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RESEARCH ARTICLE

MODERN EDUCATIONAL STRATEGIES AND SCHOOL ARCHITECTURE: MUTUAL INFLUENCE AND SYNCRETISM

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Abstract. *The article deals with the interaction between architecture and education, the influence of various factors on the creation of modern educational institutions. It is important that modern educational trends are also able to influence the formation of planning organization and volume-spatial solution of a modern school building. The world practice of life-long education is considered and how it is implemented in architectural practice in our country. The article reflects the currently popular teaching strategies: design studio model, environmental learning, taxonomy of goals, work evaluation model and the model that takes into account the needs of groups of people with special educational needs. Based on the study of existing experience, a major principle in the concept of school building design is identified: the interaction between the context, the content of the learning process and the learning process itself. A number of trends and transformations of architectural and planning solutions of school buildings have been identified. On the basis of the studied material the effective variant of the model of learning space is revealed, the taxonomy of formation of learning space of a modern school building is defined. As a result of the study, three main concepts of forming a modern school building that meets the requirements of modern education are defined.*

Keywords: *educational strategies, learning environment, learning material, taxonomy, syncretism.*

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ҒЫЛЫМИ МАҚАЛА

ҚАЗІРГІ БІЛІМ БЕРУ СТРАТЕГИЯЛАРЫ ЖӘНЕ МЕКТЕП АРХИТЕКТУРАСЫ: ӨЗАРА ӘСЕР ЖӘНЕ СИНКРЕТИЗМ

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Аңдатпа. *Мақалада сәулет пен білімнің өзара әрекеттесу мәселелері, заманауи білім беру мекемелерін құруға әртүрлі факторлардың әсері қарастырылған. Заманауи білім беру тенденциялары заманауи мектеп ғимаратының жоспарлау ұйымы мен көлемдік-кеңістіктік шешімін қалыптастыруға да әсер ете алатыны маңызды. Өмір бойы білім берудің әлемдік тәжірибесі қарастырылып, оның біздің елімізде сәулет тәжірибесіне қалай енгізіліп жатқаны қарастырылады. Мақалада бүгінгі таңдағы танымал оқыту стратегиялары көрсетілген: дизайн студиясының моделі, экологиялық оқыту, мақсаттар таксономиясы, жұмысты бағалау моделі және ерекше білім беру қажеттіліктері бар адамдар топтарының қажеттіліктерін ескеретін модель. Қолданыстағы тәжірибені зерделеу негізінде мектеп ғимараттарын жобалау концепциясындағы негізгі қағидалардың бірі анықталды: контексттің өзара әрекеттесуі, оқу процесінің мазмұны және оқу процесінің өзі. Мектеп ғимараттарының сәулеттік-жоспарлау шешімдеріндегі бірқатар тенденциялар мен өзгерістер анықталды. Зерттелген материал негізінде оқыту кеңістігі моделінің тиімді нұсқасы анықталып, заманауи мектеп ғимаратының оқу кеңістігін қалыптастыру таксономиясы анықталды. Зерттеу нәтижесінде заманауи білім беру талаптарына жауап беретін заманауи мектеп ғимаратын қалыптастырудың үш негізгі тұжырымдамасы анықталды.*

Түйін сөздер: *Білім беру стратегиялары, оқу ортасы, оқу материалы, таксономия, синкретизм*

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НАУЧНАЯ СТАТЬЯ

СОВРЕМЕННЫЕ ОБРАЗОВАТЕЛЬНЫЕ СТРАТЕГИИ И АРХИТЕКТУРА ШКОЛЫ: ВЗАИМОВЛИЯНИЕ И СИНКРЕТИЗМ

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Аннотация. *В статье рассматриваются вопросы взаимодействия архитектуры и образования, влияние различных факторов на создание современных образовательных учреждений. Важным является то, что современные образовательные тенденции тоже способны влиять на формирование планировочной организации и объёмного-пространственного решения современного школьного здания. Рассмотрена мировая практика обучения в течение всей жизни- life-long education и как она внедряется в архитектурную практику в нашей стране. В статье отражены популярные на сегодняшний день стратегии обучения: модель дизайн-студии, средовое обучение, таксономия целей, модель оценки работ и модель, учитывающая потребности групп людей с особыми образовательными потребностями. На основе изучения существующего опыта выявлен один из главных принципов в концепции проектирования школьных зданий: взаимодействие контекста, содержание учебного процесса и самого процесса обучения. Выявлен ряд тенденций и трансформаций архитектурно-планировочных решений школьных зданий. На основе изученного материала выявлен эффективный вариант модели учебного пространства, определена таксономия формирования обучающего пространства современного школьного здания. Как результат исследования определены три основные концепта формирования современного школьного здания, отвечающего требованиям современного образования.*

Ключевые слова: *Образовательные стратегии, обучающая среда, обучающий материал, таксономия, синкретизм*

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CONFLICT OF INTEREST

The authors state that there is no conflict of interest.

АЛҒЫС / ҚАРЖЫЛАНДЫРУ КӨЗІ

Зерттеу жеке қаржыландыру көздерін пайдалана отырып жүргізілді. Автор зерттеу барысында консультациялық көмек көрсеткен Халықаралық білім беру корпорациясының (ҚазБСҚА кампусы) әріптестеріне алғысын білдіреді.

МҮДДЕЛЕР ҚАҚТЫҒЫСЫ

Авторлар мүдделер қақтығысы жоқ деп мәлімдейді.

БЛАГОДАРНОСТИ / ИСТОЧНИК ФИНАНСИРОВАНИЯ

Исследование проводилось с использованием частных источников финансирования. Автор выражает благодарность коллегам Международной Образовательной корпорации (кампус КазГАСА), оказавшим консультационную помощь при проведении исследования.

КОНФЛИКТ ИНТЕРЕСОВ

Авторы заявляют, что конфликта интересов нет.

1 INTRODUCTION

The interaction between architecture and education has been developing for centuries and has a mutual character. Deep centuries-old traditions of building educational institutions, formed in regions with different natural, climatic and socio-cultural conditions, led to the formation of a variety of volumetric and spatial structures of educational facilities. Today the question of adequacy of generally accepted variants of compositional and planning solutions of existing schools and those active changes that are taking place in the education system both all over the world and in our country becomes relevant.

It is time to transform our traditional view of learning and create a new learning environment that is relevant to educators, administrators, and most importantly, learners of all ages. Active collaboration among architects, educators, parents, administrators, and other interested community members can play a very important role in this process. The question of what architects can do to support education and what educators can contribute to the design process are now becoming important as part of the implementation of co-design principles. Is it possible to create an interactive environment that serves as a “three-dimensional textbook” for learners? What elements of architectural space can drive the learner's desire and drive to learn? What architectural techniques, landscaping elements, design objects, and principles of environmental organization can become catalysts for self-learning processes?

2 LITERATURE REVIEW

The world practice of education for the whole life of a people, life-long education, is being introduced in our country as well, as it has come to be understood that education for the purpose of maintaining physical, mental and emotional health of a person is important for the effective and successful development of society as a whole. That is why for designing a modern school it becomes fundamentally important to study new educational systems, sometimes quite different from the early traditional ones. It is necessary to formulate a philosophy of education, create a taxonomy of learning experiences and performance goals, define children's rights to development, and create valid forms of analysis and evaluation. The process of the architectural design of a modern educational facility inevitably poses the challenges of a deep understanding of the learning system.

Trends in modern education are the subject of research by many scientists. In their dissertations these issues were considered by: **Kraig (2000), Bessarabova (2006), Volodin (2011), Volkova (2004), Vyazemsky (2004), Lim (2006), Marina (2003), Machekhina (2021), Statkova (2005), Shultseva (2009), Yatsenko (2021)**. Trends in modern education are the subject of research by many scientists. In their dissertations these issues were considered by: **Akulova (2004), Antonova (2012), Pankova (2004), Savinova (2021), Sosnin (2014), Belogrudova (2008), Shcheblanova (2016), Osorina (2007), Khaperskaya (2020), Khomuttsova (2005)**, and the influence of outer factors on the educational process was considered in the works of **Antipkina (2020), Bikbaeva (2021), Drozdov (2022), Makotrova (2021), Remorenko (2019)**.

3 MATERIALS AND METHODS

Despite the fact that the early methods of school building design, which were tested in capital sociological studies, have proven themselves, when developing new solutions it is necessary to ask the question again: what do schoolchildren need for successful learning? This is not an idle question, and it is caused by the change of the educational paradigm towards individualization of methods, bringing them closer to the technologies of play and creativity, where there is no single correct answer, but there are options for solving problems. And most often, as in the professional activities of adult people, it is the learner's ability to respond flexibly and effectively to emerging challenges that is assessed. Obviously, learning spaces should support the learner's enthusiasm for inquiry. At

the same time, it is clear that all learners are different and everyone has different ways of forming perceptions and processing information. This is supported by the results of well-known studies of information processing and developmental stages of children **Piaget (2004)** theory of multiple intelligence **Gardner (2004)** adopted as a basis for new learning strategies. Accordingly, new learning processes provide an active view of the learner, which is now being considered in the design of school buildings. Some of the learning strategies developed to date, depicted in **Figure 1**, are:

- design studio model (design technologies);
- environmental learning;
- taxonomy of objectives;
- a model for assessing learners' work;
- a model that takes into account the needs of different groups of learners.

Figure 1 – Modern learning strategies (authors' material)

Each of the strategies in its own way teaches certain skills, the ability to seek and find information and master the process of problem solving, i.e. it allows to solve the main tasks of the educational process.

Cooperation between the context, content of the learning process and the learning process is the main principle in the concept of school building design by researcher **Ostroverkh and Tikhomirova (2021)**. In this case, the context is understood as the learning environment **(Figure 2)**: artificial, natural, cultural, which is an active "learning material".

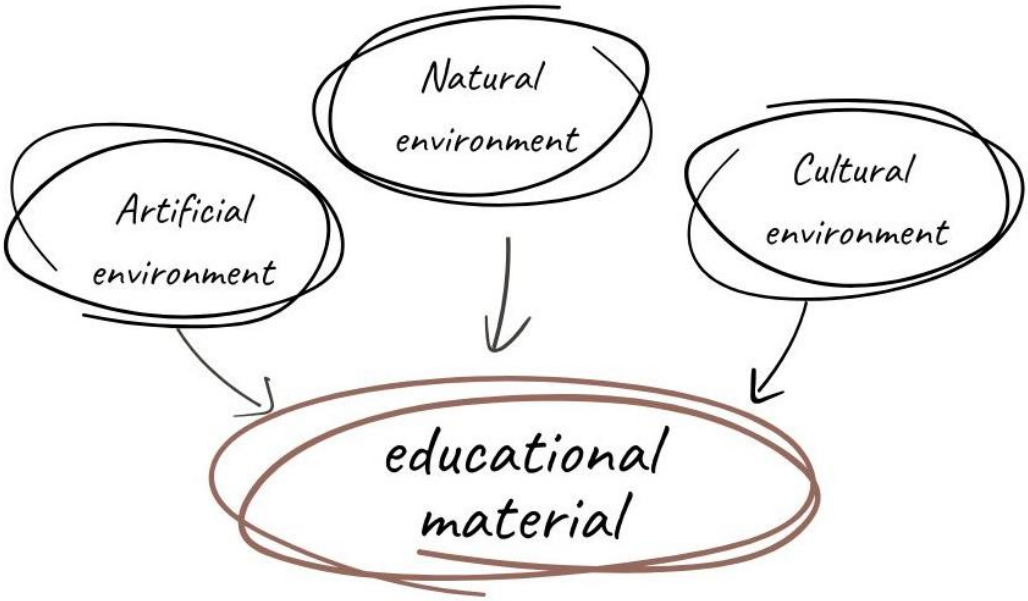

Figure 2 – Learning environment (authors' material)

The whole area of the school, in summary, should teach, and the learning environment, in turn, should take into account the ethnic, regional, cultural characteristics of the local community. The content of learning should strive for common links between disciplines, as the mind learns in an integrated and holistic way by making connections. Interdisciplinary thinking is also the goal of **Kazinik (2010)** innovative schooling methodology in which common themes are chosen for all disciplines. For example, the topic of Water: its characteristics in physics, properties in chemistry, importance in biology, civilizations of rivers, seas and oceans in history and geography, marinists and watercolor techniques in drawing, swimming in physical education, water in works of lyrics, prose and music, water economy in economics and social studies, etc. Such an integrated approach to study can reveal for a learner the phenomenon of Water from all sides and help to internalize its peculiarities as a holistic phenomenon. That is, it is not a passive, but an active process that requires a different organization of school building space.

As a result, the context and content of the learning process influence the organization of the learning process and, accordingly, can influence the layout of the school building and the organization of its territory.

The school territory has the function of a learning space, and the more diverse and complex its structure and content, the more "stimuli" for students, the more active and fulfilling the learning process can become.

4 RESULTS AND DISCUSSIONS

Studying the international experience **Samoilova and Chislova (2017)**, it can be concluded that a number of trends in the transformation of architectural and planning solutions of modern schools stand out:

1. Block functional zoning: administrative, sports and leisure facilities form an external, road-facing block, while in the back of the site are located the actual educational blocks for junior, middle and senior schools. The blocks can be connected by courtyards, warm or open passages, or a large recreational facility common to the whole school (library, assembly hall, design studio, workshop);

2. A central (in the compositional, functional and structural sense) creative space for both general and collective, as well as private and isolated types of learning activities. Most often for this purpose the hall type of layout is used, which is also an active learning space for schoolchildren. The hall type of layout can solve the problem of possible transformation of this space depending on any

changes in the future. Transformation of the space can be realized through the use of partitions, furniture, mobile equipment;

3. Flexibility of the planning scheme, especially if certain zones and blocks of the school become public socio-cultural facilities accessible to the local community. Connections between zones and blocks can be made, among other things, through the organization of courtyards-recreations, warm passages, information facilities (for example, a library). The combination of open and closed, accessible and isolated zones and spaces for play and learning activities is characteristic of many alternative schools in foreign countries. It is assumed that such diversity stimulates the free organization of students' activities, which, in turn, is intended to stimulate their sense of responsibility;

4. Using new technologies: energy-saving, possibly energy-efficient, which can have an economic effect. In addition, these technologies can also become educational material for students, and not only for schoolchildren, but for the whole community;

5. Actively using green architecture techniques, incorporating elements of landscape architecture into the interior and exterior (depending on the natural and climatic conditions of the area), which again can become a potential information and training platform;

6. The informational content of recreational, communication and educational spaces has educational properties: texture, color combinations, fonts of inscriptions, i.e. well-considered interior design has an active impact on learners and community members.

It is important to understand that the school can become a social and community center for the entire community of the residential neighborhood in which it is located. It can turn from a self-contained object into a living communicative space for the formation of social and cultural diversity. For safety reasons, it is possible to provide for the autonomous use of individual objects in the school building. Russian researchers distinguish different degrees of planning flexibility: “flexible”, “moderately flexible” and “inflexible”, implying a corresponding variety of layout, configuration of premises, and transformation possibilities. They note that “from these parts it is possible to make up schools and complexes for completely different learning systems and a wide range of uses” **(Samoilova and Chislova (2017) p. 216)**.

One of the effective ways to model a learning space, in our opinion, is a design studio. In itself, the design approach to create anything involves solving a specific problem and developing the skill of independent thinking and decision-making. In this way it is possible to teach students to think, i.e. the emphasis shifts not to the result, but to the process, which can show the connection between children's learning and the world around them. The learning space of the design studio should have the following characteristics:

−room should have a significant area (at least 72 square meters) for free placement and arrangement of equipment, as well as for possible transformation; the latter can be provided with light transformable furniture;

−the studio should be equipped with large horizontal planes for group and individual classes;

−there should be a separate utility room or space in the room itself for storing work in progress, models and maquettes, personal belongings and materials;

−it is necessary to provide vertical surfaces for general discussion of design solutions, “smart walls” for brainstorming, presentations, discussions;

−it is recommended to have a connection with the outside world, i.e. access to the patio, green walls, plants.

Modern trends in the field of education become the object of numerous studies in the field of education, attracting the attention of scientists **Baktybaev (2017), Musaeva and Avliyakulov (2017), Rasuleva et al. (2021), Kultysheva (2018), Bukina et al. (2021), Pirnazarova and Hakimova M. (2023), Smakova (2020), Tran and Phan (2020), Erik (2019), Akhmadov (2023), Petrosyan (2022)**. Another model of learning space can be the urban educational environment proper, i.e. some object that allows studying different phenomena from different sides. It can be museums, planetariums, galleries, exhibitions, botanical gardens, as well as natural environment. To involve the

urban space as a learning environment, it is effective to define an objective for the whole school year, which can be solved through both in-school technologies and by involving the urban environment surrounding the school in close and distant accessibility. This approach allows organizing learning around big ideas and problems that are relevant to the learners themselves. This makes it possible to adapt the curriculum taking into account the hypotheses and assumptions of students, making them involved and, therefore, responsible for decision-making, and developing their independence. Foreign experience shows that the introduction of such educational technologies contributes to the improvement of learning outcomes and pride in personal and group achievements, reduction of discipline problems and student engagement.

Research of the influence architecture has had on educational activities has been carried out by **Kuvaeva (2011), Skripkina and Tarasova (2021), Ermakov (2022), Klochko and Topaeva (2021), Lamekhova (2022), Domolazova (2021)**.

As a result, architecture teaches through the following factors:

– Visual/spatial: diversity of spaces, decoration (sculpture, wall graphics);

– Physical/kinesthetic: fitness tracks, gym, dance studios, manipulation tools;

– Musical/rhythmic: acoustics, music classrooms, performance spaces;

– Inter-personal: transformable and movable furniture, collaborative workspaces, large horizontal work surfaces as opposed to individual desks, indoor and outdoor meeting spaces, conference rooms;

– Intra-personal: outdoor seating areas, study nooks, private areas, quiet rooms;

– Natural: habitats, recycling sites, nature trails, green architecture.

Another important factor that can have an impact on architectural decisions is the assessment system or the so-called Ann Taylor Associates (ATA) taxonomy. This taxonomy can be used to teach any subject or concept in any learning situation and at all age levels. Even very young children, whose abilities are often underestimated by adults, can benefit from an active, experiential approach. Teachers can apply taxonomy as a system, a scheme of thought, or a teaching strategy. Architects can use it to identify the types of activities children do in educational settings and to plan spaces that support these activities.

The six-step process depicted in Picture 3, or taxonomy, involves the following steps:

I. Observation and multisensory discovery:
   1) Using the senses (sight, hearing, smell, taste, touch);
   2) Recording what is observed using a variety of media (drawing, writing, videotaping, entering data into a computer).

II. Data collection:
   1) Counting;
   2) Measuring;
   3) Mapping;
   4) Questioning and interviewing;
   5) Sorting, classifying and comparing.

III. Generation of concepts and literacy in all disciplines:
   1) Visual-spatial and verbal thinking, literacy and language (concrete to abstract);
   2) Generation of concepts and literacy across disciplines (math, science, art, language, foreign language, social studies, environmental studies, technology/digital literacy, health and physical education);
   3) Family literacy, emergent literacy, multilingualism to empower global citizens;
   4) Exploring, reading and understanding ideas.

IV. Creative problem solving (based on the scientific method, but applicable to all disciplines):
   1) Identify the problem or task;
   2) Generating a hypothesis;
   3) Testing the hypothesis by exposing the objects;
   4) Summarizing and analyzing findings;

5) Using inductive and deductive reasoning;
6) Testing: conformity to or deviation from the hypothesis;
7) Choosing whether to start over or build on what has been learned.

V. Grading:
1) Making critical aesthetic judgments;
2) Decision making;
3) Self-determination and self-motivation;
4) Working with other people, understanding different points of view and teamwork;
5) Cultural pluralism;
6) External Evaluation.

VI. Management:
1) Eco-literacy, ecological wisdom, non-linear and systemic thinking;
2) Respect and care for the built, natural and cultural environment;
3) Cultivating a symbiotic relationship with the environment and a sense of ownership;
4) Using a global ethic (sustainability as a moral issue);
5) Taking responsibility for the consequences of one's actions (freedom, not regulations);
6) Thinking outside yourself.

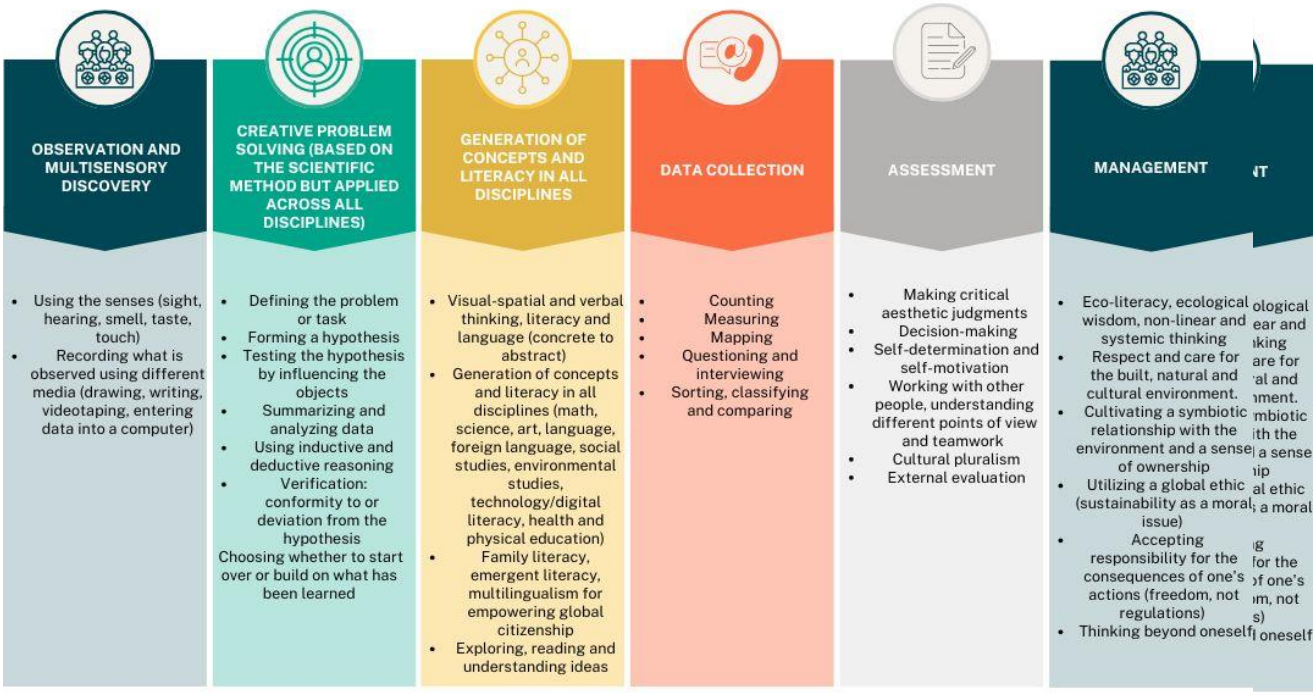

Figure 3 – Taxonomy and its components (authors' material).

Taxonomy can help identify questioning strategies for teaching and curriculum development. Educators and architects can also use taxonomies when planning school buildings. To get feedback, designers can start with simple questions aimed at developing observation skills and then move on to questions that require students or stakeholders to identify the decision-making process Higher-level learning opportunities can be programmed into the school building design, and architects and educators can eventually use the taxonomy to evaluate the learning environment once it is in use. Does the finished environment have room for multisensory learning, creative problem solving, and management? Does the environment promote imaginative thinking? These and many other questions can be answered by applying the taxonomy methodology.

5 CONCLUSIONS

In summary, we can talk about at least three concepts of the formation of a modern school building for modern education, these are:

1. Context or “Where are we learning?”: local geophysical environment (built, natural and cultural environments); thematic learning; systems thinking; sustainable worldview; cultural environment as a learning tool.
2. Content or “What are we learning?”: subject disciplines; multidisciplinary concepts; elements of architecture; art and design; project-based portfolio assessment.
3. Learning processes or “How are we learning”: rights of development for all children (body, mind, spirit); theory of multiple intellects; ATA taxonomy, including governance; practical learning; applied technology; project-based assessment.

We can identify a few general principles that guide the design of schools of the future: (1) Learner-centered learning; (2) Personalization of the environment; (3) Group and teamwork and spaces for communication; (4) Program adaptability; (5) Connection with the community; (6) Aesthetics; (7) Safety.

The organization of effective, attractive, comfortable, inclusive architecture of a school building implies, in our opinion, the following principal decisions:

– organizing different public spaces: corridors and public spaces that symbolize interconnectedness within the school community provide coherence and meaning, which increases motivation;

– safety can be ensured by different architectural techniques: planning, lighting, use of digital technologies;

– space diversity: a variety of places with different shapes, colors and lighting, nooks and crannies;

– changing expositions: changing and interacting with the environment stimulates brain development;

– integration of different zones, multiple - multifunctionality and cross-fertilization of ideas are the main goals;

– flexibility as a factor in sustainable school building architecture.

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