has exerted a substantial influence on BIM diffusion, particularly in publicly funded projects. The mandate requiring BIM for technologically complex constructions has compelled firms to restructure processes and embrace centralized data environments. Nevertheless, compliance remains uneven due to inconsistencies in regulatory enforcement and the absence of standardized digital benchmarks across different government agencies.

Interviewees voiced concern over bureaucratic fragmentation, citing cases where the same project had to be reported in multiple formats to distinct regulatory bodies. The lack of unified data schemas and digital submission protocols often leads to duplication of effort, reduced efficiency, and implementation fatigue.

Moreover, while some incentives for digital adoption exist—such as government-sponsored software licenses or pilot program funding—these are not uniformly accessible to SMEs, particularly those outside urban centers. The result is a widening digital divide, wherein firms with direct access to state institutions advance rapidly, while peripheral players struggle to keep pace.

3.4 Case Comparisons

A comparative analysis of the three case studies highlights the diverging paths of digital integration:

- Case A (Almaty): The large infrastructure project exhibited mature digital capabilities. All phases—design, construction, and post-construction—were managed within a fully integrated BIM-IoT environment. Data dashboards enabled real-time updates, and AI-driven tools were used for risk forecasting. This success was attributed to strong leadership commitment, high IT investment, and collaborative vendor relationships.
- Case B (Shymkent): The mid-sized contractor displayed partial integration. While AutoCAD and Revit were employed for design and planning, construction-phase coordination still relied on manual supervision and paper-based reporting. Efforts to adopt e-QURYLYS were hindered by poor internet connectivity and a lack of technical support. Nonetheless, the firm expressed intent to invest in training and expand digital workflows within the next fiscal year.
- Case C (Aktobe region): The rural SME operated with minimal digital intervention. Project tracking was maintained via spreadsheets, and engineers lacked exposure to BIM concepts. Interviews revealed a prevailing belief that digitalization was too costly and complex for their operational scale. The absence of state-supported outreach or demonstration projects in the area further reinforced this stance.

These cases underscore the need for differentiated digitalization strategies that cater to firms based on size, location, and resource availability.

3.5 Cultural and Psychological Barriers

Apart from technical and financial issues, cultural resistance remains a subtle but pervasive obstacle. In several organizations, older field managers expressed skepticism toward automated systems and perceived digital tools as disruptive or unnecessary. This generational divide often created internal friction, especially when younger engineers advocated for new workflows that bypassed traditional hierarchies.

Survey comments pointed to the lack of visible short-term benefits as a key demotivator. In firms where digital tools failed to deliver immediate efficiency gains, morale deteriorated and support for further investments waned. This observation aligns with existing research on change management, which emphasizes the importance of quick wins and transparent communication during technology transitions.

3.6 Synthesis and Strategic Implications

The findings suggest that Kazakhstan's construction sector is undergoing a phased and asymmetrical digital transformation. While top-down mandates have accelerated initial adoption, sustainable progress depends on bottom-up engagement and ecosystem-wide alignment.

To address prevailing challenges, the following strategic implications are proposed:

1. Develop Modular Training Models: Government agencies and universities should co-create scalable training programs tailored for SMEs and regional firms.
2. Standardize Digital Protocols: Inter-agency collaboration is needed to unify reporting schemas and ensure consistent BIM implementation.
3. Incentivize Demonstration Projects: Pilot programs in underserved regions could demystify digital tools and reduce perceived complexity.
4. Encourage Hybrid Workflows: Transitioning firms may benefit from blended systems that gradually replace legacy processes without abrupt disruption.
5. Foster Peer Networks: Creating platforms for inter-firm knowledge exchange can accelerate best-practice dissemination.

Conclusion

Kazakhstan's construction industry is approaching a decisive phase in its digital transformation. Strong political support, updated legislation, and targeted investments have already produced visible results, especially in large-scale public projects. However, many small and regional firms still face significant challenges: limited technical skills, weak connectivity, and concerns over cost-effectiveness delay adoption.

Digitalization requires more than access to software—it demands structural change, new professional competencies, and cultural adaptation across the sector. While tools like e-QURYLYS provide a foundation for centralized reporting, their impact will remain limited without broader systemic support. The country's success in this domain depends on synchronized efforts between government, industry, and academia. If Kazakhstan succeeds in addressing these challenges, it could position itself as a regional leader in construction innovation, offering a replicable model for other countries undergoing similar transitions in complex and capital-intensive sectors.

Kazakhstan's construction sector stands at a critical juncture in its digital transformation journey. The evidence from this study reveals a sector that is increasingly aware of the need to embrace digital solutions but is constrained by structural, cultural, and technical challenges that vary widely across firm size, geographic region, and institutional alignment.

The mandatory introduction of Building Information Modeling (BIM) for complex public projects has served as a catalyst for change, prompting many firms to reevaluate their operational strategies. However, adoption is uneven, and success is often limited to enterprises with existing IT capabilities, strategic leadership, and access to supportive policy environments. Smaller firms, particularly those located outside urban hubs, continue to struggle with limited technical infrastructure, workforce preparedness, and access to government incentives.

Summary of Key Findings

The research identified several critical findings with strategic relevance for stakeholders across the construction value chain:

- Digital Adoption is Stratified: Adoption levels correlate strongly with company size, financial capacity, and geographic proximity to support infrastructure. Urban-based firms benefit from better training opportunities and stronger regulatory clarity.
- Software Diversity Requires Integration: Tools like Revit, BIM 360, AutoCAD, and e-QURYLYS are widely used, but integration between platforms remains limited. Fragmented data systems hinder the realization of a unified digital workflow.
- Policy Gaps Undermine Standardization: Although the national law mandates BIM usage, inconsistent enforcement and overlapping jurisdictional demands impede seamless digitalization.

- Workforce Skills Are Unevenly Distributed: A mismatch persists between the skills provided by educational institutions and those required in practice. This talent gap is particularly acute outside Almaty and Astana.
- Cultural Resistance Slows Change: Technological adoption is not merely a technical challenge; it also involves shifting organizational mindsets. Resistance from senior staff, unclear benefits, and lack of early success stories contribute to implementation hesitancy.

The Strategic Role of Government

The Kazakh government has demonstrated strong intent to modernize the construction sector through legislation, investment, and platform development. Initiatives such as the e-QURYLYS monitoring system and national BIM guidelines lay the groundwork for further progress. However, implementation success requires not only top-down mandates but also grassroots support.

To this end, the state should consider:

- Expanding Access to Funding: Introduce tailored financing schemes for SMEs to acquire digital tools and training services.
- Institutionalizing Capacity Building: Support the creation of regional digital construction academies focused on BIM, IoT, and AI applications.
- Unifying Digital Standards: Streamline reporting protocols across agencies to eliminate redundancies and promote interoperability.
- Promoting Local Innovation: Offer grants and competitive funding for domestic software developers to build localized, standards-compliant platforms.

The Role of Industry and Academia

While government plays a foundational role, industry actors and academic institutions are equally responsible for driving sustainable digitalization. Construction firms should actively invest in internal training programs, establish innovation teams, and collaborate with technology providers to tailor tools to their specific workflows.

Universities and technical colleges, meanwhile, must realign curricula with market demands. Multidisciplinary programs integrating civil engineering, software design, and project management should become the norm rather than the exception. Work-integrated learning models, such as digital apprenticeships, could bridge the gap between theory and practice.

Industry associations and chambers of commerce can further amplify efforts by organizing workshops, publishing implementation case studies, and creating peer networks for knowledge exchange.

Future Outlook

The digital future of Kazakhstan's construction sector hinges on its ability to foster inclusive and adaptive transformation mechanisms. The country is well-positioned to lead regional efforts in digital construction due to its central geographic location, state-level commitment, and growing base of technology professionals.

Key opportunities include:

- Scalable Pilot Programs: These can serve as real-world laboratories for testing new tools, methods, and workflows—especially in underserved regions.
- AI and Data Analytics: Predictive analytics and simulation tools can vastly improve cost control, risk assessment, and resource allocation when integrated properly.
- Green Construction Technologies: The convergence of digital and environmental agendas could create momentum for low-carbon building techniques, enabled by smart sensors and BIM modeling.

However, these opportunities will only materialize if there is cohesive cooperation between public agencies, private firms, and educational institutions. Fragmented efforts risk duplicating resources, diluting impact, and deepening existing digital divides.

Recommendations

Based on the research findings and the evolving nature of digital construction in Kazakhstan, the following recommendations are proposed:

1. Create a National Digital Construction Strategy: This roadmap should align legal mandates, infrastructure development, workforce planning, and educational reform under a single cohesive vision.
2. Support Transitional Ecosystems: Not all firms can leap into full-scale digitalization. Transitional models with hybrid analog-digital workflows should be recognized and supported.
3. Establish Regional Digital Hubs: Decentralized innovation centers can address local barriers and contextualize best practices for regional implementation.
4. Incentivize Early Adopters: Tax credits, recognition awards, and preferential procurement treatment could accelerate voluntary adoption.
5. Ensure Continuous Feedback Loops: Institutional mechanisms should be created to capture lessons learned and adapt policies based on industry realities.

Concluding Remarks

Kazakhstan’s construction sector has embarked on a digital transformation journey that promises significant efficiency gains, quality improvements, and competitiveness on both national and regional scales. However, transformation is not an automatic consequence of legislation—it must be built through iterative, inclusive, and context-sensitive actions that engage every stakeholder in the value chain.

If Kazakhstan continues to align strategic policy with operational capacity and industry readiness, it could emerge as a model for other developing nations aiming to modernize their infrastructure sectors. The digital agenda must, therefore, be understood not just as a technological upgrade, but as a socio-economic project that redefines how buildings are designed, constructed, and maintained for generations to come.

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Culturology

The Ensemble as a Complex Artistic Solution in Costume Design

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An ensemble in costume design requires perfect artistic and harmonious coordination across each element of the collection as a whole. This includes the stylistically accurate representation of form, color, texture, or decor. Each element's form is a rhythmic repetition of the preceding one, yet these elements cannot be viewed independently as an artistic system, since they constitute a group of interdependent forms connected by silhouette, color, and texture.

The word "ensemble" is of French origin and means “together” (tight connection, inseparability). The concept of the ensemble emerged at the end of the 19th and beginning of the 20th century, during the Art Nouveau era (1890–1900). In the 20th century, the ensemble became a kind of "pinnacle" that fashion designers strived to conquer—especially couturiers, who, unlike stylists working in industry, created models for individual clients, developing complete costumes including hats, shoes, gloves, and other accessories. In fashion design, the costume ensemble is considered the highest form of achieving unity in artistic expression.[1]

However, the concept of the ensemble evolved throughout the 20th century. For example, in the 1920s, an ensemble solution meant a unified color scheme across the entire costume: the hat, gloves, shoes, handbag, umbrella, etc., were chosen to match the dress or suit. The decoration and color of the dress were echoed in the accessories. The ensemble maintained its significance even during World War II. Its true triumph came after the war, in the era of the “New Look,” when Christian Dior established clear rules of good taste and revived the image of the elegant woman. A dress or suit was to be complemented by a matching hat, gloves, and more.[2]

Each historical stage of cultural development is perceived through the material environment and the image of the person of that era—largely through the costume ensemble. Historical costumes have reached us precisely in the form of ensembles. A costume ensemble is created based on a unified compositional concept, where all details are coordinated and serve a cohesive whole. The ensemble is characterized by a multi-part and multi-layered rigid system of interconnection, with all parts intended to be worn simultaneously. Throughout its history, the costume ensemble has constantly transformed its system of symbolic relationships, harmony of color and texture, geometric forms, and silhouette lines, yet it has consistently maintained its multilayered nature. However, a connection between the upper and lower layers of clothing and all components of the costume has always been essential. Here, the temporal nature of the art of costume was most clearly expressed: the gradual formation of the image in the viewer’s mind.

The complexity of a collection’s theme is related to its artistic, structural, and technological solutions, as well as its effectiveness and functionality. A collection can consist of coordinated sets with shoes and accessories, festive costumes with accompanying elements, or contemporary clothing incorporating national features, among others. However, from the perspective of artistic concept quality, none of these themes can be compared to the artistic and compositional resolution found in an ensemble—which is the subject of our current discussion. The ensemble represents a complex artistic system in costume design, providing a harmonious solution through the appropriate integration of color, form, texture, and decorative details.[1]

The ensemble consists of primary and secondary components. Within a costume, there is always a dominant part compared to the others, while the subordinate elements are not equivalent to one another. In an ensemble, the main element—the one that serves as the foundation of the entire costume's form—may be the clothing itself, the footwear, the hairstyle, the headwear, or the accessories. The designer begins work on the ensemble by identifying its primary element, which is determined by the ensemble's overall image and intended function.

There are ensembles in which any component—for example, footwear—can serve as the compositional center. Shoes are the most functional part of the ensemble, but at the same time, they hold significant aesthetic value. The costume must correspond to them in style, form, color, and meaning. The ensemble is completed with a headpiece, which, more than any other part of the costume, emphasizes the individuality of the wearer. The shape of the headpiece must harmonize not only with the costume's silhouette and the shape of the footwear but also with the oval of the face. The hierarchy of ensemble components and the selection of the compositional center are based on the principles of costume composition.[3]

Fig.1-2 Collection ''SKRIPT'' 2017. Costume ensemble, by Lela Kiknavelidze

Fig. 3 Collection ''SKRIPT'' 2017. Costume ensemble

An example of a costume ensemble is the collection "SKRIPT" (Images 1–2–3), which won first place in the PRO-ART category at the "Pecherski Kashtany" International Competition for Young Designers in 2017. The collection is inspired by the theme of ancient Georgian script, the graphic forms of which are represented on both the footwear and the clothing.

The dominant element of the collection is a pair of knee-high boots made of genuine leather, with engraved Georgian inscriptions used as decorative motifs on their surface. The footwear's construction is stylistically aligned with the thematic concept.

The clothing consists of a silk dress and an overcoat made using the wet felting technique, also featuring Georgian inscriptions created using dry felting. The overcoat has a loose silhouette, with its color and shape harmoniously blending with the design of the footwear.

The dominant, conceptual, and decorative unifying detail throughout the collection is the presence of ancient Georgian inscriptions. The visual effect of aged manuscripts and parchments is recreated on both the shoes and garments, lending the costume ensemble a distinctive charm rooted in antiquity and history.

Fig. 4, Collection "Color harmony" 2019. Costume ensemble
Head of Collections

The collection "Color Harmony" is another example of a costume ensemble (Image 4), and it was the winner of the international competition "Pecherski Kashtany" in 2019, earning first place in the PRO-ART category. The dominant element of the ensemble is the color combination of the coat, which reflects the collection's conceptual idea. The ensemble includes knee-high boots, a dress, and a felted coat. The surface and decorative appearance of the coat represent the seasons of the year; it is highly painterly and stands as an independent artistic composition. In line with this, the boots are also colorful, made using a combination of cool and warm tones. The multicolored coat and footwear are balanced by the neutral tone of the dress, creating a harmonious visual relationship within the ensemble.

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What a perfect suit ensemble 2021-2022;
3. 3. https://www.linkedin.com/advice/1/what-best-ways-design-costumes-large-ensemble-tkhzf Coordinate costumes with other elements;

Physical and Mathematical Sciences

Temporal Field Theory of Gravity

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Abstract
This paper presents an alternative interpretation of gravity, in which gravitational attraction is reinterpreted not as geometric curvature of space-time, but as a manifestation of inertia resulting from the conversion of intrinsic time progression into spatial dynamics. The model expresses gravitational acceleration as a function of the temporal flow gradient, via the core relation
$g = \eta \cdot \nabla\tau$,
yielding numerical results equivalent to classical theory. The model provides an energy-based account of gravity, remains consistent with conservation laws, and outlines experimental avenues for manipulating gravitational interaction via temporal field engineering.
Keywords: Temporal gravity, proper time gradient, inertial conversion, scalar time field, time-based acceleration, temporal energy, non-geometric gravity, Lagrangian dynamics of time, artificial gravity, η-parameter, time-field coupling, gravitational field reinterpretation, internal time progression, dynamic time flow

1. Introduction

Classical and relativistic gravity theories — Newton's laws and Einstein's general relativity — have successfully described planetary motion, light deflection, and time dilation effects. However, both treat gravity as something *external* to matter: either an attracting force or a geometric deformation of space-time. Neither model provides a mechanism that explains *why* gravity arises or how it could, in principle, be manipulated.

This paper proposes a fundamentally different view: that gravity is not a geometric property or external interaction, but rather an internal reaction of matter to variations in the flow of its proper time.

Matter is postulated to carry an intrinsic energy associated with its progression along the time axis — termed *temporal energy*. When this flow encounters a spatial gradient — that is, when time slows down near mass — a portion of this energy is converted into inertia, which manifests as gravitational acceleration. The resulting effect is not a "pull" from a force field, but a shift in internal energy balance induced by the distortion of temporal flow.

The model:

- Derives gravitational acceleration from the gradient of proper time,
- Matches Newtonian predictions numerically,
- Remains consistent with the weak-field limit of general relativity,
- Provides a new energy-based interpretation of gravitational phenomena.

More importantly, this framework opens avenues for testing and perhaps even manipulating gravitational effects via controlled modulation of local time — an idea with potential implications for both fundamental physics and engineering.

2. Types of Motion

To develop a gravitational theory rooted in time dynamics, we must first reassess the fundamental categories of motion. This framework identifies three distinct forms:

- Reactive motion — motion resulting from external interactions: thrust, collisions, or propulsion via momentum exchange (e.g., a rocket).
- Inertial motion — continued uniform motion in the absence of applied forces, as formulated in Newton's first law.
- Intrinsic time progression — the irreversible advancement of all matter along the time dimension. Regardless of spatial state, all physical systems undergo continuous evolution along their worldlines with a proper time \tau, defined locally for each object.

This third form — *motion through time itself* — is proposed as a primary energy carrier. While typically unnoticed, it forms the energetic substrate from which gravitation can arise under conditions where the temporal flow is spatially non-uniform.

In other words, matter constantly "falls forward" in time at the rate of d\tau/dt, and this temporal motion underpins inertial phenomena. A gradient in proper time acts not as an external force field, but as a variation in the medium through which all matter flows — shifting part of this intrinsic motion into spatial inertia.

3. Gravity as Conversion of Intrinsic Time Progression

Let us consider a simple thought experiment: a person jumps upward and falls back down. In the absence of propulsion or external force, the return trajectory is usually attributed to inertia. Classical mechanics interprets this as a passive continuation of motion. In this model, however, gravity emerges not from an external force but from an internal redistribution of the matter's own temporal energy.

Every physical system experiences continuous proper time flow — its intrinsic progression along the time axis. In regions where this flow varies spatially (\nabla \tau \neq 0), a portion of this internal energy is no longer channeled purely through time. Instead, it is redirected into spatial inertia, manifesting as observable gravitational acceleration. Where energy flows from intrinsic time into inertial response. This transformation is illustrated in Figure 1 (see Fig. 1).

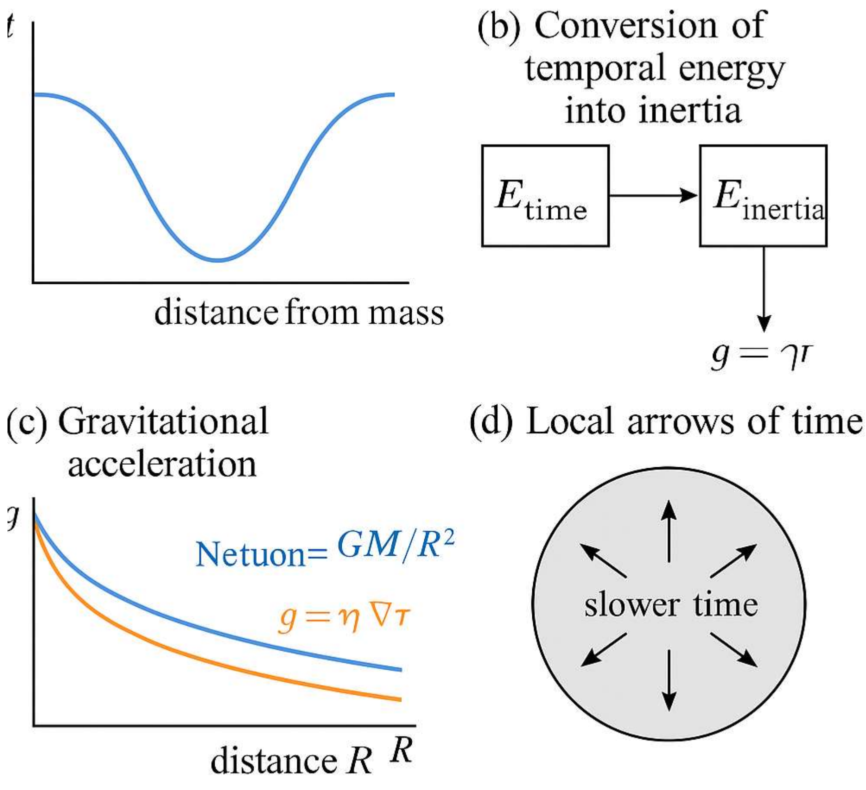

Figure 1. Conversion of Temporal Energy into Inertial Force

Diagram: E_{\text{time}} \rightarrow E_{\text{inertia}} \rightarrow g

Visualizes how time-motion is converted into gravitational acceleration

This transformation does not require any force to act externally on the object. The object accelerates inward along the time-flow gradient as a consequence of preserving continuity in its internal evolution. Thus, gravitational acceleration is interpreted as a *self-induced inertial adjustment* to non-uniform temporal conditions.

3.1. Physical Nature of Temporal Energy and the Mechanism of Transformation *(expanded)*

In this framework, matter is viewed as continuously "falling forward" in time — progressing along its own proper time axis. This motion is not passive: it carries an intrinsic energy potential, which becomes physically relevant when time flows non-uniformly across space.

We define the **canonical form of temporal energy** as:

$$E_{\text{time}} = m c^2 \cdot \frac{\tau}{t_0} \quad \text{with} \quad t_0 = 1\,\text{s}$$

This formulation treats proper time τ as a cumulative energetic variable: the longer a system evolves, the more internal energy it accumulates through its intrinsic temporal motion. The scaling factor t_0 ensures correct units and anchors the system to real-world clocks. This is the **main definition** adopted throughout this work, forming the foundation for gravitational force and acceleration derivations.

Under spatially distorted time fields — where $\nabla \tau \ne 0$ — this energy exhibits spatial variation:

$$dE_{\text{time}} = -k \cdot m c^2 \cdot \nabla \tau \cdot d\mathbf{r} \quad \Rightarrow \quad \vec{F} = -\nabla E_{\text{time}} = k m c^2 \cdot \nabla \tau$$

Leading to the key relation:

$$\vec{g} = \eta \cdot \nabla \tau, \quad \text{where} \quad \eta = k c^2$$

This expresses gravitational acceleration as a redistribution of intrinsic time-motion energy in response to temporal curvature — not a force from space, but an inertial adjustment to time itself.

Alternative View: Instantaneous Temporal Energy

While the main formulation emphasizes cumulative evolution, an alternative perspective focuses on the **instantaneous rate** at which proper time flows relative to coordinate time:

$$E_{\text{time}}^{\,\text{(alt)}} = m c^2 \cdot \frac{d\tau}{dt}$$

Here, energy tracks the local "ticking speed" of a system — aligning more closely with relativistic time dilation. When time slows near a gravitational source (i.e., $d\tau/dt < 1$), the system's accessible energy decreases, indicating reduced capacity to sustain temporal motion. This version may prove especially relevant in strong-field or quantum-scale scenarios.

Interpretational Note

- The **main model** adopts the τ-based form for consistency across derivations and to preserve a clear energy-flow structure.
- The alternative $d\tau/dt$ formulation offers a promising extension for incorporating relativity and local-frame effects — particularly in dynamic or high-speed regimes.
- Both reflect the same underlying principle: that **non-uniform temporal flow translates into real, measurable inertial effects**.

4. Mathematical Model

Having established that gravitational acceleration arises from a spatial gradient in proper time, we now construct the mathematical framework that connects energy redistribution with observable motion.

Let a body of mass m progress through a non-uniform temporal field $\tau(\mathbf{x})$, resulting in a differential internal energy change:

$$dE_{\text{time}} = -k \cdot mc^2 \cdot \nabla \tau \cdot d\mathbf{r}$$

where the negative sign reflects energy loss along the decreasing proper time.

Applying:
\vec{F} = -\nabla E_{\text{time}} \quad \Rightarrow \quad \vec{a} = \frac{\vec{F}}{m} = k c^2 \cdot \nabla \tau
\quad \Rightarrow \quad \vec{g} = \eta \cdot \nabla \tau, \quad \text{with} \quad \eta = k c^2
This expression forms the core of the model. Unlike Newtonian gravity, which treats g as a force per unit mass, here g is reinterpreted as a self-induced inertial adjustment arising from energy redistribution through distorted time flow.
This mechanism is illustrated in Figure 2 (see Fig. 2),

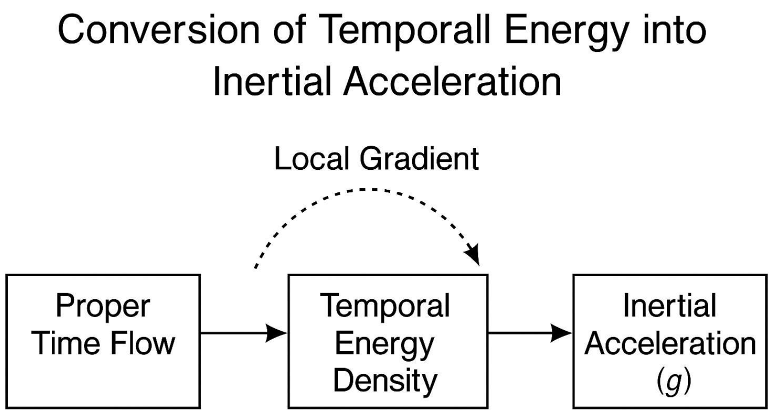

Figure 2 *Diagram label:* "Conversion of Temporal Energy into Inertial Acceleration"
Content suggestion: Three boxes with arrows:

- "Proper Time Flow" → "Temporal Energy Density" → "Inertial Acceleration (g)"
- Add a gradient field illustration showing how curvature in time causes motion toward center

To clarify the logical structure of the theory and guide the reader from physical intuition to formal modeling, we present the following diagram is illustrated in Figure 3 (see Fig. 3):

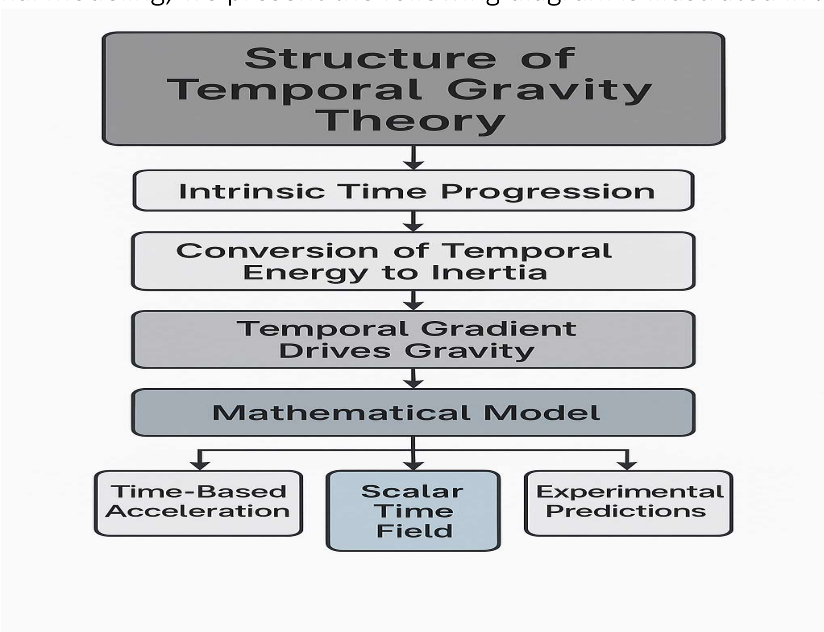

Figure 3. Conceptual Structure of Temporal Gravity Theory
Infographic summarizing the theory's flow: intrinsic time progression → temporal energy → gradient-induced inertia → scalar field → experimental predictions

4.1. Classical Newtonian Gravity

In the classical model:

$$g = \frac{GM}{R^2}$$

where:

- G is the gravitational constant,
- M is the central mass,
- R is the distance from its center.

Applied to Earth, this yields:

$$g_\oplus \approx 9.81 \, \text{m/s}^2 \quad \text{for} \quad M = 5.97 \times 10^{24} \, \text{kg}, \, R = 6.37 \times 10^6 \, \text{m}$$

4.2. Temporal Model via Time Gradient

By contrast, the temporal model defines gravitational acceleration not as an interaction from a force field, but as a **response to the spatial distortion of proper time**:

$$g = \eta \cdot \nabla \tau$$

where:

- η has units of m^2/s^3,
- $\nabla \tau$ is the spatial gradient of proper time (in $1/\text{m}$).

This formulation treats gravity as an inertial effect arising from **non-uniform temporal flow** — an internal redistribution of energy within matter moving through a temporally curved region.

For terrestrial conditions, we take the empirical value:

$$\eta_\oplus = 8.98 \times 10^{16} \, \text{m}^2/\text{s}^3$$
$$\quad \Rightarrow \quad$$
$$\nabla \tau_\oplus = \frac{g_\oplus}{\eta_\oplus} \approx 1.1 \times 10^{-16} \, \text{m}^{-1}$$

This updated value supersedes the earlier estimate of $10^{-18} \, \text{m}^{-1}$, ensuring consistency across all sections based on Earth gravity.

The proper time gradient $\nabla \tau$ becomes the **primary driver** of acceleration, modulated through the effective parameter η. This allows the model to accommodate environments where time deformation varies significantly — from near-earth conditions to quantum or astrophysical contexts.

In essence, matter no longer "falls" due to geometry or force, but accelerates because its internal clock is being slowed spatially — shifting intrinsic energy into spatial motion.

This expression describes gravity as a dynamic response to temporal curvature, not as a geometric or force field. This mechanism is illustrated in **Figure 4** (see Fig. 4),

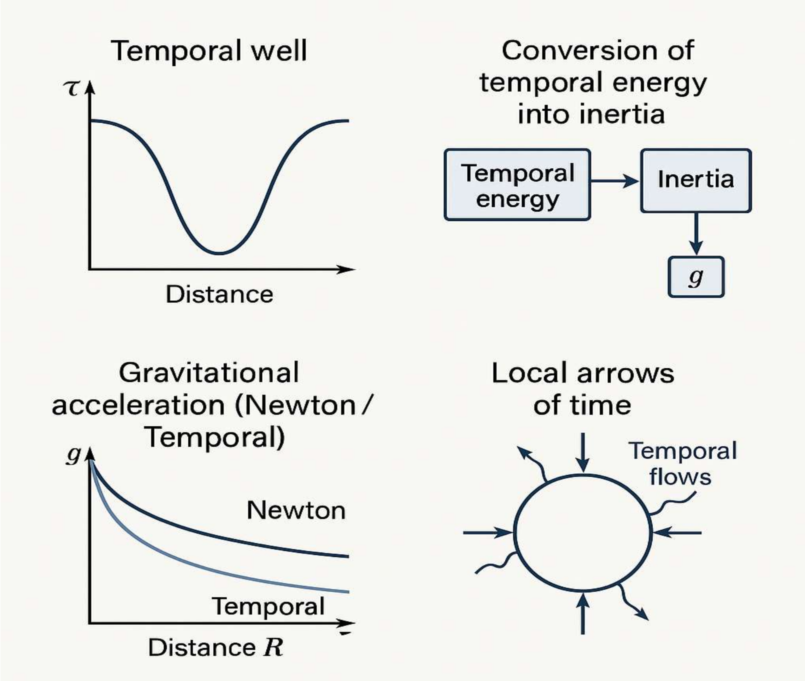

Figure 4. Comparison of Gravity Models
Graphs of g(R) for both Newtonian and Temporal theories.
X-axis: distance (R), Y-axis: acceleration (g).

4.3. Determination of η from Physical Constants

To determine the effective parameter η, we align the temporal formulation with Newtonian gravity. Recall:

$$g = \eta \cdot \nabla \tau \quad \text{vs} \quad g = \frac{GM}{R^2}$$

Assuming that the gradient of proper time near Earth's surface is inferred from observed acceleration, we obtain:

$$\eta_\oplus = \frac{g_\oplus}{\nabla \tau_\oplus}$$

Using:

$$g_\oplus \approx 9.81 \, \text{m/s}^2, \quad$$
$$\nabla \tau_\oplus \approx 1.1 \times 10^{-16} \, \text{m}^{-1}$$

we find:

$$\eta_\oplus \approx \frac{9.81}{1.1 \times 10^{-16}} \approx 8.9 \times 10^{16} \, \text{m}^2/\text{s}^3$$

This value serves as a **reference coupling constant** for converting proper time distortion into gravitational acceleration under terrestrial conditions.

To explore how this parameter may scale across other physical systems — such as stars, compact objects, or quantum regimes — we summarize representative estimates below: This is illustrated in Figure 5 (see Fig. 5).

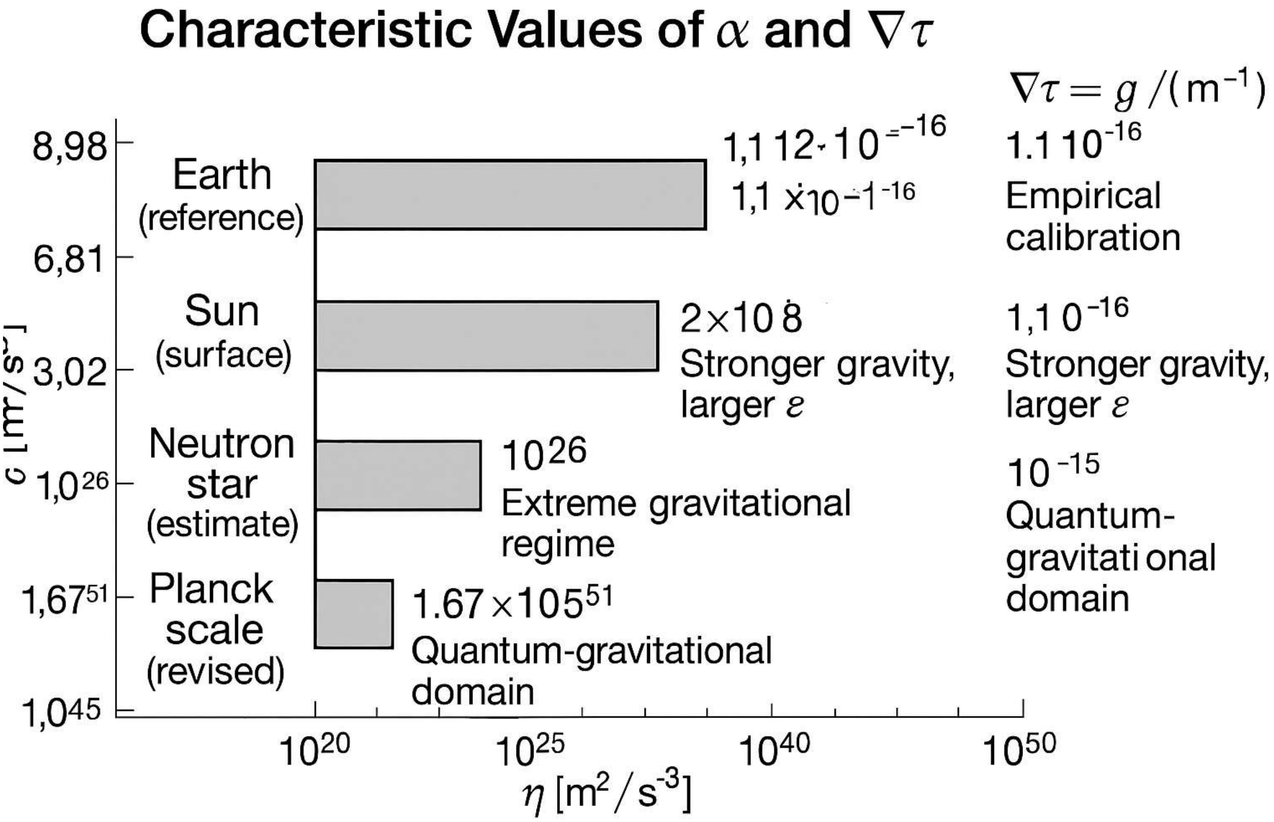

Figure 5. Characteristic Values of η and ∇τ in Physical Regimes
Bar chart comparing effective \eta and proper time gradients \nabla \tau = g / \eta for various systems:
Earth, Sun, Neutron Star, and Planck-scale domain.
Y-axis: \eta in \text{m}^2/\text{s}^3, log scale;
Annotations include corresponding \nabla \tau and qualitative descriptors ("macroscopic", "extreme gravity", "quantum gravity").
These values emphasize that \eta behaves not as a fixed constant, but as a **scale-dependent coupling** — adapting to the local gravitational and temporal structure. In high-energy or compact regimes, matter may respond more abruptly to time curvature, requiring a stronger temporal-inertial link.

4.4. Dimensional Origin and Scaling of η

The coupling parameter \eta governs how spatial variations in proper time translate into gravitational acceleration, as captured by the core relation:
\vec{g} = \eta \cdot \nabla \tau
In Section 4.3, we derived a terrestrial baseline value:
\eta_\oplus = \frac{g_\oplus}{\nabla \tau_\oplus} \approx 8.9 \times 10^{16} \, \text{m}^2/\text{s}^3
However, given its physical units and the nature of time-gradient coupling, it is natural to ask: is \eta truly universal, or might it vary across regimes?

Scaling Behavior Across Regimes

As shown in *Figure 5*, the values of \eta span a wide range — increasing dramatically in environments with higher gravitational acceleration or denser mass distributions. For instance:

- The Sun yields \eta \sim 10^{18} \, \text{m}^2/\text{s}^3,
- Neutron stars reach \eta \sim 10^{20},
- The Planck regime may require \eta \sim 10^{48}.

To visualize this variation and emphasize the **scale sensitivity of \eta**, we present a comparative bar chart below, this is illustrated in **Figure 6** (see Fig. 6).
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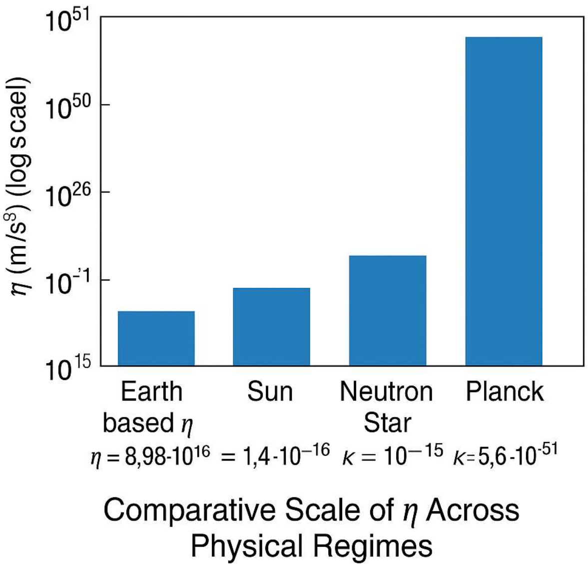

Figure 6. Comparative Scale of η Across Physical Regimes
Bar chart visualizing \eta for four distinct gravitational regimes — Earth, Sun, Neutron Star, and Planck. Each bar is annotated with \eta (in m^2/s^3), the inferred gradient \nabla \tau = g / \eta, and system type (macroscopic, stellar, compact, quantum). The diagram illustrates how \eta increases with field intensity and compactness.

This makes clear that \eta is not merely a fixed parameter, but adapts to gravitational context — growing larger as systems become more energetic and temporally curved.

Effective vs Fundamental Nature of η

The pronounced variation of \eta across physical systems suggests that it behaves as a **scale-dependent coupling**, not a fundamental constant like G or c. This mirrors the idea of *running constants* in quantum field theory, where interaction strength evolves with energy or field intensity.

In this model, \eta quantifies how efficiently a system converts intrinsic temporal motion into spatial inertia in response to proper time curvature. Thus, more extreme environments — such as neutron stars or quantum domains — demand higher \eta values to preserve energetic balance.

We interpret \eta not as a fixed input, but as a **contextual response parameter**, shaped by the structure of time, mass, and space. This interpretation is further supported by the plot in *Figure 7*, which illustrates how varying \eta modulates the resulting gravitational acceleration profile. This is illustrated in **Figure 7** (see Fig. 7).
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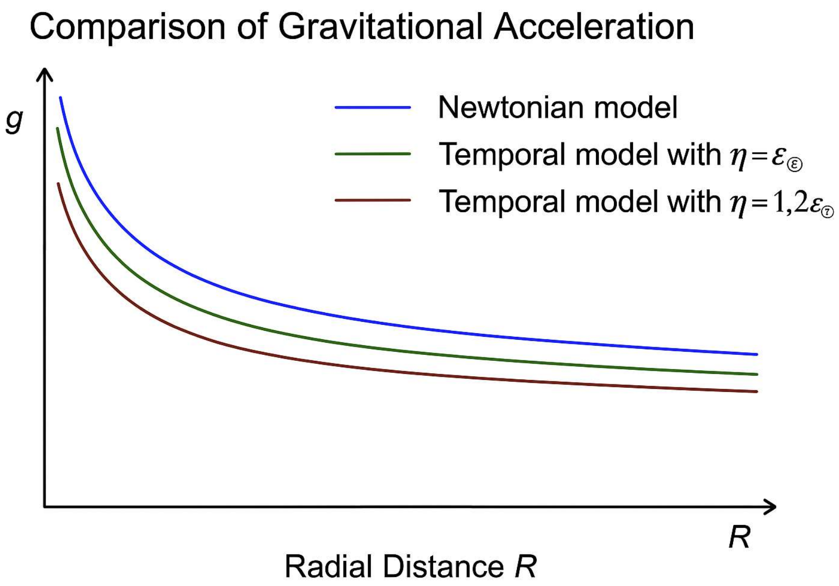

Figure 7. Comparison of Gravitational Acceleration in Classical and Temporal Models
Graph comparing acceleration g(R) for three cases:
– Newtonian gravity g = GM/R^2 (blue curve),
– Temporal model with \eta = \eta_0 (green),
– Temporal model with \eta = 1.2 \eta_0 (red).
The figure confirms that the temporal framework reproduces Newtonian behavior for \eta = \eta_0 and allows flexible modulation of g via η adjustment.

This confirms that the temporal model can faithfully reproduce classical gravity under baseline conditions, while remaining open to modulation in engineered or extreme environments. The adaptability of η reinforces its interpretation as an effective, running parameter — bridging known physics and speculative domains.

We now turn to a variational formulation of this framework to understand how temporal curvature governs motion through energy minimization.

4.5. Lagrangian Formulation of Temporal Gravity *(expanded)*

To embed the temporal gravity model within variational mechanics, we define a Lagrangian that connects inertial motion to the spatial structure of proper time. The core idea is that deformation of the time field incurs an energetic cost, which reappears as acceleration — analogously to how curvature in a potential landscape yields force.

We propose the following canonical Lagrangian:

\mathcal{L} = \frac{1}{2} m v^2 - \gamma m (\nabla \tau)^2

- The first term represents classical kinetic energy.
- The second term expresses the energy cost of moving through a spatially non-uniform time field, with coupling parameter \gamma (units: s^4/m^2).
- This form ensures that proper time distortions directly affect the path of free-falling particles by reshaping the energetic environment.

Derivation of γ

The relation

- γ = \frac{η^2}{4\,G\,c^2\,ρ_m}
- follows by requiring that the Euler–Lagrange equation for the action
- \displaystyle S = \int \bigl(\tfrac12 m v^2 - γ\,m(\nablaτ)^2\bigr)\,dt
- reproduces both g = η\nablaτ and
- \nabla^2τ = (4πGη)\,ρ_m/c^2. Matching coefficients of (∇τ)^2 then yields the above γ.

Why (\nabla \tau)^2 is physically appropriate

This quadratic form reflects several key properties:

- **Analogy to scalar field energy**: In field theory, the Lagrangian density of a scalar field ϕ commonly includes a kinetic term $(\nabla \phi)^2$, representing gradient energy stored in the field's spatial variation. Similarly, τ here plays the role of a physically active scalar field.
- **Energy as stored distortion**: The square ensures non-negativity and symmetry under $\nabla \tau \to -\nabla \tau$. That is, whether time slows down or speeds up spatially, the energetic impact is equivalent — consistent with physical observability depending on gradients, not direction.
- **Dimensional consistency**: This form aligns with the units of energy when multiplied by γm, and maintains coherence with the expression $\vec{g} = \eta \cdot \nabla \tau$.

Thus, $(\nabla \tau)^2$ is not an arbitrary choice but a **natural scalar invariant** characterizing time distortion energy.

For η-based consistency with the acceleration law $\vec{g} = \eta \cdot \nabla \tau$, one obtains:

$$\gamma = \frac{\eta^2}{4 G c^2 \rho_m},$$

assuming agreement with the Poisson solution $\nabla^2 \tau = \kappa \rho_m$ and $\kappa = 4\pi G \eta$.

Alternative Formulation: Interaction with a Dynamic Time Field

An alternative formulation would treat $\tau(x^\mu)$ not just as a passive background, but as a **true dynamical field**, analogous to a scalar boson. Then the interaction could be described by coupling matter to the field energy density:

$$\mathcal{L}_{\text{alt}} = \frac{1}{2} m v^2 - \lambda m \cdot \tau(x) - \frac{1}{2} \alpha (\partial_\mu \tau)(\partial^\mu \tau) - V(\tau)$$

Here:

- λ governs how matter couples directly to the time field,
- α scales the kinetic term of the field (units matched to energy),
- $V(\tau)$ is a potential for spontaneous breaking or self-interaction of time, e.g. $V \sim \tau^2$ or more complex forms.

This alternative opens the door to rich field-theoretic phenomena, including wave propagation, quantization of time degrees of freedom, or emergence of new collective modes in systems with engineered τ-gradients.

Interpretational Note

- The **main model** adopts the minimal coupling via $(\nabla \tau)^2$, reflecting an effective cost function of temporal deformation. It parallels scalar field theories and maintains simplicity and testability.
- The **alternative view** introduces a full field dynamics for τ, enabling extension into covariant or quantum frameworks — a topic reserved for future development.

This reconciles the variational approach with the energy-based acceleration law of temporal gravity. This is illustrated in **Figure 8** (see Fig. 8).

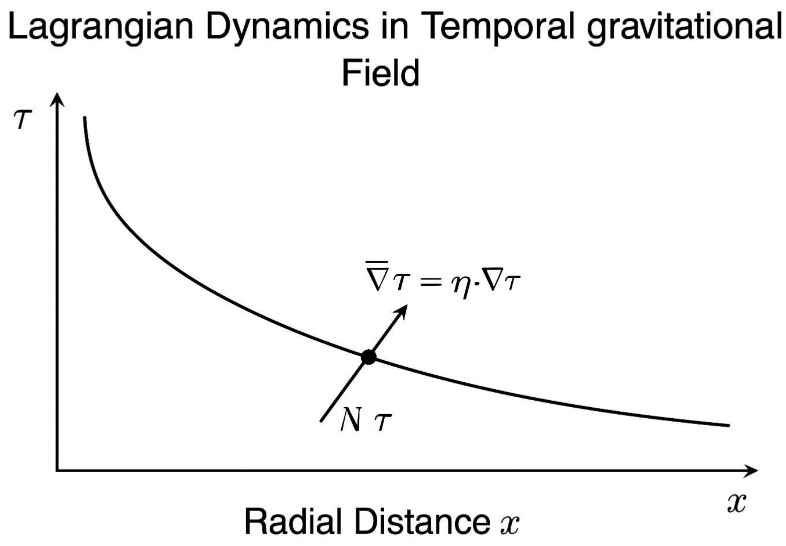

Figure 8. Lagrangian Dynamics in a Temporal Gravitational Field
Diagram:

- Object moving through a proper time gradient
- Vector field \nabla \tau shown;
- Acceleration vector \vec{g} = \eta \cdot \nabla \tau;
- Energy exchange from intrinsic time to spatial inertia.
- Style: clean vector illustration with soft contours and directional arrows.

This Lagrangian framework shows that gravitational acceleration arises naturally from minimizing the action in a deformed temporal field — offering a non-geometric derivation for inertial motion, rooted in time dynamics.

This is illustrated in Figure 9 (see Fig.9)

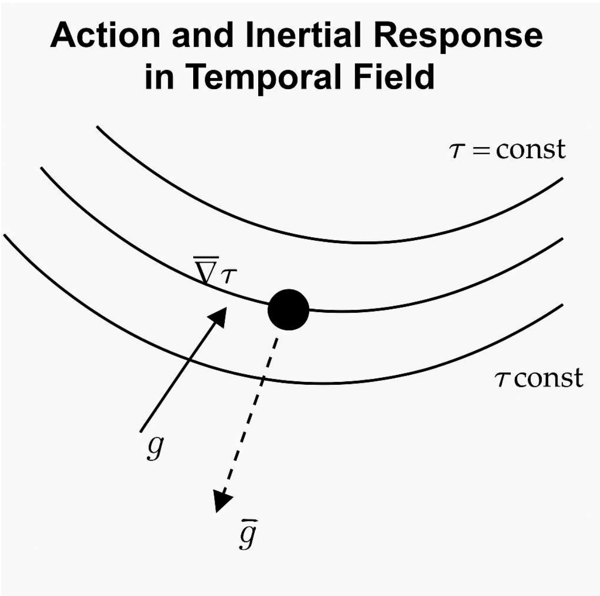

Figure 9. Action-Based Emergence of Gravitational Acceleration in a Temporal Field
Illustration of an object progressing through a spatial gradient of proper time. The flow of intrinsic temporal energy is partially redirected into inertial motion due to distortion in the field \tau(\mathbf{x}). Vectors indicate the gradient \nabla \tau, resulting acceleration \vec{g} = \eta \cdot \nabla \tau, and energy flow from time to space.

This formulation connects acceleration to gradients in the proper time field through the principle of least action — offering an intrinsic, energy-based origin of gravity without invoking relativistic metric tensors.

Thus, the temporal model **reproduces the radial profile of classical gravity** — but reinterprets it as a gradient in internal temporal structure, not an external force field or curvature.
This reframing allows gravity to be derived from **a dynamic equation for proper time itself**, offering a unified view that connects mass, time, and inertia without geometric postulates.

5. Temporal Field as a Physical Medium

In the temporal gravity model, proper time $\tau(x^\mu)$ is reinterpreted as a **physical scalar field** dynamically coupled to mass. This field structure offers a new foundation for gravitational phenomena — not through geometric curvature, but via distortions in internal time progression.

5.1. Field Equation for Proper Time

In the temporal gravity framework, we treat proper time $\tau(x^\mu)$ as a physically meaningful scalar field. Its spatial gradient determines local acceleration:

$$\vec{g} = \eta \cdot \nabla \tau$$

To define the behavior of this field in the presence of matter, we propose a field equation of the form:

$$\Box \tau = \kappa \cdot \frac{\tau}{t_0} \cdot \frac{\rho_m}{c^2}$$

Here:

- $\Box = \partial^\mu \partial_\mu$ is the 4D d'Alembert operator,
- ρ_m is the rest-mass density,
- c is the speed of light,
- $t_0 = 1\,\text{s}$ is a characteristic reference time introduced to ensure dimensional consistency,
- $\kappa = 4\pi G \cdot \eta$ is the coupling constant,
- and the ratio τ / t_0 expresses how far the local clock deviates from inertial flow.

This formulation ensures that the source term $(\tau / t_0) \cdot \rho_m$ has units of energy density, consistent with the relativistic interpretation.

Dimensional Consistency Verification"

$$[\Box \tau] = \text{m}^{-2}, \quad$$

$$[\rho_m / c^2] = \text{J}/\text{m}^3, \quad$$

$$[\tau / t_0] = 1$$

Then:

$$[\kappa \cdot (\tau / t_0) \cdot \rho_m / c^2] = [\kappa] \cdot \text{J}/\text{m}^3$$

Given $\kappa = 4\pi G \cdot \eta$, and:

$$[G] = \frac{\text{m}^3}{\text{kg} \cdot \text{s}^2}, \quad$$

$$[\eta] = \frac{\text{m}^2}{\text{s}^3}$$

$$\Rightarrow [\kappa] = \frac{\text{m}^5}{\text{kg} \cdot \text{s}^5}$$

Combining with $\rho_m / c^2 \sim \text{kg}/\text{m}^3 / (\text{m}^2/\text{s}^2) = \text{kg} \cdot \text{s}^2 / \text{m}^5$:

$$[\kappa \cdot \frac{\rho_m}{c^2}] = \frac{\text{m}^5}{\text{kg} \cdot \text{s}^5} \cdot \frac{\text{kg} \cdot \text{s}^2}{\text{m}^5} = \frac{1}{\text{s}^3}$$

To restore agreement with $\Box \tau \sim \text{m}^{-2}$, we **scale the right-hand side by a time factor** via τ / t_0, thereby ensuring that the output retains the correct physical units — because $\Box \tau$ encodes curvature per unit distance squared.

Physical Interpretation

- The presence of τ / t_0 emphasizes that the field is **self-coupled**: matter not only sources τ, but also responds to its local value.
- This scaling allows the model to extend beyond the static case and **bridge into relativistic domains**, while remaining dimensionally correct.

5.2. Static Solution and Recovery of Newtonian Gravity

For a static, spherically symmetric mass distribution, the field equation becomes:

$$\nabla^2 \tau = \kappa \cdot \rho_m$$

Outside the mass ($\rho_m = 0$), it satisfies Laplace’s equation:

$$\nabla^2 \tau = 0 \quad \Rightarrow \quad \tau(R) = \frac{A}{R} + B$$

Substituting this into the model's core relation $g = \eta \cdot \nabla \tau$, we find:

$$g = \eta \cdot \left(-\frac{A}{R^2}\right) = \frac{GM}{R^2}$$

$$\quad \Rightarrow \quad A = \frac{GM}{\eta}$$

Thus, the time field becomes:

$$\tau(R) = \frac{GM}{\eta R} + \text{const}$$

This reproduces the **Newtonian acceleration law** without invoking geometric curvature — acceleration arises from motion along the proper time gradient.

Like potential $\Phi = -\frac{GM}{R}$, the field $\tau(R)$ decays with distance and encodes the gravitational influence of mass via internal temporal distortion.

5.3. Structural Equivalence with Classical Gravity

The temporal formulation mirrors classical gravity in both form and outcome. Figure 10 summarizes the structural parallels. This is illustrated in **Figure 10** (see Fig. 10).

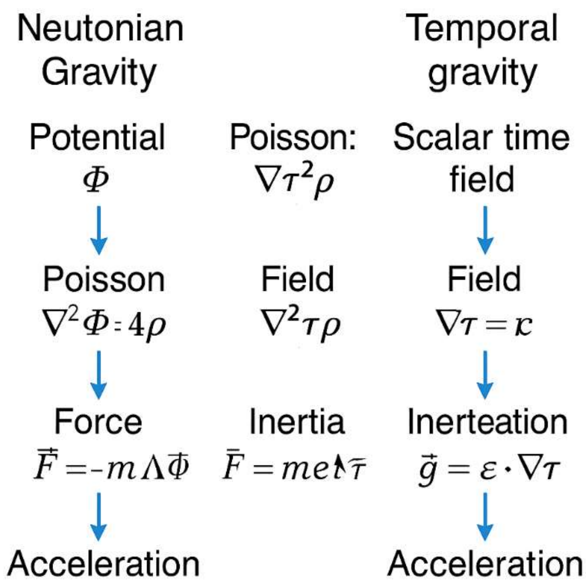

Figure .10 Field Theory Correspondence Table

Visual comparison between Newtonian potential Φ and temporal field τ, including their source terms, equations, and derived acceleration.

These equivalences are illustrated in **Figure 10**, which presents visual correspondence between the classical and temporal frameworks — including source terms, governing equations, and the structure of acceleration.

5.4. Interpretation of the Coupling Constant κ

To ensure full dimensional and conceptual consistency between the temporal field equation and classical gravity, we introduce a single coupling constant

$$\kappa = 4\pi\,G\,\eta$$

so that the source term in the field equation

$$\Box\,\tau \;=\;\kappa\;\frac{\rho_m}{c^2}$$ der

directly mirrors Poisson’s equation for the Newtonian potential

$$\nabla^2\Phi \;=\;4\pi\,G\,\rho_m.$$

Here η provides the conversion from a time-gradient to acceleration, and κ packages together the familiar gravitational constant G with this temporal–inertial factor. Throughout this work, we therefore use

$$\kappa = 4\pi\,G\,\eta$$

in every occurrence.

Dimensional Consistency

As shown in Section 5.1, proper nondimensionalization of the time coordinate (via $t_0=1\,\text{s}$) brings the right–hand side of $\Box\tau=\kappa\,(\rho_m/c^2)$ into direct correspondence with a spatial Laplacian, so that both sides carry the effective dimension of inverse length squared.

Physical Meaning

By defining $\kappa=4\pi G\eta$, we see that mass–energy density ρ_m sources curvature in the proper-time field with a strength modulated by η. A larger η amplifies the translation of time-flow distortion into inertial acceleration, while G retains its role in linking mass to field distortion.

Comparison with Classical Gravity

- Newtonian theory (Poisson's equation):
- $\nabla^2\Phi = 4\pi G\,\rho_m$
- Temporal model (proper-time field):
- $\Box\tau = 4\pi G\,\eta\;\frac{\rho_m}{c^2}$

The formal analogy between Φ and τ is now exact, with η quantifying how strongly time-flow gradients produce acceleration in lieu of spatial curvature.

Physical Meaning

The constant κ reflects how efficiently mass-energy density ρ_m induces curvature in the intrinsic time field. Through this definition, we see that:

- A higher mass density ρ_m increases the magnitude of $\Box \tau$, meaning sharper local bending of the time field;
- A larger inertial parameter η strengthens the coupling between time curvature and acceleration.

Comparison with Classical Gravity

In Newtonian theory:

$$\nabla^2 \Phi = 4\pi G \cdot \rho_m$$

In the temporal model:

$$\nabla^2 \tau = \kappa \cdot \frac{\rho_m}{c^2}, \quad \kappa = 4\pi G \cdot \eta$$

Thus, the temporal theory mirrors the classical field structure, but replaces the gravitational potential Φ with the proper time field τ, and expresses curvature in terms of internal energetic distortion rather than spatial geometry.

This substitution preserves the empirical equivalence:

$$\vec{g} = \eta \cdot \nabla \tau = \frac{GM}{R^2}$$

$$\quad \Rightarrow \quad$$

$$\tau(R) = \frac{GM}{\eta R}$$

reaffirming that Newtonian gravity emerges as a limiting case of the temporal framework.

Physical Interpretation:

The constant κ encodes how strongly mass-energy density ρ_m sources distortions in the proper time field. By expressing it in terms of the inertial coupling η, it becomes clear that:

- More massive or compact systems (i.e., with larger ρ_m) produce sharper curvatures in the time field τ,
- The acceleration response remains governed by:

$$\vec{g} = \eta \cdot \nabla \tau$$

where η serves as the bridge between time curvature and observable motion.

Comparison with Classical Gravity:

In Newtonian theory, Poisson's equation links mass to potential via:

$$\nabla^2 \Phi = 4\pi G \cdot \rho_m$$

In the temporal model, the structurally analogous relation becomes:

$$\nabla^2 \tau = \kappa \cdot \rho_m \quad \text{with} \quad \kappa = \frac{4\pi G}{c^2 \eta}$$

Thus, gravity here emerges not from space curvature or potential depth, but from how matter reshapes the intrinsic flow of time — and how systems accelerate in response to gradients in that temporal flow.

Note: While $\kappa \cdot \rho_m / c^2$ carries units of m^2/s^6, this corresponds to m^{-2} under a spacetime framework where the temporal coordinate scales with s^3. This reflects the geometric interpretation of $\Box\tau$ as curvature per unit length squared, consistent with the dimensionless nature of physical observables when scaled by time-energy couplings.

6. Experimental Predictions

While the temporal gravity model reproduces Newtonian results under known conditions, it also enables novel experimental predictions — particularly in engineered systems where the proper time gradient $\nabla \tau$ is artificially induced or amplified. These predictions differ in mechanism and design from those of general relativity and open new avenues for low-energy testing.

6.1. Artificial Gravity via Temporal Gradients

The model predicts that creating a non-uniform temporal field — for instance, through material rotation, structured refractive media, or energy-modulated environments — will lead to a measurable inertial acceleration:

$$g_{\text{induced}} = \eta \cdot \nabla \tau$$

Quantitative Estimate

Assume experimental control over a localized region where:

$$\nabla \tau_{\text{lab}} \sim 10^{-14} \, \text{m}^{-1}$$

Then, using $\eta \approx 9 \times 10^{16} \, \text{m}^2/\text{s}^3$, the resulting induced acceleration is:

$$g_{\text{induced}} \approx \eta \cdot \nabla \tau_{\text{lab}} = 0.9 \, \text{m/s}^2$$

This corresponds to approximately 9% of Earth's surface gravity — well within detection capabilities of modern torsion balances, precision accelerometers, or resonant pendulum devices. This laboratory-scale estimate is approximately 100 times larger than the natural terrestrial time gradient ($\nabla\tau_\oplus \sim 10^{-16}\ m^{-1}$), uggesting that materials with strong temporal dispersion — such as metamaterials with negative refractive index or Bose–Einstein condensates with anomalous dispersion — may be required to realize such gradients. — such as engineered metamaterials or ultracold condensates — may be required to realize such gradients.

Suggested Implementation

Experimental setups capable of engineering a spatial distortion in the temporal field may include:

- Rotating high-density superconducting discs, generating frame-drag-like effects in time structure;
- Modulated optical cavities with embedded phase-shift media, affecting photon delay across space;
- Pulsed electromagnetic fields or scalar modulation zones designed to locally suppress the rate of proper time progression.

In each configuration, the key goal is to generate a persistent or oscillating gradient $\nabla \tau$ large enough to induce inertial reactions that mimic gravitational pull — but without any external mass present.

6.2. Quantum-Scale Time Sensitivity

Because the model links gravitational phenomena to the structure of proper time, even subtle distortions of τ at the micro- or nanoscale may influence quantum systems — particularly those sensitive to timing, phase stability, or coherence.

Such effects are especially relevant for systems that already serve as precise probes of gravitational and relativistic influences, such as:

- atomic clocks,

- interferometers (optical, neutron, or atom-based),
- superconducting qubits and spin-resonant states.

Predicted Quantum Effects

If a spatial gradient in the proper time field exists — say,

$$\nabla \tau \sim 10^{-14} \, \text{m}^{-1}$$

as postulated in the laboratory-scale scenario (see 6.1), then corresponding phase delays or decoherence shifts may be detectable in quantum systems with sub-nanosecond sensitivity.

Potential observables include:

- **Phase shifts** in neutron or photon interferometers passing through or near engineered regions of temporal gradient;
- **Frequency drifts** in atomic clocks or precision oscillators placed across opposing sides of a controlled $\nabla \tau$ field;
- **Modification of decay rates** or tunneling probabilities for metastable particles in regions of temporally curved space;
- **Anomalous fluctuations** in entangled pairs due to localized variation in proper time flow.

Experimental Platforms

Candidate platforms for probing such effects include:

- **Optical lattice clocks**, offering time resolution below $10^{-18} \, \text{s}$, sensitive to differential timing across millimeter-scale gradients;
- **Neutron interferometry**, capable of detecting phase differences due to sub-nanojoule energy shifts;
- **Trapped ion arrays** and superconducting circuits, where engineered couplings may create artificial $\nabla \tau$ “landscapes” across quantum domains.

Although these effects are subtle, the **temporal gravity model offers a testable hypothesis**: that gravity-induced or engineered distortions of proper time, even at extremely small scales, should leave signatures in quantum behavior — not through space curvature, but through energetic redirection across time gradients.

6.3. Torsion Balance Modulation *(revised)*

Torsion balances remain among the most sensitive instruments for detecting ultra-weak forces and accelerations — often reaching thresholds below $10^{-10} \, \text{m/s}^2$. Within the framework of temporal gravity, these devices can serve as precision probes for detecting artificially engineered gradients in proper time.

Principle of Operation

If a localized temporal field exhibits an oscillating gradient of the form:

$$\nabla \tau(t) = \nabla \tau_0 \cdot \sin(\omega t)$$

then, by the model’s core relation $\vec{g} = \eta \cdot \nabla \tau$, a test mass suspended on a torsional fiber will experience a time-varying horizontal acceleration:

$$\theta(t) \propto \eta \cdot \nabla \tau_0 \cdot \sin(\omega t)$$

Realistic Parameters

Assuming:

- $\nabla \tau_0 \sim 10^{-14} \, \text{m}^{-1}$ (as in 6.1),
- $\eta \sim 9 \times 10^{16} \, \text{m}^2/\text{s}^3$

yields an induced acceleration of $g_{\text{induced}} \sim 0.9 \, \text{m/s}^2$, comparable to 9% of Earth gravity.

For a typical balance arm of length $L = 0.1 \, \text{m}$, this generates angular deflections:

$$\theta_{\text{max}} \sim \frac{F L}{k} \approx 10^{-6} \, \text{rad}$$

well within the detection range of current high-Q torsion systems.

Experimental Setup

Potential designs include:

- A torsion pendulum suspended above a platform with spatially modulated optical or electromagnetic structures;
- Rotation or oscillation of dense phase-gradient materials beneath the test mass;
- Interferometric tracking of angular displacement at nanoradian precision.

This application bridges the macro and quantum domains, as the induced acceleration is sourced not by mass, but by temporal deformation — offering a fundamentally new mechanism for laboratory-scale gravity research. . This is illustrated in Figure 11 (see Fig. 11).

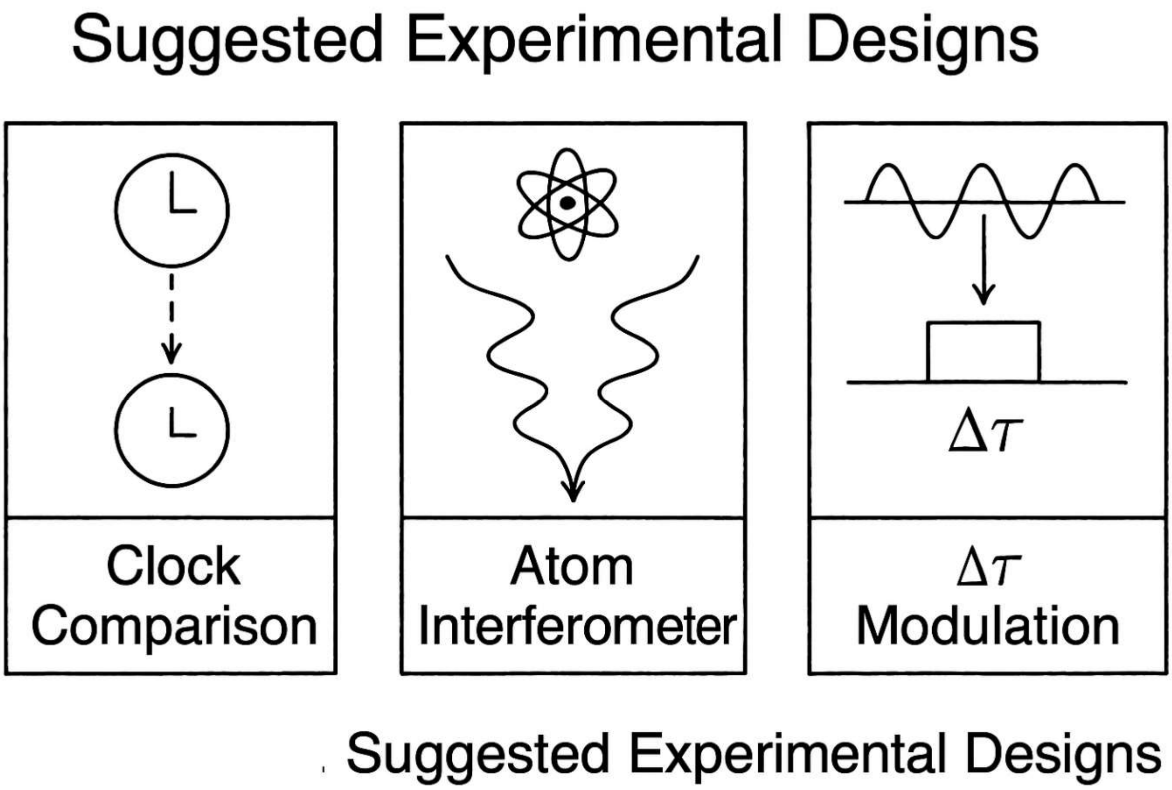

Figure 11. Suggested Experimental Designs

Diagram showing laboratory setups for generating artificial \nabla \tau fields:
— Torsion pendulum above oscillating gradient medium
— Rotating superconducting disk with refractive structure
— Space-based platform with clock arrays across synthetic time curvature
“See also Sections 6.1–6.3 for quantitative modeling of each design.”

“This application bridges the macro and quantum domains, as the induced acceleration is sourced not by mass, but by temporal deformation — offering a fundamentally new mechanism for laboratory-scale gravity research.”

7. Conclusions

This work introduces a novel formulation of gravity in which acceleration arises not from space-time curvature or external force fields, but as an *inertial response* to spatial distortions in the intrinsic flow of proper time \tau(x^\mu). In this framework, matter is seen as continuously evolving along its own time axis, and gravitational effects emerge when that evolution is unevenly distributed across space.

The central mechanism is governed by the relation:

\vec{g} = \eta \cdot \nabla \tau

where:

- \vec{g} is local acceleration,

- $\nabla \tau$ is the spatial gradient of proper time,
- η is a phenomenological coupling constant with units of m^2/s^3, quantifying how internal temporal energy converts into inertial motion.

Gravity is thus reinterpreted not as a long-range interaction or curvature, but as a *context-sensitive redistribution of energy* — one driven by the cost of preserving temporal continuity in the presence of spatially non-uniform time flow.

Key Results and Formulations

- A scalar field $\tau(x^\mu)$ was introduced to encode gravitational behavior through proper time curvature.
- A Lagrangian formulation was developed:
  $\mathcal{L} = \frac{1}{2} m v^2 - \gamma m (\nabla \tau)^2$
- The field equation was derived:
  $\Box \tau = \kappa \cdot \frac{\rho_m}{c^2}, \quad \text{with} \quad \kappa = 4\pi G \cdot \eta$
- ensuring dimensional consistency and coherent coupling to energy density.
- Newtonian gravity emerged as a special case:
  $\tau(R) = \frac{GM}{\eta R}$
  $\quad \Rightarrow \quad$
  $g = \frac{GM}{R^2}$
- A reference value $\eta_\oplus \approx 8.98 \times 10^{16} \, \text{m}^2/\text{s}^3$ was determined from Earth's surface gravity, ensuring empirical viability.
- Experimental scenarios were proposed — torsion balances, quantum phase shifts, time-modulated platforms — to probe engineered $\nabla \tau$ fields.

Model Strengths

- **Simplicity**: relies on a single scalar field rather than ten-component metric tensors.
- **Energetic Foundation**: acceleration derives from internal energy distortion, not geometry.
- **Scalability**: coupling constant η adapts across physical regimes.
- **Testability**: artificial gradients $\nabla \tau \sim 10^{-14} \, \text{m}^{-1}$ may yield effects observable with current tools.

Future Directions

- **Geometric Reconstruction**: derive spatial metric as emergent from $\tau(x^\mu)$.
- **Quantum Integration**: link temporal deformation to phase shifts and coherence decay.
- **Relativistic Extension**: generalize the model to dynamic matter and high-speed flow.
- **Experimental Tests**: design low-energy laboratory setups for time-gradient detection.

7.1. Discussion and Future Directions

This work presents a temporally grounded reinterpretation of gravity — one in which matter responds not to curvature in space, but to curvature in the flow of its own proper time. In this framework, mass is not an attractor, but a **modulator of time**, and acceleration is a consequence of preserving internal energetic continuity as time bends.

A crucial structural element throughout the model is the presence of the **reference timescale** $t_0 = 1\,\text{s}$. While this constant appears deceptively simple, its function is twofold:

1. **Dimensional consistency** — enabling proper scaling of energy terms such as:
   $E_{\text{time}} = m c^2 \cdot \frac{\tau}{t_0}$
    1. so that the field τ retains the physical meaning of time, and derived quantities like energy, force, and acceleration remain dimensionally valid.
    2. **Physical anchoring** — providing a fixed benchmark against which distortions in intrinsic time flow can be meaningfully compared, thus embedding the model within real-world measurement systems.

By including t_0, the theory achieves not only alignment with Newtonian gravity in the static limit but also opens pathways to extend into relativistic domains, where proper time deformation is no longer negligible.

This framework predicts that gradients on the order of $\nabla\tau \sim 10^{-14}\ m^{-1}$ — while far stronger than Earth's ambient value — may be realizable in controlled environments. Such gradients could induce inertial accelerations up to ~0.9 m/s², enabling laboratory-scale simulations of gravity, distinct from mass-based attraction.

An alternative — and potentially complementary — approach to defining temporal energy involves tracking the *instantaneous rate* of proper time flow via d\tau/dt. This differential form becomes especially relevant in relativistic settings, where time dilation alters the system's local ticking speed and may affect energetic behavior. While the main formulation adopts the cumulative \tau / t_0 structure for consistency across classical and quantum regimes, integrating d\tau/dt may prove valuable in developing fully covariant dynamics or exploring quantum-temporal coherence effects.

Paths Forward

Several open directions invite further development:

3. Relativistic Dynamics: Generalizing the static field equation to a fully covariant dynamical model involving \Box \tau, with proper dimensional regularization and causal structure.
4. Multidimensional Time Fields: Exploring formulations where \tau is extended to a vector field \vec{\tau}, allowing richer curvature structures and potential coupling to quantum behavior.
5. Emergent Space and Geometry: Investigating how metric structure may arise as a secondary effect of temporal field configuration — treating space not as fundamental, but as emergent from anisotropies in time flow.
6. Laboratory Verification: Pursuing experimental setups based on predicted artificial gradients \nabla \tau \sim 10^{-14} \, \text{m}^{-1}, potentially yielding gravitational analogues without external mass — from torsion balances to quantum coherence shifts.
7. Field-Theoretic Structure of the Lagrangian: While the present model adopts a minimal coupling term proportional to (\nabla \tau)^2 — representing the effective energy cost of temporal field distortion — further development may involve treating \tau(x^\mu) as a dynamical scalar field with its own kinetic and potential terms. This would allow extensions into covariant formulations, wave propagation, or even quantization of time degrees of freedom.
8.

Final Remark

By treating time not as a passive background but as an active field, this theory reframes gravity as a dynamic redistribution of internal flow — one that scales naturally across terrestrial, astrophysical, and quantum domains. The path ahead leads not through curving space, but through sculpting time itself.

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10.Appendix A: Linear vs Nonlinear Structure of the Time Field Equation

A.1 Nonlinearity in the Canonical Equation

The core field equation of the model is:

$$\Box \tau = \kappa \cdot \frac{\tau}{t_0} \cdot \frac{\rho_m}{c^2}$$

This formulation is **nonlinear**, since the field τ appears both on the left (via derivatives) and on the right (algebraically). The presence of the term $\tau \cdot \rho_m$ introduces feedback — the local time curvature is modulated not only by the density of mass-energy, but by the current state of the time field itself. This structure reflects a **self-coupled field**, possibly pointing to spontaneous instabilities, nontrivial vacuum states, or time curvature back-reaction.

A.2 Alternative Linear Form (for comparison)

An alternative linear version would be:

$$\Box \tau = \tilde{\kappa} \cdot \frac{\rho_m}{c^2}$$

with no explicit dependence on τ in the source term. This version simplifies mathematical treatment — e.g., Green's functions, linear superposition — and retains dimensional consistency with a properly scaled \tilde{\kappa}. However, it **removes the possibility of field self-modulation**, which may be central to the model's core interpretation.

A.3 Why the Nonlinear Form is Preferred Here

- It aligns with the idea that **time curvature depends on the local rate of intrinsic time**, not just on raw mass-energy.
- It allows the time field to "resist" or "amplify" its own bending, much like nonlinear dielectric media.
- It reflects the model's energy-based origin: time *stores* energetic meaning, and this feedback must enter the dynamics.

Nonetheless, the linear form may still serve as a useful approximation in **weak-field limits**, and its solutions can offer valuable intuition.

Philosophical Sciences

Ibn-Sina's concept of active intellect and its relevance in modern philosophy of consciousness

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Abstract
The article is devoted to the analysis of the concept of active intellect in Ibn-Sina's philosophical system and its relevance for modern philosophy of consciousness. The structure of intellect, including potential, acting, acquired and active levels, is studied, with an emphasis on the epistemological and ontological role of active intellect. The latter is seen as universal, immaterial and eternal intelligence, serving as the source of forms and completing the process of cognition. In Ibn-Sina's model, the active intellect acts as an intermediary between individual thinking and the transcendent order of being, providing the possibility of comprehending universals and the transition from sensual perception to abstract knowledge.
A comparison is made with the key directions of modern philosophy of consciousness - theories of mental states, functionalism, and models of cognitive architecture. Despite significant differences in methodology, points of convergence in understanding the structure of thinking, abstraction processes, and mechanisms of conscious perception are identified. It is concluded that the concept of active intelligence retains its philosophical significance as a model integrating rational and transcendental principles and can be productively reinterpreted in modern philosophical and interdisciplinary discussions.
Keywords: active intellect, Ibn-Sina, philosophy of consciousness, cognition, epistemology, metaphysics.

Introduction

The philosophical system of Ibn-Sīnā (Avicenna) is an integration of Aristotelian and Neoplatonic traditions reworked within the framework of Islamic metaphysics and epistemology. One of the central concepts in this system is the active intellect (al-'aql al-faʿʿʿāl), which has a key function in the process of cognition and in the formation of universals. In the tradition of Islamic philosophy, the active intellect is regarded as the last of the ten intelligences, emanations from the First Mover, the link between transcendent and empirical existence.

Modern philosophy of consciousness operates with different methods and conceptual apparatus, but within its framework the search for a universal model of intelligence capable of explaining the nature of consciousness, subjective experience, and cognitive processes continues. Comparison of the concept of active intelligence with modern theories reveals similarities in the structure of thinking and modeling of cognitive acts.

The aim of the study is to philosophically analyze Ibn-Sina's concept of active intelligence and its actualization in the context of modern approaches to the study of consciousness. The main task is to identify the ontological and epistemological foundations of this concept and to establish its philosophical significance in the context of post-classical discourse on consciousness.

Materials and Methods The study is based on Ibn-Sīnā's texts, primarily the treatises The Book of Healing (Kitāb al-Shifā') and The Book of Salvation (Kitāb al-Najāt), as well as on the works of contemporary scholars of Islamic philosophy and philosophy of consciousness. The methodological framework includes hermeneutical analysis of primary sources, comparative-philosophical approach, structural analysis of epistemological models, and interpretation of concepts through the prism of modern analytic philosophy.

Historiography In the study of Ibn-Sina's philosophy, considerable attention has been paid to the problem of intellect. The works of N. Rizvi, S. Nasr, J. Wiesengrind, A. Sezgin, and M. Mahdi emphasize the structure of Avicenna's epistemology. The studies of N. Hakimov and V. Makhmudov reveal the context of the emergence of the concept of active intellect in the philosophy of the Islamic East, its correlation with Greek origins, and its influence on Latin scholasticism. Within the framework of analytical philosophy the idea of active intelligence is compared with cognitive theories. The works of J. Searle and D. Chalmers criticize reductionism and propose a non-classical understanding of subjectivity, which allows us to draw a parallel with the concept of universal mind of Ibn-Sina.

The structure of intelligence in Ibn-Sina's philosophy Ibn-Sina builds a hierarchical model of intelligence, including four levels: potential, active, acquired and active. Potential intelligence is the soul's ability to perceive forms, initially empty but ready to be filled. It represents the first stage in the process of cognition. The active intellect activates this ability by providing for the processing and comprehension of information coming from sense experience. Here the mind begins to develop abstractions, to build judgments and inferences. It participates in the first acts of rational cognition. Acquired intelligence is formed on the basis of individual experience, learning and reflection. It represents the totality of already learned knowledge and skills. This is a relatively stable level of intelligence that characterizes the cognitive development of the individual. Active intelligence is the key element of the theory. Unlike the previous ones, it does not belong to the individual mind, but represents a universal and eternal source of forms. It is necessary for the completion of the act of cognition: it brings potential knowledge to the actual state. Through it the transition from sensual to abstract thinking is realized. It makes possible the cognition of universals, i.e., general concepts and entities that are inaccessible solely through experience. Active intelligence connects the individual mind with the universal order of being. The human mind becomes capable of universalization precisely through contact with the active intellect. The latter contains the forms of all things and transmits them to the individual mind with a certain degree of preparation of the latter.

The epistemological role of the active intellect Ibn-Sina's active intellect plays a central role in the process of cognition. In his epistemological system, knowledge does not arise from sense experience or logical inference alone. True knowledge becomes possible through the union of the individual mind with an active intellect that actualizes potential forms. This approach is opposed to radical empiricism, which denies the necessity of an external source of knowledge, and Platonism, which affirms the innateness of ideas. Ibn-Sina does not regard forms as innate, but recognizes the existence of a transcendent intelligence from which knowledge of universals is derived. The active intellect mediates between perception and abstraction, between the particular and the general. It allows the human mind to move from individual impressions to universal truths. This creates a model of cognition in which truth is neither reduced to subjective experience nor to pure thought, but arises as a result of interaction with an external, immaterial mind. Such an epistemology remains relevant in the context of contemporary philosophical discussions about the nature of knowledge. Ibn-Sina's active intellect plays a key role in the process of cognition. In his epistemological system, knowledge does not arise solely from sensory experience or inference. True knowledge is achieved through the union of individual reason with an active intellect that actualizes potential knowledge. This approach is opposed to both radical empiricism, which denies the role of reason, and Platonism, which affirms the innateness of ideas. Ibn-Sina does not regard forms as innate, but believes that they exist in a transcendent mind that can be accessed through the active intellect. The active intellect serves as the necessary mediator between individual reason and universals. It provides a way beyond subjective experience and forms the basis for objective knowledge. This model emphasizes the importance of the interaction between sense perception, rational thought, and the metaphysical source of truth

Active intellect in Ibn-Sina's system fulfills not only epistemological but also ontological function. It is the final link in the chain of emanations from the First Mover, the first cause and source of all forms of being. In this system, the active intellect occupies a unique position: it connects the eternal, transcendent world of forms with the changeable, multiple and perishable material world, playing the role of an intermediary between being and cognition. Through the active intellect the transfer of universals - the forms of all things - from the world of pure reason to the sensually perceived world is realized. It becomes the cause not only of the possibility of cognition, but also of the actualization of the entities themselves in empirical reality. Active intelligence does not merely serve cognitive processes, but also provides the very structure of reality. Ontologically, it acts as an organizing and ordering agent, shaping the cosmos as an ordered whole in which each thing has its essential form. It represents the last stage of intellectual emanation available to the human mind for interaction, and sets the direction of the soul's ascent to higher forms of cognition. Through interaction with the active intellect, man is able to move from potential knowledge to actual knowledge, realizing his rational nature. From an epistemological point of view, the active intellect performs the role of an external noesis, actualizing forms in the human mind. It does not create knowledge in man, but activates the mental faculty, directing it toward universals. This overcomes the limitations of individual thinking and allows objective truth to be attained. Active intelligence becomes a necessary condition for all scientific cognition. In general, Ibn-Sina's active intellect embodies the principle of unity of ontological and epistemological order, acting as the source of being and at the same time as the cause of the possibility of cognition. It serves as a key link in the structure of Ibn-Sina's metaphysical system, providing integrity and coherence between the world and the mind

Modern philosophy of consciousness: structure and parallels Modern approaches to consciousness include reductionist physicalism and models of subjective experience. Theories of mental states and cognitive modules view consciousness as the result of information processing by specialized structures. Ibn-Sina describes active intelligence as a mind external to the individual that provides the transition from perception to abstract thought. This model functionally resembles modern cognitive architectures in which there is a central information synthesis module. Active intelligence can be interpreted as a philosophical analog of a global workspace providing access to universals. It links the individual mind to the universal order of being. Parallels with the phenomenology of consciousness are also possible: Ibn-Sina's idea of the transcendental basis of cognition echoes the concept of intensionality. Thus, his concept remains significant in contemporary discussions of the nature of consciousness, offering an integrative approach that combines cognitive and metaphysical elements. Contemporary approaches to consciousness range from reductionist physicalism to models that account for subjective experience. The theories of mental states (J. Searle) and cognitive modules describe consciousness as a set of specialized information processing systems.

Modern interpretations of intelligence and consciousness are focused on neuropsychological and algorithmic descriptions. However, philosophical problems concerning subjective experience, intensionality and universality of knowledge remain relevant. Ibn-Sina's concept allows us to reconstruct a model in which the mind is a mediator between being and knowledge, not just a computational system. This approach has implications for postnonclassical philosophy, which recognizes the limitations of scientific reductionism in explaining the subjective.

Active intelligence can be seen as a condition for the possibility of metacognitive acts and the transcendent grounding of thought. In this context, active intelligence functions not as a mental module but as a philosophical precondition for the universality of thought. It sets the framework within which understanding, reflection, and self-awareness are possible. It can be seen as an archetype of rationality that is not reducible to biological processes. This understanding is relevant in the light of new trends in the philosophy of consciousness - phenomenology, qualia-theories, integrative models of consciousness - which emphasize the primacy of meaning and deep structures of experience.

Active intellect is a necessary condition for the cognition of universals. Within the framework of Avicenna's epistemology, knowledge is not the result of purely sensory experience or individual inference. True knowledge arises from the conjugation of reason with active intellect, which brings potential knowledge into actuality. This approach is opposed to both radical empiricism and Platonism. Unlike Plato, Ibn-Sina does not assume the innateness of ideas, but asserts the existence of a transcendent mind that preserves forms. Unlike the empiricists, he insists on the impossibility of knowing the universal solely on the basis of sensual material. In Ibn-Sina's epistemological structure, the active intellect appears as a necessary condition not only for abstraction but also for comprehension of the universal, which cannot be achieved in isolation, only by relying on experience. Perception, imagination, and reason are the stages of individual cognition, but true knowledge is achieved only when reason is combined with active intellect. The latter does not merely supplement the process of cognition, but makes it possible in the full sense. The active intellect acts as an intellectual light that enables the mind to illuminate universals in material objects. This metaphor of light recurs in the writings of Ibn-Sina himself and many of his followers. The light of the active intellect allows us to “see” not sensually, but by reason - laws, essences, principles. Therefore, it not only conveys forms, but also structures the process of thinking, introducing necessity and integrity into it. Special attention in Ibn-Sina's conception is paid to the distinction between knowledge as opinion (doxa) and knowledge as truth (episteme). Sensual experience can only provide partial, changeable knowledge, whereas connection with the active intellect provides access to unchanging forms. Such knowledge is true in the strict sense because its source is perfect and universal reason.

Conclusions

Ibn-Sina's concept of active intelligence retains its philosophical significance in the context of modern philosophy of consciousness. It offers an integral model of cognition combining ontological, epistemological, and metaphysical aspects. Comparison with modern theories shows that the structure of Avicenna's epistemology has not lost its relevance and can be reinterpreted in the light of cognitive and philosophical-anthropological research. The model of active intelligence serves as a philosophical basis for the construction of the theory of the subject, in which knowledge is seen as the result of the conjugation of the individual and the universal. Its potential lies in the possibility of philosophical synthesis of classical and modern ideas about consciousness.

The idea of the interaction of empirical and transcendent levels of cognition remains especially valuable, which allows us to go beyond reductionism and consider thinking as a process related to the metaphysical depth of being. Active intellect in this context becomes not only a mechanism of cognition, but also a basis for the interpretation of subjective experience, intuition and intellectual insight. Thus, the Avicenna concept can contribute to the formation of new approaches in the philosophy of consciousness, integrating elements of Islamic metaphysics with modern theories of cognitive science and philosophical anthropology.

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Ж.ШАМҰРАТОВА ПРОЗАСЫНДАҒЫ ЖАЛҒЫЗДЫҚ МОТИВІ ЖӘНЕ ЗАМАНДАС БЕЙНЕСІ

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Аңдатпа. Мақалада жазушы Жадыра Шамұратованың «Секундтар арасындағы шексіздік» кітабына енген әңгімелері мен хикаяттарының тақырыптық, көркемдік ізденістері, жас қаламгердің прозадағы өзіне тән баяндау стилі талданады. Жазушының прозасындағы жалғыздық мотиві, оның ғылыми негіздері айқындалды. Жалғыздық, жалғызсырау, жатсыну ұғымдарының жазушы әңгімелеріндегі көріністеріне мән беріліп, талдау жасалды. Прозадағы замандас бейнесі, қоғам келбетін ашудағы психологизм, сана ағымы, т.б. қолданудағы жазушылық шеберлігіне тұжырымдар жасалды. Жазушы әңгімелерінің поэтикасы, сюжеттік, композициялық құрылымдық ерекшелігі, кейіпкерлер жүйесі, ұлттық дүниетаным құндылықтардың авторлық тұрғыдан көрініс табуы сөз болады.

Мақаланың міндеті жас қаламгер Ж.Шамұратованың жинағына енген әңгімелерінің көркемдік-эстетикалық, танымдық әлемін тану, қазіргі әдеби процеспен тығыз бірлікте қарастыру.

Ғылыми зерттеудің мақсаты жоғарыда аталған міндеттерді шешуі үшін, жазушы әңгімелерінің мәтіндік құрылымы, мазмұндық негізіне талдау жүргізе отырып, жазушы көтерген мәселелердің қазіргі қоғамдағы өзектілігі, адамның ішкі психологиялық әлемі мен сыртқы форма арасындағы көркемдік эстетикалық таным арқылы сарапқа түскен өмір шындығын жеткізудегі авторлық шеберлігін танытуды көздейді.

Зерттеудің ғылыми-практикалық мәні жаңа ғасырдағы қазақ прозасының даму бағдарын айқындау, әдеби өлкетану мәселелерін зерттеуге аз да болса, үлес болып қосылады.

Мақаладағы қазіргі қазақ прозасын жаңаша талдау, жаңа заман әдебиетіндегі проза жанрының даму бағдары, реализм мен постмодернизм аралығындағы мәдени-тарихи кеңістік, автор туындыларының көркемдік жүйесі, дәстүр мен жаңашылдық, постмодернистік бағыты, образдар жүйесі, тілдік ерекшеліктері, туындының иедялық-эстетикалық мазмұнын ашу зерттеу жұмысының құндылығы бағдарын көрсетеді.

Кілт сөздер*:* жатсыну, жалғыздық мотиві, қазіргі қазақ прозасы, дәстүр мен жаңашылыдық

Кіріспе. Мақаламыздың тақырыбына негіз болған «жалғыздық мотиві» туралы әдебиеттану, философия, психология сынды бірнеше ғылым салалары бойынша жазылып, зерттеліп келеді. Бізге қажетті ұғым осы мәселенің әдебиеттану бағытындағы негізгі түсініктерін анықтап алу. Философия ғылымында жалғыздық, жалғызсырау деген ұғымдар жатсыну сияқты философиялық категориямен тығыз байланысты қарастырылады.

«Человек в мире отчуждения», яғни өскен ортасынан жеру, қоғамынан түңілу, жатсыну, жалғызсырау формасы болып табылады. «...Осы замандағы әлеуметтік өмір шындығы ұғымында адамды жатсыну идеясынан туындайтын ұстанымдар. Жатсыну – адамның өзінің жеке қарым-қатынастарын, қызметтерін, және нәтижелерін жатырқауының тумасы мен салдары болып табылады» [1,98].

Қазіргі қазақ әдебиетіндегі жатсыну, жалғыздық мотиві жазушыларды да, ғалымдарды да ерекше қызықтырып келеді. Себебі әдебиет өзекті тақырыпты ғана жазып қоймайды, сол арқылы адамзат қоғамының мәселесін терең саралайды. Адамды, яғни образды жеке тұлға, әрбір адам бірін-бірін қайталамайтын жұмбақ әлем екенін суреттеу кеңестік цензурадан құтылғаннан кейін ерекше мүмкіндікке ие болды. Алайда, сол кезеңнің өзінде-ақ талантты қаламгерлер өздерінің шығармашылығында адамның ерекше жаратылыс табиғатындағы жұмбағы, қоғам мен адам, адам мен адамның ішкі санасындағы тартысты, психологиялық жағдайын суреттеуде де өзіндік жол тауып отырды. Мысалы, сонау көне дәуірдегі Қорқыт, Асан қайғылардан бастап, Ақан сері, Абай, Шәкәрім, Мағжандардың жатсынуы, жалғыздығы мәселесі бүгінгі әдебиетіміздің көрнекті өкілдері О.Бөкей, Ә.Кекілбаев, Д.Исабеков, Т.Әбдіковтердің шығармашылығынан анық көрініс тапты.

Адамның өз-өзінен жатсыну мәселесі (самоотчуждение). Мұнда адам болмысының рухани дағдарысы жеке адамның ішкі себептерінен және олардың өмір сүру кеңістігінің трагедиясынан ізделінеді [1, 104].

«Адамдардың адамнан жатсынуы. Жазушылар өмірінің трагедиялық бейнесін жасай отырып, сол қатыгез тағдырдың құрбандығына айналған кейіпкерлерді сомдайды.

Адамның қоғамнан жатсынуы. Қоғамдық тіршілік пен жеке адамның бір-бірінен алшақтауы сөз етіледі [1, 104-105]. Жоғарыдағы ғылыми тұжырымдарды бағамдасақ, қазіргі қазақ әдебиетіндегі жатсыну, жалғыздық мотиві тәуелсіздік жылдары әдебиетіндегі қазақ прозасында да ерекше көрніс тауып отырғанын байқаймыз. Бұл біздің мақаламыздың зерттеу нысанына алынған Жадыра Шамұратованың кітабында ерекше байқалады.

Зерттеу материалдары мен әдістері. Зерттеу мақаланы жазу барысында, қазіргі қазақ прозасының дамуы туралы жазылған монографиялық еңбектер, сондай-ақ жекелеген ғалымдардың еңбектері басшылыққа алынды. Жазушы Ж.Шамұратованың «Секундтар арасындағы шексіздік» кітабы зерттеу нысаны болды.

Аталған тақырыпты зерттеу аясында терминдік ұғымдарды мәнін ашу үшін сипаттау, көркем шығарманы талдау, жинақтау, салыстыру әдістері жүзеге асырылды.

Нәтижесі. Зерттеу жұмысының нәтижесінде қаламгер Ж.Шамұратованың жаңадан шыққан жинағы «Секундтар арасындағы шексіздік» кітабы тақырыптық, мазмұндық тұрғыдан зерттеліп, автордың жаңаша сипаттағы туындылары алғаш рет зерттеу нысанына айналды. Жаңа заман әдебиетіндегі тың ізденістер, жаңа заманның образдары, қоғам мен адамның әлеуметтік тұрмыс мәселелері, жеке адамның ішкі табиғаты, жалғыздық мәселесі, түрлі өмірлік мәселелер автор әңгімлерінің мәтіндік негіздері бойынша ғылыми талдауға ұласты.

Мақаладағы тұжырымдар әдебиеттану ғылымның ғылыми теориялық, негіздеріне, сыни еңбектердің тұжырымдарына сүйеніп, сонымен қатар авторлардың жеке субъективтік ғылыми пайымдарына құрылып, қазіргі қоғамдағы өзекті мәселелерді психологиялық тұрғыда жете жазған автордың шығармашылығы жан-жақты талданады. Аталған мақаланы қазіргі заман әдебиеті туралы, жеке шығармашылық туралы зерттеушілерге дереккөздер ретінде ұсынуға болады.

Талдау. «Фолиант» баспасынан жарық көрген жазушы Жадыра Шамұроватованың *«Секундтар арасындағы шексіздік»* (2021) кітабы - проза саласындағы тұңғыш жинағы.

Қаламгердің әңгімелері мерзімді басылымдарда жарық көріп, әлеуметтік желі арқылы оқырманға жақсы таныс. Жақсы кітап өзінің иіріміне еріксіз тартып, неше түрлі кейіпкерлер әлемімен тағдырластырып қойғандай күйге түсіреді.

Кітапқа енген «Бейуақта ашылған құпия» (Арыс, актриса), «Пойыздағы мазасыз түн» (кейіпкері баяндаушы автор мен бейтаныс сотталған әйел), «Жұмбақ куәгер» (Зара Максимовна мен күйеуі Сайын Сапарович), «Сарымсақ қосылған ұлу еті» (Асылбек), «Секундтар арасындағы шексіздік» (Сәлима ана, жалғыз ұлы Ақылжан) шығармаларындағы әрбір кейіпкері - жалғыздық мұңын арқалаған жандар. Бірі қоғамдық тіршілік пен адам санасындағы түсініктің дәстүрлі құндылықтармен қабыспай жатауын көрсетсе («Секундтар арасындағы шексіздік» Ақылжанның діннің шырмауына түсіп адасуы), енді бірі адамның өз-өзінен жатсынуын, яғни адамның өзін-өзі құртуын («Сарымсақ қосылған ұлу еті» (әңгімесіндегі Асылбектің байлықтың кесірінен тасынып, казиноға бар дүние-мүлкін салып, отбасын ойрандап, өзінен-өзі азуы), «Бейуақта ашылған құпия» хикаятындағы актрисаның адамдардан саяқ өмір сүруі, яғни адамдардың адамнан жатсынуы (махаббатта, өнер жолындағы жолы болмауы, психикалық ауруға ұсшыруы т.б. оның адамдардан өзін-өзі оқшаулануына итермелеу) бәрі де жатсыну, жалғыздық мотивтерінің адам өміріндегі орын алатын күрделі құбылыс екенін көркемдік тұрғыдан жеткізеді.

Қаламгердің кітабын оқи отырып, тақырып таңдау және кейіпкерлердің әлеуметтік жағдайындағы бұрын-соңды прозадағы байқалмайтын жаңалықты сезінгендей болдық. Автор әңгімелеріндегі кейіпкерлер жапон әдебиеті өкілдерінінің кітаптарын оқып отыруы, тегін емес секілді, себебі автордың шығармашылығынан жапон әдебиетіндегі кейбір сарындар ізі де байқалатындай.

Кітапқа «Бейуақта ашылған құпия», «Пойыздағы мазасыз түн», «Жұмбақ куәгер», «Жалғыз көз», «Сарымсақ қосылған ұлу еті», «Секундтар арасындағы шексіздік» сынды бірнеше әңгіме, шағын хикаяттары мен новелласы енген. Автордың прозасындағы кейіпкерлердің қабылдануы да тосын, тақырыбы да тосын.

«Бейуақта ашылған құпия» шағын хикаятың тақырыбында паралельді екі ұғым бірге желі таратады. Бірі - қазіргі қоғамдағы байлық, екіншісі - жоқшылық, кедейлік. Бірақ екі желінің ортақ мотиві – жалғыздық. Автор байлықтың астарындағы мұңды суреттеу арқылы жалғыздық мотивтін бүгінгі қоғамның мысалында жаңа бір қырынан алып суреттеуге тырысқан. Кейіпкерлерінің мамандықтары да оқырманға тосын көрінуі мүмкін. Шағын хикаятта кейіпкерлер саны да санаулы. Басты кейіпкер патологоанатом Арыс және нағашы апасы – актриса. Әңгіменің түйініне құпия күнделіктің сырына үңілгенде көзіміз жетеді. Актрисаның шын мәнісінде Арыстың туған анасы екенін бір-ақ ұғынамыз.

Басты кейіпкердің бірі Арыс тұрмыстың тауқыметін тартып, жоқшылық көреді. Өмірдегі жалғыз қорғаны анасы қайтыс болады. Анасы қайтыс болардан бұрын ұлына жалғыз туысқан нағашы апасы барын естіртеді. Бұрын-соңды көрмеген адамын іздеп келген Арыстың нағашы апасынан көңілі қалады. Арыс өмірдегі қиыншылықты көріп өскен азамат болса, нағашы апасы ен байлықтың ортасында отырса да, жалғыздық мұңын арқалаған бейбақ. Бірақ мінезі ауыр, келген қонақты да жаратпайды. Жалғыздыққа әбден үйрген, итінен басқа тілдесер жан баласы жоқ.

«Нағашы апасы бұған біртүрлі суық, адамға онша назар салмайтындай көрінді. Тіпті өзінің әпкесінің қайтыс болғанын естігенде де көзіне жас алмай бедірейіп отыра берді. Сұрағы оғаш көрінді.

- Рактан кетті ме?
- Жүректен.
- Перзентханадағылар түгел келді ме?
- Иә. Бәрі келді. Жерлеуіне де көмектесті.
- Көп ауырды ма?

- Жоқ. Тіпті ауырмаған сияқты. Әлде маған білдірмеді.
- Тез кетсе мамаң бақытты екен.

Жігіт тосылып қалды. Ол не дегені, өмірден ерте кету бақыт па? Жалғыз баласын өсіріп, оқытып, енді қызығын көрем дегенде бір туысы жоқ үлкен қалада жалғыз тастап кете барғанын қалай бақытқа балайды? «Мына кісі біртүрлі екен» [1,11].

Жалпы Жадыраның кітабын оқи отырып, байқағанымыз, оның кейіпкерлерінің көбі жалғыздық мұңын арқалаған бейбақ жандар. Автор тақырыптық тұрғыдан алғанда бүгінгі қоғамдағы өзекті мәселелердің бәрін қамтиды, жұмыссыздық, байлық пен мансап, өнердің бағаланбауы, байлықтан не істерін білмей санасы уланып, өзінің еркін тежей алмаған адасқан жандар, казино, дін мәселесі т.б. негізгі мәселелермен қоса, адамның ішкі жан дүниесіндегі психологиялық ахуалды қопара жазып, адамдар неге жалғыздық мұңын шегеді деп жауап іздейтіндей? Бірақ автор біреуге күнә артудан гөрі, қоғамдағы түрлі жағдаяттардың жетегінде жүрген жанрдың іс-әрекеті арқылы түрлі ойларды, шешімдерді қабылдауды оқырмандардың өзіне қалдырып отыратындай күйге қалдырады.

Анасы қайтыс болған Арыс Айямен отау тігіп, шаңырақ көтеруді ойлағанымен, осынау үлкен қалада сүйеу болар бір туысқаны жоқ екенін ойлағанда қапалана түседі. Күдікшілдігі, секемшілдігі, келген қонақты жаратпайтындай мінезі болса да, анасынан кейінгі жалғыз адамына барып жағдайын айтуды құп көрген Арыстың автобус ішіндегі ойы мен көз алдынан өткен жағдайлардың жанды картинасы – бүгінгі қоғамның айнасы ма дерсің.

«Дүниеде сүйетін ісі – салондағылардың бет-әлпетін, қимылын бақылап, киген киімдерін назар аудару. Көзіндегі қап-қара көзілдірігінің арқасында, әсіресе, қыз-келіншектертің мүсініне көзін армансыз суаратыны бар. Әлденеге ызалы, әлденеге ашулы жүздер, шаршаған, жалыққан жанарлар, ойсыз, мағынасыз көзқарастар мұны шаршатпайтын. Танымақ тұрмақ, өмірінде бір мәрте көріп тұрған сол адамдармен өмір сүру салты да бірдей болғаннан ба, тіпті солармен алыс адамдармен өмір сүру салты да бірдей болғанынан ба, тіпті солармен туғандардай сезінеді өзін. Жолаушылардың бәрі бірдей өзі секілді жұмыстан кеш қайтып, асығыста қытай кеспесін талғажау етіп, құлазыған, кірі баттасқан жатақхананы паналап, о бір жылғы көне пиджагін үстіне жапсырып жүргендер емес, олардың арасында тұрмыстары әжептәуірлері бар болса да, салонның атмосферасы сондай ма, бәрінен өздерінің осы күніне риза болмаушылық пен осыған әлдекімді кінәлаушылық аңғарылып тұрады. «Сонда олар неге риза емес? Өздерінің бай болмағанына ма, осы салонға мен секілділермен қатар отырғанына ма? Болмаса жақсы тұрмыс іздеп келгенде бәрі өзі ойлағандай керемет болып кетпегеніне ме?

- Сіз не ары тұрыңыз, не былай шығыңызшы! Кедергі келтіріп тұрсыз тіпті!

Өзіне сөйлеген даусы ызбарлы әйел баласының кірпігінің ұзындығы мен қалыңдығынан бір қарағанда ұйқысы келіп тұрғандай көрінеді екен. Сол ұйқысы келіп тұрған көздер тесірейіп суық қарайды. Кейін ысырылып, салоннан шыққалы тұрғандарды өткізіп жібергенде тура қасынан бұрқ еткен қолаңса иісі аузы-мұрнын шарпып кетті. «Жасанды қас пен кірпік, тырнақ жасатам деп жүріп қолтығын жуатын сабынға ақшасы жетпей қалды ма екен» деп ойлады жиркеніп тұрып» [2,19]. Міне, осы бір ғана детальды алып қарасақ, автор кейіпкерлердің көзқарастары арқылы түрлі-түрлі тағдырлардың көз жанарларының тоғысуынан біршама сырды ағартса керек. Кейіпкерінің ой-санасы арқылы қоғамдық шындықты, бүгінгі өміріміздің тірі картинасын бар бояуымен жеткізе отырып, автор да сол қоғамдық ортаның бір мүшесі, яғни осындай әрбір құбылысты жазушылық талғампаздықпен көре білген және сол қоғамдық ортаны өзінің кейіпкерлерімен беруге тырысқанын аңғартады. Автор кейіпкерлерді образдауда шартты жақсы, не жаман деп суреттеуден гөрі, екі аяқты пенде екенін жеткізуді де басты мақсат тұтқан тәрізді. Мысалы, «Дүниеде сүйетін ісі – салондағылардың бет-әлпетін, қимылын бақылап, киген киімдерін назар аудару.

Көзіндегі қап-қара көзілдірігінің арқасында, әсірсе, қыз-келіншектертің мүсініне көзін армансыз суаратыны бар» деген детальдық қолданыстан Арыстың өзіне ғана аян, ішкі жан әлеміндегі осалдығын да көрсету арқылы автор образ сомдауда бір жақтылыққа ұрынбай, көркемдік шарттылықты басты назар да ұстауға тырысқаны көрінеді.

Әңгіме түйінінде авторлық дүниетаным құндылығы өз қанынан жеріген ана, тұрақсыз, жолы болмаған махаббат азабы, өнердегі бақталастық, бәсекелестік т.б. толып жатқан мәселелердің ұлттық құндылықтардан ажарып бара жатқан қоғамның бүгінгі-жай күйін суреттейді. Жалпы Ж.Шамұратова бұл туралы өзінің «Қазақтың ауылы» деген ұғым жоғалмаса екен...» деген бір сұхбатында былай дейді: «Біздің балалық шағымыз 90-жылдарға тап келгеннен бе, маған біздің ауылдың адамдары басқашалау, қалжыңы аз, мұңы көп болып көрінеді. Сол кезде ауылдың атпалдай азаматтары арақтан азып, мас күйінде асылып қалып жатты. «Өзім өлсем де балаларым жетім ретінде жәрдемақы алады ғой» деп шарасыздықтан өзіне қол салғандар болды. Сол жетім өскен балалар әкелерінің құнын ешкімнен даулай алмады. Қазір не көп, тренинг, психолог көп, сол кезде ауылда сөзінің де, өзінің де салмағы бар екі-үш ақсақал болғанда ғой, ондай жағдай болмас еді...

Иә, біреулер үшін түбі күйелеш қара шойын көрінгенімен, қазан – символ. Қазақтың қазаны – үйдегі үлкен-кішінің түгелдігінің, бір ыдлыстан ас ішуге жиналатын татулық-бірлігінің, сол бірліктің арқасында ұйыған берекесінің символы. Қара қазаы оттан түспеген қазақтан асқан бай болмайды. Қазақ ең бір ессіз тентек атаған, өйткені отта тұрған қзанды аударып, сындырған адамда ес болуы мүмкін емес. Әңгімеде кемпірдің «қазанын тастай қашқанның несі жақсы дейсің» деп күрсінетін жері бар. Қазақтың болмысы, қазақы мінез сол қара қазандармен бірге ескі жұртта қалды. Ұлттың танымын, дәстүрін өзгертудің салқыны қашан басталып еді, оған да біраз жыл, «ол қазанның біроі әкемнің үйінен келген еді» дейтін жері бар, бұл да тұспал, ертеде қазақ қызын ұзатқанда қанша жерден жақсы көріп тұрса да оған қазанын бермеген дейді, өйткені қыз басқа жұртқа кетеді, енді бөтен елдің адамы, қазаныңды берсең үйіңдегі молшылық пен береке сол әулетке ауып кетеді деп есептелген. Біз уақыт ауысқан сайын дәстүрден осылай ажырап отырдық. Қазақтың қарнын тойдырған қазаны да күндердің күнінде архаизмге айнала ма деген уайым ғой»[3,18], - деп ағынан жарылады. Осы сұхбатында айтылған ой қаламгердің басқа да туындыларының ой өзектестігімен үнемі сабақтасып жатады. Тәуелсіздік жылдарындағы ұлттық идеологияның жаһандық үрдістерге жұтылуы, нарық экономикалық қатынастардың дендеп енуі, шын мәнісінде, ұлттық құндылықтан ажырауға да себеп болғанын білеміз. Осындай мәселелерді әрбір әңгімесінде қозғай отырып, бірде ашық, кейде жанама түрде көтереді және кейіпкерлерінің мінез-құлқы мен характерінен, болмысынан анық аңғартады.

«Бейуақта ашылған құпия» хикаятының түйіні, жұмбақ сыры қызыл былғары түсті кітапшаны ашып, нағашы апасының жазған күнделігін оқиғанда анықталады. Паталогоанатом Арыс жұмысындағы күнделікті құпияларға тап болып жүрсе де, апалы-сіңлілі бола тұра анасы мен нағашы апасы деп жүрген жандардың бір-бірінен айырмасы жермен көктей екеніне, тіпті тірлігінде бір-бірін іздемеуінде жатқан құпияның сырына келгенде тосылып қалады. Ал, бұл жұмабақтың жауабы мынадай еді: «Мен сорлы туа сала одан безектей қашып, бауыр қалармын деп қорқып, құтылғанша асығып, сәбиім деп еміреніп те үлгермедім, есімін де қоймадым. Баланың бағы ғой, медбике расымен жақсы адам екен, оны адам қылыпты. Атын Арыс қойыпты. Келісті жігіт болып өскен екен. Бойы қандай! Өмір бойы өзімді ешқашан бала туған емеспін» деп сендіріп келгенімде туа сала өзім бас тартқан ұлымның іздеп келгені мені есімнен тандыра жаздады. Бір сәтте неше түрлі күйді бастан кешірдім, тіпті миым ойлауды ұмытып қалғандай болды. Өзімді оның алдында қалай ұстарымды білмедім. Тіпті бір сәттік рольге де кіре алмағанымды айтсайшы...» [2,43]. Міне, кейіпкер адам баласына айта алмаған жан сырын күнделігіне төгеді. Жүйке ауруына шалдыққан актриса, баласынан өзі бас тартып кете салады. Шағын хикаяттың психологиялық ахуалды баурап алтын әсері, баяндау стиліндегі тіл шұрайлылығы мен қарапайымдылығы оқырманды бей-жай қалдырмайды.

Хикаяттағы тағы бір байқалатын ерекшелік, автордың ғылыми терминдерді көркем әдебиеттің тіліне тігісін жатқызып пайдалана отырып баяндауын ерекше атап өтер едік. Себебі мамандығы паталогоанатом Арыс сияқты кейіпкерді бұрын-соңды қазақ әдебиетінде кездестірмедік. Ал оның жұмыс үстіндегі сәттерін, өзінің айнласындағы нәрселерге деген бағасын көрсетуде қаламгер медицина терминдерін орынды пайдалана отырып, оқырманға бейтаныс мамандық иесінің ішкі әлемін ашып көрсетеді. Бұл біріншіден қаламгерге кейіпкері туралы ақпарат беруге тәуелді болса, екіншіден автордың осы мамандық иесін орталық кейіпкер ретінде алу үшін сол бағытты да терең зерттегенін көрсетеді.

«Материалдардың езіліп-босаңсуын қайтару үшін формалинге салып қойды. Осылайша тканьнің қалдығы бірнеше рет өңдеуден өтіп, арнайы парафинге құйылады. Бөлек-бөлек шыныларда өт, ісіктің бөлігі, хирург операция кезінде кесіп алған материалдар салынған. Жазушаны микраскоппен анық көру үшін тканьдерді арнайы сұйықтыққа салып бояп алды, сол кезде қанға боялған орган сұр түске, ал өте жіңішке тіндер ашық түске енеді. Бірнеше шыныны былай алып қойды. Осының бәрін ештеңе ойламай отырып жайбарақат жатты. Биопсиясыны зерттеуге әдетте 2-4 күн беріледі, ал нақты диагноз қоюға он шақты күн керек. Енді бүгінгі жұмысы бойынша акті толтырып, қорытынды жасау қалды. Тыныштықты клавиатураның тық-тық еткен даусы ғана бұзып тұр. Принтер шулап, бірінші акті дайын болды. Ол екіншісіне кірісті. Осы отырған өзінің бүкіл клиенттерін танитын секілді» [2,7].

Медицина терминдерін қолдану бір ғана хикаятымен шектелмейді, оның бірнеше шығармасында медицина саласының терминдік сөздері тақырыпқа орай жиі қолданыс тапқан. Бұл автордың инттелектуалдық прозаға да бейдімлігін, кез-келген тақырыпты зерттеу, зейін қою арқылы жазу шеберлігін көрсетеді. «Жалғыз көз» новелласындағы бала кезінен жалғыз көзімен жарық әлемдегі жақсылық атаулыны көруге тырысқан кейіпкеріміз «амблиопия» ауруымен аурады. Өзінің балалық шағынан өткен жағдаяттарды баяндай отырып, сол жалғыз көзімен болса да, өзіне үміт сыйлаған өмірге құштар жанды көреміз. Мысалы, «Жалғыз көз» новелласындағы мына бір үзіндіден де жоғарыдағы стильдік ерекшелікті байқаймыз.

«Жүйке ауырса, бас та ішіне қогрғасын құйылған алып шар секілді. Жоғары көтеруге ауыр, төмен еңкейсең зірк-зіркі етеді. Адамның сырты алдамшы. Рас айтам. Мен де сыртымнан қарасаң мойынындағы міндеттерді атқарып жүрген тәртіпті адам секілдімін, ал ішімнен басқамын, мысалы, қыз келгенде терезенің аржағында қимылсыз қалған уақытты жылжыту үшін сыңғырлай қағылатын ғажайып қоңырау керек еді. Мен қоңырауды үнін көп күттім.

- Лазерьмен жасалатын фемтосекунд, ласик, суперласик деген

операциялар сізге келмейді. Лазерь ақауды толық алуға қауқарсыз. Бір ғана амал – «факичный йол» деген операция. Бірақ ол бізде алғаш жасалып жатыр, нәтижесі қалай болары белгісіз. Ештеңеге кепілдік бермейміз. Келіссеңіз, бір миллион теңге төлейсіз, сіздің көз өлщеміңізді алып, Швейцарияға тапсырыс береміз, коллаген арқылы арнайы жасалған сол линзаны көзіңіздің ішіне саламыз, - деді дәрігер.

Алғаш жасалып жатқан тәжірибенің «құралы» болу мені шошытқан жоқ. Бәріне де әзір едім. Тек өмір бойы сол көзіме қосамжарланып жүретін, өз бетінше ештеңе көрмейтін «жалқау» көзім не болар екен?

- Ал амблиопия көзім ше?

Дәрігер үндемей қалды.

- Ол тек көмекші болады, бірақ көруінде еш өзгеріс болмайды.
- Ал оған әуелі лазерьмен астигматизмін түзеп, сосын барып линза

салуға болмай ма?

- Сізде астигматизм көп емес, сіздікі амблиопия! – деді дәрігер өзі де байқамай даусын қатайтып.

Оған тап қазір өзіне кіріптар пациенттің білгішсінгені ұнамады. Ал маған екі көздің операциясының ақшасын төлеп, бірақ бұрынғыша жалғыз көзбен қалатыным түсініксіз»[2,98-99]. Бұл үзіндідегі бала кезден мүгедек қыздың ішкі жан толғанысы, тіпті өзінің ауруын өз зерттеп біліп алған өмірге деген құштарлығын көреміз. Осы бір үзіндіден қазіргі медицинадағы соңғы жаңалықтармен, терминдердің, көз ауруының түрін естіп, он екі мүшең сау жүргенде денсаулықтың қадірін түсінбейтін пенделігімізді еске түсіріп, оқырманның тәубеге шақыра түседі.

Жадыра Шамұратова прозасының тіл көркемдігін, баяндаудағы сөздік қоры мен көркемдік әдіс-амалдарды қолдануын да атап өткен орынды. Бұл шығарманың оқырман санасында ерекше әсер қалдырып, оқырманын жалықтырмай, қарапайым тілі арқылы бірден баурап алады. Мысалы, «Пойыздағы мазасыз түн» әңгімесі:

«Ireңдеген алып құрт бірте-бірте қарқын алып, суық желді қақ жарып жүйткіп келеді»[2,46].

«Сықпытына қарасаң кәрі шешеммен құрдас көрінетін буылтық матрас төменге сырғи береді»[2,47].

«Алыстан көзге шалынатын қазақ ауылдары соғыс көргендей тым жүдеу. Тек салқын самалға кеудесін тосып тыныстап, момақан жатқан дала ғана жаңалау көрініп, қай өңір, қай облыстың тұсында келе жатсаң да қыраты мен белі көзге жылы ұшырайды»[1,49]. Міне, бұл сыртқы портреттік және пейзаждық суреттеулерде автор сол сәттегі кейіпкердің қабылдауы арқылы тұрмыс-тіршілікті қаз қалпында береді.

Ал «Жалғыз көз» новелласындағы мына бір үзіндіде автор кейіпкердің ішкі мінезінен, жан-дүниесінен де хабардар етеді. Мысалы: «Қасын да қақпастан мелшиген, міз бақпайтын дүниенің саппас келбетіне бауыр басып кеткенім де бар. Әйтеуір бір жерде біреуді басынан балғамен тоқ еткізіп ұрып кетіпті десе де... селт етпейтін болып алдым, онсыз да алды-артыңа қарауға мұрша бермес осы тірліктің балғасын күн сайын өз арқамнан сезем [2,98]. Жазушы кейіпкері арқылы қоғам келбетін мысқылдай отырып, қарапайым сөздерді шебер қолдануы, адамдардың жан түпкірінде жатқан сезім қырларын, жан сарайын дәл баса білуі, оның жазушылық шеберлік қырларын, айғақтай түседі.

Қорытынды. Ойымызды түйіндесек, Ж.Шамұратованың «Секундтар арасындағы шексіздік» кітабына енген шығармалары - қазіргі қоғамдағы өзекті мәселелерді психологиялық тұрғыда қопара суреттей отырып, кейіпкерлері арқылы заманымыздың шынайы келбетін жеткізген туындылар. Көркемдік детальдарға, психологиялық ахуалды суреттеуде портреттік бейнелеу тәсілдеріне ерекше мән беріп, ішкі сезімді, кейіпкерлердің ішкі жан арпалысын ашуда сана ағымына, еркін баяндауға құрылыған көркем туындылар. Мәңгілік тақырып ана мен бала махаббаты, өнерге деген махаббат, байлық пен жоқшылық, мұң, жалғыздық, адам баласының өзінің ішкі жан әлемімен арпалысы шебер суреттелген жұмыр, тілі жатық, оқырманын түрлі ойға жетелейтін хикаят. Жалпы Жадыра прозасында кейіпкерлері де жаңа заманға сай мамандық иелері, не болмаса, жаңа қоғам тудырған әлеуметтік топ мүшелері. Ал, оның шығармасындағы дедиктивтік элементтердің кездесіп отыруы да тегін емес, себебі автордың өзі ішкі істер саласының баспасөзінде қызмет етуі, оның тақырыптарды терең зерттеп, ой елегінен өткізу арқылы үлкен қоғамдық әлеуметтік, тұрмыстық, һәм адамзатты толғандырантын тақырыптарға еркін баруына мүмкіндік ашқан.

МОТИВ ОДИНОЧЕСТВА И ОБРАЗ СОВРЕМЕННИКА В ПРОЗЕ Ж.ШАМУРАТОВОЙ

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Аннотация. В статье «Мотив одиночества и образ современника в прозе Ж.Шамуратовой» анализируются тематико-художественные искания в рассказах писательницы Жадыры Шамуратовой, вошедших в книгу «Бесконечность между секундами», и характерный стиль прозаического повествования молодой писательницы. Определен мотив одиночества в прозе писателя, его научные обоснования. В работе обращается внимание и анализируются проявления концептов одиночества, изоляции, отчуждения в рассказах писательницы. В статье рассматриваются образы современников, изображенные в прозе, психологизм в раскрытии образа общества, сознания народа и др. аспекты; делаются выводы о мастерстве писательницы. Своей задачей авторы статьи ставят рассмотрение поэтики рассказов писателя, сюжета, особенностей композиционного построения, системы персонажей, национальных мировоззренческих ценностей с точки зрения художника.

Задача статьи - раскрыть художественно-эстетический, познавательный мир рассказов, вошедших в сборник молодой писательницы Ж. Шамуратовой, рассмотреть их в тесной связи с современным литературным процессом.

Для решения вышеперечисленных задач научного исследования проводится анализ текстовой структуры и содержания рассказов, показана актуальность поднятых в произведениях проблем современного общества, раскрыто мастерство автора в передаче реальности жизни, рассматриваемой через художественно-эстетическое познание между внутренним психологическим миром человека и внешней формой.

Научная и практическая ценность исследования заключается в том, чтобы определить направление развития казахской прозы в новое время, внести своеобразный вклад в изучение вопросов литературоведческого краеведения.

Значимость исследовательской работы представлен в статье принципиально новым анализом современной казахской прозы, направления развития жанра прозы в современной литературе, культурно-исторического пространства между реализмом и постмодернизмом, художественной системы произведений, традиций и новаторства Ж.Шамуратовой; направления постмодерн, системы образов, языковых особенностей, раскрытия идейно-эстетического содержания произведений.

Ключевые слова: отчуждение, мотив одиночества, современная казахская проза, традиция и новаторство.

LONELY MOTIF AND CONTEMPORARY IMAGE IN J. SHAMURATOVA'S PROSE

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Abstract. The article analyzes the thematic and artistic researches of the stories and stories included in the book "Infinity Between Seconds" by the writer Zhadyra Shamuratova, as well as the characteristic narrative style of the young writer in prose. The motif of loneliness in the writer's prose, its scientific foundations have been determined. The expressions of the concepts of loneliness, isolation, and alienation in the writer's stories were analyzed and paid attention to. Contemporary image in prose, psychologism in revealing the image of society, stream of consciousness, etc. Conclusions were made on writing skills in use.

The poetics of the writer's stories, plot, compositional structural features, character system, national worldview values from the author's point of view will be discussed.

The task of the article is to recognize the artistic-aesthetic, cognitive world of the stories included in the collection of the young writer J. Shamuratova, to consider them in close connection with the modern literary process.

In order to solve the above-mentioned tasks, the purpose of the scientific research is to analyze the textual structure and content of the writer's stories, to show the relevance of the issues raised by the writer in modern society, to show the author's skill in conveying the reality of life examined through the artistic aesthetic knowledge between the inner psychological world of a person and the external form.

The scientific and practical value of the research is to determine the direction of the development of Kazakh prose in the new century, and contribute, even if only a little, to the study of literary regional studies.

The article presents a new analysis of modern Kazakh prose, the direction of the development of the prose genre in modern literature, the cultural-historical space between realism and postmodernism, the artistic system of the author's works, tradition and innovation, the postmodern direction, the system of images, language features, and the discovery of the ideological and aesthetic content of the work. indicates the orientation of the value.

Key words: alienation, motif of loneliness, modern Kazakh prose, tradition and innovation

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Бұл мақала Қазақстан Республикасы Ғылым және жоғары білім министрлігі Ғылым комитеті қаржыландыратын ғылыми жоба аясында шығарылды (грант №AP19676441).

Тәуелсіздік кезеңіндегі қазақ-орыс тілдерінің өзара ықпалдастығы

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Тіл – ұлт болмысының көрінісі, ұлттық ой-сананың өлшемі. Сондықтан да ұлттық тіл мен ділдің бір-бірімен байланысы – өте күрделі. Бұл байланыстың қыр-сырын танып-білу, дұрыс түсіну, зерттеп-зерделеу қажырлы еңбек пен терең ізденісті қажет етеді.

Тіл – рухани барлық құндылықтың негізі болғандықтан, әлемдік мәдениет пен өркениеттің дамуынан тысқары қала алмайды. Белгілі бір ұлттың дамуы өзінің ұлттық тілін қазіргі жаһандану заманында сақтай отырып, оны одан әрі өркендетуге, қоғамдық қызметін сан сала бойынша кеңейтуге, сонымен қатар осы мақсаттағы іс-шараларының дұрыс ұйымдастырылып жүргізілуіне, демек мемлекеттік тілдік саясат пен бағдарламаларға тікелей байланысты. Ал кез келген тілдің даму жолы мәдени-тарихи мазмұнды құрай отырып, әрбір ұлттық ділді (менталитетті) басқалардан ерекшелейді. Әлемдік өркениеттегі кез келген мәдениет адам қолымен жасалған құндылық болғандықтан, ол таза табиғи үдеріс (процесс) ретінде таныла алмайды. Қай ұлттың болсын мәдениеті сол елдің сан ғасырлық қоғамдық-әлеуметтік дамуының негізінде қалыптасып, өркендейді. Тілді ұлттан, ұлтты тілден, айналып келгенде, тілді ұлт өмір сүріп отырған қоғамдық-әлеуметтік ортадан, қоғамдық қарым-қатынастан бөліп қарау мүмкін еместігі сондықтан [1, 23].

Қазақстан қостілді: қазақ тілі – мемлекеттік тіл, орыс тілі – ресми тіл. Мұндай тілдік саясаттың формуласы барлық елдерге тән. Бір тіл өзіне тән бір функцияны атқарса, мемлекеттегі екінші тіл тағы бір өзіндік бір саяси-әлеуметтік функцияны атқарады. Қазақстанда қазақ тілі – мемлекеттік тіл. Бұл заңмен бекітілген статус. Ал орыс тілі ресми тіл, бұл да заңмен бекітілген, алайда орыс тілінің мемлекеттегі екі үлкен функциясын айтуға болады: бірі – ұлтаралық қатынас тілі, екіншісі – халықаралық қатынас тілі. Соңғы функцияны орыс тілі ағылшын тілімен қатар атқарады. Рас, орыс тілі еліміздегі ұлттардың өзара қатынас тіліне айналған (1989 жылғы тіл заңында айқындалған ұлтаралық қатынас қызметі ретінде танылғаннан бері), бірақ орыс тілі бұл қызметті қазақ тілімен қатар атқаруда. Дәстүрлі принцип бойынша, Қазақстан қазақ халқының мемлекеті болғандықтан қазақ тілі барлық функцияны негізгі міндетіне айналдырған бірден-бір тіл болуы қажет еді. Алайда орыс тілінің өлшемін айқындап отырған үлкен факторлар мен себептер бар. Бұлар айтарлықтай мәселелер. Әсер етуші факторларды сыртқы және ішкі деп бөліп қарастырсақ болады
[3, 16]. Сыртқы факторлар:*Біріншіден*, қазақ елі Ресей Федерациясымен шекаралас және саяси-экономикалық жағынан әрі әріптес, әрі одақтас. Қазақстан мен Ресей 178 салада өзара әріптес. Біздің Ресеймен тығыз қарым-қатынасқа түсуіміздің өзі сыртқы фактор бойынша орыс тілінің рөлін айқындап тұрған ең негізгі көрсеткіш. Ресейдің саяси кеңістігі бүкіл ТМД елдерін құрап отыр. Орыс тілі тек ТМД кеңістігіне ғана әсер етіп отырған жоқ. Орыс тілі ЕуроОдақтың саясат жүргізетін саяси тілдерінің бірі. Орыс тілі әлемдегі ең кең таралған 6 тілдің құрамына енеді. Сондықтан Ресеймен шекаралас Қазақстанға орыс тілінің ықпалы басқа елдерге қарағанда амплитудалық күйде болуы заңды. Тек Ресей саяси державасының дүрілі саябырсығанда, күші әлсірегенде ғана орыс тілінің әлемдік ықпалы төмендемек. Соның ішінде Қазақстан үшін де.

Екіншіден, біздің еліміздің ақпарат кеңістігі тікелей Ресей ақпарат көзімен байланысты. Бұл факторды екі тармақта қарастырсақ болады. Бірі, Қазақстан медиа кеңістігі мен баспасөз басылымдары Ресей ақпараттарын тасымалдайды. Мәселен, бізде Ресей телеарналарының тікелей трансляциясы жүреді. Сондықтан қазақстандықтар ресей шоу-бизнесі мен саясатын, жаңалықтарын, саясаткерлері мен қайраткерлерін жақсы біледі (отандыққа қарағанда!). Кең таралған «Дискавери» және өзге де танымал әлемдік телеарналарды қазақ тілінде сөйлете алмай отырмыз. Қазақстандық медиакеңістіктің қазақтілді болмауы Ресейлік ақпараттың Қазақстанға еркін енуіне себепкер болып отыр. Шетелдіктер тілді, тіпті, субтитрмен оқытатын тәжірибе барлығын ескерсек, таза тілде сайраған тікелей эфирдің адам тіл үйренісіне қатты әсер ететіні белгілі. Сонымен қатар қазақстандықтар ресейлік (752 журнал, 214 газет) өзге басылымдарға жазылып, оқырманы болып есетпеледі. Екінші, Қазақстан интернет ресурстары тікелей Ресейдің орыс тілді интернет ақпаратымен байланысты. Ал Ресей ақпарат қоймасы Еуропа, АҚШ-тың ақпараттарымен қамтамасыз етіледі. Демек, бұл жерде орыс тілінің делдалдық қызметте тұрғанын байқауға болады. Ресей ақпарат аумағымен қазақстандық мүдденің жұмыс істеуін екі сипатта көруге болады: бірі – Ресей ақпаратын тікелей еш өзгеріске ұшыратпай тікелей тасымалдау, бұнымен телеарналар мен интернет жұмыс жасайды; екіншісі – Ресей орыс тілді ақпаратын баламалау, аудару және интерпретациялау тәсілімен әкелу. Бұл екі сипат та орыс тіліне тәуелділік тудырып отыр.

Үшіншіден, ғылым. Ғылым саласы қашан да ғылыми дүниелерді тиімді жеткізетін әрі кең көлемде тарататын тиімділігі жоғары тілді немесе әлемдік ғылымды игеретін икемді тілді қажет ететіні белгілі. Біз ғылыми негізделген, ғылыми стандарт пен нормаға ие орыс тілін ғылыми кеңістікке шығатын көпір ретінде аламыз. Және Ресей ғылымымен де тығыз байланыстамыз. Көптеген жаратылыстану және гуманитарлық ғылымдары Ресей ғылымының аспектілерімен қарастырамыз, тіпті, филологияны да. Орыс тілі – әлемдік ғылыми қауымдастыққа қауыштыратын жол. Қазірде әлемдік ғылым тілі – ағылшын тілі. Әлемдік жаңалықтар ағылшын тілінде жазылып, ғылыми форум-конференциялар ағылшын тілінде өтеді. Орыс тілі осынау ғылыми кеңістікке мүмкіндік береді. Осы тұста да орыс тілінің делдалдық қызметі туралы айтсақ болады. Бұл жерде орыс тілі Қазақстанда ағылшын тілімен қатар қызмет атқарып тұр. Ағылшын тілі Қазақстан үшін де ақпарат тілі мен ғылым тіліне айналып барады. Тіпті Ресей ғылымы да ағылшын тілінің ықпалына бой алдыруда. Сыртқы экстрафакторлардың барлығы Ресейдің ықпалымен туып отыр.

Ішкі факторлар сыртқы факторларға қарағанда маңызды орын алады. Ішкі саясатта орыс тілі толығымен өзінің әлеуметтік функциясын сақтаған. Еліміздегі орыс тілінің орнын айқындап тұрған ішкі факторларды қарастырсақ болады[4, 32]. *Біріншіден*, қазақстандықтардың орыстілді дискурспен жақсы таныстығы, яғни Қазақстан халқының орыс тілін жақсы меңгергендігі, қазақ тілімен қатар орыс тілінің де «тасымалдаушысы» болып отыр. Статистика бойынша, Қазақстан халқының 94,4%-ы орыс тілін ауызша формада түсінеді, ал 84,8%-ы орыс тілін жақсы деңгейде меңгерген. Орыс тілі – елімізде славян халықтары мен қазақ халқының меңгерген тілі. Сондықтан орыс тілі 1989 жылғы заңда актіленген ұлтаралық қатынас тілі функциясын әлі атқарып тұр. Болашақта бұл функцияның рөлін атқарушы қазақ тілі болуы қажет. Кез келген тілдің кез келген ортада қолданыс құбылысын айқындайтын екі үлкен жағдай бар: бірі – демографиялық, екінші – коммуникациялық жағдай. Бұл тұрғыдан Қазақстанда орыс тілінің аталған екі жағдайы да тұрақты. Қазақстанда орыс тілінің коммуникациялық рөлі басым.

Екіншіден, мемлекетте БАҚ пен ақпарат таратушы көздердің көп бөлігі орыс тілінде болып отыр. Қазақстандағы 2300 тіркелген басылымдардың тек 5/1-і (18%-ы) ғана мемлекеттік тілде көрінеді, ал қалған бөлігі орыс тілді басылымдардың еншісіне көшіп отыр (басқа тілде шығатын басылымдар саны аз). Республикалық газеттердің 40%-ы орыс тілінде, 37,7%-ы қазақ тілінде, 14,5%-ы басқа тілдерде жарияланған. Әрине, басылымдар да сұранысқа жұмыс жасайтындықтан, елімізде орыстілді басылымдарға халықтың сұранысы басым екенін аңғаруға болады. Сонымен қатар ақпарат таратушы интернеттің негізгі тілі елімізде

орыс тілі. Қазақсандық Inet-тің басым көпшілігі орыстілді сайттардан тұрады. Тікелей интернетке шығатын тіл де орыс тілі [4, 45].
Үшіншіден, биліктің көзқарасы. Қазақстандық билік тікелей орыс тілінің қолданысына мүдделі болып отыр. Бұл жағынан Қазақстан Украина елінде болып жатқан жағдаймен ұқсас. Украина билігі де орыс тілін қолдап отыр, билік иелері елде орыс тілінің қолданысына мүдделі болып отыр. Қазақстанда да дәл осы жағдай. Биліктің тарапынан қабылданған шешімдер мен ұсыныстар мемлекеттің тікелей саяси климатына, соның ішінде тілдік саясатына әсер ететіні белгілі.
Төртіншіден, еліміздегі орыс тілінің ресми статусы. Бұл ең үлкен айқындаушы фактор. Заңдық тұрғыдан бекітілген құжат бойынша және мемлекеттік бағдарлама бойынша орыс тілінің мемлекетте нақты құқықтық қызметі бар. Қазақстан ТМД елдері ішінде ең бірінші болып орыс тіліне ресми статус берген мемлекет. Мемлекеттің тілдерді дамыту концепциясы бойынша Қазақстанда тілдердің функцияналдылығын пропорциялы түрде ұстау әрі біртұтас тілдік кеңістік құру көзделген. Үш тұғырлы тіл саясаты да соның ішінде орыс тілін қолдауға арналған. Әсіресе, білім мен ғылым саласында тілдердің тиімділігі қажет екені рас. Бұл тұрғыдан біртұтас ғылыми кеңістікке жол аша алатын әрі білім саласында да көптеген тиімді қырлары бар орыс тілі Қазақстан үшін кәсіби мақсатта қажет екені түсінікті.

Алайда, осы тұста әлемде де орын алып отырған ұлттық мүдде мен мемлекеттік мүдденің қарама-қарсылығы туралы да айтса болады. Мемлекеттік мүдде бойынша ғаламдасу, әлемдік даму деңгейіне жету жолдарын алға тарту мақсатында қабылдаған шаралары мен ұлттық сана-сезімді қалыптастыруды қарымына алған ұлттық ұстаным-мүдденің өзара тоқайластық танытуы көптеген елдерге тән құбылыс болып отыр. Соның ішінде біздің еліміз үшін де. Қазақ халқының ұлттық-тарихи темпераментін қалыптастыруда орыс тілінің кері ықпалы болып отырғандығы хақында. Орыс тілі халықтың батысқа еліктеуін тікелей жүзеге асырып отыр. Қазір елімізде қостілді буын қалыптасып келе жатыр. Олардың көп бөлігі – қазақ халқы. Алайда мынаны түсінген жөн: орыс тілін қазақ тілімен қатар білу – бұл құзіреттілік, қабілеттілік. Қашан да бір тілді қосымша білу тұлға тарапынан үлкен басымдылық екені белгілі. Сол сияқты халқымыздың қостілді болуы да оның басымдылығын, яғни білім алуында да, әлемді, дүниені тануда да қарымдылығын танытады. Тек ұлттық психологияны сіңдіру үшін халқымыздың ұрпағына бірінші болып ана тілді үйрету қажет. Кейін келіп қана өзге тілдерді игерген жөн (Ахмет Байтұрсынұлы балаға 12 жасқа дейін өз тілінде ғана білім беруді айтқан, дәл осындай тәжірибе жапон елінде қолданылады).

Қостілділіктің тағы бір келеңсіз жағы бар. Олардың басым көпшілігі, көп жағдайда, бір тілдегі ойын екінші тілге аударып жеткізеді. Жоғарыда айтқанымыздай қазақша телерадио мен газет-журнал тіліндегі тіліміздің әдеби нормасына сәйкес келмейтін небір «тың қолданыстарды» екі тілді бірдей меңгергендер немесе екеуінің біреуін орташа деңгейде білетіндер айтып-жазып жүр [5, 78].

Бұндай келеңсіздіктер БАҚ-да да көптеп кездесті. Мәселен, жаңа астанамыздың атауы орыс тілінің сөзжасамдық жүйесіне бағынып, сол арқылы қолданысқа еніп жүр. Бірақ тілдік қолданысқа әлі де бір жүйеге келіп, бірыңғайлық болған жоқ. Астана қаласының тұрғындарын «астаницы» деп атау халық арасында кездеседі. Ал тура мағынаға сай (2001 жылғы КТК телеарнасының экспресс-сұрау кезінде нақтыланған) атау «астанчане» сөзі болатын. Ал «Хабар» телеарнасында «Томирис –коренная астанчанка» деп қолданылған. Жазушы И.Щеголихин «Рахат» арнасында бағдарлама барысында «астанайцы» деп атаған. Бұдан өзге халық арасында «жители Астаны, жители новой столицы, жители северной столицы» сынды сөз тіркестері де қатар қолданылуда. Аналогиялық аспектіде қарасақ, Қарағанды тұрғындарын – «карагандинцы» деп атасақ, Астана тұрғындарын да «астанинцы» деп атау ойға қонымды сияқты. Бірақ бұл атаудың халықтар арасында қолданысқа толықтау енбеуінің бірден бір себебі «астанинцы» және «сатанинцы» сөзімен тұлғалық ұқсастықтарының болуында деген ойдамын. Сол сияқты «астанийский» сөзі «астанайский» болып та қолданылуды жиі кездестіруге болады. Мысалы, "Время" газетінде «как шутят астанайские острословы» деген сөйлем басылған [6].

Бүгінгі күні еліміздің қоғамдық-саяси өмірімен байланысты орыс тіліне қазақ тілінен ауысып келген сөздер, оларды сөзжасамдық тәсілдер арқылы пайда болған жаңа сөздер көптеп қолданысқа енуде. Мысалы, младобаи, младодемократы, младотюрки, т.б. сынды сөздердің тілімізде 90-шы жылдары өте кең таралған болатын. Тіпті БАҚ-да: Мухтар Аблязов, безусловно, одна из самых ярких фигур когорты так называемых младотюрков («Время»); Нурлан Джамбулович «родом» из стана младобаев («Время»). Бұл сөздер 1990-2000 жылдар аралығында ең актив сөздердің қатарына жатқан. Бұл сөздің пайда болуын тілшілер 1998 жылғы КТК арнасындағы ең үздік бағдарламалардың бірі болған «Портрет недели» хабарымен байланыстырады. Кезекті хабардың бірінде «эра младотюрков» атты тіркес алғаш қолданылды, осы кезден кейін дереу түрде халық арасында кең таралды деп көрсетеді. «Мегаполис» газетінде тіпті бұл сөзге толықтай анықтама берген: Младотюрки практическ и сплошь выходцы из Старшего и Среднего жуза; Младотюрки и те, кто вызвал их к жизни, - это и есть те, кто принимает в Казахстане всякое мало-мальское важное решение [7, 7].

Көпұлттылық жағдайында тілді сақтап қалу мен оны дамытудың бір жолы - қостілділік яғни екі тілді қатар меңгеру. Ұлтаралық қатынас құралы мен ана тілді қатар не алма-кезек пайдалану екі тілдің өмір сүруін қамтамасыз етеді. Өйткені тілдің тіл болып қалуы мен дамуының бірден-бір шарты - оның іс жүзінде қолданылуы. Қолданысқа түспеген тіл құриды. Тіл о бастан қолдануға жаралған, қолдану үшін де дамиды, даму үшін де қолданылады. Өмірдің сан қилы саласында қай тіл жиі қолданылса, сол тілдің болашағы мол болмақ. Демек, қазақ тілінің елімізде мемлекеттік мәртебеге лайық қызмет атқаруы үшін алдымен оның қоғамдағы нақты жағдайын анықтап, сол жағдайды жөндейтін жолдарды іздестіру қажет деп түсінемін.

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İNGILIS DILINDƏ AKADEMIK YAZININ TƏDRISINDƏ TƏLƏBƏLƏRIN QARŞILAŞDIĞI ÇƏTINLIKLƏR VƏ ONLARIN ARADAN QALDIRILMASI YOLLARI

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Qloballaşan və rəqabət mühitində ingilis dili, elmi və akademik fəaliyyətlərin əsas vasitəsinə çevrilmişdir. Tələbələrin bu dil vasitəsilə effektiv və düzgün akademik yazı bacarığını inkişaf etdirməsi, onların elmi və peşəkar kariyerasında mühüm rol oynayır. Lakin, bu sahədə qarşılaşdıqları çətinliklər, onların təlim və tədqiqat fəaliyyətlərinin keyfiyyətinə mənfi təsir göstərir. Bu məqalədə, ingilis dilində akademik yazının tədrisində tələbələrin üzləşdiyi əsas problemlər və bu problemlərin aradan qaldırılması üçün təklif olunan metodlar və strategiyalar geniş şəkildə araşdırılacaq.

Bu sahədəki mövcud problemləri anlamaq və təhsil sistemində və tədris prosesində tətbiq oluna biləcək praktik və elmi əsaslı həll yollarını təqdim etmək tədris işçilərinin qarşısında duran əsas vəzifələrdir.

Akademik yazı, elmi və tədqiqat məqsədli, struktur və qaydalara riayət edən, məlumatların düzgün və sistemli təqdim olunduğu yazı növüdür. Bu yazı növü, dilin qrammatik və leksik səviyyəsindən başqa, məntiq və arqumentasiya bacarıqlarını da əhatə edir. Akademik yazı, elmi mühitdə müzakirə və elmi cəmiyyətə məlumat çatdırmaq üçün əsas vasitədir və onun düzgün tərtib olunması, tədqiqatçı və tələbələrin elmi fəaliyyətlərinin keyfiyyətini artırır. Bu növ yazılar elmi jurnallarda, dissertasiyalarda, məqalələrdə və konfrans materiallarında istifadə olunur. Akademik yazının əsas xüsusiyyətləri aşağıdakılardır:

Objektivlik və elmi əsaslılıq. Yazılar, şəxsi fikirlərdən çox, elmi və faktiki məlumatlara əsaslanır.

Struktur və format. Giriş, metodologiya, nəticələr və müzakirə kimi bölmələrdən ibarətdir.

Dəqiq və aydın ifadə. Düşüncələr aydın və qərəzsiz ifadə edilir.

İstinadların düzgün verilməsi. Əsas mənbələr və əvvəlki tədqiqatlar düzgün şəkildə göstərilir.

Akademik yazı, elmi mühitdə bilik və məlumatların düzgün və effektiv şəkildə yayılmasının əsas vasitəsidir. Bu yazılar vasitəsilə tədqiqatçılar öz tapıntılarını paylaşır, fikir və arqumentlərini əsaslandırır və elmi mühitdə müzakirə aparırlar. Tələbələr üçün isə, akademik yazı bacarığı, onların analitik və kritik düşüncə qabiliyyətlərinin inkişafına, elmi mühitdə aktiv iştirakına və gələcək karyeralarında uğurlu olmalarına zəmin yaradır.

Tələbələr, akademik yazı ilə bağlı müxtəlif səviyyədə və növdə problemlərlə üzləşirlər. Bu problemlər, həm dil və qrammatika, həm də strukturlama və məntiqin qurulması ilə əlaqədardır. Əlavə olaraq, motivasiya və resurs çatışmazlığı da bu problemləri gücləndirir.

Akademik yazının tədrisində tələbələrin qarşılaşdığı bir sıra vacib və geniş yayılmış problemlərdən mövcuddur. Bu sahədə tələbələrin üzləşdikləri çətinliklər əsasən aşağıdakı bəndlər üzrə özünü göstərir:

Struktur və məntiqin düzgün qurulmaması:

Giriş və nəticənin qeyri-dəqiq və ya zəif olması. Akademik məqalənin və ya essenin başlanğıcı və yekunu çox mühüm əhəmiyyət daşıyır, çünki onlar oxucuya mövzunun aktuallığını, məqsədini və nəticələri haqqında ilkin məlumat verir. Tədris prosesində tələbələr çox vaxt giriş və nəticələrin yazılmasına kifayət qədər diqqət yetirmirlər və ya onları qeyri-dəqiq və zəif ifadə edirlər. Bu, bir neçə səbəblə bağlı ola bilər:

- Girişin və ya nəticənin məqsəd və məzmununun düzgün müəyyən edilməməsi.
- Girişdə mövzunun aktuallığının və tədqiqatın məqsədinin aydın şəkildə ortaya qoyulmaması.
- Nəticədə isə, əsas fikrin və əldə edilən nəticələrin qısa və konkret şəkildə ifadə olunmaması.

Nəticənin zəif və ya qeyri-dəqiq olması, oxucuya məqalənin əsas ideyasını və müəllifin düşüncəsini düzgün başa düşməyə imkan vermir. Bu isə öz növbəsində, akademik yazının effektivliyini azaldır və təqdim olunan məlumatların dəyərini aşağı salır.

Əsas fikrin və arqumentlərin aydın və ardıcıl təqdim olunmaması. Tələbələr çox vaxt öz fikirlərini və arqumentlərini düzgün və ardıcıl şəkildə ifadə etməkdə çətinlik çəkirlər. Bu, aşağıdakı səbəblərdən yaranır:

- Fikirlərin və arqumentlərin məntiqi ardıcıllığının nəzərə alınmaması.
- Məlumatların və dəlillərin düzgün və sistemli təqdim olunmaması.
- Müxtəlif fikirlərin və mövzuların əlaqəsinin aydın göstərilməməsi.

Nəticədə, məqalənin ümumi axarı pozulur, oxucu fikirləri rahat qavramaq və onları izləməkdə çətinlik çəkir. Bu, məqalənin ümumi strukturunun zəif olmasına və elmi dəyərinin aşağı düşməsinə gətirib çıxarır.

Müxtəlif bölmələr arasında əlaqənin zəif olması. Akademik yazının effektivliyi üçün müxtəlif bölmələr və hissələr arasında əlaqənin düzgün qurulması vacibdir. Tədris zamanı tələbələr çox vaxt müxtəlif bölmələr arasında əlaqəni və keçidləri düzgün təşkil edə bilmirlər:

- Bölmələr və paraqraflar arasında məntiqi və struktur əlaqəsinin qurulmaması.
- Mövzunun müxtəlif aspektlərinin əlaqələndirilməməsi, nəticədə isə məqalənin ümumi koherentliyi zəifləyir.
- Keçid ifadələrinin və əlaqələndirici sözlərin istifadə edilməməsi və ya düzgün olmayan formada istifadəsi.

Bu isə, ümumi yazının axıcılığını və anlaşılırlığını azaldır, oxucunun diqqətini yayındırır və yazının elmi dəyərini aşağı salır.

Akademik yazı prosesində tələbələrin ən çox rastlaşdıqları digər problemlərə aşağıdakılar daxildir:

Qrammatik və leksik səhvlər. Akademik yazı zamanı tələbələr arasında qrammatik və leksik səhvlər çox yayılmışdır və bu, mətnin ümumi keyfiyyətinə mənfi təsir göstərir. Qrammatik səhvlər arasında cümlənin düzgün qurulmaması, fel və isim formalarının uyğunsuzluğu, çox vaxt sözlərin düzgün sırasının pozulması və cümlənin məntiqi axarının pozulması yer alır. Leksik səhvlər isə sözlərin düzgün seçilməməsi və ya yanlış istifadəsindən ibarətdir. Məsələn, elmi terminlərin səhv və ya qeyri-dəqiq istifadəsi, sinonimlərin düzgün seçilməməsi və ya terminlərin kontekstdən kənar istifadəsi kimi nüanslar akademik yazının keyfiyyətini azaldır və oxucu üçün anlaşıqlılığı çətinləşdirir.

Cümlələrin düzgün qurulmaması və əlaqəsiz ifadələr. Akademik yazıda cümlələrin düzgün qurulması və məntiqi əlaqənin qorunması çox vacibdir. Əks halda, mətnin axıcılığı pozulur və oxucu üçün anlaşılmazlıq yaranır. Bəzən cümlələr çox uzun və mürəkkəb olur, ya da qısa və qeyri-dəqiq ifadələrlə yazılır. Əlaqəsiz ifadələr və ya mənasız cümlələr isə mətnin ümumi strukturunu zəiflədir və fikrin düzgün çatdırılmasına mane olur. Məsələn, bir fikri açıq və aydın ifadə etmək üçün cümlələr arasında uyğun bağlantılar və keçidlər olmalıdır. Əks halda, mətnin məntiqi ardıcıllığı pozulur və oxucu üçün məntiqi əlaqənin qırılması ilə nəticələnir.

Səhv zaman və şəxs forması istifadəsi. Akademik yazıda zaman və şəxs formalarının düzgün seçilməsi çox önəmlidir. Əgər zaman və şəxs forması düzgün istifadə olunmasa, bu, yazının anlaşılmasını çətinləşdirir və ya yanlış anlamalara yol açır. Məsələn, keçmiş və indiki zamanların qarışdırılması, cümlənin düzgün qurulmasına mane olur. Eyni zamanda, şəxslərin (birinci, ikinci, üçüncü şəxs) düzgün istifadəsi də vacibdir. Bu, xüsusən, elmi məqalələr və ya hesabatlarda daimi və ardıcıl şəkildə qorunmalıdır. Səhv zaman və şəxs forması istifadə edildikdə, mətnin elmi dəyəri azala bilər və ya oxucu tərəfindən yanlış anlaşılma riski artar.

Əlavə və ya əskik sözlər. Əlavə və ya əskik sözlər də akademik yazıda rast gəlinən problemlərdəndir. Əlavə sözlər cümlənin mənasını dəyişə və ya qəlizləşdirə və oxucu üçün anlaşılmazlıq yarada bilər. Əskik və ya çatışmayan sözlər isə cümlənin düzgün qurulmamasına və mənanın tam çatdırılmamasına səbəb olur. Bu, xüsusən, mürəkkəb cümlələrdə və ya çoxsaylı terminlərin işlədiyi mətnlərdə daha çox nəzərə çarpır. Məsələn, cümlədə əsas fikrin ifadə olunması üçün lazım olan predikat və ya obyektin olmaması, cümlənin mənasını pozur və elmi dəyərini azaldır.

Terminlərin və elmi ifadələrin qeyri-dəqiq istifadəsi. Ən vacib məsələlərdən biri də terminlərin və elmi ifadələrin düzgün və dəqiq istifadəsidir. Terminlərin səhv və ya qeyri-dəqiq istifadəsi, elmi əsərin elmi dəyərini azaldır və oxucunun anlayışını çətinləşdirir. Məsələn, elmi sahədə xüsusi mənaya malik olan terminlərin yanlış istifadə olunması və ya kontekstdən kənar istifadəsi elmi mətnin keyfiyyətini aşağı salır. Həmçinin, bəzi hallarda yanlış terminlər və ya qeyri-dəqiq ifadələrdən istifadə edildikdə, elmi məlumatların doğruluğu şübhə altına düşür və mətnin elmi ciddiliyi zəifləyir. Bu səbəbdən, terminologiyanın düzgün və dəqiq istifadəsinə xüsusi diqqət yetirilməlidir.

Mənbələrin istinad və sitatların düzgün verilməməsi. Tələbələr çox vaxt mənbələrə düzgün istinad və sitat gətirmirlər və ya bu prosedurları yanlış yerinə yetirirlər. Bu, akademik dürüstlük və elmi düzgünlük prinsiplərinə ziddir və məqalənin və ya işin etibarını azaldır. Səhvlər, məsələn, mənbənin düzgün qeyd olunmaması və ya sitatların tam və düzgün verilməməsi, müəllif hüquqlarını pozmaq və plagiat riskini artırmaqla yanaşı, akademik nüfuzun zədələnməsinə səbəb olur.

Qeyd etdiyimiz kimi, İngilis dilində akademik yazı bacarığının formalaşdırılması və inkişafı təhsil prosesində mühüm yer tutur. Gördüyümüz kimi, tələbələrin bu sahədə qarşılaşdıqları çətinliklər müxtəlif amillərdən qaynaqlanır və onları aradan qaldırmaq üçün müəllimlərin fəal və məqsədyönlü fəaliyyəti vacibdir. Müəllimlərin ingilis dilində akademik yazının tədrisində tələbələrin qarşılaşdığı əsas çətinlikləri aradan qaldırmaq üçün üzərinə düşən vəzifələr aşağıdakılardan ibarətdir:

1. Dil və üslub çətinliklərinin aradan qaldırılması:

Əsas dil qaydalarının və qrammatikasının gücləndirilməsi. Tələbələr çox vaxt akademik yazılarda düzgün dil və üslubdan istifadə etməkdə çətinlik çəkirlər. Bu, xüsusən də dil bacarıqları zəif olan tələbələr üçün aktualdır. Tələbələrin akademik yazıda düzgün və aydın ifadə tərzini mənimsəmələri üçün dil və qrammatika qaydalarını dərindən öyrənmələri vacibdir. Müəllimlərin bu sahədə vəzifəsi, tələbələrə düzgün qrammatika, söz seçimi və formal üslubun əsaslarını öyrətmək, nümunə və təlimatlarla onların bacarıqlarını inkişaf etdirməkdir. Bu məqsədlə, xüsusi dil və qrammatika dərsləri təşkil edilə və ya mövcud dərslərdə bu mövzuya diqqət artırıla bilər. Bu dərslərdə tələbələrə cümlə quruluşları, söz birləşmələri, düzgün növlər və zaman formaları kimi əsas qaydalar izah olunmalı və praktiki tapşırıqlar vasitəsilə möhkəmləndirilə bilər.

Üslub və tərz üzrə təlimlər. Akademik yazıda düzgün və rəsmi üslubun seçilməsi çox önəmlidir. Bu səbəbdən, tələbələrə müxtəlif üslub nümunələri göstərilməli və onların üstünlükləri ilə tanış edilməlidir. Üslub və tərz üzərində təlimlər vasitəsilə tələbələrə öz fikirlərini rəsmi və elmi tərzdə ifadə etmə bacarığı qazandırılır. Məsələn, “söz seçimi”, “cümlə uzunluğu və mürəkkəbliyi”, “qoşma və bağlama ifadələri” kimi mövzular üzərində çalışmaq faydalıdır.

Nümunə və təcrübə əsaslı tədris. Tələbələrə nümunə mətnlər təqdim edilərək, onların dil və üslub xüsusiyyətlərini analiz etmələri və təkrarlamaları təmin edilə bilər. Bu, onların düzgün ifadə tərzini mənimsəməsinə kömək edir. Həmçinin, tələbələrin öz yazdıqları mətnlər üzərində redaktə və təkmilləşdirmə məşqləri təşkil edilməli, müəllim və ya təcrübəli tələbələr tərəfindən geribildirimlər verilərək düzgünlük və aydınlıq təmin edilməlidir.

Yazı təcrübəsinin artırılması və müntəzəm praktika. Akademik yazıda dil və üslubun yaxşılaşması üçün müntəzəm və davamlı praktika çox önəmlidir. Tələbələrə müxtəlif mövzularda yazı tapşırıqları verilməli və onları mütəmadi şəkildə yerinə yetirməyə təşviq edilməlidir. Bu zaman, yazıların üzərində xüsusi diqqətlə işlənərək, dil və üslub səhvləri üzə çıxarılıb düzəldilməlidir.

2. Akademik Mətnlərin Strukturu və Planlaşdırılması.

a) Müəyyənləşmiş və aydın planın hazırlanması. Çox sayda tələbə üçün ən böyük çətinliklərdən biri mətnin düzgün və ardıcıl strukturunun yaradılmasında olur. Bu problemi həll etmək üçün:

- Əvvəlcədən planlaşdırma və xəritəçəkmə: Yazıya başlamazdan əvvəl mövzunun əsas ideyalarını və alt başlıqları qeyd etmək və onları məntiqi ardıcıllıqla sıralamaq vacibdir. Bu, mətnin ümumi strukturunu və məqsədini aydınlaşdırır.
- Başlanğıc, inkişaf və nəticə bölmələrinin müəyyənləşdirilməsi: Hər akademik mətnin giriş, inkişaf və yekun bölmələri olmalıdır. Girişdə mövzu və məqsəd, inkişaf hissəsində əsas arqumentlər və sübutlar, yekunda isə ümumi nəticə və tövsiyələr verilir.

Müəllimlər, tələbələrin fikirlərini aydın və məntiqli şəkildə ifadə edə bilmələri üçün, məqalənin giriş, əsas və nəticə hissələrinin düzgün təşkilinə diqqət yetirməlidir. Bu məqsədlə, struktur nümunələri və planlaşdırma metodları tətbiq olunmalı, tələbələrə müntəzəm məşqlər və təlimatlar verilərək, onların planlaşdırma bacarıqları inkişaf etdirilməlidir.

b) Struktur elementlərinin və məntiqi əlaqələrin başa düşülməsi. Tələbələr üçün aşağıdakı üsullar faydalı ola bilər:

- Nümunəvi mətnlərin incələnməsi: Əvvəlcədən yazılmış akademik mətnlər üzərində işləyərək struktur elementlərinin necə qurulduğunu öyrənmək.
- Əsas və yan fikirlərin ayırd edilməsi: Hər bölmədə əsas fikrin və onu dəstəkləyən arqumentlərin aydın şəkildə qeyd olunması.
- Keçid ifadələrindən istifadə: Fikirlər arasında əlaqəni gücləndirmək və mətnin axıcılığını təmin etmək üçün uyğun keçid ifadələrindən istifadə etmək.

c) Tələblərə uyğun mətn planının hazırlanması və tətbiqi. Tələbələr üçün:

- Yazı planını yazmaq və ona əməl etmək: Yazmağa başlamazdan əvvəl planı çəkmək və yazı prosesində ona sadiq qalmaq lazımdır.
- Planın yenidən gözdən keçirilməsi və təkmilləşdirilməsi: Yazıdan sonra planı yenidən nəzərdən keçirmək və lazım gəldikdə dəyişikliklər etmək.

d) Praktik məşğələlər və təcrübə.

- İcmal və analitik tapşırıqların yerinə yetirilməsi: Müxtəlif akademik mətn nümunələrini analiz etmək və öz planlarını hazırlamaq.
- Müəllim və ya məsləhətçi ilə məsləhətləşmələr: Yazı prosesində nəzəri və praktiki dəstək almaq üçün müntəzəm olaraq müəllimlə və ya mütəxəssis ilə təlimlər keçmək.

e) Özünütəhlil və geribildirim.

- Yazılan mətnə öz-özünü və ya başqalarının rəyini almaq: Bu, struktur və planın düzgünlüyünü və məntiqinin aydınlığını yoxlamağa kömək edir.
- Düzəliş və təkmilləşdirmələr: Rəy və öz-özünə təhlil əsasında mətnin çatışmazlıqlarını aradan qaldırmaq və strukturunu gücləndirmək.

Beləliklə, İngilis dilində akademik yazının tədrisi tələbələrin xarici dil biliklərinin və akademik kommunikasiya bacarıqlarının inkişafında mühüm rol oynayır. Lakin, bu sahədə müxtəlif çətinliklər və maneələr ilə üzləşən tələbələr üçün effektiv tədris metodlarının və dəstək mexanizmlərinin tətbiqi vacibdir. Əldə olunan tədqiqatlar və müşahidələr göstərir ki, tələbələrin ən çox qarşılaşdıqları çətinliklər arasında dil səviyyəsinin aşağı olması, akademik yazının spesifik strukturlarına və üslubuna yiyələnməməsi, leksik və qrammatik səhvlər, eləcə də mövzunu düzgün ifadə edə bilməmək kimi problemlər yer alır.

Bununla yanaşı, tələbələrin qarşılaşdıqları digər çətinliklər arasında vaxtın idarə olunması, tədqiqat və məlumatların düzgün toplanması və analizi, eləcə də akademik etik və sitat vermə qaydalarını düzgün tətbiq etmə zəifliyi qeyd olunur. Bu maneələr, tədris prosesində tələbələrin motivasiyasını azalda və onların akademik uğurlarını mənfi təsir edə bilər.

Bu problemlərin aradan qaldırılması üçün bir sıra effektiv yollar və strategiyalar təklif olunur. Bunlar arasında dil bacarıqlarının gücləndirilməsi üçün xüsusi hazırlıq kurslarının keçirilməsi, akademik yazı ilə bağlı nümunə və təlimatların təqdim olunması, interaktiv və praktiki məşğələlərin təşkili, müəllim və tədqiqatçıların dəstək və məsləhətlərinin artırılması yer alır. Eyni zamanda, texnoloji vasitələrin və müasir tədris metodlarının tətbiqi, tələbələrin özünütəhlil və özünüinkişaf imkanlarının genişləndirilməsi də müsbət nəticələr verə bilər.

Nəticə olaraq, ingilis dilində akademik yazının tədrisində qarşılaşılan çətinliklərin öhdəsindən gəlmək üçün təkcə tədris metodlarının və proqramlarının yenilənməsi kifayət deyil, həmçinin tələbələrin motivasiyasını artırmaq və onlara davamlı dəstək göstərmək vacibdir. Bu yanaşmaların tətbiqi ilə akademik yazının keyfiyyətini artırmaq və tələbələrin elmi və akademik səviyyəsini yüksəltmək mümkündür.

Pedagogical Sciences

The Integration of Artificial Intelligence into Secondary School English Curricula: Implications and Challenges for the Development of Critical Thinking Skills

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Abstract

This article explores the integration of Artificial Intelligence (AI) tools in secondary school English language instruction, with a specific focus on how such technologies affect the development of students' critical thinking skills. Drawing on recent educational trends in Kazakhstan and internationally, the paper analyzes both the pedagogical opportunities and the challenges posed by AI in fostering independent analysis, interpretation, and reflective thinking in the English classroom. The article concludes with recommendations for curriculum design, teacher training, and ethical use of AI to ensure that critical thinking remains central to language education.

Keywords: Artificial Intelligence, Secondary Education, English Language Teaching, Critical Thinking, AI in Classrooms, Educational Technology, Kazakhstan, Curriculum Integration, Pedagogy, Digital Literacy

Introduction

The rapid development of artificial intelligence (AI) has begun to reshape traditional classroom instruction, particularly in language education. In Kazakhstan, secondary school English teachers are increasingly experimenting with AI-powered applications such as automated writing feedback tools, chatbots for conversational practice, and content generation platforms like ChatGPT. While these tools offer exciting new possibilities for personalized learning and classroom efficiency, there is growing concern about their long-term impact on students' critical thinking abilities.

This article examines how AI is being integrated into English language teaching at the secondary level and asks: does it truly support the development of students' critical thinking skills, or does it risk replacing cognitive effort with technological shortcuts?

The Role of Critical Thinking in English Language Education

Critical thinking is a foundational skill in modern education. In English language learning, it involves the ability to:

- Interpret and analyze texts;
- Evaluate arguments;
- Formulate coherent opinions;
- Reflect on language use and meaning.

These skills are essential not only for academic success but also for personal, social, and professional development. The English classroom has traditionally been a space for encouraging debate, creative writing, and argumentation—activities that inherently demand critical engagement.

AI Tools in the Secondary English Classroom

In Kazakhstani secondary schools and globally, teachers and students are using a variety of AI tools in English lessons:

- Grammarly, QuillBot, and other grammar/style checkers to improve writing;
- ChatGPT and other language models to brainstorm essay ideas or generate sample responses;
- Automated essay grading tools to provide instant feedback;
- AI-powered reading platforms that adapt difficulty levels based on student performance.

These technologies can potentially enhance learning experiences, but their impact depends on how they are implemented.

Opportunities for Critical Thinking Development

1. Encouraging Reflective Writing: AI feedback tools can prompt students to reflect on grammar, tone, and clarity, encouraging metacognitive awareness of their writing process.
2. Stimulating Inquiry-Based Learning: Students can use AI chatbots to explore different interpretations of texts or generate discussion questions, fostering deeper engagement with content.
3. Supporting Differentiated Instruction: AI platforms can tailor tasks to student ability levels, allowing teachers to focus on higher-order thinking activities with advanced learners.
4. Promoting Teacher Innovation: AI may free teachers from routine tasks (e.g., grading) so they can design more creative, analytical lesson activities that challenge students intellectually.

Challenges and Risks

1. Over-Reliance on AI Outputs: Students may copy AI-generated text without understanding or questioning it, weakening their ability to think independently.
2. Reduced Engagement with Complex Tasks: If students depend on AI to generate ideas or structure essays, they may avoid the cognitive struggle that develops critical thinking.
3. Teacher Preparedness: Many teachers lack formal training in using AI tools pedagogically. Without proper guidance, AI may be misused or underutilized.
4. Assessment Issues: Traditional assessment systems may fail to distinguish between student-authored and AI-generated content, complicating the evaluation of critical thinking skills.

The Kazakhstani Context

In Kazakhstan, AI integration into English curricula is still at an early stage. Urban schools and private institutions are leading the way in using AI-assisted tools. However, rural schools face challenges related to digital infrastructure and teacher readiness.

The Ministry of Education has yet to release specific guidelines on AI use in language learning. As a result, the responsibility of ensuring that AI supports rather than replaces critical thinking lies largely with individual teachers.

Recommendations

To effectively integrate AI into English language curricula while promoting critical thinking, the following steps are recommended:

- Teacher Training: Include AI literacy and ethics in teacher professional development programs.
- Curriculum Development: Embed AI-related tasks that require critical analysis, such as comparing human-written and AI-written texts.
- Assessment Reform: Adopt assessment models that emphasize reasoning, originality, and argumentation.

- Student Awareness: Teach students how to critically evaluate AI outputs and use them as tools—not answers.

Conclusion

The integration of artificial intelligence into secondary school English curricula presents both significant opportunities and serious challenges for the development of critical thinking skills. While AI can support personalized learning and reflective writing, it can also undermine independent thought if misapplied. For Kazakhstan and beyond, the key lies in intentional, pedagogically grounded use of AI—empowering teachers to guide students in becoming not only proficient language users but also thoughtful, critical thinkers.

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Generative AI as a Tool in Language Teaching

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Abstract

The public release of ChatGPT by OpenAI in November 2022, and the subsequent release of a plethora of generative artificial intelligence (GenAI) tools by different technology companies, has led to intense wonder, surprise, excitement, concern, and worry about their capabilities (Moorhouse, 2024). These tools offer the potential to assist language teachers in helping their learners achieve their language learning goals, and, at the same time, risk disrupting language teaching and learning processes, the teaching profession, and possibly the instrumental needs to learn foreign languages (Jeon & Lee, 2023; Moorhouse & Kohnke, 2024).
KEY WORDS: artificial intelligence, language teachers, digital competence, GenAI tools.

We believe that teachers are essential to effective and holistic learning, and they will not be replaced by artificial intelligence (AI), however, AI could help augment their abilities and intelligence. It is important for language teachers to develop the knowledge and skills associated with using GenAI to help their learners navigate the GenAI-infused world but also become critically informed about the ethical and social issues associated with these tools' development. To do this, teachers should model ethical, legal, and safe ways to use GenAI (Hockly, 2023) and help learners think critically about how AI shapes and changes society. At the same time, it is imperative that language teachers can distinguish between the 'hype'surrounding these tools, and evidence-informed professional use of GenAI. This allows language teachers to have greater agency in their use of GenAI tools with thoughtful consideration for how GenAI may shape language teaching. Although language teachers' digital competencies and confidence in using technology have increased since the Covid-19 pandemic, which forced teachers to use technology to mediate teaching and learning (Lee & Jeon, 2024; Moorhouse, 2023), the complex and diverse uses of GenAI tools necessitate unique competencies (Ng et al., 2023).

This Element is centred around the idea that language teachers need new and specific skills and knowledge to use GenAI in their professional practices.We argue that these tools are so different from previous technological advancements that developing these skills and knowledge are essential to the profession. Although there are various frameworks that can be used to help conceptualise the competencies needed to use technology (e.g., technological pedagogical content knowledge), in this Element, we have adapted professional digital competence (Instefjord & Munthe, 2017). Professional digital competence conceptualises that different professions utilise technology differently in their professional practices, and, therefore, the knowledge and skills needed to use technology are different. For example, a doctor and a language teacher will use different technologies or even the same technologies in different ways than each other as part of their professional practices. Yet, both need a level of digital competence to effectively engage in their professional tasks and be considered professionally competent. Equally, GenAI is affecting each profession differently. A doctor may need to understand and apply the use of AI in medical diagnostic processes. In contrast, a language teacher may need to guide students in how to use GenAI tools to engage in language practice activities. Therefore, in this Element, we adopt five aspects of a newly conceptualised construct, 'professional-GenAI-competence' (P-GenAI-C), to conceptualise the knowledge and skills needed by language teachers in the GenAI world. The aim is that by engaging with this Element, language teachers can develop these five aspects and, therefore, be able to implement GenAI tools effectively and responsibly into their professional practices. The five aspects are:

1. GenAI technological proficiency: Technological proficiency is concerned with teachers' awareness of a variety of GenAI tools, including their functions, uses, and affordances.

2. Pedagogical compatibility of GenAI in English language teaching (PC): PC refers to teachers' use of GenAI tools to supplement and enhance their students' English language learning, including using GenAI tools to help them achieve their learning objectives.

3. Teachers' professional work: Professional work is concerned with the use of GenAI tools in teachers' professional work outside of the classroom, including grading and giving feedback, communicating with stakeholders, and school administration.

4. Risk, well-being, and the ethical use of GenAI (EU): EU refers to teachers' awareness of the risks associated with using AI, the effects that GenAI tools may have on teacher and learner well-being, and the ethical issues pertaining to the use of GenAI tools.

5. Preparation of students for a GenAI world: Preparation of students relates to a teacher's abilities to prepare their students with the knowledge and skills needed to critically and productively engage in GenAI tools in their learning, recreation time, and future work.

It can be concluded that Generative Artificial Intelligence (GenAI) has transformative potential in language teaching. It contrasts GenAI tools, such as large language models (LLMs) like ChatGPT, with traditional rule-based AI tools. Unlike earlier AI systems, GenAI leverages deep learning and extensive datasets to generate diverse content, from text and images to audio and video, in response to user prompts. GenAI tools include: AI chatbots, visual/audio/video generators, and tools with embedded GenAI functions. It possesses adaptability, speed, and evolving capabilities while raising questions about their impact and ethical considerations in educational contexts.

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Medical Sciences

ТКАНЕВАЯ ЭОЗИНОФИЛИЯ КАК КОМПОНЕНТ ПРОТИВООПУХОЛЕВОГО ИММУННОГО ОТВЕТА ПРИ МЕЛАНОМЕ КОЖИ

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АННОТАЦИЯ

Меланома кожи является одним из наиболее иммуногенных и агрессивных злокачественных новообразований, характеризующееся высокой метастатической активностью и резистентностью к традиционным схемам терапии. В этом контексте особый научный интерес представляет тканевая эозинофилия – накопление в тканях опухоли эозинофильных гранулоцитов, обычно рассматриваемых преимущественно в качестве медиаторов и эффекторов аллергических и антипаразитарных реакций. Инфильтрация эозинофильными гранулоцитами, выявленная в биопсийных гистологических препаратах, ассоциируется с благоприятным прогнозом, повышенной чувствительностью к иммунотерапии и увеличением выживаемости пациентов. Соответственно, данный феномен представляет собой важное функциональное звено врождённого и адаптивного иммунного ответа при меланоме кожи. Материал данной статьи рассматривает некоторые механизмы развития тканевой эозинофилии при меланоме кожи, участие эозинофильных гранулоцитов в данном типе противоопухолевого иммунитета, а также возможность использования указанных механизмов в терапии меланомы.

Ключевые слова: меланома кожи, эозинофильные гранулоциты, противоопухолевый иммунитет.

В биопсийном материале тканей меланомы достаточно часто выявляется значительная инфильтрация эозинофильными гранулоцитами, проявляющаяся перитуморальными и интратуморальными скоплениями клеток с двудольным ядром и яркой эозинофильной зернистостью в цитоплазме. При окрашивании материала гематоксилин – эозином, хромотропом 2Р, азур-II-эозином по Гимзе они отчетливо видны в строме опухоли, особенно вокруг сосудов и зон некроза. Иммуногистохимическое определение функциональных белков эозинофилов, в частности – эозинофильного катионного белка, подтверждает их функционально активное состояние и локализацию в пределах опухоли [1]. Секреция активных медиаторов, включая ECP, MBP, EDN [2], пероксидазу, гранзимы и цитокины (IL-12, IFN-γ), а также экспрессия рецепторов, таких как NKG2D, способствуют прямой цитотоксичности по отношению к меланоцитам и модуляции противоопухолевой микросреды [3].

Тканевая эозинофилия, выявляемая патогистологически, часто ассоциируется с интегрированной иммунной реакцией: эозинофилы нередко выявляются вместе с $CD8^+$ Т-лимфоцитами, макрофагами и дендритными клетками, формируя сочетанную воспалительную инфильтрацию. В ряде клинических наблюдений и ретроспективных исследований повышенная плотность эозинофильных клеток, особенно активных (ECP^+), в первичной опухоли или метастазах позитивно коррелировала с увеличением времени без прогрессирования (PFS) и общей выживаемостью [4, 5], особенно у пациентов при терапии ингибиторами контрольных точек [6].

Особый интерес представляют молекулярные и сигнальные каскады, регулирующие миграцию эозинофилов в ткани опухоли и их активацию. IL-5 и факторы хемотаксиса эозинофилов (особенно CCL11 и CCL24) способствуют их мобилизации из красного костного мозга и направленной миграции через кровь в опухолевые ткани [7, 8, 9]. Под действием IL-5, секретируемого активированными CD4+ Т-клетками, усиливается накопление эозинофилов в опухолевой ткани. Эозинофилы, в свою очередь, продуцируют сигнальные молекулы IFN-γ и TNF-α, которые активируют иммунную систему и усиливают противоопухолевую защиту [7]. Сигнальная CXCL9/CXCR3-ось играет ключевую роль в привлечении CD8+ цитотоксических Т-клеток в очаг опухоли, где, собственно, и происходит их взаимодействие с антиген-презентирующими клетками [10].

Следует заметить, что у отдельных пациентов эозинофильные гранулоциты в тканях меланомы могут обладать противоположным потенциалом – в одних случаях могут проявлять противоопухолевую активность, в других – напротив, способствовать росту опухоли. Последнее происходит, когда в организме преобладает так называемый Th2-тип иммунного ответа. В таких условиях эозинофилы могут привлекать особые клетки супрессорного типа (Treg) [11], которые подавляют активность иммунной системы, а также модифицировать активность макрофагов, переводя их в форму, способствующую росту опухоли [12]. Кроме того, они могут стимулировать образование новых сосудов (ангиогенез) с помощью фактора VEGF, улучшая, тем самым, питание опухоли. Поэтому, в каждом конкретном случае важно учитывать не только присутствие эозинофилов в тканях опухоли, но и активность общего иммунного окружения, поскольку от этого зависит выбор тактики лечения и прогноз.

По отношению к опухолевым клеткам меланомы эозинофильные гранулоциты проявляют прямую цитотоксичность за счёт выделения белков, содержащихся в гранулах, включая основной катионный белок, эозинофильную пероксидазу и гранзимы [13]. Эти вещества индуцируют апоптоз меланоцитов и лизис опухолевых клеток, что подтверждено клеточными исследованиями *in vitro* и *in vivo*, демонстрирующими снижение роста опухоли B16-F10 при активных эозинофилах [3].

Далее, эозинофилы осуществляют непрямую иммуностимуляцию, продуцируя TNF-α, IFN-γ и хемокины (CCL5, CXCL9, CXCL10), которые направляют цитотоксические $CD8^+$ Т-лимфоциты в опухолевую ткань, что коррелирует с увеличением числа $CD8^+$ Т-клеток в участках опухолевого микроокружения и повышенной выживаемостью пациентов [14]. Участвуя в модуляции микросреды, эозинофильные гранулоциты способствуют поляризации макрофагов в антиопухолевый М1-тип и ингибируют ангиогенез через снижение экспрессии VEGF/HIF-1α [14,15].

Выраженная активная инфильтрация эозинофилами тканей первичных меланом ассоциируется с увеличением времени без прогрессирования опухолевого роста у пациентов, особенно при сочетании с высоким уровнем $CD8^+$ Т-лимфоцитов [11].

Кроме того, возможна интеграция адаптивной терапии эозинофилами с методом ингибирования контрольных точек и/или лучевой терапией [16]. В доклинических моделях показано, что при радиотерапии [17] эозинофилы усиливают приток $CD8^+$-клеток и улучшают терапевтический эффект [6, 18]. Это обосновывает необходимость клинического изучения подходов, включающих IL-5 стимулированные эозинофилы или их генетически модифицированные аналоги, что создаёт перспективу комбинированной терапии с методом ингибирования контрольных точек для повышения противоопухолевой активности иммунитета [18].

Таким образом, тканевая эозинофилия при меланоме кожи представляет собой морфологически значимый компонент противоопухолевого иммунного ответа, который, в свою очередь, отражает активное вовлечение эозинофилов в регуляцию опухолевого микроокружения, иммунную цитотоксичность и межклеточные взаимодействия. Пространственно распределённая инфильтрация эозинофилами, преимущественно в периферических участках опухоли, свидетельствует о направленной миграции и функциональной активности данных клеток в зоне неоплазии.

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THYROID CANCER: MODERN DIAGNOSTIC AND CLINICAL STRATEGY

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Annotation: this scientific and analytical work presents modern world and local-regional data on incidence, mortality, lethality and five-year survival rate of such a common oncological pathology as thyroid cancer. The issues of etiology and pathogenesis, modern approaches and principles of complex diagnostics, prospects for improving treatment results, as well as the prognosis are covered in detail. The epidemiological characteristics of this pathology in our republic are given in the context of the regions of the country.

Key words: oncology, thyroid cancer, biomarkers, RNA, ultrasound examination, epidemiology, incidence, mortality, lethality, five-year survival rate, prognosis.

Thyroid cancer (TC) is a malignant tumor that develops from thyroid tissue. The following diagnostic criteria for TC are distinguished. Complaints about: enlargement of the gland; appearance of a tumor on the anterior and lateral surface of the neck; change in voice (with tumor growth into the recurrent nerve); rapid tumor growth; shortness of breath, feeling of lack of air (with tumor growth into the recurrent nerve, upper respiratory tract). Anamnesis: thyroid disease (hypothyroidism, euthyroidism, hyperthyroidism, thyroiditis); long-term use of antithyroid drugs; ionizing radiation; history of radiation therapy to the head and neck. Physical examination: 1) upon examination, neck deformity (uniform swelling on the anterior surface of the neck, asymmetry due to an increase in any part of the thyroid gland, an increase in regional lymph nodes); 2) palpation examination of the thyroid gland - the presence of a nodular formation in the thickness of the thyroid gland, dense consistency; 3) palpation examination of regional lymph nodes - dense consistency, painful, mobile, immobile, partially mobile.

Laboratory tests: cytological examination; histological examination. Immunohistochemical examination: TTF-1, determination of calcitonin, fine-needle aspiration biopsy. All patients diagnosed with medullary TC or a family history of medullary TC or multiple endocrine neoplasia syndrome type 2 are recommended to undergo genetic testing to determine the germline mutation rearranged during transfection (RET) in order to determine the prognosis of the disease.

Instrumental studies: 1) ultrasound examination of the thyroid gland (determines the structure of the gland and tumor, the presence of a nodular formation, cystic cavities, size, echogenicity); the protocol for ultrasound examination of the thyroid gland includes determining the size, localization, ultrasound characteristics of the tumor; suspicious signs are (assessed only in solid nodes or in solid areas of the nodes) hypoechoic solid structure; uneven, fuzzy or polycyclic contour; point hyperechoic inclusions (microcalcifications); predominance of the anteroposterior size of the node over the width ("higher/than/wider"); 2) ultrasound examination of the cervical, submandibular, supraclavicular, subclavian lymph nodes (the presence of enlarged lymph nodes, structure, echogenicity, size); The protocol for ultrasound examination of the thyroid gland and regional lymph nodes should include assessment of the following parameters: size (it is necessary to assess the diameter or anteroposterior size, and not the length; for all cervical lymph nodes, except for level II - the fascial cellular space of the neck (submandibular zone), the largest size is no more than 0.6 cm, for level II - no more than 0.8 cm); the ratio of the long and short axes; the presence / absence of the gate; cystic changes; point hyperechoic inclusions (microcalcifications); the nature of vascularization (gate or the entire lymph node); increased echogenicity of the lymph node (similarity to normal thyroid tissue); the most specific signs that allow us to suspect metastatic lesions of the lymph node are microcalcifications, a cystic component, peripheral vascularization, and similarity of the lymph node tissue to the thyroid gland; less specific signs are an increase in size, rounded contours, and the absence of a hilum; 3) computed tomography and/or magnetic resonance imaging of the soft tissues of the neck and mediastinum (with contrast - in the presence of invasion into the main vessels, with a retrosternal location), fine-needle aspiration biopsy from the tumor (allows us to determine tumor and non-tumor processes, the benign and malignant nature of the tumor); 4) skeletal scintigraphy (prescribed if bone metastases are suspected); 5) positron emission tomography, positron emission tomography/computed tomography of the whole body (performed to diagnose the prevalence of the tumor process or the progression of the disease, or to assess the dynamics of the effectiveness of specialized treatment) [1].

The thyroid or glandula thyroidea is an endocrine gland located in the neck below the larynx in front of the trachea in mammals. In humans, it has the shape of a butterfly. It consists of two lobes connected by a narrow bridge called the isthmus. Thyroid carcinoma or TC is a malignant tumor of the thyroid gland. It is the most common malignancy of the endocrine (hormonal) system, but is very rare, accounting for about 1% of all malignant tumors, however, it has been increasing in frequency in recent years. TC is a malignant tumor of the glandular tissue of the thyroid gland. There are different types of TC that arise from different cells in the thyroid gland. TC comprises several categories: (1) differentiated TC (DTC), including papillary (PTC), follicular (FTC), and Huerthle cell tumours, (2) medullary TC (MTC) and (3) anaplastic TC. The long-term survival rate of patients with differentiated TC is about 90%, whereas patients with poorly differentiated TC types show a long-term survival rate of below 10% due to their resistance to standard treatment options [2]. The latest Global Cancer Observatory survey from 2020 reports that TC is responsible for 586,000 cancer cases worldwide [3].

Horgan D. et al. in their work they say that TC is the most common malignancy of the endocrine system that affects the thyroid gland. It is usually treatable and, in most cases, curable. The central issues are how to improve knowledge on TC, to accurately identify cases at an early stage that can benefit from effective intervention, optimise therapy, and reduce the risk of overdiagnosis and unnecessary treatment. Our colleagues focus on the fact that the approach to TC needs a rethink to early and correct identification of patients and improve their patient journey and treatment outcomes, including improved quality of life. All patients should be referred to comprehensive cancer centres. Such an approach would instate an optimal patient management mitigating overdiagnosis and overtreatment and would improve access to biomarker testing, clinical trials, and appropriate systemic therapies for patients with advanced forms of TC. It would also help establish focused national expertise on rare TC cases, promote research, training, awareness, and facilitate international collaboration [4].

Treatment and molecular testing guidelines should be regularly updated at regional and national levels to facilitate the reimbursement and availability for the most effective diagnostics and therapies. In the most recent update of the clinical practice guidelines, ESMO highlights for the first time the need to test for actionable cancer alterations in TC. It is essential that national guidelines are coordinated with the European and international ones [5].

Quality comprehensive genomic testing should be incorporated in clinical practice (tissue or liquid samples) for all TC patients that can benefit from targeted therapies. In order to facilitate correct diagnosis, pathology practice, data collection and analysis, as well as communication with the treating physicians should be improved, with the provision of registers based on pathology. National cancer registries should distinguish specific diseases with standardised, quality-controlled systems, including details of case management and including long-term survival data. National and international data bases are needed not only for refractory TC, but for all types of TC. Thyroid gland examination practices in the asymptomatic general population need updating. With the rapid growth of big data analytics in genomics, imaging, and clinical outcomes, health systems should make it possible to generate a personalised, data-driven risk profile to customise therapy for individual patients, aiming for both long-term tumour control and manageable adverse effects [4].

Silva S.N. [6] notes that TC is not just a common type of cancer, it is the most frequently diagnosed endocrine malignancy worldwide. The etiology of TC is essentially multifactorial and radiation is the best documented risk factor related to the disease. However, many questions are still open and seeking clarification, especially regarding the genetic aspects of this pathology, with clear implications not only on a scientific basis of the disease, but foremost in clinical oncology. Thyroid gland tumours are a heterogeneous group of neoplasms that may arise from virtually any of the different cell types that are present in the thyroid gland. Although the malignant tumours are most frequently identified in thyroid follicular cells, it is clear that the molecular-genetic characterization is crucial and should be further explored to emphasize differences in tumour biological behaviours, aggressiveness, and disease prognostics. Papillary and follicular thyroid carcinomas (PTC and FTC, respectively) represent 85-90% and 5-10% of TC cases, respectively, arising from thyroid follicular cells. These tumour histotypes retain their morphologic features and are often referred to as DTC. However, the etiology of DTC is still unknown. Considerable progress has been made in the understanding of thyroid carcinogenesis, in part based on retrospective and prospective studies published worldwide in recent decades, but also in the development of high-throughput approaches and the availability of improved diagnostic methodologies that lead to early diagnosis. In fact, over the last few decades, the research in TC has highlighted the mutational landscape leading to better understanding of the molecular pathogenesis of DTC.

The hallmarks of cancer have been identified with several potential targets involved in gene expression deregulation, leading to the promotion of genetic instability and cancer development. The identification of genetic variants related to TC has been a long way, though it is crucial to identify possible potential biomarkers of susceptibility. Some genetic variants have been identified in specific subtypes, which are related to the increased risk to develop this malignancy, such as the BRAF V600E mutation in PTC patients with a more aggressive phenotype if telomerase reverse transcriptase gene promoter mutation coexists [7].

However, mutations in RET and Retrovirus Associated DNA Sequences genes have also been identified as biomarkers in TC patients.

Alongside with genetic variants, epigenetic events and alterations in the expression of microRNA (miRNA) and long noncoding RNA (lncRNA) may also, through modulation of gene expression, drive the aberrant activation of oncogenic signalling pathways and the downregulation of thyroid-specific genes, thus contributing to the development, progression, and dedifferentiation of TC [8].

Connected to this, the genetic instability inflicted in this malignancy, involving genetic and epigenetic alterations, might also compromise the treatment response. The standard treatment for TC patients consists of surgical resection accompanied by post-thyroidectomy radioiodine (RAI) adjuvant therapy. The radioiodine therapy relies on the ability of 131I to be preferentially taken up in normal or neoplastic thyroid follicular cells. Its accumulation induces high DNA damage, which leads to cytotoxicity. However, the ionizing radiation does not only affect tumour cells, but the lesions may also impair normal cells. The most common lesions induced by radiation are double-strand breaks, which are processed by enzymes involved in DNA repair pathways. The presence of genetic variants in these enzymes might impair the repair efficiency but also could influence the cytotoxic potential of RAI therapy, hence its efficacy in DTC treatment. The development of induced DNA damage approaches can help in the evaluation of the efficacy of therapeutics as it has been shown to be an important tool for establishing biomarkers of susceptibility. Although the most frequent variants identified in TC contribute to sporadic disease, about 5 to 15% of all diagnosed cases are familial (first degree relatives) in nonMTC, increasing to 25% in MTC cases. This adds to the clear existence of genetic predisposition factors related to this pathology Advances in molecular genetics and several candidate gene studies developed worldwide have linked the occurrence of this malignancy to some hereditary syndromes, some of which are related to germline mutations in RET genes [6].

Macvanin M.T. et al. [9] in their study note that after the metabolic syndrome and its components, thyroid disorders represent the most common endocrine disorders, with increasing prevalence in the last two decades. Thyroid dysfunctions are distinguished by hyperthyroidism, hypothyroidism, or inflammation (thyroiditis) of the thyroid gland, in addition to the presence of thyroid nodules that can be benign or malignant. TC is typically detected via an ultrasound fine-needle aspiration biopsy, cytological examination of the specimen and measurements of traditional biochemical markers, such as TSH, FT4, Tg, TgAb, and TPOAB. Novel RNA-based markers of thyroid neoplasms are identified by expression profiling of the thyroid gland tissue and/or blood samples of patients using high-throughput platforms for RNA analysis and identification, such as next-generation sequencing. Other emerging biomarkers of thyroid neoplasms are identified using flow cytometry, enzyme-linked immunosorbent assays, genetic tests, and immunohistological analyses. Due to the rapid advancement of high-throughput molecular biology techniques, it is now possible to identify new biomarkers for thyroid neoplasms that can supplement traditional imaging modalities in postoperative surveillance and aid in the preoperative cytology examination of indeterminate or follicular lesions. In conclusion, the authors draw attention to the fact that due to the rapid advancement of high-throughput molecular biology techniques, it is now possible to identify novel biomarkers for thyroid neoplasms that can supplement or replace existing biomarkers. Current circulating biomarkers, such as Tg or TgAb, are routinely used in postoperative monitoring; however, at the preoperative stage, they cannot distinguish between benign and malignant neoplasms or between low- and high-risk malignant lesions. Several new targets are emerging as potentially useful prognostic circulating biomarkers for TC. Evidence for miRNA, lncRNA and circular RNA (circRNA) dysregulation in several thyroid neoplasms and their potential use as sensitive diagnostic and prognostic biomarkers is particularly interesting. However, the data currently available in the literature is derived from small-scale clinical studies in specific patient cohorts. Thus, further validation is required to demonstrate their potential for clinical application. Large-scale studies are needed to confirm and validate novel biomarkers in the diagnosis, prognosis, and surveillance of thyroid neoplasms, such as miRNAs, lncRNAs, and circRNAs.

As they note in their work Saenko V., Mitsutake N. [10], radiation is an environmental factor that elevates the risk of developing TC. Actual and possible scenarios of exposures to external and internal radiation are multiple and diverse. In this case: 1) radiation is a risk factor for TC; the risk steadily increases up to the dose of 10 Gy, levels off in the 10- to 30-Gy interval, and asymptotically declines at higher doses but remains elevated; once exposed, the risk persists for many decades; 2) risks from the external and internal irradiation are comparable; 3) there is no evidence of dose-response departure from linearity at low doses (<0.1 Gy) and of the existence of a "safe" threshold dose; 4) the magnitude of radiation risk for TC is highest if exposure takes place at a young age; 5) after the Chornobyl nuclear reactor accident, due to internal exposure to radioactive iodine, a dramatic increase in the incidence of childhood TCs was observed, especially among children less than 5 years old at the time of the accident; 6) although many TCs were found by the thyroid-screening program after the Fukushima nuclear power plant accident, comparisons of exposures and characteristics of TC diagnosed after the Chornobyl and Fukushima nuclear accidents do not support a causative role of radiation in the latter; 7) reduction of the risk for TC may be achieved by following the As Low As Reasonably Achievable principle, and iodine thyroid blockage may be performed to protect from anticipated internal exposure. A substantial progress in understanding of radiation-related TC has been achieved since the discovery of this phenomenon about 60 years ago. Irradiation of the head, neck, and chest areas has been learned to increase the risk for developing thyroid malignancy during the lifespan. This stimulated numerous investigations in medical, industrial, and military settings whenever radiation exposure was relevant. Radiation risks have been quantified and found to be comparable for the external and internal radiation. According to this knowledge, certain groups at elevated risk could be determined, including those with medical, occupational, or emergency exposures. Now, the focus of radiation risk studies is shifting toward low-dose exposures in view of growing number of various radiological procedures, especially in pediatric patients. The markers of radiation-related TC have not been found so far. Overlaps in the histological types, oncogenic driver spectrums, and corresponding gene expression profiles between radiation-related and sporadic tumors suggest that these parameters were unlikely to serve as a marker. Clinical studies have demonstrated that TCs diagnosed in irradiated patients are of the same histological types as in nonirradiated patients and that disease prognosis is determined by tumor characteristics regardless of etiology. This is rather good news for clinicians to know that standard treatment and follow-up approaches could be used for radiation-exposed patients, but it is necessary to keep in mind that TC phenotype is changing with patient age and latency period.

Lukasiewicz M. et al. [11] emphasize that the etiology of TC is complex, and a variety of factors contribute to its development. Among these factors, disorders of lipid metabolism have emerged as a notable area of interest. Lipids, including fatty acids (FA), play a fundamental role in cell structure and function. Consequently, disturbances in lipid metabolism can have profound effects on various cellular processes, potentially favoring the development and progression of TC. Understanding the intricate relationship between lipid metabolism disorders and TC is of paramount importance as it may provide new insights into the prevention and treatment of this malignancy. TC is a neoplasm with an increasing incidence worldwide. Its etiology is complex and based on a multi-layered interplay of factors. Among these, disorders of lipid metabolism have emerged as an important area of investigation. Cancer cells are metabolically reprogrammed to promote their rapid growth, proliferation, and survival. This reprogramming is associated with significant changes at the level of lipids, mainly FA, as they play a critical role in maintaining cell structure, facilitating signaling pathways, and providing energy. These lipid-related changes help cancer cells meet the increased demands of continued growth and division while adapting to the tumor microenvironment. Recent scientific efforts have revealed disturbances in lipid homeostasis that are specific to TC, opening up potential avenues for early detection and targeted therapeutic interventions. Understanding the intricate metabolic pathways involved in FA metabolism may provide insights into potential interventions to prevent cancer progression and mitigate its effects on surrounding tissues.

Luzón-Toro B. et al. [12] emphasize in their publication that TC, a cancerous tumor or growth located within the thyroid gland, is the most common endocrine cancer. It is one of the few cancers whereby incidence rates have increased in recent years. It occurs in all age groups, from children through to seniors. Most studies are focused on dissecting its genetic basis, since our current knowledge of the genetic background of the different forms of TC is far from complete, which poses a challenge for diagnosis and prognosis of the disease. TC is the most common endocrine cancer, with an increasing overall incidence in recent decades of about two fold in the last 25 years and accounting for 2% of all cancers. TC is the sixth most common cancer in women, who are three times more likely to have TC than men. About 2% of cases occur in children and teens. Overall, the 5-year survival rate of TC is 98%. However, survival rates depend on many factors, such as the specific type of TC and stage of disease. TC is a disease induced by progressive genetic and epigenetic molecular abnormalities. Most studies describe several classical aberrations involved in the tumorigenesis and progression of this tumor, such as point mutations, gene copy number variations, and aberrant gene methylation. The genetic landscape of TC is growing rapidly. Therapies that are targeted at genetic mutations related to this tumor are being used in patient care and clinical trials. In comparison with traditional disease-specific trials, molecular allocation studies ("basket studies") are testing targeted therapies in patients whose tumors carry particular mutations, in spite of the tumor type or origin. These studies are more informative on anticancer therapies because they include a greater number of patients. The correlation of molecular profile (obtained by new sequencing technologies) with clinicopathological characteristics will lead to the development of novel precision therapies, reducing incidence and mortality in TC patients. In this sense, differential response to a mitogen-activated protein kinase inhibitor was found to be related to the thyroid cancer genotype. Molecular testing of mutation hotspots, rearrangements, and gene expression is now an effective diagnostic tool to better select patients for potential thyroid surgery. The authors note that the diagnosis and treatment of TC is nowadays influenced by the molecular characterization of TC types. The improvement of such techniques would help to reduce the amount of TC treatment needed and improve outcomes in patients with clinically aggressive forms of cancer.

Chen D.W. et al. [13] emphasize in their work that the past 5-10 years have brought in a new era in the care of patients with TC, with the introduction of transformative diagnostic and management options. Several international ultrasound-based thyroid nodule risk stratification systems have been developed with the goal of reducing unnecessary biopsies. Less invasive alternatives to surgery for low-risk TC, such as active surveillance and minimally invasive interventions, are being explored. New systemic therapies are now available for patients with advanced TC. However, in the setting of these advances, disparities exist in the diagnosis and management of TC. As new management options are becoming available for TC, it is essential to support population-based studies and randomised clinical trials that will inform evidence-based clinical practice guidelines on the management of TC, and to include diverse patient populations in research to better understand and subsequently address existing barriers to equitable TC care.

Now, regarding this pathology in our country at the republican level. The incidence of TC in the Republic of Kazakhstan in 2023 was 5.4 per 100 thousand population (4.8 in 2022) with a growth rate of 13.1% compared to the previous year, taking 3rd place together with connective and soft tissue tumors, second only to prostate cancer (16.7%) and laryngeal cancer (15.5%), and amounting to 1084 people in absolute numbers (939 cases a year earlier). The proportion of cases diagnosed for the first time in life, recorded by oncology organizations, was 2.9% (2.7% in 2022). In this case, 167 men fell ill (the proportion is 1.0%), women - 917 (the proportion is 4.4%) [14].

The TC rate above the national average was established in 9 regions of the country: North Kazakhstan - 12.6 (the maximum rate); East Kazakhstan - 10.6; Pavlodar - 8.5; the city of Astana - 8.2; the city of Almaty - 7.9; Kyzylorda - 7.6; Karaganda - 7.0; Akmola - 6.5; Abay - 5.9. This indicator is below the national average in 11 regions: Turkestan - 1.7 (the lowest rate); the city of Shymkent - 2.4; Atyrau - 2.6; Almaty - 3.0; West Kazakhstan - 3.8; Aktobe - 4.0; Zhambyl and Kostanay - 4.1; Ulytau - 4.5; Mangistau - 4.9; Zhetysu - 5.0 regions per 100 thousand population. Mortality from this pathology was 0.3 per 100 thousand population with an increase rate of 19.1% compared to the previous year, second only to non-melanoma skin cancer (26.0%).

The regions where the TC mortality rate is higher than the national average (0.3 per 100 thousand population) include: Abay - 1.0 (maximum level); Aktobe - 0.7; East Kazakhstan and Pavlodar - 0.5; Zhambyl, Karaganda, North Kazakhstan and the city of Almaty - 0.4. Zhetysu region and the city of Shymkent are on par with the national average. The lowest rates are noted in Atyrau and Ulytau - 0.0; Akmola, West Kazakhstan, Kostanay, Mangistau and Turkestan - 0.1; Almaty, Kyzylorda regions and the city of Astana - 0.2 per 100 thousand population [14].

One-year lethality was 2.3% (2.4% in 2022). At the same time, the ratio between one-year lethality and neglect (stage IV) was, as in 2022, 0.5, and this is the best indicator among all nosological forms of malignant tumors after prostate cancer (0.3). At the same time, we recall that the farthest from "1" is the worst ratio between one-year lethality and neglect.

Now, regarding preventive examinations. It should be noted that during large-scale preventive examinations of the population in 2023, significantly more patients with malignant neoplasms were actively identified than in 2022. This is 25,193 patients versus 23,623 patients identified in 2022, i.e. +6.6%. This is due to the further abatement of the epidemiological situation with coronavirus and the increased availability of preventive care for the population. The proportion of patients identified during routine examinations increased from 62.0% to 62.4% of the total number of patients identified over the year.

Of course, when analyzing the epidemiological situation, early diagnosis indicators are very important issues.

As for TC, the early detection of this pathology during routine examinations increased from 78.6% to 83.7%. The absolute number of TC patients identified during routine examinations was 900 people (732 a year earlier). At the same time, 849 are patients with early stages (in 2022 - 683 patients) [14].

In general, according to the amount of detected cases of cancer of all localizations, in 2023 the proportion of forms detected at early stages (0, I-II stages) increased from 66.3% to 67.9%. At the same time, detection at 0, I-II stages in TC increased from 93.3% to 94.3%. The regions where the proportion of patients with early stage I of the pathology in question is above the national average (71.5% and 2nd rank place among the best indicators after non-melanoma skin cancer) include the following regions: Kyzylorda - 85.9% (the best indicator); the city of Almaty - 84.8%; the city of Astana - 83.3%; North Kazakhstan - 80.0%; West Kazakhstan - 76.9%; Karaganda - 73.4%; Zhambyl - 72.0%; Almaty – 71.7%.

The lowest rates of early diagnosis were recorded in: East Kazakhstan - 50.6% (the worst rate); Atyrau and Turkestan - 55.6%; Mangistau - 56.8%; Zhetysu - 57.1%; Akmola - 58.8%; Aktobe - 59.5%; Ulytau - 60.0%; Kostanay - 60.6%; Abay - 65.7%; Pavlodar - 69.8% regions and in the city of Shymkent - 71.4%.

TC is in the top three in early diagnosis (stages I-II) - 92.4%. First place goes to non-melanoma skin cancer (98.4%), third - to lip cancer (90.7%). The regions where the proportion of patients with TC detected at stages I-II is above the national average (92.4% - 2nd rank place) include the following regions. The leaders are our two megacities - the city of Astana (98.2%) and the city of Almaty (97.1%). Next come: Kyzylorda - 96.9%; Zhambyl - 96.0%; Karaganda - 94.9%; Aktobe - 94.6%; Atyrau and Turkestan - 94.4%; East Kazakhstan - 93.5% regions and the city of

Shymkent (92.9%). Low rates of early diagnosis were recorded in Ulytau - 70.0% (the worst result in the country); Kostanay - 72.7%; Abay - 80.0%; Akmola - 80.4%; Zhetysu - 82.9%; North Kazakhstan - 90.8%; Almaty - 91.3%; Mangistau - 91.9%; Pavlodar - 92.1%; West Kazakhstan - 92.3% regions [14].

As is clearly seen from the above data, there is a very large spread in early diagnostic rates across the country, from very good to thought-provoking. Of course, it is necessary to take into account migration processes and other factors affecting early diagnostic rates, but nevertheless, the results obtained give reason not to stop there, both for oncologists and endocrinologists, ultrasound diagnostic doctors, otolaryngologists, and general practitioners, since improving early diagnostic rates of malignant tumors has remained one of the main postulates and one of the main tasks of medicine in general, and continues to be relevant today.

The proportion of stage IV TC among all nosological forms of malignant neoplasms was 3.9%, and this is the 4th rank place after tumors of the central nervous system (2.5%), lip cancer (0.9%) and non-melanoma skin cancer (0.4%). In general, in 2023, the share of stage IV malignant neoplasms in the republic for the sum of all nosologies decreased from 12.58 to 11.7% (from 4790 to 4735 patients). As for the average republican indicator of the share of stage IV (3.9%), Aktobe, Atyrau, West Kazakhstan regions and the city of Astana stand out against this background - 0.0%. Then come: the city of Almaty (0.6%); East Kazakhstan (1.3%); Turkestan (2.8%); Kyzylorda (3.1%) regions. Akmola region is on par with the average republican indicator. Lower indicators are in: Kostanay region, where every fifth patient with this visually accessible localization was detected in the terminal stage of the disease (21.2%). Next in line were: Abay - 14.3%, Ulytau - 10.0%, Zhetysu - 8.6%, the city of Shymkent - 7.1%; North Kazakhstan - 6.2%, Mangistau - 5.4%, Karaganda - 5.1%, Pavlodar - 4.8%, Almaty - 4.3% and Zhambyl - 4.0% regions.

The morphological verification rate of the disease in the country was 97.0%. In 13 regions out of 20 this figure is 100% (Abay, Aktobe, Almaty, Atyrau, East Kazakhstan, Zhambyl, West Kazakhstan, Karaganda, Mangistau, Pavlodar and Ulytau regions, as well as the cities of Astana and Shymkent. The lowest figure is in Kyzylorda region (68.8%). Further down the list are Zhetysu (88.6%), Kostanay (93.9%), Akmola (96.1%), Turkestan (97.2%), North Kazakhstan (98.5%) and the city of Almaty (98.8%) [14].

The total number of patients with malignant neoplasms registered with specialized oncology organizations of the republic continued to grow and by the end of 2023 amounted to 218,186 people, with an increase of 6.0% compared to the level of the previous year (2022 - 205,822, +5.8%). The overall incidence rate of malignant neoplasms increased by 3.9%, from 1055.3 to 1096.4 per 100 thousand people. The growth of this indicator is due to both the increase in the incidence and detection of pathology, and the increase in the survival rate of cancer patients. In addition, statistical data on patients diagnosed with malignant neoplasms, who have been under observation for 5 years or more, and continue to be observed in 2023, showed that the number of patients under observation by oncological organizations of Kazakhstan for over five years continued to grow and at the end of the reporting year amounted to 117,616 people, with an increase of 6.2% (2022 - 110,790 people, + 6.6%) (form No. 7).

One cannot ignore such an important clinical aspect as the coverage in the Republic of Kazakhstan of special treatment for patients diagnosed with TC for the first time in their lives. In 2023, the number of hospitalizations for all nosological forms of malignant tumors in oncological organizations of the country amounted to 108,252 cases (2022 - 101,095), with an increase of 7.1% compared to the previous year, which is associated with a constant increase in the number of cancer patients, improvement of the standardization of oncological care, and the development of palliative and restorative services. At the end of 2023, the absolute number of TC patients who completed specialized treatment amounted to 560 people, continuing treatment - 414 patients. In percentage terms, the following results were obtained by methods and types of treatment. The overwhelming majority - 90.4% of patients received surgical treatment only, complex - 3.8%, combined - 2.1%, only radiation - 0.4%, only drug - 0.2%.

Further, regarding the five-year survival rate of patients. As for TC, at the end of 2023, 9901 people or 49.8 per 100 thousand of the population were registered at the dispensary (at the end of 2022 - 9121 patients or 46.8 per 100 thousand of the population, respectively); and this is a high 7th rank place among all nosological forms of malignant neoplasms.

At the same time, the mortality rate of the observed contingents in 2023 was 0.6%, as in the previous year.

The five-year survival rate of patients with TC was 63.8% in 2023, while in 2022 it was 64.6% [14].

Summarizing the above, we can conclude that with TC, despite the fact that this localization is visually accessible, despite the increased effectiveness of preventive examinations and fairly high rates of early diagnosis, a high number of people with this pathology is noted annually, and the five-year survival rate does not reach 65%. The scarcity, variability and veiled nature of symptoms, their similarity with various non-core processes, leads to the neglect and progression of the disease, even during dispensary observation. All this requires both oncologists and, first of all, primary health care workers and, of course, endocrinologists, ultrasound diagnosticians, otolaryngologists to increase the level of oncological alertness, inform the population about early symptoms that may indicate this pathology or the onset of proliferative changes and conduct high-tech diagnostic measures, including for the purpose of differential diagnosis and, as a result, timely treatment. People from the risk group are recommended to visit specialized specialists annually and, if necessary, undergo an examination. An epidemiological assessment of the situation with TC in our country suggests that there are sometimes significant differences in the regions not only in incidence rates, but also in the parameters of early diagnosis and mortality from this pathology. In connection with the above, this pathology continues to be a serious problem of modern clinical oncology.

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Biological Sciences

Ақылды жылыжай-мектептегі STEM жобаларының үздік үлгісі

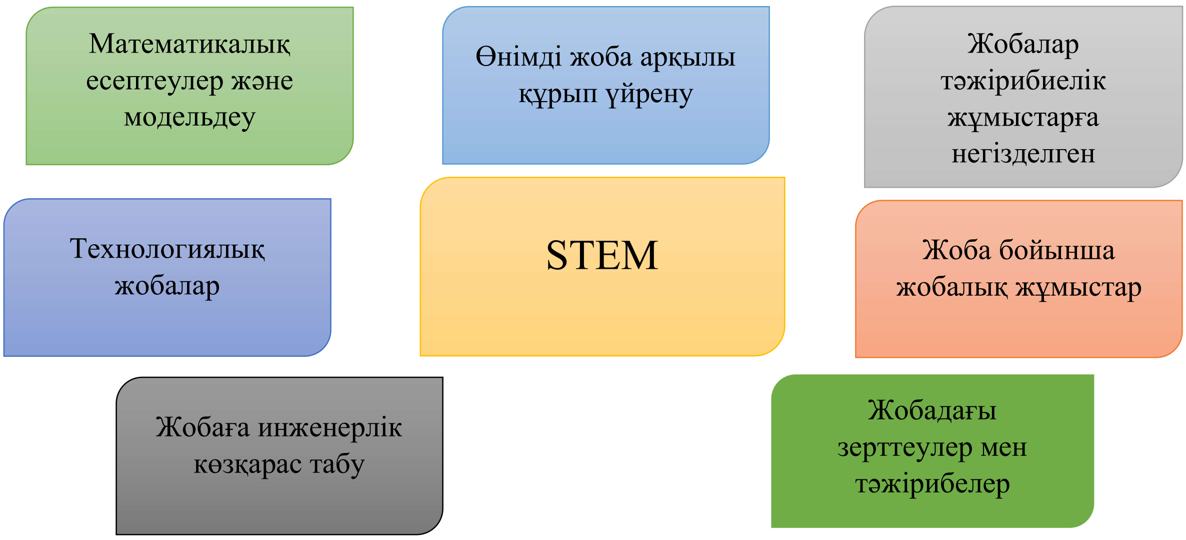
Қырғызбай Назерке Нұржауқызы Ошибка! Закладка не определена.
№201 мектеп-гимназиясының биология пәні мұғалімі

Аннотация. Бұл мақалада ақылды жылыжайлардың STEM (ғылым, технология, инженерия, математика) жобаларындағы маңызы қарастырылады. Ақылды жылыжайлар – экологиялық таза технологияларды қолдану арқылы өсімдіктерді тиімді өсіруге мүмкіндік беретін заманауи құрылымдар. Олар оқушыларға ғылыми және техникалық білім беру үдерісінде қолданылатын үздік үлгі ретінде ұсынылады. Ақылды жылыжайлар арқылы оқушылар бағдарламалау, инженерлік дағдылар, экология және математикалық модельдеу сияқты маңызды дағдыларды меңгереді. Жоба оқушыларды табиғатты қорғау, энергия тиімділігін арттыру және тұрақты даму мәселелерін шешуге бағыттайды. Мақалада ақылды жылыжайлардың құрылымы мен жұмыс принциптері, олардың білім беру процесіндегі рөлі, сондай-ақ болашақта жастардың ғылыми-зерттеу жұмыстары мен инновациялық шешімдер қабылдау дағдыларын дамытудағы маңыздылығы сипатталады.

Кілт сөздер: STEM технологиясы, инженерия, технология, сыни ойлау, инновация, кәсіпкерлік, жоба.

Кіріспе. Қоғамның қай саласы болмасын олардың дамуы білім мен ғылымға тікелей байланысты. XXI ғасырда ғылым мен техниканың жетістігі тоғысқан десе де қате болмайды, себебі, әлем елдері технологиялық революцияның төртінші толқынына куә болып отыр. Олардың ішіне технологиялық инновациялар, өнертабыстар, робототехника және жоғары ақпараттық технологиялар мен автоматтық жүйелер кіреді. [1]

STEM сөзін ашып қарастыратын болса, ағылшын тіліндегі «science, technology, engineering, mathematics» деген сөздерден алынған. Яғни, бұл бағыт бір мезгілде ғылым, технология, инженерия және математиканы біріктіреді және академиялық бағытта дамыту дегенді білдіреді.«STEM» ұғымын ең алғаш 1990 жылы америкалық бактериолог Р.Колвэлл ұсынған.



1-кесте. STEM технологиясының мәні

1-кесте бойынша STEM технологиясының мәнін түсіндіретін болса, бұл технология арқылы әр ғылымның бір-бірімен ұштасатынын байқауға болады, бұл технологияның мәні – бір пәнді екінші пәнмен біріктере отырып оқыту, бұл тәсіл балалардың өз бетінше ізденіп, білім алуына және сол білімін іс жүзінде жүзеге асыруына мүмкіндік береді. [2]

STEM білім беру жүйесі оқушыларды шығармашылық ойлау, проблемаларды шешу және жаңашылдыққа бағыттау арқылы олардың болашақта сұранысқа ие мамандықтарда жұмыс істей алуына мүмкіндік береді. Бұл сала қазіргі заманғы еңбек нарығының қажеттіліктеріне сай, бәсекеге қабілетті және инновациялық қоғамды құру үшін өте маңызды.

STEM технологиясы:

1. Ғылым – табиғаттағы құбылыстарды зерттеу, эксперименттер өткізу және ғылыми әдістерді қолдану.
2. Технология – ақпараттық жүйелер мен құрылғыларды дамыту, жаңа өнімдер мен қызметтерді жасап шығару.
3. Инженерия – конструкцияларды, құрылғыларды, жүйелерді жасау және оларды тиімді пайдалану.
4. Математика – деректерді талдау, модельдер құру, есептерді шешу және дәл шешімдер қабылдау үшін сандық әдістерді қолдану.[3]

STEM технологиясы — ғылым, технология, инженерия және математика салаларын біріктіріп оқытатын және зерттейтін кешенді білім беру жүйесі. Бұл сала жастарды болашақтың заманауи дағдыларына үйретуді мақсат етеді. STEM жүйесі әлемдегі көптеген елдерде жұмыс күшінің сапасын жақсарту, инновацияны арттыру және технологиялық дамуды қамтамасыз ету үшін маңызды роль атқарады.

STEM технологиясының ерекшеліктері:

1. Тақырыптарды біріктіру: STEM жүйесі әрбір пәнді бөлек оқытудың орнына, оларды бір-бірімен байланыстырып, біртұтас кешен ретінде қарастырады. Мысалы, математика мен инженерияны біріктіру арқылы студенттер нақты мәселелерді шешу дағдыларын меңгереді.
2. Шығармашылық және сыни ойлау: STEM білім беру жүйесі шығармашылықты және сыни ойлауды дамытуға ерекше назар аударады. Оқушылар тек теориялық білімді ғана емес, практикалық дағдыларды да меңгереді, бұл өз кезегінде оларды жаңа жағдайларда тиімді шешімдер қабылдауға ынталандырады.
3. Жобаға негізделген оқу: STEM оқыту тәсілінде студенттер нақты жобалар мен тапсырмалар орындау арқылы білім алады. Бұл оқушылардың нақты өмірде кездесетін мәселелерді шешуге қабілетті болуын қамтамасыз етеді.
4. Технологияға басымдық беру: STEM-дің басты ерекшелігі — бұл жаңа технологияларды пайдалану арқылы білім алудың тиімділігін арттыру. Оқушылар компьютерлік бағдарламалаудан бастап, робототехника мен жасанды интеллектке дейінгі түрлі технологияларды пайдалану дағдыларын меңгереді.
5. Инновация мен кәсіпкерлік: STEM бағытында оқыған жастар технологиялық жаңалықтарды енгізу, стартаптарды дамыту және өз идеяларын жүзеге асыру мүмкіндігін алады. Олар тек қолданушы болып қана қоймай, жаңа өнімдер мен қызметтерді жасауға қабілетті болады[4].

STEM және болашақ

Болашақта STEM технологиясы өте маңызды рөл атқарады деп күтілуде. Жаңа технологиялар мен инновациялар жылдам дамып келе жатқандықтан, STEM дағдыларына ие адамдарға сұраныс жоғары болады. Бұл мамандықтар әлемнің түрлі бөліктерінде жаңа жұмыс орындарын құруға және экономикалық өсімді қолдауға ықпал етеді.

Жалпы алғанда, STEM технологиясының мәні — бұл ғылыми-зерттеу, жаңашылдық және білім алуды жаңа деңгейге көтеретін жүйе. Ол оқушыларға болашақтың өзекті дағдыларын үйретуге, технологиялық және әлеуметтік мәселелерді шешуге көмектеседі, сондай-ақ бүкіл қоғамның дамуында маңызды рөл атқарады[5].

Материалдар мен әдістері. Биология пәнін оқытуда ақылды жылыжай-мектептегі STEM жобаларының үздік үлгісін жасауда қолданылатын теориялық әдістер: педагогикалық және ғылыми әдістерге шолу жасау, жүйелеу, салыстыру, сонымен қатар эмпирикалық әдістерге зерттеудің нәтижесін талдау мен түсіндіру жатады.

Биология пәні – жаратылыстану ғылымдарының ішіндегі ең маңыздысы. Бұл пән теория мен тәжірибеден тұрғандықтан, пәнді оқыту барысында оқушылардың теориялық алған білімін практикада қолдана алуына жағдай жасалуы тиіс[6]

Зерттеу нәтижелері. Биология пәнін оқытуда ақылды жылыжайдың жаңа моделін құру барысында зерттеу жұмысына 9-сынып оқушылары алынған болатын.

Мектептегі STEM жобаларының үздік үлгісі ретінде ақылды жылыжайлар мен жасыл технологиялар тақырыбындағы жобаларды айтуға болады. STEM (Science, Technology, Engineering, Mathematics) жобаларының басты мақсаты – оқушылардың ғылым, технология, инженерия және математика салаларындағы дағдыларын дамыту болып табылады. Ақылды жылыжайлар STEM жобаларына өте жақсы үйлеседі, себебі олар заманауи технологияларды, экологияны және инженерлік ойлауды біріктіреді[7].

Ақылды жылыжайлар – бұл ауыл шаруашылығы мен экологияны біріктіретін жобалар, олар оқушыларға жаңа технологияларды пайдалана отырып, табиғат пен қоғамның арасындағы тепе-теңдікті сақтау жолдарын үйретеді. STEM жобаларының ішінде ақылды жылыжайлар ерекше орын алады, себебі олар бірнеше ғылым мен техникалық салаларды біріктіреді: биология, экология, информатика, инженерия және математика.

Ақылды жылыжайлар заманауи технологияларды қолданудың нәтижесінде әртүрлі климаттық және экологиялық жағдайларда тиімді жұмыс істей алады. Әрбір ақылды жылыжай сенсорлармен жабдықталған, олар температураны, ылғалдылықты, топырақтың жағдайын және жарықты бақылап отырады. Бұл деректер автоматты түрде жүйеге енгізіледі, және олар негізінде өсімдіктердің ең жақсы өсу жағдайлары қамтамасыз етіледі. Осылайша, өсімдіктерге қажетті оңтайлы жағдайлар автоматты түрде сақталады, ал адам факторына аз тәуелді болады.

Ақылды жылыжайдың тағы бір маңызды аспектісі – оның энергия тиімділігі. Заманауи жылыжайларда күн энергиясы немесе басқа жаңартылатын энергия көздері пайдаланылады, бұл экологиялық тұрғыдан да тиімді әрі қаржылық шығындарды азайтуға мүмкіндік береді. Сонымен қатар, ақылды жылыжайлар су мен энергияның үнемділігін қамтамасыз ете отырып, қоршаған ортаны қорғау принциптерін сақтайды.

STEM жобаларының маңызды аспектісі – оқушылардың ғылыми-зерттеу және инженерлік дағдыларын дамытуға мүмкіндік береді. Ақылды жылыжайды құру мен басқару оқушыларға нақты мәселелерді шешу үшін ғылыми әдістерді қолдануға үйретеді. Бұл жоба барысында оқушылар:

1. Бағдарламалау мен кодтау: Ақылды жүйені басқару үшін оқушылар түрлі бағдарламалау тілдерін үйреніп, деректерді талдауға арналған код жазуды меңгереді. Бұл білім оларды болашақта цифрлық технологиялар мен ақпараттық жүйелер саласында жұмыс істеуге дайындайды.
2. Инженерлік дағдылар: Жобаны іске асыру барысында оқушылар инженерлік дағдыларды қолдана отырып, жылыжайдың құрылымын жобалайды, сенсорларды орнатады, автоматтандырылған жүйелерді құрады. Бұл дағдылар оқушыларға болашақта инженерия саласында жұмыс істеуге жол ашады.

3. Экологиялық білім: Ақылды жылыжайлар арқылы оқушылар экология мен тұрақты даму принциптерін үйренеді. Олар табиғатпен үйлесімді өмір сүру үшін қажетті технологияларды қолдануды үйренеді, мысалы, қалдықтарды қайта өңдеу, энергияны үнемдеу, суды рационалды пайдалану.
4. Математикалық дағдылар: Ақылды жылыжайлардағы жүйелердің тиімді жұмыс істеуі үшін математикалық модельдеу мен деректерді талдау дағдылары қажет. Оқушылар математикалық есептеулерді орындап, өсімдіктердің өсу жағдайларын есептеуде қолданады[8]

STEM жобаларын жүзеге асыру арқылы оқушылардың ғылыми және техникалық дағдыларын дамытуға үлкен мүмкіндіктер ұсынады. Осы жобалар арқылы оқушылар келесі дағдыларды меңгереді[9]:

Бағдарламалау және кодтау: Ақылды жүйені басқару үшін оқушылар бағдарламалау тілдерін қолданады. Python, Java немесе C++ сияқты тілдер арқылы оқушылар құрылғылардың жұмысын реттейтін бағдарламаларды жаза алады. Бұл дағды олардың болашақта ақпараттық технологиялар саласында жұмыс істеуіне көмектеседі.
Инженерлік дағдылар: Ақылды жылыжайды жобалау және құрастыру барысында оқушылар инженерлік дағдыларын қолданады. Олар жылыжайдың құрылымын жобалайды, сенсорлар мен автоматтандырылған жүйелерді орнатады. Бұл үдеріс оларды инженерлік ойлауға үйретеді, себебі әрбір шешім мен әрекет алдын ала жобалануы және техникалық тұрғыдан негізделуі керек.
Математикалық модельдеу: Ақылды жылыжайлар деректерді жинап, математикалық модельдер құруға мүмкіндік береді. Өсімдіктердің өсуіне әсер ететін әртүрлі факторларды (температура, ылғалдылық, жарық және т.б.) есептеп, олардың арасындағы өзара байланысты талдауға болады. Бұл математикалық есептеулерді орындау үшін оқушылар деректерді жинап, оларды өңдейді.
Экологиялық білім: Ақылды жылыжайларды қолдану арқылы оқушылар қоршаған ортаны қорғау және тұрақты даму принциптерімен танысады. Олар энергия үнемдеу, су ресурстарын басқару, қалдықтарды қайта өңдеу сияқты экологиялық мәселелерді шешу жолдарын үйренеді. Мұндай жобалар арқылы оқушылар табиғатты қорғау мен экологияны сақтау үшін жаңа технологияларды қолданудың маңыздылығын түсінеді.
Деректерді талдау: Ақылды жылыжайлардан алынған деректерді жинап, талдау арқылы оқушылар статистика, аналитика және деректер ғылымы негіздерін меңгереді. Олар әртүрлі деректерді өңдеп, нәтижелерді салыстырып, тиімді шешімдер қабылдауға дағдыланады.

2-кесте. Оқушылардың Ақылды жылыжайлар STEM жобаларын жүзеге асыру арқылы игеретін дағдылары

Жобаның нәтижелері мен болашақ перспективалары

Ақылды жылыжайлар STEM жобаларын жүзеге асыру арқылы оқушылар ауыл шаруашылығы мен технология саласында дағдыларды жетілдіреді. Сонымен қатар, олар экологияны қорғау, су мен энергия ресурстарын үнемдеу сияқты маңызды мәселелерді шешуге арналған шешімдерді табуға көмектеседі.

Оқушылар ақылды жылыжайларды жобалау мен іске асыру арқылы болашақта экология мен ауыл шаруашылығы саласында жұмыс істеуге дайын болады. Бұл жобалар олардың тек ғылыми білімін ғана емес, сонымен қатар әлеуметтік жауапкершілігін де арттырады, себебі олар табиғаттың сақталуына үлес қосады.

Ақылды жылыжайлар арқылы оқушылар әлемдегі ең өзекті мәселелерге – азық-түлік қауіпсіздігіне, экологиялық дағдарыстарға және энергия тиімділігіне қатысты өз шешімдерін ұсына алады. Бұл тұрғыда STEM жобалары тек білім беру үдерісін ғана емес, қоғамның дамуына үлес қосуға бағытталған[10]

Қорытынды

Ақылды жылыжайлар – бұл STEM жобаларының тамаша үлгісі. Олар оқушыларды тек ғылыми біліммен ғана емес, практикалық дағдылармен де қамтамасыз етеді. Сонымен қатар, бұл жобалар экология мен ауыл шаруашылығына жаңа технологиялар енгізудің тиімді жолын көрсетеді. Ақылды жылыжайлар арқылы оқушылар инновацияны қолдана отырып, болашаққа бағытталған, экологиялық таза және энергетикалық тиімді шешімдер іздеуді үйренеді. STEM жобаларының осындай үлгілері қазіргі білім беру жүйесінде маңызды орын алып, жастардың ғылыми және техникалық дағдыларын дамытуға көмектеседі.

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Journalism

ANALYSIS ON THE PATH AND STRATEGY OF CHINA-KAZAKHSTAN NEWS EXCHANGE-BASED ON THE PERSPECTIVE OF THE "BELT AND ROAD" INITIATIVE

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Abstract. This study aims to analyze the ways and strategies for news exchange between China and Kazakhstan within the framework of the "One Belt, One Road" initiative. It examines the features of media communication between the two countries through a lens of regulatory frameworks, a thorough analysis of media, discursive strategies, and international cooperation.The study reveals an existing imbalance in information exchange, with Chinese narratives dominating and limited Kazakh participation in shaping a shared media landscape. The findings are based on content analysis, comparative legal analysis, discursive analysis of statistics, and scientific literature review. The conclusion emphasizes the need for a balanced media partnership built on mutual respect, transparency, and cultural understanding.. The work contributes to a better understanding of the role of media as a tool for soft power in Chinese-Kazakh strategic cooperation.

Keywords: China, Kazakhstan, Belt and Road, news exchange, media cooperation.

Introduction. In the context of rapid globalization and regional integration, information exchange between states is becoming increasingly important. This is especially evident in the "One Belt, One Road" initiative proposed by China, which aims to promote economic cooperation and infrastructure development in Asia and Europe[1].

One of the key players in this initiative is Kazakhstan, which has a strategic role as a transit country and partner for political, economic, and cultural cooperation. As a result, news exchange between China and Kazakhstan has become not only an important tool for information diplomacy but also a means of building mutual understanding and promoting a positive image of partnership.

This exchange of information helps to foster a constructive international dialogue and strengthen cooperation between the two countries. It also contributes to the development of a sustainable partnership that benefits both parties and promotes stability and prosperity in the region.

The importance of the topic lies in the fact that information space shapes public perception of international initiatives, which in turn affects bilateral relations' stability. Effective news exchange allows for correct communication of national priorities, clarification of strategic intentions, and overcoming stereotypes. This is especially significant in the context of the OBOR, a multi-level and long-term initiative.

This research aims to analyze China-Kazakhstan information exchange strategies and practices through the lens of the "One Belt, One Road" initiative. Previous studies have focused on infrastructure and economic aspects of this initiative, but information interaction remains underexplored as a significant factor.

The purpose of this study is to analyze the ways, mechanisms, and strategic approaches to developing Chinese-Kazakh news exchange within the context of implementing the "One Belt, One Road" initiative. The study aims to identify the impact of this exchange on the formation of countries' images and the strengthening of interstate cooperation.

This research covers the following key areas:

Firstly, it examines the evolution of news interactions between China and Kazakhstan before and after the announcement of the OBOR (One Belt, One Road) initiative. Special attention is given to the content, tone, and subjects of news publications in both countries' media, as well as the degree of synchronization between information agendas and public reactions.

Secondly, it analyzes the platforms and mechanisms that facilitate bilateral information exchange, including traditional media, digital media, and interstate media platforms. Governmental agencies, international media initiatives, and news portals are important components of this analysis.

Thus, the study not only contributes to a deeper understanding of the specific features of the Chinese-Kazakh information partnership, but also supports the strengthening of media interaction in order to promote shared interests within the context of the One Belt, One Road initiative.

Literature review. The topic of media cooperation between China and Kazakhstan within the framework of the Belt and Road Initiative (BRI) has attracted the attention of scientists from both countries. In recent years, researchers have increasingly emphasized the importance of strategic communications, national image formation, and the role of mass media in strengthening bilateral understanding. The following literature review highlights the contributions of two Chinese and two Kazakhstani scientists, whose work provides a comprehensive understanding of this complex interaction.

Chinese scientist Qin B., Liu W., Zhang Y. in their work explores how China uses international broadcasting and media work to promote peaceful development and mutually beneficial cooperation[2]. Authors argues that Chinese media should adapt their communication strategies to the local cultural and information contexts in Central Asian countries. According to him, the success of the initiative largely depends not only on infrastructure and trade, but also on information flows that shape public perception and political consensus.

Similarly, Chandra R., Sinha D. M. that the media serve as a powerful tool for shaping China's image and countering misconceptions in neighboring countries. They emphasizes the strategic use of government-funded platforms such as CGTN and Xinhua to promote Chinese values, economic cooperation, and ideas of mutual development[3]. Lee also emphasizes the importance of two-way communication as opposed to one-way dissemination of information.

From the point of view of Kazakhstan, Slamgazhy A. argues that Kazakhstan has significant potential to act as an information bridge between East and West. He notes that although Kazakhstan participates in numerous international media partnerships, its media strategies in the context of the BRI Initiative remain insufficiently developed. He also highlights the value of Russian-language media in making information accessible in the region[4].

Taken together, these studies show that although China actively uses its media platforms to promote the BRI agenda, there is a need for closer cooperation and balanced media participation between China and Kazakhstan. The study also highlights a gap in mutual understanding and the need to strengthen the capacity of local media and joint communication strategies. The development of a more symmetrical, dialogue-based news exchange could significantly contribute to strengthening bilateral cooperation and building trust within the framework of the BRI initiative.

Materials and methods. Within the framework of this study, a comprehensive and interdisciplinary approach was taken, including both qualitative and quantitative analysis methods. This allowed for a thorough examination of the ways and strategies of Chinese-Kazakh news exchange within the context of the "One Belt, One Road" initiative.

Content analysis was used to study the content and tone of news articles related to Chinese-Kazakh cooperation published in leading national and international media. The analysis revealed dominant themes, key messages, and the image of Kazakhstan as a partner country. It also explored the nature of coverage of events and developments.

The comparative legal method was employed to compare provisions of Kazakh and Chinese legislation on media, information exchange, and cross-border information dissemination. International acts regulating freedom of information and media cooperation were also analyzed.

The method of discursive analysis was used to examine the rhetoric of official statements, press releases, and publications from government agencies. This allowed us to explore a strategic approach to shaping the image of partnership within the context of the OBOR initiative.

Additionally, the historical and genetic method was employed to study the dynamic development of Chinese-Kazakh information relations. This included identifying the stages of evolution in bilateral news exchange and media cooperation.

Statistical data analysis was conducted using open sources such as reports from UNESCO, the Committee of Statistics of the Republic of Kazakhstan, the Chinese Center for Media Research, and reports related to the OBOR. Data from media monitoring agencies, including international ones, were also utilized.

The review of scientific literature included studies on information diplomacy, cross-border media cooperation, digital platforms, and the "One Belt, One Road" initiative, as well as international research on the image of countries.

Official documents such as program documents and agreements related to OBOR, intergovernmental memorandums on cooperation in information and communication, and legislative acts of Kazakhstan, including the Law on Mass Media and the Law on Information, were also analyzed. Additionally, legal regulations of the PRC governing the activities of foreign and joint media platforms were examined.

Results and discussion.

A content analysis of publications in Kazakh and Chinese media for the period 2013-2024 showed that the main topics covered in news are infrastructure projects, energy, education, and cultural exchange. Chinese sources often use a positive and optimistic tone when covering these topics, presenting Kazakhstan as a reliable partner. The Kazakh media, on the other hand, take a more balanced approach to coverage, sometimes addressing issues of public concern and the transparency of cooperation.

A comparative analysis of the media legislation of the Republic of Kazakhstan and the People's Republic of China has revealed significant differences in terms of press freedom and government regulation. While China has strict regulations on foreign media, Kazakhstan's laws are more flexible, albeit with provisions for protecting state information sovereignty. International legal instruments such as the International Covenant on Civil and Political Rights are applicable to Kazakhstan to some extent, but not to the same extent in China, which affects the asymmetry of information exchange between the two countries(table 1).

Table 1. Comparative overview of media legislation: Republic of Kazakhstan vs. People's Republic of China

Comparison Criteria	Republic of Kazakhstan	People's Republic of China
Freedom of the Press	Constitutionally guaranteed, but regulated for national security	Restricted; media is under strict control of the state and the Communist Party
Regulation of Foreign Media	Requires accreditation and registration, but access is relatively open	Strict limitations; direct access for foreign media is restricted, partnerships required
Legislative Acts	Law on Mass Media (1999), Law on Information (2015)	Cybersecurity Law (2016), Internet Content Regulation (2021)
Access to International Legal Instruments	Signatory of the International Covenant on Civil and Political Rights	Signed but not ratified; its provisions are not practically applied
Government Intervention	State control exists over strategic content and state secrets	Total control including censorship, filtering, and publication bans
Digital Censorship and Filtering	Relatively limited (blocking of specific sites)	Extensive (Great Firewall, bans on Google, YouTube, Twitter, etc.)
International Media Cooperation	Open to cooperation with China, Russia, EU and CIS countries	Prioritizes one-sided promotion of Chinese content as within the framework of diplomacy

Source compiled by the author [5-8]

A study of official statements by the Ministry of Foreign Affairs of the People's Republic of China and the Republic of Kazakhstan, as well as press releases and government agency publications, has shown that the rhetoric surrounding cooperation within the One Belt, One Road initiative is based on concepts such as mutual benefit, historical friendship, and a new form of international collaboration. The Chinese side tends to employ a positive positioning strategy, while Kazakhstan emphasizes pragmatism and economic gains.

Using the historical and genealogical method, we have identified three main stages in the evolution of Chinese-Kazakh informational collaboration:

- 2013-2016: Initial stage, with a focus on official media outlets.
- 2017-2019: Digitalization and expansion of partnership projects, such as the launch of shared news feeds.
- 2020-present: Integration of new formats, including social media and video platforms, and an increase in youth and educational exchange programs[9].

According to statistics from Chinese and international media platforms, the number of publications about Kazakhstan has increased significantly since 2013, by more than 65%. In Kazakhstan, there has also been an increase in news reports mentioning China, especially in the context of the OBOR initiative. However, despite this growth, the share of original Kazakh media content about China is still low compared to reprinted materials from Chinese sources.

A review of works by Chinese and Kazakh scholars has confirmed the importance of media cooperation as an element of a tool of diplomacy. Despite the growing number of publications on this topic, there is still a lack of scientific research on joint media strategies.. In addition, the researchers emphasize the need for synchronization of information policy and strengthening of academic dialogue. An analysis of the documents from the OBOR initiative and interstate memorandums and agreements (such as the Memorandum on Cooperation in the Field of Mass

Media between the Ministry of Foreign Affairs of the Republic of Kazakhstan and the International Information Office of the People's Republic of China), revealed the existence of legal frameworks for deepening information exchange. However, practical implementation has identified gaps, such as the lack of mechanisms for bilateral quality control of media content, the weak institutionalization of joint projects, and lack of transparency in information flow distribution.

The comparative examination of media regulations and communication strategies in Kazakhstan and China highlights a distinct disparity in the regulatory frameworks and practical implementation of media policies. While Kazakhstan exhibits a relatively open approach to international media cooperation and pluralism, China maintains strict state control over its information environment, utilizing media primarily as a tool for strategic influence under the Belt and Road Initiative[10]. This imbalance affects the dynamics of bilateral news exchange, resulting in the prevalence of Chinese narratives in the information space and limiting Kazakhstan's ability to assert its own voice in joint media projects. Moreover, despite the existence of formal agreements and memoranda on media cooperation, their practical impact is constrained by structural and ideological differences in how both countries approach freedom of expression and the role of media in diplomacy.. To establish a more harmonious and productive collaboration in the media industry, it is essential for both parties to increase transparency, promote joint content creation, and maintain cultural and informational exchange in accordance with global norms.

Conclusion.

This research has shown that the development of media cooperation between China and Kazakhstan within the framework of the Belt and Road Initiative is both promising and challenging. The examination of media content, legal frameworks, official statements, and academic literature reveals that while both countries officially endorse closer media collaboration, significant disparities persist. China's approach is characterized by centralized control and the export of state-driven narratives, whereas Kazakhstan, although more open and diverse, lacks sufficient institutional mechanisms and resources to equally contribute to the shared media space. These disparities are evident in the dominance of Chinese information flows and the underrepresentation of Kazakh perspectives in joint narratives. Despite the existence of formal agreements and positive diplomatic rhetoric, practical collaboration remains limited, particularly in terms of balanced content production and mutual access to media platforms.

To establish a more efficient and fair media collaboration, both countries should focus on long-term strategic communication planning, promote joint projects in journalism, invest in multilingual media training, and uphold the principles of cultural awareness and information balance. By addressing these structural issues, China and Kazakhstan can transform media cooperation into a more balanced and mutually beneficial tool for soft power, trust-building, and regional connectivity in the context of the Belt and Road Initiative.

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A STUDY ON THE ANALYTICAL FRAMEWORK OF KAZAKHSTAN'S MEDIA COVERAGE OF THE "BELT AND ROAD INITIATIVE"

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Abstract. This study is dedicated to the analysis of coverage of the Belt and Road initiative in Kazakh media. The aim of the work is to identify features of information discourse, key topics, and rhetorical strategies used in different types of media.

The analysis is based on methods of discourse analysis, content analysis, and comparative analysis of sources. Special attention is given to differences between Russian- and Kazakh-language publications, as well as their presentation in state-owned and independent media.

Results of the study were systematized using PESTLE analysis, which allowed us to evaluate political, economic, social, technological, and legal aspects of media representation of the initiative. The conclusion is drawn from the analysis of the predominance of official and positive rhetoric in the media coverage of transnational projects, as well as the lack of critical and legal assessments. It is suggested that a more balanced and multifaceted approach to the reporting of these projects is needed.

Keywords: Belt and Road Initiative, Kazakhstan, media coverage, discourse analysis, international relations

Introduction. In the context of rapidly expanding international collaboration, the Belt and Road Initiative, proposed by China in 2013, has become a global priority as a strategic framework for creating a new economic and infrastructure framework[1].

Kazakhstan, with its strategic location at the heart of Eurasia, has emerged as a key partner and active participant in the implementation of this initiative[2].

At the same time, national media serve as a vital instrument for shaping public opinion and political legitimacy regarding the One Belt, One Road Initiative. They play a crucial role in disseminating, interpreting, and evaluating projects undertaken within the framework of this initiative.

The significance of this study lies in the necessity to comprehend how the Kazakh media portray the «One Belt, One Road» initiative, the narratives they create, the priorities they emphasize, and the objectivity of their information presentation. In the context of escalating geopolitical rivalry and growing interest in the Eurasian region, the media landscape is transforming into a platform for information manipulation, and media discourse serves as a crucial indicator of public opinion and foreign policy inclinations.

The novelty of this research lies in its analytical approach to examining the media coverage of the OBOR in the context of Kazakhstan. This approach allows us to identify the characteristics of the information agenda, the tone of the publications, the thematic focus, and the participation of various types of media, ranging from government-controlled outlets to independent online platforms.

Unlike previous studies that focused on the economic and political aspects of the initiative, this research delves into the media representation, providing a unique perspective on the information support for foreign policy processes.

The objective of this study is to analyze the analytical framework and nature of the coverage of the "One Belt, One Road" initiative in the Kazakh media. We aim to identify the prevailing discursive strategies, thematic areas, and the extent to which the information context influences the public perception of Chinese-Kazakh cooperation within the framework of the OBOR.

The importance of this study lies in the fact that the findings can be applied to both scientific understanding of Kazakhstan's media policy and to enhancing information support for international projects. The research contributes to a deeper exploration of the media's role in shaping the perception of the OBOR initiative and in determining the country's foreign policy direction.

The research encompasses the following key areas:

The creation of the informational image of the OBOR initiative in the Kazakh media;

A comparative examination of the initiative's coverage in various media outlets, including official, independent, Russian-language, and Kazakh-language sources;

The impact of media discourse on public opinion and the perception of the China-Kazakhstan strategic partnership;

The analysis of the political and economic messages conveyed in the media landscape.

Therefore, the exploration of media portrayals of the One Belt, One Road initiative in Kazakhstan is a significant field of academic inquiry that enhances our comprehension of the interplay between media, politics, and international endeavors in the contemporary world.

Literature review. Investigating the portrayal of the Belt and Road Initiative (BRI) in the media of Kazakhstan necessitates a multidisciplinary approach that combines media discourse analysis, political science, and socio-cultural context.

Numerous scholars have explored the media's support for China's international initiatives, including an examination of how these initiatives are represented in Central Asian countries.

Slamgazhy A., Yousaf M. focuses on the positive discourse surrounding the BRI in the Kazakh media. She notes that state-owned media in Kazakhstan portray China as a strategic partner, highlighting the infrastructure and economic benefits[3]. However, there is a lack of critical analysis. Authors concludes that the Kazakh media often serve as a tool for foreign policy support rather than providing objective information.

Baranov N., Ozkan S. discovered that the Russian-language media tends to adopt a pragmatic and economically-focused narrative, whereas Kazakh-language sources frequently employ historical and cultural analogies and highlight the significance of Eurasian unity. Authors highlights the significance of the cultural code and the language barrier in shaping media awareness[4].

Yi Y. explores this topic through the lens of international relations. He highlights that the way Belt and Road initiative is presented in the Kazakh media is influenced by the global geopolitical landscape and the stance of other actors towards China[5]. Authors suggests that the Kazakh media often reflect the official stance and avoid discussing controversial issues such as the environmental and social implications of Chinese investments.

Li J. explores the integration of Chinese initiatives into the digital agenda in the countries of the region[6]. He highlights that the influence of social media and emerging media on public perception of the Belt and Road Initiative is increasing in Kazakhstan, with more critical and alternative perspectives being shared in the digital realm compared to traditional media. Authors argues that the growing involvement of civil society actors in the information landscape fosters a diverse and complex environment, making it more challenging to control information about international initiatives.

Consequently, the integration of scientific methods enables us to discern significant patterns: the prevalence of positive discourse in conventional media, the diversity of stories depending on the language used, the constraints of critical evaluation, and the growing significance of the digital realm as a platform for diverse viewpoints. These insights serve as a foundation for further exploration of the analytical frameworks and approaches employed in media coverage of OBOR in Kazakhstan.

Materials and methods.

Both qualitative and quantitative methods of analysis were employed in this study. The methodological approach was based on discourse analysis and content analysis. Discourse analysis was used to identify key narratives, rhetorical strategies, and the evaluative tone of publications related to the Belt and Road initiative in Kazakh media. Content analysis allowed us to quantify the frequency of mentions of the initiative, the subjects of articles, the actors mentioned (China, Kazakhstan, international organizations, etc.), and the ratio of positive, neutral, and negative assessments. Comparative analysis of Russian- and Kazakh-language sources enabled us to compare the characteristics of information presentation in different media types.

The empirical basis of this study was the analysis of publications from the Kazakh media between 2015 and 2024. We examined both state-owned publications, such as Kazakhstanskaya Pravda and Egemen Qazaqstan, as well as independent and analytical media outlets like Vlast and Informburo. In addition, we analyzed materials from news agencies like Kazinform and CCS, official press releases from government agencies, and information resources from Chinese diplomatic missions in Kazakhstan.

Normative documents and scientific literature were also used for contextual analysis. We studied the provisions of the legislation of the Republic of Kazakhstan in the field of mass media, as well as intergovernmental agreements and memorandums signed within the framework of the "One Belt, One Road" initiative. We also reviewed scientific and analytical articles on China's foreign policy strategy, issues of digital diplomacy, and information influence in international relations.

Results and discussion. As a result of our discourse analysis, it was revealed that most Kazakhstani media present a positive image of the Belt and Road initiative. This is achieved through the use of rhetorical strategies that emphasize economic benefits, investment attractiveness, and the friendship and strategic partnership between Kazakhstan and China.

However, there is limited representation of critical points of view, particularly in government-affiliated sources. The majority of texts focus on terms related to development, stability, mutual benefit, and infrastructure modernization. Additionally, there is a tendency towards uniformity in the presentation, with different media repeating similar formulations and agendas. This may indicate a centralized influence on content.

Content analysis revealed that the majority of publications about the Belt and Road initiative occurred during visits by high-ranking Chinese delegations and the signing of significant agreements between the two countries in 2017, 2019, and 2023[7]. Approximately 70% of these materials had a neutral or positive tone, with around 25% being strictly positive and only 5% classified as conditionally critical. Topics frequently discussed in publications included infrastructure development, railway connections, energy projects, and logistics cooperation. Russian-language media tended to focus on technical and economic aspects, while Kazakh-language media frequently incorporated historical, cultural references, and themes of Eurasian unity.

A comparative analysis showed that the government-controlled media exhibit a high level of conformity and rarely permit the publication of articles that contain elements of doubt or uncertainty regarding the initiative.

On the other hand, independent publications, particularly online platforms, offer a broader spectrum of viewpoints, including perspectives from experts, analysts, and civil society activists. However, even in these independent sources, criticism is often limited and tends to focus on technical or local aspects, such as the environmental consequences of specific projects, rather than the political underpinnings of the initiative.

It was also observed that regulatory documents related to Belt and road initiative are not extensively covered in the media, with their content rarely being discussed in depth.

To summarize the findings of the discourse analysis, content analysis, and comparative analysis of sources, it is clear that the coverage of the "One Belt, One Road" initiative in the Kazakh media is predominantly positive and formal, with a focus on political and economic cooperation. However, there is a lack of critical assessment, limited representation of legal and social aspects, and variations in the presentation of information depending on the type and language of media. To gain a more comprehensive understanding of these trends, a PEST analysis was conducted(table 1)

Table 1. PESTL analysis

Factor	Findings and Observations Based on the Research
Political	The coverage of the Belt and Road Initiative (BRI) in Kazakhstani media largely aligns with the country's foreign policy direction of strengthening relations with China. State-run media mainly reflect the official stance, emphasizing strategic partnership and political stability. Criticism of geopolitical risks is virtually absent.
Economic	Media actively highlight the economic benefits of Kazakhstan's participation in the BRI, such as investment inflows, infrastructure development, and job creation. However, issues like debt dependency, project efficiency, and long-term economic consequences are rarely addressed.
Social	While the coverage is generally positive, there is a lack of in-depth analysis of public opinion. Social risks, potential dissatisfaction in local communities, and labor market effects are seldom discussed in mainstream media. Alternative viewpoints are more likely to be found on social media platforms.
Technological	The BRI is often portrayed as a driver of logistics and infrastructure digitalization. However, there is little media discussion about data transmission technologies, cybersecurity standards, or dependency on Chinese digital systems. The potential of digital platforms within the initiative is superficially explored.
Legal	Legal aspects of BRI project implementation receive minimal attention. Issues such as agreement terms, protection of Kazakhstani interests, and contract transparency are rarely covered. The media show little engagement with the legal risks or responsibilities of the involved parties.

Source compiled by the author [8-11]

The findings of the PESTL analysis revealed that the coverage of the "One Belt, One Road" initiative in the Kazakh media primarily revolves around political and economic aspects, with a strong emphasis on supporting official discourse. The absence of critical evaluations, the underrepresentation of legal and social issues, and the superficial treatment of technological matters all contribute to the limited depth of media analysis.

The nature of the coverage varies depending on the type and affiliation of the media, which in turn influences the shaping of public opinion.

Conclusion.

The examination revealed that the Kazakh media outlets play a significant role in shaping the public perception of the Belt and Road initiative as a foreign policy and economic priority. However, the information provided is largely one-sided, with a bias towards positive and official narratives. The lack of attention to alternative viewpoints, critical aspects, and public interests hinders the level of information transparency and the active involvement of civil society in assessing international initiatives. Therefore, there is a need for a more balanced and multi-faceted approach to media coverage of transnational projects, considering the legal, social, and technological implications.

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