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A. Ozhet¹, S. Mamedov², Sh. Surankulov¹

¹S. Seifullin Kazakh Agrotechnical Research University, Astana, Kazakhstan,

*E-mail: Arshyn.novyj@bk.ru**

E-mail: sh.surankulov@kazatu.edu.kz

²L.N. Gumilyov, Astana, Kazakhstan

E-mail: sp_proekt_stroy@bk.ru

FEATURES OF ARCHITECTURAL DESIGN OF GENERAL EDUCATIONAL ORGANIZATIONS IN THE HISTORICAL EXAMPLE OF GERMAN ARCHITECTURE

НЕМІС СӘУЛЕТТІК ТАРИХЫ МЫСАЛЫНДАҒЫ ЖАЛПЫ БІЛІМ БЕРУ ҰЙЫМДАРЫНЫҢ СӘУЛЕТТІК ЖОБАЛАУ ЕРЕКШЕЛІКТЕРІ

ОСОБЕННОСТИ АРХИТЕКТУРНОГО ПРОЕКТИРОВАНИЯ ОБЩЕОБРАЗОВАТЕЛЬНЫХ ОРГАНИЗАЦИЙ В ИСТОРИЧЕСКОМ ПРИМЕРЕ НЕМЕЦКОЙ АРХИТЕКТУРЫ

Abstract. Throughout his life, a person goes through a long and thorny path, forming skills, and discovering consciousness. With the temporary human need for education in educational institutions, however, it should be noted that people have knowledge and awareness and education in educational institutions, at the expense of individual education. In this article, we analyzed how the social aspect influenced the architectural planning methods of comprehensive schools in 19th-century Germany. The main reason for the emergence of international school standards was the new initiatives in the design of school buildings that began in the 19th century. In the article, we determined the theoretical model of school buildings, taking into account the features of each period.

Keywords: Architecture, schools, educational system, book-frontal method, class system, comfortable environment, architecture-planning methods.

Аңдатпа. Адамзат қоғамды қалыптастыруда ұзақ әрі қиырлы жолдан өтеді, дағды қалыптастырады, санасын ашады. Адамның оқу орындарында білім алуы ұзақ уақыттық қажеттілік болғандықтан, олардың білім алуы мен тұлғалық сана-сезімі білім беру мекемелерінде тәлім алу барысында қалыптасатынын атап өткен жөн. Бұл мақалада біз 19 ғасырдағы Германиядағы жалпы білім беретін мектептердің сәулеттік жоспарлау әдістеріне елеуметтік аспект қалай әсер еткенін талдадық. Халықаралық мектеп стандарттарының пайда болуының негізгі себебі 19 ғасырда басталған мектеп ғимараттарын жобалаудағы жаңа бастамалар болды. Мақалада біз әр кезеңнің ерекшеліктерін ескере отырып, мектеп ғимараттарының теориялық үлгісін анықтадық.

Түйін сөздер: Сәулет, мектептер, оқу жүйесі, кітап-фронтальды әдіс, сынып жүйесі, қолайлы орта, сәулет-жоспарлау әдістері.

Аннотация. Всю свою жизнь человек преодолевает длинный и тернистый путь, создавая навыки, привычки и накапливая знания. Так как обучения человека в учебных заведениях – это долгосрочная потребность, следует отметить, что его образование и личностное сознание формируются посредством обучения в образовательных учреждениях. В данной статье мы проанализировали, как социальный аспект влиял на методы архитектурного планирования средних школ Германии в XIX веке. Основным направлением возникновения интернационального школьного образования стали новые инициативы в проектировании школьных зданий, начавшиеся в XIX в. В статье мы определили теоретическую модель школы с учетом особенностей каждого периода.

Ключевые слова: Архитектура, школы, образовательная система, книжно-лицевой метод, система классов, подходящая среда, архитектурно-планировочные методы.

Introduction. The initial school buildings in the history of architecture were placed inside teachers' homes. As a result, primary education in Germany is conducted in informal school buildings that lack sufficient space to cater to the needs of the education system. Until the 19th century, most children were educated in an informal, unorganized space, in cooperation with church authorities. These schools were located in church buildings and premises located in their courtyards.

The Manual of School Buildings penned towards the close of the 18th century, is acknowledged as one of the earliest and most coherent treatises on school structures in Germany. To build a school building construction plans were put into basic use, and in the following decades, these standards and regulations were mostly supplemented with additional aspects.

Literature Review. In their analysis «from “school building” to “school architecture” – school technicians, grand school buildings and educational architecture in Prussia and the USA in the nineteenth century», Daniel Töpper and Fanny Isensee [1] omitted an examination of the transformative dynamics within the educational landscape of Germany, particularly concerning the evolutionary model and the extent of external factors' influence on architectural and planning frameworks within educational institutions.

The study conducted by Töpper and Isensee, while insightful in certain aspects, falls short of comprehensively addressing the intricate evolutionary trajectories of the German educational system. Notably absent from their investigation is a nuanced exploration of the underlying paradigm shifts and the intricate interplay between external variables and the architectural and planning constructs governing educational organizations.

Hesam Mosharraf's «Urban Morphology Schools: A Review of the English, Italian, and French Schools of Thought» scholarly work delves into urban morphology schools, focusing on the English, Italian, and French schools. Employing robust academic methodologies, the analysis systematically identifies key themes and considerations, contributing significantly to urban morphology knowledge and offering a framework for future research. The English School, championed by Otto Schluter and MRG Conzen, examines urban landscapes' impact on development. The Italian School, led by Saverio Muratori and Gianfranco Caniggia, analyzes existing cities' morphology. The French School, established by Philippe Panerai, Jean Castex, and Jean Charles Depaule, merges design theory with urban development theory, drawing from sociology and architectural history. The article compares and critiques these schools, aiming to deepen understanding and foster scholarly discourse. While modern methods exist, the study argues for the continued relevance of classic schools and their fundamental elements in analyzing urban settlements through case studies. Wich recommends evaluating the merits of each school in relation to specific case studies rather than being confined to specific school boundaries [16].

The evolution of school architecture in Germany reflects a dynamic interplay between educational philosophies, architectural innovations, and socio-political contexts. Recent research from Scope and Web Science databases illuminates contemporary trends such as sustainable design integration, underscoring the ongoing dialogue between tradition and innovation in German school architecture. The purpose of this scientific article that emphasizes the critical role of understanding the historical patterns of architectural development within the educational landscape of Germany. By exploring the evolution of school architecture throughout history, particularly within the German context, we aim to elucidate the foundational principles that underpin modern architectural solutions in educational settings.

Materials and methods of research.

– method of analysis of documents. At the initial stage of this research, the collection of literary and scientific material was carried out, and then the collected material was analyzed.

– graphic design method. The architectural design method was used in the formation of options for architectural and planning decisions of school complexes, affecting the comfort and economy of the educational environment.

– A method of comparative analysis shown by comparing the methods used in Western school buildings.

– the method of summarizing the results. Due to the scope of this study, the results obtained will be generalized and clarified in the last stage.

Results and discussion. The basis of classroom teaching, which is widespread in the modern world education system, was formed in the early Middle Ages. Medieval religious figures were the spreaders of the teachings of that period and became an ideal that glorified knowledge. In Germany, following the same principles, it was believed that in the formation of the systematic stage of education, it is necessary to submit to religion and to obey the teachings written in religious books. Because the answers and solutions to all unknown questions to mankind were shown in religious books, and there was no mutual feedback between the student and the teacher, the book-frontal system of education was formed as a teaching format at that time.

In the present period, the round individual format of the lesson was taken, and due to the lack of personal relations with students, teachers had the opportunity to lecture a large number of students at one time. The arrangement of the lecture desks in the classroom was placed in the frontal direction to the teachers, and the frontal equipped in a row was formed as a systematic method of teaching.

On this basis, we can see that a well-established pattern of teaching and classroom organization emerged in the early Middle Ages. The main component of education in the period of early feudalism is theological (spiritual).

The emergence of the feudal city and the appearance of urban culture broke the centuries-old monopoly of the Catholic Church in the field of education. This is how the first urban schools appeared in Prussia. [1].

A logical starting point for delving into the evolution of school architecture in Prussia is to focus on the urban elementary schools in Berlin. Prussia, known not only for its economic progress but also for its exemplary approach to education administration, played a pivotal role in shaping various educational systems during the late Middle Ages. During this period, the method of teaching a group of students collectively through the frontal book-based approach gained widespread use. Compared to the traditional individual mentoring approach, this teaching method contributed to the rapid development of science and knowledge within a short timeframe, addressing the evolving needs of the emerging society. Furthermore, the widespread implementation of mass education was made feasible with the introduction of the printing press [2].

Instruction took place in designated classrooms utilizing specifically crafted textbooks, allowing teachers to educate multiple students concurrently. This widespread adoption of this method led to the decline of the personalized, adaptable teaching approach. In its stead, there was a marked surge in the efficiency and effectiveness of education.

The development of the state in the period of global trade and the economic market was directly related to the level of education in demand of the demographic group. Taking into account these conditions, he began to establish a new format and specific principles of education in the field of education, and he realized that he would find a solution by teaching the maximum number of people in the same space in a short period. The book-frontal method of

education proved to be suitable for mass lectures. This means 25-50 students per teacher. The classroom system is sometimes named after Henry Ford, who invented the assembly line method of production.

In particular, in the second half of the 19th century, Prussian Berlin underwent significant changes in its educational system, when a new generation of school buildings were built, reflecting the latest innovations in educational theory and architecture. These new schools were designed with different educational needs in mind and were designed in a class-wise manner.

The establishment of a school administration system in Germany, similar to the model introduced by Wilhelm Reichenau in 1826, began with his appointment as a leading figure in the municipal school council. During this period, there was a mandated restructuring of educational institutions, requiring the re-establishment of private and parish schools to provide a uniform and comprehensive education for diverse groups of students, starting from primary levels. His plan for reconstruction in 1827 included inviting apprentices to municipal school buildings. These schools were obliged to follow a prescribed curriculum, divided into upper and lower classes depending on certain age periods and learning outcomes.

Focusing on the work of education officials, we will discuss the joint work of teachers and school administration and analyze the history of school buildings.

Taking a close look at the cost argument, Reichhelm [3] student education detailing how much it would have cost in the past and how much his plan would cost, he says building public schools would be only slightly more expensive than private schools. Ultimately, his plan was realized and remained the standard for the following 20 to 30 years, even if the willingness to raise the necessary funds dwindled. [4] Differentiation into individual subjects is not based on the increase in the number of students, as suggested by Felbiger, but is considered an effective way to attract as many students.

The external appearance and architectural design of school buildings were shaped by the requirements of the educational process. The standard rectangular layout of classrooms in the architectural plan was intended for a frontal-linear reception of information. The arrangement of students' desks in rows, facing the teacher's board at the end of the classroom, influenced the overall layout of the school building. This structure consisted of standard classrooms interconnected by a corridor, which served as a means of communication between classrooms. Along this corridor, students moved from one classroom to another, receiving information from different teachers. To enhance the organization of the entire learning process, the space was not only designated for typical classrooms but also incorporated specific standard time divisions, including periods for information reception and breaks for rest (which also allowed time for transitioning to a new study location).

As a rule, the same period of training was developed in all states - 40-45 minutes. exercise, 8-15 minutes are divided into rest [5].

During the era of industrialization, the evolution of school building design aligned with the classroom teaching method, progressing gradually over several centuries. Towards the end of the 18th century, notably in Germany and Anglo-Saxon countries such as England, the USA, Canada, Australia, and New Zealand [6], schools emerged as single-room structures where approximately 10 students of varying ages and skill levels received instruction. Alongside the classroom, these schools typically featured an additional space designated for the teacher or even served as a residential apartment.

In 1827, there was a notable expansion in the size of the study hall, accommodating up to 300 students simultaneously due to a growing demand for education. Faced with a shortage of teachers during this period, assistant teachers were introduced, each responsible for their class of students. To address the challenge of managing a large space and reducing noise, special

curtains were installed in rows to visually separate different sections. Over time, these curtains evolved to serve as partitions, separating one group of students along with their teacher from another class. This period was the beginning of the transition period from a multi-class school to a multi-class school.

In the initial phase, the initial segmentation of the educational curriculum into distinct classrooms was not based on age groups but rather on the type of lesson, such as writing, reading, and counting. These classrooms could encompass children with varying levels of preparation simultaneously. Subsequently, students within a single educational institution were segregated into separate rooms, leading to a beneficial impact on the pace and quality of learning.

In the following decades, from 1835, the number of classes in the school increased due to the increase in the number of students enrolled and was accompanied by a differentiation from four classes in the school curriculum (see Figure 1) to eight classes (four) per school. After 1850 school buildings with 12 classrooms were built, which went hand in hand with a curriculum with six differentiated classes [7].

In primary schools, lessons are conducted across six consecutive classrooms. However, the swift rise in student numbers necessitated the construction of more extensive buildings, leading to the customary practice of combining 15 or 16 classes with 70, 65, and 60 students in the lower, middle, and upper classes.

Figure 1 illustrates the initial floor plan of the Schmidstrasse school building, originally constructed in 1846 and later renovated between 1872 and 1873. This plan represents the earliest concept of a 12-room school. The image showcases two out of three floors of the Kurfürstenstrasse school building, erected between 1873 and 1874, featuring 14 classrooms, including three additional classrooms and an assembly hall. Subsequent buildings incorporated an increasing number of classrooms, as depicted in Figure 1: all had at least 36 classrooms, the later the school was built, the more rooms it had [7]. In the following decades, these standards were mostly upheld and new aspects were rarely added [8].

The evolution of learning environments occurred progressively, though not uniformly, across various nations. Over time, nearly all European educational systems transitioned from compact rooms accommodating students of various ages to a multi-class configuration of school buildings organized based on the student's age groups. Typically, the structure with corridors has demonstrated its effectiveness, where classes of similar sizes are universally linked through communicative transitions.

The vast majority of public schools in the world have typical classrooms attached to the axis of the corridor built according to this principle. This principle is based on the number, design level, equipment, etc. of additional school premises. remains constant regardless of the difference.

Thus, the main idea of the 20th century is the standardization of both educational programs and the design of school buildings.

In Germany, the cultural factor played a major role in the formation of education and school architecture in the 19th century. Germany was in the throes of a national awakening and education played an important role in shaping national identity [8].

In the 19th century, Germany was a leader in scientific research and education became a top priority of public policy. During this period, an educational system was created that was accessible to all groups of the population and ensured high quality of education. He entered the education system and determined the national and cultural traditions used in school construction. The rapid increase in the number of students necessitated the construction of increasingly large buildings and the differentiation of classrooms in the architectural planning organization.

The main activities of the society	Factors	Theoretical model of evolution (development) of architectural planning structures of schools	Functional diagram	Educational model	
				Learning principle	Educational space
God-center of the world, rigid hierarchy (before 1800)	Religion Morality			Learning principle no clear structure, passive method 	No differentiation of learning space
Division of society into classes formation of urban society Rigid hierarchy (Berlin Comprehensive Schools 1827)	The science Religion			book-frontal method 	Beginning of differentiation learning space
The emergence of new social groups (Berlin school with twelve classes 1846)	The science Morality			Classroom systems 	Differentiation of educational institutions
The emergence of new social groups, the development of industrialization (school with twelve classrooms, two additional classrooms and an assembly hall)	The science Economy Art			Subject method teaching 	Differentiation of additional educational institutions
Many social groups, industrial boom (School with 40 classrooms, built between 1888 and 1890)	The science Economy Art			Subject method of teaching standardization of the class-lesson system 	Rigid modular structure of the learning space, increasing the odds of buildings
Legend: Room for study Special subject room for training sessions Assembly Hall Corridors				Legend: Teacher №1 Teacher №2 Teacher №3 Teacher №4 Students	

Figure 1. Evolution of architectural and planning methods of organizing general institutions in Germany in the 19th century

At the same time, the economic factor played an important role in the development of education [9] and school architecture in Germany. During this period, Germany experienced rapid economic growth, which led to population growth and the need to develop the education

system. In response to this growth, new schools were established using new technologies and architectural principles. One of the main goals of the development of the schools was to attract young people to the innovative economy, which was the basis of the new way of life in Germany. It was necessary to develop the intellectual abilities of schoolchildren, and this was the main task of the new pedagogical concept developed by Johannes Schulenburg.

A theoretical model of the evolution of the architectural planning structure shows the stages of development of schools in Germany in the 19th century. According to the analysis table, the main activity of the society is directly reflected in the teaching principles of the educational model. According to the tab. 1 strict hierarchy, social unity, and the influence of religion created the need for the passive frontal method as a more suitable form of mass education with a series of tables directed at the teacher. In turn, this process was also reflected in the architectural planning of German schools of that period as a monofunctional layout.

In the first half of the 19th century (early 1800s) [11], the division of society into classes was due to the development of the economy and the expansion of cities. Consequently, this affected the size of the gym, accommodating up to 300 students at a time. One teacher was not enough, other teachers appeared, each of them dealing with students in their ranks. From 1927, this period was practically a transition from single-class to multi-class schools.

In the next few decades, in 1827, due to the emergence of new social groups in the school, the number of students increased, the classes increased, and the school curriculum was differentiated. The rationale behind dividing subjects individually is deemed an efficient approach to maximize student enrollment in the education system [12].

The evolution of learning spaces occurred gradually and varied across different countries [17]. Over time, the majority of European educational systems transitioned from small classrooms accommodating students of different ages to a multi-class school building design organized by student age groups. Typically, the corridor-style structure has proven to be the most effective, connecting classes of similar sizes through communicative transitions.

During the industrial surge in Germany, similar to many other nations, there arose an urgent demand to supply the job market with a skilled workforce capable of operating increasingly sophisticated equipment. In the context of rapid advancements in production and the scientific and technical revolution, the primary objective was to eradicate general population illiteracy, with the highest priority being the prompt provision of specialized professionals to meet production needs.

The evolution of the architecture of the 19th-century school in Germany was significantly influenced by scientific and economic factors. After the unification of Germany in 1871, during the rapid development of industry and population growth, significant changes took place in the education system of the country, which were reflected in the architecture of schools [13]. They were functional, convenient, and affordable, which met the new requirements for teaching and educating the younger generation. These changes in the architectural planning structure of schools also reflected the general trend towards rationalization of buildings in the late 19th century [14]. School buildings certainly represent a subject of interest for different professions and their discourses [15].

Conclusions. Following this, one can deduce that the architectural planning arrangement within educational establishments is contingent upon educational principles, content, the establishment of the educational process system, and its configuration. From this standpoint, the progression in shaping the theoretical model (development) of the architectural planning structure for school buildings can be discerned, driven by shifts in the educational process, encompassing its social elements and teaching principles, educational principles, teachers, and students). to determine the general laws of the structural organization of educational institutions to predict the future development of their buildings.

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