

THE SCHOOL OF MODERNITY: THE ARCHITECTURE OF EIGHT INTELLIGENCES

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Abstract

Introduction. The architecture of school buildings plays a vital role in shaping the educational environment and influencing learning processes. **Purpose of the study:** To investigate how the architectural and spatial organization of modern school buildings in Astana can be aligned with the theory of Multiple Intelligences, with the goal of identifying planning principles and design strategies that support the comprehensive intellectual development of students across all eight intelligence types. **Methods:** The study defines temporal and territorial boundaries, analyzes urban structure analysis, employs field survey methods, collection and analysis of architectural documentation, and a review of theoretical foundations. An additional focus is placed on methods of interaction, interpreted as architectural-spatial typologies of communication and environmental stylistics that support different modes of learning and engagement. **Results:** The analysis revealed that the existing school architecture typologies in Astana predominantly support linguistic and logical-mathematical intelligences through traditional classroom-based layouts. However, architecture elements that encourage the development of other types of intelligence — such as music rooms, art studios, outdoor learning zones, and flexible collaborative spaces — are inconsistently present and often marginalized in spatial hierarchy. The study identified architectural features that correlate with the activation of different intelligences, including amphitheater-style gathering spaces (interpersonal), green inner courtyards (naturalistic), maker spaces (bodily-kinesthetic), and modular classroom arrangements (intrapersonal). Based on the findings, the authors propose a planning model for a multi-intelligence-oriented school, in which functional zones are organized to provide spatial stimuli aligned with each intelligence type. This model demonstrates a potential direction for rethinking school architecture as an adaptive and inclusive educational infrastructure.

Keywords: school architecture; educational system; types of intelligence; book-frontal method; classroom-lesson system; comfortable environment; architectural and planning methods.

Introduction

The school, being one of the most important institutions of society, is, on the one hand, inherently conservative, yet on the other, highly sensitive to social changes and progressive scientific advancements (Samoilova and Chislova, 2017). Modern schools are largely a legacy of the industrialization era, when educational processes were built upon the principles of standardization and the unification of knowledge (Samoilova and Chislova, 2017). During Kazakhstan's time as part of the USSR, changes took place in the architectural and planning structures of schools, reflecting broader trends in Soviet urban planning policies. In the 1920s–1940s, schools were constructed according to standardized designs emphasizing economic balance and standardization. In the 1950s–1960s, a period of mass urban school construction began, aimed at accommodating growing student populations. By the 1970s–1980s, school projects became more specialized, incorporating multifunctional spaces such as sports halls and laboratories, reflecting the development of polytechnic and technical education (Amanzhol and Yerkin, 2006). These standard school designs

continue to play an important role in Kazakhstan's educational architectural system. Today, Astana, as the rapidly growing capital of Kazakhstan, is experiencing significant pressure on its educational infrastructure. According to statistics, during the 2024–2025 academic year, there are 188 general education schools in Astana, including 109 public, 72 private, and 7 republican schools. Currently, it is crucial to cultivate children's abilities to search for and critically interpret information, to develop psychological flexibility, communication skills, and a high level of general cultural competence (Mark, 2000). Consequently, there is a growing demand for diverse educational programs and various learning environments. For individuals to generate new ideas, they must cultivate a broad range of interests and develop comprehensively. Equally important is the ability and motivation to find and utilize information from a variety of sources (Gladilina et al., 2022). In the context of Astana's rapid urban development and the legacy of standardization from industrial and post-industrial periods, it is necessary to integrate the needs of an information-driven, multi-intelligent society when planning new educational facilities.

The theory of multiple intelligences, developed by American psychologist and Harvard University professor Howard Gardner, emerged from research into human creative potential. According to Gardner, any type of intelligence can be developed through appropriate educational tools and methodologies (Gardner, 2007). The adaptation of multiple intelligences theory into the architecture of general education schools is based on a multi-aspect approach, integrating the works of leading scholars in this field. Researchers such as H. Gardner, L. S. Vygotsky, D. Goleman, R. B. Cattell, and R. Sternberg emphasize that intelligence is not a uniform construct but manifests in multiple forms. Their studies demonstrate that, beyond traditional logical-mathematical reasoning, emotional, social, creative, and practical intelligences also play critical roles in the educational process. This perspective enables a more comprehensive consideration of learners' individual characteristics and supports the creation of educational environments conducive to holistic personal development. The theory of multiple intelligences has gained widespread recognition in pedagogy and is actively being experimented with in educational systems worldwide. In this study, the authors adapt Gardner's concept into an architectural model, creating learning environments that nurture and develop different types of intelligence. These models allow for the design of educational institutions where each space corresponds to a specific type of intelligence, thereby fostering individual growth. Such environments provoke different behavioral models, (Upitis, 2004) ultimately shaping a new type of multi-intelligent personality.

Methods

To achieve the set objectives in developing a modern functional structure for schools, the present study was divided into several stages:

1) Defining temporal and territorial boundaries. Due to the broad scope of the research, the authors initially established the temporal and territorial boundaries of this study. Considering that the internal functional structure of schools has evolved continuously and is based on regulatory documents, it was decided to study school structures beginning from 1960, marking the active phase of school construction in Astana. The diversity of school architecture — depending on the city's status, population size, climatic conditions, and other factors — prompted the authors to focus territorially on the capital of the Republic of Kazakhstan, Astana. Additionally, the research concentrated solely on public general education institutions rather than private schools, as public schools are designed based on governmental specifications and better reflect the social needs of the broader population.

2) Urban structure analysis. At the second stage, the urban planning structure of Astana was studied

to identify general education institutions relevant to the research. An optimal map of city routes was developed to enable rational field surveys.

3) Field surveys of educational institutions. A field survey method was applied to general education organizations. A total of 19 schools were studied. During the surveys, photographic documentation was conducted, including images of the school grounds, buildings, and evacuation plans located at entrances on each floor. The collected data were then systematized, allowing the identification of several types of "standard school models" that emerged as a result of the rapid population growth and shortage of educational institutions, leading to widespread replication of architectural designs and solutions. The field survey method is recognized as one of the key techniques in architectural and urban analysis, providing objective data on existing structures.

4) Collection and analysis of architectural documentation. At the fourth stage, architectural design documents for schools were collected and analyzed. The authors sent formal requests to relevant authorities (including LLP "AstanaGenPlan" Research Institute, the Department of Architecture, Urban Planning, and Land Relations of Astana, RSE "State Expertise", and RSE "State Urban Cadastre") and held meetings with project company executives. As a result, 11 sketch projects of standard schools and 3 detailed working projects for schools in Astana were obtained. Among them were typical designs for public educational institutions. Analysis of the architectural and planning solutions presented in these projects allowed for the formation of the existing functional model of general education institutions, primarily based on two most commonly implemented "standard" projects.

5) Review of theoretical foundations. The fifth stage focused on reviewing theoretical materials regarding the architectural and planning structure of schools and the factors influencing their transformation. Doctoral dissertations by T. A. Gvozdikova (2024), T. A. Kiseleva (2019), and along with scientific articles by S. Sh. Sadykova (2022), were analyzed. It was established that the growth of the student population and the adoption of new teaching methods aimed at developing well-rounded individuals are the main drivers of changes in the functional structure of schools. While the growth of the student body represents a quantitative factor leading to architectural replication of traditional spaces, the authors subsequently focused on qualitative factors: namely, types of intelligence. To this end, the theoretical works of renowned scholars were studied, including Howard Gardner (*Frames of Mind: The Theory of Multiple Intelligences*, 1983), Lev S. Vygotsky (*Mind in Society: The Development of Higher Psychological Processes*, Harvard University Press, 1978), Daniel Goleman (*Emotional Intelligence*,

Bantam Books, 1995), Raymond B. Cattell (Theory of Fluid and Crystallized Intelligence, Journal of Educational Psychology, 1963), Robert J. Sternberg (Beyond IQ: A Triarchic Theory of Human Intelligence, Cambridge University Press, 1985). Following this, common intelligence domains acknowledged by these authors were identified. In the article “Promoting Inclusive Education in Kazakhstan: Environmental and Architectural Aspects” by T. A. Gvozdikova and D. Amandykova (2024), the authors explore strategies for improving the spatial environments of educational institutions to promote inclusive education in Kazakhstan. They emphasize the importance of creating comfortable learning conditions for all students, including individuals with disabilities, and examine architectural and planning concepts that support this goal.

6) At the sixth stage, using the method of interaction (flow and synthesis), architectural spaces corresponding to different types of intelligence were developed. This approach enabled the assessment of the extent to which various types of intelligence are currently supported within existing schools, and allowed for projections regarding their future functional development.

7) At the seventh stage of the study, the authors conducted a sociological survey among teachers, students, and their parents. The objective of this method was to determine the social necessity of the proposed functional elements within the educational structure. A total of 495 participants were randomly selected for the survey. The survey included the following key questions: Are you satisfied with the range of educational spaces

currently available at your school? In your opinion, are the proposed spaces necessary within the school structure? (Participants were presented with a list of spaces identified by the authors). Subsequently, respondents were provided with a structured questionnaire where they were asked to rate the importance of each proposed space on a scale from 1 to 10, where 1 indicated “not important” and 10 indicated “extremely important”. Participants were also encouraged to leave comments or suggest their own answers for each question. The collected responses were systematized, enabling the identification of the direction and relevance of the study. Finally, using graphic modeling software, the authors demonstrated the scientific novelty of the research by visualizing the differences between the existing functional model of school buildings and the proposed model, which is based on the need to cultivate a multi-faceted individual and is supported by the results of the sociological survey.

Analysis

Field survey of 19 schools in Astana revealed the predominance of a standard architectural and planning model of educational institutions.

Standard schools of Type 1 (marked in red) include six facilities with a service radius of 500 meters, evenly distributed throughout the city territory, including residential neighborhoods and prospective development areas. Standard schools of Type 2 (marked in yellow) comprise 13 facilities with the same service radius, predominantly concentrated in the central and southern parts of the city (Fig. 1). Based on the analysis, a unified functional and planning model was identified across all types

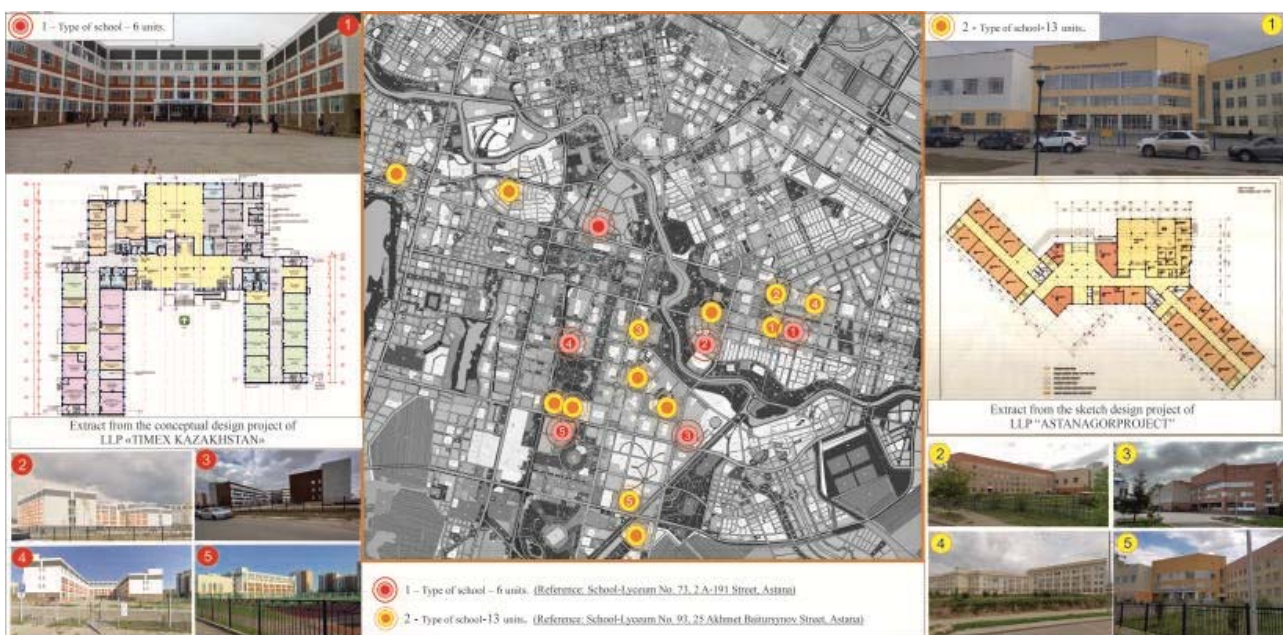


Fig. 1. Cartogram of the typological distribution of school buildings within the residential structure (Astana)

of schools. Consequently, for further in-depth study, two representative cases were selected: School-Lyceum No. 93, located at 25 Akhmet Baitursynov Street, Astana and School-Lyceum No. 73, located at 2 A-191 Street, Astana. Sociological Survey: To incorporate the perspectives of direct participants in the educational process, a sociological survey was conducted, covering 495 respondents (including approximately 40 teachers, 30 parents, and 425 students). The survey aimed to assess current perceptions of the school environment and to identify preferred directions for its development. The key quantitative findings are as follows: Approximately 70 % of teachers reported a shortage of specialized spaces for practical and creative activities (such as laboratories, studios, and project areas). Teachers emphasized that spatial limitations hinder the implementation of new educational methods – from project-based learning to interactive group work formats. 65 % of students expressed a desire for a greater variety of spaces beyond standard classrooms, including areas for socialization and relaxation, creative corners, and modern computer or

scientific laboratories. Additionally, 52 % of students directly stated that the current school environment does not sufficiently stimulate their interest in learning and personal development beyond the formal curriculum. Overall, the sociological survey revealed a consensus among teachers, parents, and students that the traditional school model is outdated and in need of transformation. The majority of respondents agreed with the statement that “a school should be a space for holistic development, not merely a place for knowledge transmission”.

Results and Discussion

These findings formed the basis for the proposed model of a school oriented towards the development of multiple types of intelligence. Formation of the Generalized Spatial Model: as a result of the analysis of prevalent standard school types, a generalized model of the spatial organization of existing schools was developed and is presented in the accompanying diagram (Fig. 2). It is important to note that this model is not an isolated case but reflects broader trends in mass school construction over the past decades. Conceptual Model of the

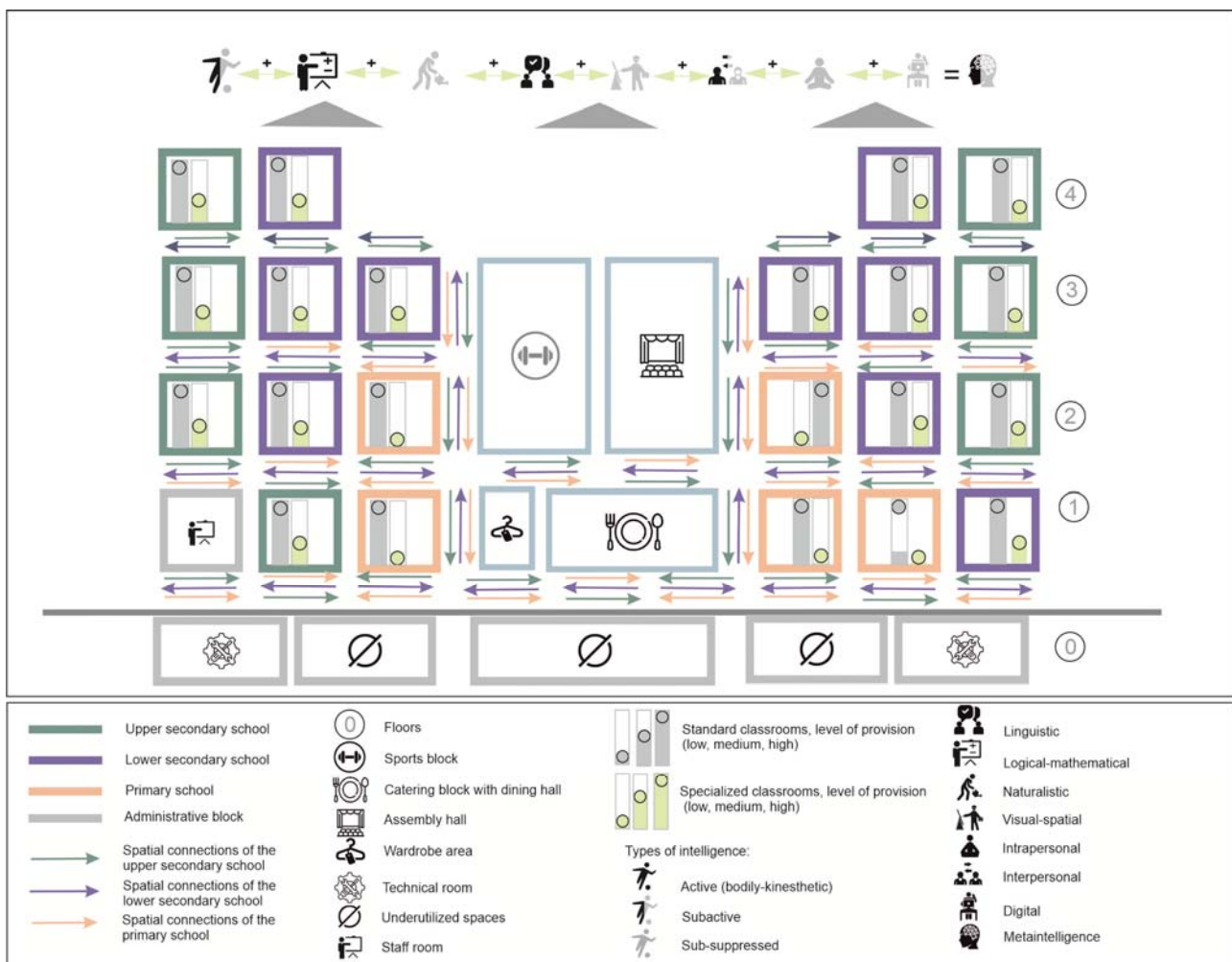


Fig. 2. Existing architectural and planning model of the school (Astana)

Functional-Planning Structure: the conceptual visualization is presented in the form of square blocks, representing the building's vertical structure (from ground floor to the fourth floor), with functional zoning of key school blocks: primary, middle, and high school areas; workshops; libraries; sports and administrative blocks; as well as medical facilities and an assembly hall. This model highlights the typical deficiencies in the organization of educational spaces characteristic of schools constructed under mass development programs in Astana.

The scheme presents a spatial-functional model of a modern school, structured by educational levels and corresponding types of intelligence. The diagram illustrates the interconnections between primary, middle, and high school blocks, emphasizing differentiated circulation routes, specialized facilities (sports, arts, administrative, dining, and assembly spaces), and zones that support the development of multiple intelligences — from linguistic and logical-mathematical to bodily-kinesthetic and digital.

As shown in the model, current school projects demonstrate a noticeable lack of specialized spaces designated for specific grade levels, resulting in the universal use of classrooms regardless of students' levels of preparedness. Specialized facilities (such as workshops, art rooms, and libraries) are located without consideration of age-specific student groups, leading to shared use by both younger and older students. This reduces the adaptability of the environment to the educational needs of different age groups and complicates the formation of coherent educational pathways. The placement of classrooms does not take age characteristics into account: for instance, middle and high school classrooms are often concentrated on the same floors, which causes intersecting student flows and disrupts the organization of the educational process. The spatial structure tends toward centralization, where shared areas become overloaded and serve as points of conflict between different traffic flows. Moreover, recreational spaces, which are particularly important for younger students, are largely absent, negatively impacting rest and recovery. Primary school blocks are fragmented across different floors, violating the principle of age-group isolation and complicating navigation within the building. In addition, primary grades are not equipped with specialized spaces such as workshops or laboratories, nor are there adapted zones that meet the specific developmental and educational needs of young students. Importantly, the layout of existing school architectural models enforces a regime of regulation and passivity—students sit in traditional frontal classroom arrangements, wait for bells, and move in narrow corridors under supervision. This structure presents a clear pedagogical disadvantage, as modern education values initiative, autonomy, and collaboration, and the physical environment should

support the development of these qualities rather than suppress them (Lackney, 1994). It is important to note the inefficiency of current architectural and urban planning solutions, which is reflected in the excessive size of school sites, the underutilization of basement levels, the inappropriate number of floors, and the presence of incomplete or irregular stories. All of these shortcomings negatively affect the formation of a comfortable and functional educational environment. The lack of professional functional zoning within such structures leads to the emergence of social “conflict points”, caused by the constant movement and intersection of student groups of different ages. This not only disrupts spatial organization but also reduces students' opportunities for rest and psychological recovery. The narrow range of functional spaces results in the creative and intellectual limitation of modern students, diminishing their opportunities for social interaction and communication. Furthermore, the reliance on average-age architectural standards in the design of learning spaces often leads to the creation of non-ergonomic environments that fail to meet the diverse physiological and psychological needs of students of different ages. According to a comprehensive literature review, Howard Gardner proposed the theory of multiple intelligences, recognizing the existence of several independent types of intelligence, each essential for successful human functioning. This theory integrates the analytical, creative, and practical intelligences studied by L. S. Vygotsky and R. Sternberg, as well as the emotional intelligence emphasized by D. Goleman. The concepts of fluid and crystallized intelligences, introduced by R. B. Cattell, also find their place within Gardner's framework, being interpreted through different forms of thinking and knowledge accumulation. Thus, Gardner's theory synthesizes the approaches of other scholars, offering a more holistic and flexible understanding of intelligence, making it particularly valuable for educational practices, including school architectural design. The proposed Architectural and Planning model consists of three autonomous blocks corresponding to different levels of education: the upper secondary school on the left, the primary school in the center, and the lower secondary school on the right. Color coding and individual directional arrows emphasize that each level has its own movement contour without intersecting with others. The planning structure is multi-core: within each block, a recurring module of “two classrooms+ + recreation area + specialized rooms” forms closed circuits around the main functional zones. Each wing includes a sports block, while the ground floor accommodates a catering unit with a dining hall and separate cloakrooms for each educational level, reducing counter-flows during breaks and lunch periods.

Administrative offices and teachers' co-working spaces are positioned along the façade, ensuring convenient visual supervision of student flows and quick access to the educational cores. Recreational and co-working areas (highlighted in green) are located inside the learning clusters rather than in corridor remnants, creating conditions for informal interaction, project work, and socialization. Standard and specialized classrooms are indicated by separate pictograms with levels of provision – low, medium, and high. At the bottom of the diagram, urban planning connections are shown: distinct entrance groups, links to the street network, and the possibility of phased operation, allowing school blocks, sports, and assembly halls to function autonomously and serve the local community beyond school hours (Fig. 3). In the proposed model, spatial organization is directly correlated with the types of intelligence identified by Gardner. For each area of development, the authors have identified corresponding school spaces: While all aspects are important for learning, particular emphasis is placed on the practical application of knowledge within mathematics classrooms, where students can solve complex problems and apply theoretical

concepts in practice. Additional spaces such as logic corners, robotics and programming laboratories, and mathematical project rooms can complement these core areas. According to the theory, the development of linguistic intelligence requires not only specific criteria but also specialized types of spaces that can stimulate this form of intelligence. Examples include language classrooms, literary corners, creative writing studios, spaces for linguistic games and problem-solving, literary discussion clubs, and recording studios. Bodily-kinesthetic intelligence is cultivated through physical activity, dance, games, coordination exercises, as well as practices of meditation and yoga. The corresponding spatial types include gyms, dance studios, interactive play zones, outdoor yoga and fitness areas, and studios for creative workshops. Naturalistic intelligence develops through experimentation and observation, as well as through the study of biology, geography, astronomy, chemistry, and physics, including field research, botany, and zoology. Specialized spaces such as astronomical observatories, zoological corners, winter gardens, and educational gardens play a key role in this process, as they immerse students in the natural environment



Fig. 3. Proposed architectural and planning model of the school (Astana)

and foster systemic ecological thinking. Intrapersonal intelligence evolves through self-awareness and reflection, emotional literacy, meditation and relaxation practices, independent research, and participation in discussion circles. Spaces that support these activities include psychological consultation rooms, centers for self-awareness, meditation rooms, and studios for creativity and self-expression. Digital intelligence is shaped through interaction with information and communication technologies, the development of digital literacy, programming, and critical thinking in media environments. Spatially, this manifests in IT laboratories, multimedia classrooms, VR and AR studios, digital fabrication labs, and cybersecurity zones, where students learn the principles of working with data and digital tools. Visual-spatial intelligence develops through visual arts, geometric constructions, three-dimensional modeling, virtual reality, and cartographic studies. Classrooms for graphic programming and design consultations, art studios, laboratories for 3D modeling and virtual environments, and spaces dedicated to geometry and cartography contribute significantly to this process. Interpersonal intelligence is enhanced through group projects and collaborative tasks, feedback training, communication workshops, and other forms of social interaction. Spaces designed for social games, teamwork, and collective exercises play an important role in nurturing interpersonal intelligence, extending students' opportunities for developing communication and cooperation skills. Furthermore, it should be noted that certain criteria for developing different types of intelligence can be effectively combined and balanced within a single educational space. For example, the use of interactive multimedia technologies in classrooms can simultaneously promote the development of both logical and visual-spatial intelligences. Such flexible environments contribute to a more holistic and comprehensive development of students, allowing them to acquire diverse skills and competencies within a unified educational context. All of the above-mentioned forms of intelligence collectively contribute to the formation of meta-intelligence – the human capacity to be aware of, integrate, and manage multiple cognitive abilities within a unified process of thinking and learning. Meta-intelligence (from Greek “meta” – “beyond” and Latin “intellectus” – “understanding”) refers to the ability of an individual to consciously analyze and direct their own cognitive processes, turning thinking into an intentional tool for self-development and adaptation to complex environments. It is precisely meta-intelligence that enables a modern person to maintain critical thinking, creative initiative, and emotional resilience in an era when analytical and routine functions are increasingly being delegated to artificial intelligence.

Spaces such as social gaming areas and team-building training rooms play a crucial role in supporting

the development of interpersonal skills and collaborative competencies (Pak et al., 2023). It is important to note that some spatial criteria for the development of multiple intelligences can be successfully combined within a single educational space. For instance, interactive multimedia classrooms can simultaneously support the development of both logical-mathematical and visual-spatial intelligences. Such flexible environments contribute to a more comprehensive and holistic student development by enabling diverse skills and abilities to be cultivated within a unified educational context. The spaces in the proposed model are designed to be transformable, adaptable to different learning scenarios, and inclusive by design. Unlike the standardized educational spaces found in Model 1, Model 2 integrates recreational areas directly into the learning environment, promoting informal interaction and a diversity of educational trajectories. This architectural approach not only extends the functionality of the school building but also fosters an environment that supports the realization of each student's individual potential. Thus, the developed model demonstrates improved performance across key aspects — zoning, organization of student flows, provision of specialized and recreational spaces, architectural flexibility, inclusivity, and alignment with current pedagogical approaches. Model 2 represents a new typology of educational space — adaptive, multifunctional, and oriented toward the cultivation of multiple forms of intelligence. Depending on the specific educational objectives and specialization of the institution, it is possible to enhance certain types of intelligence by adjusting the types of spaces. For example, a school that emphasizes creativity and visual-spatial thinking may increase the number of creative and artistic studios for maximum effect. As emphasized by previous research: “Effective learning environments integrate technology and provide learners with opportunities for collaboration, creativity, and critical thinking” (Sanoff, 2001). “The interaction between physical space and educational practice is complex, but designing environments that support diverse learning needs can enhance educational outcomes” (Woolner, 2010). It is crucial to recognize that while some educational spaces can comprehensively support the development of multiple intelligences, others may be tailored to specific intelligences. For instance, multifunctional areas such as libraries or media centers offer students the opportunity to simultaneously develop various aspects of intelligence through a diversity of resources and activities.

PhD in Architecture, Associate Professor S. Sh. Sadykova (2022), in her article “Innovative Trends in the Formation of Internal Educational Spaces of New Schools in Kazakhstan,” emphasizes that the principle of universality and adaptability is one of the priorities in the design of school buildings. Such an approach not only ensures flexibility in the

use of premises but also contributes to expanding the functional composition of the educational environment, allowing the integration of various forms of academic, project-based, and extracurricular activities. The results of the present study correlate with the conclusions of S. Sh. Sadykova, yet develop them further in a more practical and spatial-typological dimension. The proposed model goes beyond the mere universalization of spaces and focuses instead on structural diversity and functional specialization of educational blocks, which enables the implementation of Howard Gardner's theory of Multiple Intelligences within the architectural environment of the school. PhD in Architecture T. A. Kiseleva (2019), in her dissertation "Development of the Network of General Education Institutions in the Urban Structure of Astana in the 19th–21st Centuries", highlights the urgency of modernizing Kazakhstan's education system to meet the challenges of contemporary society. Her research identifies the absence of a clear theoretical classification of specialized educational institutions, which often leads to unsubstantiated placement of such schools within the urban structure. In response, the author proposes a conceptual model for developing the network of general education institutions at the city level, introducing a new concept of the "specialized school". Unlike the "specialized school" model proposed by T. A. Kiseleva, the present research does not confine itself to a single type of institution. Instead, it explores a universal, systemic model that can serve as a design tool for various general education schools within the urban framework. In dissertation "Architectural and Planning Organization of a School Building in the Context of the Information Society (on the Example of Samara)", PhD in Architecture S. V. Poznyak (2009) focuses on the changing role of information in society and the increasing need for its independent acquisition. According to the author, these factors create prerequisites for forming in schools a developed informational environment with open access. The findings of S. V. Poznyak's dissertation resonate with our research in recognizing the school as a dynamic information – spatial system that reflects ongoing social transformations. However, unlike Poznyak's emphasis on the development of the informational environment and digital infrastructure, the present study interprets the architectural model more broadly as a cognitive-spatial structure aimed not only at informational but also at intellectual and social integration within the learning environment.

Conclusions

The conducted study revealed that the existing architectural and functional structure of schools

in Astana largely reproduces modern standardized models that do not meet the requirements of contemporary education. Despite certain attempts to introduce new spatial solutions, most schools remain oriented toward the traditional classroom-lesson system and fail to account for the diversity of students' intellectual abilities. The analysis established that population growth and new teaching methodologies — aimed at developing a well-rounded individual — serve as the main catalysts for the transformation of school functional structures.

The research demonstrated that the architectural and planning structure of a school is a crucial instrument in shaping the educational environment and fostering personal development. The analysis of existing schools in Astana showed that typical design models largely preserve outdated organizational principles, failing to provide the necessary flexibility, specialization, and psychological comfort. The model developed by the authors focuses on distributing student flows according to age and functional zones, which significantly reduces the intersection of movement paths and enhances the ergonomics of the educational process. The increase in the number of specialized classrooms, such as laboratories, creative studios, scientific and digital rooms, contributes to the development of multiple types of intelligence and the formation of individual educational trajectories. Special attention is given to the creation of recreation and co-working zones integrated into the overall spatial structure. These spaces form an environment for informal communication, collaborative creativity, and knowledge exchange among students, teachers, and parents. Collectively, these elements transform the school from a static building into a flexible educational ecosystem that supports self-development and cooperation. From an urban planning perspective, the proposed model promotes the rational use of territory, the inclusion of schools within residential block structures, and the formation of local educational clusters. From a socio-economic standpoint, it increases the efficiency of space utilization (including previously underused areas such as basements), reduces operational costs, and enhances the public value of educational facilities. At the cognitive level, the model aims to develop multiple intelligences and meta-intelligence, ensuring a transition from a traditional monofunctional structure to a system that stimulates conscious thinking, self-organization, and interdisciplinary interaction. Thus, the school of the future appears as the architecture of eight intelligences, where space becomes an active participant in the educational process and a catalyst for the holistic development of the individual.

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ШКОЛА СОВРЕМЕННОСТИ: АРХИТЕКТУРА ВОСЬМИ ИНТЕЛЛЕКТОВ

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Аннотация

Введение. Архитектура школьных зданий играет важную роль в формировании образовательной среды и влиянии на учебные процессы. **Цель исследования:** Изучить, как архитектурная и пространственная организация современных школьных зданий в Астане может быть согласована с теорией множественных интеллектов, с целью выявления принципов планирования и стратегий проектирования, поддерживающих всестороннее интеллектуальное развитие учащихся по всем восьми типам интеллекта. **Методы:** В исследовании определены временные и территориальные границы, проведен анализ городской структуры, использованы методы полевых исследований, сбор и анализ архитектурной документации, а также обзор теоретических основ. Дополнительное внимание уделено методам взаимодействия, интерпретируемым как архитектурно-пространственные типологии коммуникации и стилистика окружающей среды, поддерживающие различные способы обучения и вовлечения. **Результаты:** Анализ показал, что существующие типологии школьной архитектуры в Астане преимущественно поддерживают лингвистический и логико-математический интеллект посредством традиционной планировки классных комнат. Однако архитектурные элементы, способствующие развитию других типов интеллекта — такие как музыкальные классы, художественные студии, открытые учебные зоны и гибкие пространства для совместной работы — присутствуют непоследовательно и часто маргинализированы в пространственной иерархии. В исследовании выявлены архитектурные особенности, коррелирующие с активизацией различных типов интеллекта, включая амфитеатральные пространства для собраний (межличностный интеллект), зеленые внутренние двory (натуралистический интеллект), мастерские (телесно-кинестетический интеллект) и модульные классные помещения (внутриличностный интеллект). На основе полученных результатов авторы предлагают модель планирования школы, ориентированной на развитие нескольких типов интеллекта, в которой функциональные зоны организованы таким образом, чтобы обеспечить пространственные стимулы, соответствующие каждому типу интеллекта. Эта модель демонстрирует потенциальное направление для переосмысления школьной архитектуры как адаптивной и инклюзивной образовательной инфраструктуры.

Ключевые слова: школьная архитектура; образовательная система; типы интеллекта; книжно-фронтальный метод; система «класс-урок»; комфортная среда; архитектурно-планировочные методы.