ANNOTATION

to the dissertation for the degree of Doctor of Philosophy (PhD) on the educational program: 6D042000 - "Architecture" Gvozdikova Tatiana Anatolyena on the theme: "Ways of development of architecture of school buildings in Kazakhstan".

The Concept of Education Development of the Republic of Kazakhstan for 2022-2026 defines the role of the education system as one of the main priorities of human capital development. "One of the main tasks of the state is the correct upbringing of the younger generation, education of a healthy, purposeful, conscious, spiritually rich and moral personality, which is the most important guarantor of the existence of the state and its future peaceful development", - says the Concept of Education Development of the Republic of Kazakhstan, approved by the Government of the Republic of Kazakhstan on November 24, 2022 № 941. The Constitution of the Republic of Kazakhstan guarantees all citizens the right to free secondary education in state educational institutions.

In 1997, the Republic of Kazakhstan adopted the state development strategy "Kazakhstan - 2030", which defined seven long-term priorities of the country, one of which was "Health, education and well-being of the citizens of Kazakhstan". During the implementation of the strategy, the society has consistently moved forward in all directions, including improving and modernizing the education system. Thus, as a result of work under the development program "Kazakhstan - 2030" with regard to affordable and quality education, the coverage of children with preschool education was increased to 65.4%, programs of compulsory pre-school training covered 94.7% of preschool children, and since the introduction of the strategy "Kazakhstan - 2030" in the country built 942 schools. The strategic program "Kazakhstan - 2050" defines a new political course of development of the state. The list of priorities in the field of education includes the following: development of social responsibility system, development of engineering education system, modernization of educational methods and others.

Specifics of the organization of the educational process, modern educational programs and advanced pedagogical methods influence the trends in the development of architecture of school buildings. Nowadays, school is defined as the basic structure of society's culture, where within the educational process the students are formed not only functional literacy skills, but also worldview, morality, and psychological development. In this regard, the concept of modernization of the education sphere should be considered on the basis of interaction between architecture and pedagogy, as we are talking about creating a new type of personality.

The development of the concept of educational process on the territory of Kazakhstan can be divided into several stages. The history of education development is a rather complex and long process. Starting from ancient civilizations, education was primarily intended to teach religion and train priests, and schools existed at temples. Thus, in Kazakhstan until the XIX century there were only Muslim schools:

mekteb and madrasah, which primarily taught the Muslim faith. Subsequent development of general education schools in Kazakhstan was based on the Constitutions (basic law) approved in different historical periods. At the beginning of the XX century, the Union of Soviet Socialist Republics (USSR) proclaimed the right of citizens to education, enshrined in Article 45 of the last Soviet Constitution (adopted on October 7, 1977). This right was ensured by compulsory eight-year education for all, as well as by the development of specialized secondary, general polytechnic, vocational, technical and higher education based on the link between education and life and production. In addition, forms of evening and correspondence education were developed, and education in schools was conducted in the native language. This process of education development brought quantitative and qualitative changes in the spheres of life of Kazakh society, which is confirmed by the functioning of a significant number of school buildings.

Since independence, the state policy of the Republic of Kazakhstan has undergone reforms not only in educational processes, but also in the architectural design of schools. The development of education in independent Kazakhstan was based on two main objectives: preservation of the existing stock of educational facilities and the existing positive experience of the educational system. Construction of new schools and capital reconstruction of existing schools began. The main reason for the implementation of these measures was urbanization, demographic growth, change in the concept of education, and the demand for a new approach to the organization of the educational environment. According to the collection of statistical data "Education in the RK", in the 2019-2020 school year, 237 thousand schoolchildren in 138 general educational institutions studied in three shifts. It should be noted that in the 2018-2019 school year their number was 128, and five years earlier - 87. According to the analysis of statistical data, the majority of such schools working in three shifts are located in Almaty region (38) and Shymkent (17). There are no three-shift schools at all in the East Kazakhstan, Pavlodar and Kostanay Provinces. Despite the presented statistical data, insufficient number of places in schools is noted; this problem is conditioned by demographic growth.

In order to solve the problem of lack of places in schools in Almaty and Kazakhstan as a whole, the state developed and implemented such projects as "100 Schools, 100 Hospitals" (2007), as well as projects based on public and private partnership. Now the national project in the field of education "Comfortable School", approved by the resolution of the Government of the Republic of Kazakhstan on November 30, 2022, has been developed. The main goal of the project is to eliminate emergency educational facilities, three-shift education and shortage of pupil places in secondary education facilities. Also one of the possible options to solve the issue of insufficient number of places in the existing schools of our city can be their reconstruction.

The actuality of the theme **of this research** is determined by the given statistics, changes in approaches to learning, specifics of modern educational programs and new forms of organization of the educational process. In addition, these trends have an impact on the development of school building architecture. The

development of digital technologies, robotics and programming, requirements for the introduction of inclusive education become important aspects that need to be taken into account in the architectural organization of all types of school buildings with different specific bias.

All over the world, schools built in the last decade are increasingly utilizing non-traditional learning environments where classrooms and corridors are being replaced by more flexible, complex and multifunctional learning spaces. The practice of collaborative design is the cutting edge of modern planners and architects. Architects use the principle of co-design, where teachers and students as stakeholders participate in the planning stage, to create promising designs for modern schools, where the volumetric-spatial and architectural-planning solution will take into account the requirements of the educational process. The rapid development of information technology, global digitalization, the rapid growth of artificial intelligence in various spheres - all this dictates the need to revise not only the goals and methods of education, but also a new view on the design of school space. In this regard, research, development of educational goals and plans, understanding of the essence of interactive learning and innovations in education should be the basis in forming the strategy of "smart classrooms", creating a flexible educational space, comfortable environment that can and should be multifunctional.

Boundaries of the research: temporal boundaries are determined by the period from the 1930s to the present. Geographical boundaries are defined by the modern territory of the Republic of Kazakhstan, in particular, the existing school buildings in the city of Almaty are considered.

Object of study: Architecture of public and private school buildings in Kazakhstan.

Subject of research: architectural and planning, functional, volumetric and spatial methods of solving school buildings and classrooms taking into account the specifics of education (STEM, inclusion, safety issues, additional educational services - musical, mathematical, physical education, art, specialized).

The purpose of the dissertation research is to identify the peculiarities of the development of architectural organization of school buildings in Kazakhstan.

For achieving the set purpose, the following **research tasks** have been identified:

- to study the theoretical basis and archival materials on the research theme;
- to identify architectural and typological aspects of school buildings in Kazakhstan in the XX century;
- to determine the specific features of architectural and compositional design of school buildings at the beginning of the XXI century;
- to study the specifics of modern educational programs and requirements for the space organization of school buildings;
- to make a cross-comparative analysis of the compliance of school buildings in Kazakhstan with the requirements of universal design as the main indicator of the organization of an inclusive environment;
- to make a theoretical model of architectural design of the perspective types of school buildings in Kazakhstan.

Degree of study problem

To identify the state of study of the theme of the dissertation research were considered the works of leading researchers in the architectural sphere, whose works in different degrees reveal the issues of development of architecture in general and school building in special.

The main works of Abdrasilova G.S., Espenbet A.S., Maulenova G.D., Sabitov A.R. and others on the **development of architecture in the cities of Kazakhstan** are reflected in this dissertation.

The problems of school building architecture have been considered by different scientists in their studies: Akhmetova S.P., Bulgakova E.A., Bunik O.A., Vaneyan S.S., Verkhoturova M.V., Gladkova E.O., Irshidat M.S., Koblashova G.V., Konsulova N.A.,Krundyshev B.L., Makaryan M.S., Mironyuk A.V., Mirchevskaya L.B., Motyleva M.I., Naumkin G.I., Nurkusheva L.T., Poznyak S.V., Pridonova N.S., Slavinsky S.P., Tilloev S.S., Titsa L., Turgumbekova E.Z., Huteit N.M., Shmankievich T.Y.

Research on the **questions of school building typology** was conducted by many scientists, such as: Amandykova D.A., Gazizova A.T., Glaudinov B.A., Dvorkina E.B., Ezhov V.I., Zmeul S.G., Zudin A.V., Kuznetsov S.Y., Magula T.K., Pimenova E.V., Smirnov V.V., Stepanov V.I., Chaldymov A.K. and others.

Some attention was given to **urban planning questions of school buildings** design in the works of scientists G.A. Gradov, V.I. Zherdev, A.V. Mahrovskaya, M.S. Myagkov, B.M. Poluya, I.V. Ponomarev, I.B. Fedorova, A.K. Chaldymov, L.N. Chekhov.

Historical steps in the development of compulsory education are studied in the works of Gurkina N.K., Zelev M.V., Romanova G.A., Rubin L.I., Rutkevich M.N.

A big contribution to the study of various aspects in the field **of pedagogy and psychology** was made by: Abdulkayumova I.V., Amonashvili Sh.A., Afanasyeva N.P., Bekhterev V.M., Vakhrushev S.V., Vakhrusheva I.G., Vygotsky L.S., Galperin P.Y., Gordeeva A.V., Ilyin E.I., Leontiev A.N., Makarenko A.S., Probst L.E., Sablina A.N., Slavina T.A., Sukhomlinsky V.A., Fridman L.M., Shatalov V.F., Shpareva N.L., Elkonin D.B..

The questions of inclusive education in their dissertation research were considered by such scientists as: Astanoyants M.S., Artyushenko N.P., Dargan A.A., Daniel M.A., Donkan I.M., Zubareva T.G., Karpova G.G., Melnik Y.V., Naberushkina E.K., Panfyorova O.S., Rossikhina I.G., Sirotiuk A.S., Trofimova V.I., Cherkasova S.A., Chigrina A.Y.; the results of research on the specifics of inclusive education are reflected in the scientific articles by Boyle, C., Espinoza, V.M.T., Moore, B., Wade, C.B., Woodcock, S., and K.A., as well as the results of the study on the specifics of inclusive education.

Scientific innovation of the dissertation research consists in the development of a theoretical model of architectural solution for perspective types of school buildings in Kazakhstan.

The validity results of the dissertation research are confirmed by conducting field research, sociological survey, research methods, which correspond to the purpose of the work and the set tasks.

Methodology and methods of research. The research was based on modern scientific approaches - complex and systemic, which allowed us to study, systematize and analyze the data on the research theme. The work used the main general scientific theoretical and empirical research methods:

- historical-chronological method of analyzing the formation of school buildings of Kazakhstan as an independent type;
- scientific-theoretical method of architectural-typological development of school buildings;
- design-comparative method of architectural solution of foreign and domestic experience of designing school buildings;
- scientific and methodological method of analyzing the development of the specifics of modern educational programs;
- method of sociological research;
- method of field survey of school buildings in the city of Almaty;
- method of conceptual development of models of architectural solutions of promising types of school buildings in Kazakhstan.

The hypothesis of the research is that the concepts of educational programs and using advanced pedagogical methods and educational trends in modern schools require the improvement of architectural and planning, volumetric and spatial solutions and qualitative transformation of the interior space of educational institution, landscaping of school buildings in Kazakhstan.

The scientific and theoretical importance of the dissertation consists in using the results of the results generated in the framework of the sociological research identifying the need for the formation of schools taking into account the principles of accessibility for all groups of students, as well as taking into account the needs of society in the formation of a comprehensively developed personality.

The practical importance of the dissertation consists in expanding the spectrum of architectural decisions in the design of school buildings of various types, taking into account modern trends in the education sector.

Approbation and implementation of scientific results consists in the published textbook “Principles of organization of modern school buildings”. The textbook is used in the training of students of the group of educational programs B073 - “Architecture” in the International Educational Corporation. The results of the dissertation research are implemented in the project practice of “Elite Project Engineering” LLP in 2023.

Structure and volume of the work. The dissertation work consists of an introduction, three section, conclusion, list of used reference sources and applications. The whole work is set out on 189 pages, of which the main text 121 pages and 46 pages of applications, the list of used references consists of 265 names.

On the defense are presented:

- the scheme of chronological development of architectural and typological aspects of the structure of school buildings in Kazakhstan in XX and beginning of

XXI centuries reflecting the main stages, typological changes, the influence of social, political, economic and historical factors on the changes;

- analytical table of architectural and compositional decisions of school buildings in Kazakhstan and foreign countries: architectural-planning, volume-spatial decisions, color-coloristic and stylistic aspects, models of schools, depending on their urban location and other factors;

- the main requirements of modern educational programs for the architectural and typological design of school buildings: functionality, adaptability, safety and innovation;

- analyze the compliance of existing school buildings in Kazakhstan with the requirements of barrier-free space, accessibility, inclusive education and safety;

- requirements of modern education, which affect the formation of architectural-planning and volumetric-spatial decisions of school buildings, identified on the basis of a sociological research conducted;

- theoretical models of conceptual architectural decisions for perspective types of school buildings in Kazakhstan, generated as a result of the research conducted within the framework of the dissertation work.

The author would like to express his appreciation to the staff and faculty members of the IEC (KazGASA), who provided consulting assistance on the composition and content of the study; the Scientific and Technical Library of the Kazakhstan Republic, the National Library of the Kazakhstan Republic, the Russian State Library, the Scientific Electronic Library of dissertations and abstracts “Disser Cat”, the search engine “Google”, the information system “Wikipedia”, whose funds were involved in the formation of the literary and illustrative base of the study; foreign scientific adviser, candidate of architecture, associate professor of the Department of Architecture of the National Research University of Moscow State University Bantserova Olga Leonidovna, as well as domestic scientific adviser, candidate of architecture, research professor of the Faculty of Design IOC (KazGASA) Amandykova Dina Abilmazhinovna.

Main content of the work

In the first part, **“Genesis and development of the school building as an independent typological unit”** gives a historical background on the emergence of education in general in the life of society, considered the systems of organization of education in ancient Egypt, ancient Greece, Rome, in Russia. The architecture and specific features of the organization of learning in madrasahs - as a historical aspect of the formation of the education system in Kazakhstan - are considered.

The experience of creating standard designs of school buildings in the Kazakh SSR since the 1930s has been studied, which allowed analyzing typological changes in school designs. The analysis of changes in architectural and planning solutions in conjunction with the retrospective analysis of changes in the education system, which occurred under the influence of various factors, including political changes of that time, allowed to identify a number of main stages in the development and formation of school space:

- 1917-1950. “Post-revolutionary stage”); Resolution of the Central Committee of the All-Russian Communist Party (Central Committee of the All-Russian Communist Party) “On the Structure of Primary and Secondary Schools in the USSR” (1934); Resolution of the Central Committee of the All-Russian Communist Party “On Measures for the Further Development of Higher and Secondary Education in the Kazakh SSR” (1947));

-1950-1980. Introduction of standard design. This period was marked by the development of a number of standard designs of schools for 640, 690 and 964 pupils by the design institute “Kazgorstroyproekt”, as well as the emergence of boarding schools for different numbers of pupils. During this period there were constant changes in the education system, moreover, the number of school-age children who had to be provided with school places was rapidly increasing. Despite the constant and widespread construction of schools according to the developed standard designs, these factors led to the need to revise the normative requirements for the design of school buildings. Thus, in 1973, new construction norms and rules SNiP 65-73 “General Education Schools and Boarding Schools” were developed, which approved new norms of area per pupil and increased the permitted floor area;

- 1980-1990. It was marked by the “ flash” of construction of school buildings according to the developed standard designs. It should be noted that the number of school-age children continued to increase, which led to the need not only to build new schools according to the designs of larger capacity, but also dictated the need to modernize existing schools through their reconstruction and redevelopment;

- 1990 to the present. Period of change. During this period a number of reforms in the education system took place, new educational standards and design norms were introduced. The school in this period begins to provide not only general education services, but also deals with the all-round development of the learner's personality. Private schools, especially those implementing international educational programs, become a priority when choosing an educational institution.

The analysis of local and foreign experience in the construction of school buildings has revealed significant differences in the volume-spatial and architectural-planning solutions of modern school buildings built abroad and in Kazakhstan. Based on the analysis, it can be concluded that modern trends in the design of educational facilities are inextricably linked to technical and information progress, which in turn make their own adjustments to the requirements for architectural and planning organization of modern school.

Conclusions from the first part:

1 The research of genesis and development of education as a whole and school as a space allowed to determine that the emergence of school has ancient roots and originates in the 5th century BC in ancient civilizations such as Ancient Egypt, Ancient Greece and Ancient Rome.

2. Retrospective analysis of school building changes in the period from 1917 to the present, allowed us to identify 6 main stages of development. The change of school building typology in each period was dictated by the needs of society.

1) The architectural design of school buildings where the educational process was conducted can be called the first stage of “mektebs and madrasahs”.

2) The second stage can be called “adaptation”.

3) The third stage is the stage of so-called “adaptation”, during which general education schools began to be used for specialized needs:

- boarding schools for children with disabilities
- specialized schools (math, music, sports)

4) The fourth stage - determined by the action of the 1955 Decree. The fourth stage - defined by the Decree of 1955 “On the Elimination of Excesses in Architecture” and the creation of the so-called “five-year plans”, which determined the plans in construction, lasting from 1960 to 1991 - is called “typization”.

5) The fifth stage shows economic instability, which caused the network of targeted institutions for disabled children to decrease from 1991 to 2000 and return to the pre-war level of development, as a result of which this period is referred to as stagnation.

6) “Recovery” was the sixth stage, illustrating the beginning of the new century and the state's attention to solving social problems. The stage from 2000-2015 is characterized by a very active construction of socially significant objects (development of honest form of education).

3. Typological analysis of school buildings allowed to determine that the predominant layout is the corridor layout, in which separate zones are allocated: educational, sports, methodical, general school. At the same time, in the educational zone, the rooms intended for studying physics, chemistry, biology do not form a separate laboratory block, but are located separately.

4. Architecture analysis of schools in Kazakhstan and foreign schools has shown that architectural solutions of schools in Kazakhstan are inferior to the world analogs in conceptual, imaginative and innovative solutions.

The second part, **“Modern models of school buildings and the ability of their adaptation to new conditions”**, presents the main trends in education, among which the most significant are globalization, informatization, humanitarization, and humanization of the educational process. The study of these trends allowed us to determine that one of the leading global trends in the development of modern education is the transition to continuous, open education, which forms the basis of information society and is built on the principles of open information space.

In the process of the research we studied various pedagogical methods that are used in foreign and domestic schools. The studied material allowed us to identify three main methodologies - the pedagogical methodology of Maria Montessori, Waldorf pedagogy and Reggio Emilia methodology, the concepts of which determine the architectural and spatial parameters and interiors of school buildings as one of the main components for the successful implementation of the specified teaching methodology.

The study conducted in the second section allowed to identify the main directions in the field of modern education of interest to researchers, among which

are: educational technology and pedagogy, psychology of education, sociology of education, economics of education, politics and education, visual and multimedia education, research on learning outcomes. The conducted research allowed to identify the main teaching methods in modern education: STEM, project method, inclusive education, game-based learning, technological approach to learning, application of artificial intelligence, development of soft skills and collaborative learning of schoolchildren in different schools.

Determined the structure of school education in Kazakhstan, aimed at organizing the system of upbringing and education of children from 6 (7) to 17 (18) years of age. The structure of school education includes three levels: primary, basic secondary and general secondary. Each of the levels has its own purpose. For the purpose of flexibility, mobility and efficiency of the school structure, each level of education is allowed to be independent:

- Stage I - elementary school - primary education (grades 1-4 (5));
- Stage II - basic school - basic general education (grades 5-9);
- Stage III - high school, general secondary education (grades 10-11(12)).

Pandemic (Covid-19), as one of the factors that influenced changes in various spheres of human life, is considered in the second section of this dissertation research. The paper outlines and analyzes information about changes in the field of education as a result of the impact of the pandemic (Covid-19), and in particular issues related to changes in regulatory and other requirements for school building architecture.

As part of the research in the second section, a sociological survey was conducted, which provided valuable information about society's requirements to modern educational space. The survey revealed the main modern methods and approaches to learning that are of interest to modern schoolchildren and their parents. The main and additional functional areas required in a modern school were identified. The sociological survey also revealed that the planning organization of the school building, within the framework of the implementation of inclusive education program, can be significantly influenced by the group of children with locomotor disorders. In addition, in order to determine the spectrum of inclusion in three schools of different types, meetings and surveys of medical staff and teachers were conducted, and materials of social care specialists were studied. The compliance of existing school buildings of different types (international, private and public) with the criteria of universal design was analyzed on the example of schools in Almaty city. The conducted sociological research allowed to identify a number of factors on the basis of which the author formulated not only theoretical recommendations on the organization of school planning structure, but also developed recommendations on modernization of the existing school stock.

Sociological research conducted by the author in conjunction with the studied scientific and theoretical material on the topic of this dissertation allowed to formulate a number of basic issues and recommendations on the organization of inclusive educational space, which in terms of the organization of the learning process for children with special educational needs is reflected in the State Standards of Education (SSE). The second section also provides the current normative

requirements in the architectural and planning organization of inclusive educational environment.

Conclusions to the second part:

1. In the last years, the education system has undergone significant changes, including in educational programs. As a result, various trends and tendencies have emerged (inclusive education, STEM, research and project-based approaches to learning and others), which, in turn, influence the formation of functional areas in a modern school;

2. A modern school should include not only the standard composition of rooms, but also areas for play and recreation of pupils;

3. The form of ownership (public, private), as well as the level of training (general education, gymnasium, lyceum) are not the main factors in the choice of parents. Professional teaching staff, scientific and laboratory facilities, comfortable environment, educational programs - are the main factors in the choice of parents;

4. Teaching children with special educational needs has become an integral part of modern education. Such children study in regular schools. Groups of students with locomotor disorders (cerebral palsy) require certain changes in the planning structure of the school building;

5. Pandemic 2020 made changes in different areas of society, including the requirements for the planned organization of educational facilities. The school building was no exception. The emergency transition to online learning, the need for a certain social distance set new challenges for both educators and architects. The social distance dictated the need to increase the normative permitted area per student;

6. Creation of comfortable conditions for the implementation of inclusive education program should be based on the statistical data of the spectrum of diversity of school building users. The presented information on the spectrum of inclusion emphasizes the relevance of applying the principles of universal design for all types of secondary education institutions: private schools, public comprehensive schools and gymnasiums;

7. The main factors influencing the changes in the school building have been identified: the growth in the number of students, the emergence of multidisciplinary educational programs, changes in state standards of education, and the demands of society;

8. Analysis of the experience of educational organization in schools implementing international programs testifies to the convenient organization of the educational process (full school day, availability of additional developmental programs and sports clubs after the main classes);

9. Practical research of the spatial environment of school buildings of different types has shown partial compliance with the requirements of universal design. Criteria and principles of universal design are one of the key directions in improving the comfort of the subject-spatial environment of school buildings implementing inclusive education programs.

In the third part, **“Prospects for the development of the educational concept and its impact on the architecture of school buildings in Kazakhstan”**, the requirements for the architectural and planning organization of modern educational

space, which will take into account the specifics of various educational trends and advanced pedagogical methods, are formed.

The conducted research allowed us to determine the role of the school in the process of socialization of students, which consists in the influence of architectural solutions, on the formation of a community center around the school, and the creation of an attractive space within the general education school for communication and creativity. The school is the key object of socialization of students. In the process of socialization, along with the educational process, the architecture of the school building, more precisely its functionality and comfort created by means of architecture, is also involved. In the course of the study the role of all architectural aspects of the school building in the process of socialization was determined: the functionality and planning organization of the school is designed to ensure the effectiveness of the educational process and is expressed in the optimal distribution of classrooms, administrative and sports areas, library and other general school premises that can contribute to the creation of a favorable educational environment; ergonomics and comfort of the educational space affect the health of all participants in the educational process, both students and teachers; the safety of the school building is ensured by basic systems that include video surveillance systems, fire protection equipment, emergency protection and evacuation plan; application of the principles of sustainable architecture, energy efficient and environmental technologies, green solutions in the architecture of school buildings.

Reconstruction of school buildings is an opportunity not only to transform the space, but also to influence the educational process itself. It allows to adapt school space to the requirements of modern education and society, it can also allow to increase the classroom capacity of schools, which will reduce the shortage of student places. Besides, with the help of reconstruction it is possible to improve conditions for students and teachers, to create a modern educational space taking into account modern technologies. The result of the reconstruction project is not just a school building, but an educational space designed to be comfortable and meet modern educational needs. Reconstruction as one of the steps that will solve complex architectural problems of the existing school is considered in the third section of the dissertation research.

Based on the results obtained in the course of this research, the author has proposed a theoretical model of general education school based on the principle of variability. The minimum list of school premises for the implementation of the educational process in accordance with the requirements of the state standard is defined, which can be supplemented and expanded under different conditions, for example, taking into account territorial restrictions or on the basis of educational programs chosen by the school. The model reflects a set of basic functional groups of premises. Depending on the territorial conditions and characteristics of educational programs planned to be applied in the school under development, the model can be transformed. The functional composition of spaces may have an optimal list for rural areas, for example, where the number of students will not be large and the spaces can be multipurpose. This model takes into account the functional interrelationship of teaching and general school premises in the school.

One of the main concepts of best pedagogical practices in education is to educate children through communication, i.e. by means of communication, discussion and so on. In this regard, the atrium can become not only a place to spend time during recess, or a place to move from one building to another, but also the main center for forming connections between students through communication. Such a space will provide opportunities for members of the school community to communicate and consequently socialize. Communicating within such a space on common topics, distracted from learning or discussing specific learning tasks between students of different grades and ages, will minimize or eliminate formal barriers between students.

This research made it possible for the author to develop a theoretical model of a school where communication spaces - atriums, recreations, recreation areas, galleries - become the central core of the school building, around which other functional zones are located. These central or "key" spaces will be used not only for school-wide events, but also, if necessary, for educational purposes: for organizing guest lectures, training conferences, and others.

Models that have been developed take into account the possibilities of transformation and adaptation of school space for specific tasks of the educational process and take into account the changes in educational trends in different conditions.

Conclusions to the third part:

1. State programs in order to reduce the deficit of pupil places in schools and improve conditions for students and teachers in the context of the requirements of modern education are not implemented in full compliance with their plan;
2. The developed action plan for reconstruction of the school building can be implemented in a fairly short period of time for the purpose of solving existing problems in the sphere of general school education;
3. Concepts of modern educational programs highlight the following trends in the design of school buildings: Environmental friendliness, psychological comfort, non-standard solutions, individual trajectories, visual diversity, interaction of the school with the public.
4. Developed models of modern school space, take into account the requirements of modern education, such as:

- the possibility of transforming the internal space according to the principle of changing the nature of work with the learner (learner - flow of learners);
- use of open space;
- different types of organization of learning activities (individual or group work, project work or game-based learning);
- formation of a safe space, taking into account anti-terrorist measures;
- use of atrium and recreational spaces for both school-wide purposes and educational purposes;
- provision of conditions for preserving and improving the health of students;

- availability of educational and laboratory equipment and school-wide communications to ensure the educational needs of students with special educational needs;

5. Principles of the developed models show the formation of functional interrelationships of educational space premises of schools implementing different programs, which can be used both in new construction and in the implementation of reconstruction projects of school buildings;

6. Defined groups of premises, the combination of which will make the school space “flexible” and adapted to the conditions of modern education.

7. The most promising is defined as a school that implements the programs of the international standard of education. Such a school will allow to realize all the needs of compulsory education and comprehensive development of the child's personality in the learning process. The set of functional zones for the implementation of such training will have a significant impact on the architectural and planning organization of the school space.

8. Inclusive education is a key component of creating a just and equitable society in which everyone will have equal rights. In the context of universal progress, globalization and a rapidly changing educational landscape, the role and importance of education cannot be underestimated.

Conclusion

Modern school is a multifunctional object, the effectiveness of which depends on the competent merging and solution of educational and architectural tasks. Architects designing school buildings become direct stakeholders of the educational process. This dissertation research considered the issues of compulsory education, the right to which is guaranteed to every citizen by the Constitution of the Republic of Kazakhstan. It should be noted that in modern conditions education is not just the acquisition of knowledge, it is a complex process of education of a developed personality, possessing critical thinking skills, capable of independent activity (collection, systematization of material, planning and responsible decision-making), ready for life in society, labor activity and able to adapt to the realities of the modern world. Education is a process that allows a child to pass through formal and informal institutions. Educational space plays a crucial role in the process of education.

School as a free-standing structure did not appear at once. All over the world, schools were part of monasteries or temples, and existed in cathedrals or mosques. The necessity to build freestanding school buildings in the former Soviet Union appeared in 1918, when the decree on the separation of church and state and school from church was issued. At the same time, the principle of universal compulsory free education was introduced for the first time. The adoption of these laws becomes the starting point for the construction of school buildings as separate architectural objects.

The way of development of education and appearance of school institutions in Kazakhstan was very difficult, our task is to appreciate the merits of our ancestors

and to develop the issues of school buildings design taking into account modern requirements of education and society.

In This research was considered a number of issues: the historical problems of school formation, the processes of school building evolution and the development of the education system were studied. When embarking on this research, the author defined the hypothesis, which was that the concept of educational programs and the use of advanced pedagogical methods in modern schools can have a significant impact on architectural, planning and volumetric-spatial solutions. In the course of the research both theoretical and empirical research methods were applied, such as studying the theoretical base and archival materials on the theme of the research; conducting a retrospective analysis on the issue of school formation; studying the features of modern educational programs, various trends and methods used in modern schools; conducting a sociological survey and conversations with teachers and specialists directly involved in the process of teaching children with special educational needs. The paper substantiates the idea of demand for a new approach to the design of school buildings based on the facts that traditional education needs serious adjustments requiring new architectural solutions for organizing space. The research conducted in the framework of this thesis has allowed us to formulate a number of conclusions.

1. Modern pedagogical methods, educational trends and programs, as well as approaches to learning at the present stage dictate the need to revise the standards of school building design and change the requirements for architectural and planning solutions. The main requirements for designing a modern educational environment should be mobility, the possibility of introducing STEAM/STEM technologies, safety, environmental friendliness, creation of psychological comfort and support of individual educational trajectories by means of architectural solutions.
2. Visual difference, non-standard architectural solutions, the use of accents in the architecture of school buildings, play an important role in creating an educational environment that can arouse interest in learning, inspire and stimulate students not only to study, but also to self-development;
3. Studies of existing educational programs in Kazakhstan and their comparative analysis allowed to conclude that the most promising will be the school that implements international educational programs, which take into account not only the programs of compulsory education according to the state standard, but also offer additional comprehensive development of students;
4. Experience with the change to online learning lessons learned during the covid-19 pandemic, as well as the continued implementation of educational processes within schools during the pandemic, revealed the need for adjustments to the normative requirements for the design of school buildings, such as changing (increasing) the normative space, having more rooms for individual or small group classes, and having a well-developed technical infrastructure of educational institutions;

5. Inclusive education, as one of the promising types of educational trajectories in Kazakhstan, dictates the requirements for the organization of a barrier-free educational space, as well as a comfortable environment for learning for children with special educational needs. Such conditions can be created with the help of architectural and planning solutions, as well as taking into account the application of criteria of universal design of the internal spaces of the school building.
6. Experience of implementing state programs to solve the existing problems in the field of education from the architectural point of view revealed incomplete compliance of their implementation in relation to the envisaged plan, from which it can be concluded that the implementation of such programs can not fully affect the change of the existing situation;
7. Designed models of perspective types of school building in Kazakhstan take into account the requirements of the studied pedagogical methods, educational trends, programs, as well as the requirements of modern society to the educational space of a school building. It should be noted that these models can exist and be applied in design practice both individually and creating various combinations among themselves.

So, this research confirms the hypothesis established at the initial stage of the study. The study of modern educational programs has shown that a modern school should solve various problems and meet the requirements of modern globalized and intercultural society.

Based on the findings of the conducted dissertation research, the following perspectives for the development of school building architecture can be proposed:

1. The projecting of school buildings with the application of the principles of adaptability of school structures and the formation of flexible planning solutions, will contribute to the realization of different methods and ways of learning, as well as allow to adapt the educational space of schools to the requirements of educational trends, which in turn will make the school modern, corresponding to the requirements of education, taking into account the changes in educational trajectories in the future.
2. During the design of school buildings taking into account the prospects of their development, it is necessary to pay attention to the creation of the internal space of the school, meeting the requirements of psychological and aesthetic comfort, as based on the study conducted in the dissertation revealed that the school at all times was not only a place to obtain knowledge, but also influenced the psychological development of personality, and contributed to the formation of human personality
3. Application of sustainable architecture principles in the design of school buildings, the introduction of innovative technologies and ecological solutions will make it possible to create a facility that meets the requirements of environmental safety, which is important today and will become even more important in the future;
4. Design of school buildings as objects of socialization and social adaptation of students should take into account the principles of interaction of the

school with the environment, as well as cultural and regional issues of architecture.

All these recommendations help to create a school building that meets the requirements of environmental friendliness, energy efficiency, safety and comfort. Such a school will meet the needs of education and society for a long time, and an architectural object designed according to these principles will be able to interest students and stimulate students to study and self-development.

Research of school buildings architecture is perspective for expansion of the issues under study. The research of this topic for Kazakhstan can be continued by studying the direction of structural solutions used to implement the projects of modern school buildings, as well as researching the possibilities of using different structural systems in modular design.

Publications on the dissertation theme include the following:

1. Гвоздикова Т.А. Современные тенденции в образовании и архитектура современной школы // «Вестник современных исследований». – 2018. - Выпуск № 12-15 (27). – С. 79-83
2. Gvozdikova T., Nurkusheva L., Isniyazov Z., Yestemessova A., Gumenyuk V. Inclusive public space as a principle of understanding of cultural diversity // EurAsian Journal of BioSciences. – 2020. – P. 6371-6376.
3. Gvozdikova T., Amandykova D. Promoting Inclusive Education in Kazakhstan: Environmental and Architectural Aspects // ISVS e-journal. – 2023. -Vol. 10, Issue 4. – P.201-210.
4. Гвоздикова Т.А., Горячих В.А. Медресе как прототип современной школы // XX Международная научно–практическая конференция им. В. Татлина. – Пенза, 2024. – С.177–183.
5. Гвоздикова Т.А. Современные методы образования. инклюзивное образование // Международная научная конференция «Progress in Science». - Brussels, Belgium 2024. – P. 118-126.
6. Гвоздикова Т.А., Влияние социологических данных на проектирование школьных зданий: результаты социалогического опроса и их практическое значение // X международная научная конференция. Торонто. Канада. 02-03.05.2024. с. 5-13.
7. Smilka V., Gvozdikova T., Yespenbet A., Fendt Y., Amandykova D., Utesheva G. Methodology for evaluation pedestrical accessibility to educational institutions for the formation of an inclusive environment / Architecture and Culture, 2024. Принята в печать.