

A METHODOLOGY OF TEACHING THE MODULE "TRAINING VISUAL ART" IN HIGHER EDUCATION BASED ON THE STEAM APPROACH (USING PRESCHOOL EDUCATION AS AN EXAMPLE)

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Abstract

This article presents the forms, methods, and content of teaching the module "Teaching Visual Arts" based on the STEAM approach. This research analyzes the content and historical development of teaching the module of visual arts based on the STEAM approach, identifies the didactic potential of teaching visual arts, and develops a methodological system for teaching visual arts. The didactic potential of the "Teaching Visual Arts" module based on the STEAM approach has been identified, and its pedagogical model has been implemented. The developed methodological system has been refined through the integration of subjects into an art laboratory focused on the interpretation of disciplines and the analysis of literary works. Effective methods and technologies for developing students' creative abilities have been modernized through a focus on the practical application of approaches that develop integrative thinking, technological creativity, and didactic adaptability. The proposals and recommendations for improving the "Teaching Visual Arts" module based on the STEAM approach in higher pedagogical education focus on comprehensively preparing students for professional work, enhancing their capacity for reflective observation and self-analysis, and providing a comprehensive and in-depth study of the scientific and pedagogical aspects of integrative capabilities and constructivist practice.

Keywords: Art engineering, art laboratory, experimental color science, constructive plasticity, design thinking, integrative possibilities.

Introduction

МЕТОДИКА ПРЕПОДАВАНИЯ МОДУЛЯ «ОБУЧЕНИЕ ИЗОБРАЗИТЕЛЬНОЙ ДЕЯТЕЛЬНОСТИ» В ВЫСШЕМ ОБРАЗОВАНИИ НА ОСНОВЕ ПОДХОДА STEAM (НА ПРИМЕРЕ ДОШКОЛЬНОГО ОБРАЗОВАНИЯ)

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Аннотация

В данной статье представлены формы, методы и средства содержания обучения модулю «Обучение изобразительной деятельности» на основе STEAM-подхода. В исследовательской работе проанализированы содержание и историческое развитие обучения модулю изобразительной деятельности на основе STEAM-подхода, выявлены дидактические возможности обучения изобразительной деятельности и разработана методическая система обучения изобразительной деятельности. Определены дидактические возможности модуля «Обучение изобразительной деятельности» на основе STEAM-подхода, а также внедрена в практику его педагогическая модель. Разработанная методическая система усовершенствована на основе интеграции предметов в состав арт-лаборатории, направленной на интерпретацию (истолкование) дисциплин и анализ литературных произведений. Эффективные методы и технологии развития творческих способностей у студентов модернизированы на основе ориентации на практическое применение подходов, развивающих интегративное мышление, технологическую креативность и дидактическую адаптивность. Разработанные предложения и рекомендации по совершенствованию модуля «Обучение изобразительной деятельности» на основе STEAM-подхода в высшем педагогическом образовании заключаются в комплексной подготовке студентов к профессиональной деятельности, повышении их способности к рефлексивному наблюдению и самоанализу, а также в полном и глубоком исследовании научно-педагогических аспектов интегративных возможностей и конструктивистской практики.

Ключевые слова: Арт-инжиниринг, арт-лаборатория, экспериментальное цветоведение, конструктивная пластика, дизайн-мышление, интегративные возможности.

Introduction

In the era of globalization, the global higher education system places particular emphasis on preparing students for professional and creative teaching by improving visual arts teaching methods, developing theoretical knowledge, practical skills, and the necessary abilities to teach and educate preschool children in the field of artistic and aesthetic education, and developing their professional skills, taking into account the age-appropriate characteristics of students. UNESCO's 2030 Sustainable Development Goals emphasize that STEAM is not a traditional teaching method, but a mechanism for innovative thinking necessary for solving global problems. It also stipulates that the approach should be based on design and creativity, and the educational environment should be comfortable and aesthetically pleasing for students.

There is a growing need for targeted scientific and pedagogical research aimed at improving the pedagogical process, using innovative approaches to develop creativity in visual arts and professional competence in students, as well as organizing the educational process in a manner that takes into account their interests, needs, and age capabilities. In global practice for training future preschool teachers, it is important to develop modern requirements such as independent thinking skills, increased creativity, mastery of technical tools and technologies, and in-depth development of psychological and pedagogical knowledge about the age-related characteristics of children.

Improving the methodology of visual arts in higher education through STEAM technologies, implementing an integrative approach, and comprehensively preparing students for professional work are particularly relevant.

Literature Review

In our research, we examined and analyzed international experience related to this issue. In particular, the Council of Canadian Academies of Sciences notes the need to develop STEAM skills in students. This requires maximizing the effectiveness of STEAM skills, as well as developing students' leadership qualities, creativity, flexibility, and entrepreneurial abilities. Most researchers

have found that these skills can be developed through the integration of art with the STEAM system. The STEAM concept views creativity as a factor that creates a favorable learning environment, a means of developing critical thinking, and a foundation for communication and collaboration skills. In recent years, the potential for using modern approaches in higher education has become increasingly popular. However, in the development of any science, its historical formation and origin serve as the methodological foundation. In particular, in Russia, from the 1920s to the mid-1950s (1920–1950), an interdisciplinary community developed in the field of teaching preschool children visual arts. This community included ethnographers, art historians, cultural scientists, psychologists, drawing teachers, kindergarten practitioners, and methodologists. Although research in the field of art education in the region emphasized the particular significance of this area in cognitive and affective development, the integration of art with other disciplines has remained a pervasive trend since the 1980s. At the beginning of the 20th century, children's creativity (children's art) emerged as an independent scientific field.[1] As N. Sakulina noted, "we can guide a child's visual activity only by studying the general patterns of his or her development." Interest in children's drawings arose in the 1880s and 1890s. Until then, drawing was viewed solely as an academic subject. By the end of the 19th century, however, it began to be studied as an activity reflecting the unique nature of a child's development, the main directions of which are not directly dependent on upbringing and education [2].

V. Lowenfeld developed a typology of stages in the development of visual activity in young children. This typology combines a high aesthetic appreciation of children's spontaneous and original artistic discoveries with a pedagogical focus on non-intrusion of adults into the art education process, so as not to hinder children's creativity. The researcher distinguishes between productive (based solely on the child's own creativity) and reproductive (directed and controlled by the teacher) approaches.[3] In particular, F. Cizek viewed children's art as a form of humanistic and aesthetic expression. In 1908, he organized an exhibition of children's drawings in Vienna. Cizek and other contemporary artists demonstrated that children's art is characterized by emotional openness, sincerity of approach, and flexibility of children's imagination. He emphasized that each child represents an individual "law" for themselves and must be given the

opportunity to develop their own technique. For this reason, children should not be forced into a rigorous technical training program. [4]

Integrating art into the educational process encourages reflective practice in teachers, enables their professional growth, and fosters deeper connections with children. Art also allows teachers to develop self-confidence and refine skills, creating an atmosphere of shared exploration and the joy of learning.

As a result, art serves as a powerful tool for building deep interactions between teacher and children, enriching the educational experience and creating a joyful, playful, and creatively inspired learning environment. Active engagement with the visual arts in childhood creates significant benefits for cognitive development and brain maturation. In the early years of life, when neural connections are intensively formed, the enriching sensory experience of artistic activity strengthens memory, communication skills, and cognitive flexibility, while supporting social-emotional development and adaptability [5].

Leonardo da Vinci changed the course of human knowledge by combining art and science, aesthetics and engineering; It is precisely this polymathic (multifaceted) harmony of disciplines that is necessary for future generations of creative STEAM specialists.[6]

J. Dewey is one of the outstanding scholars who sparked the era of development and renewal in education, and it is his philosophy that reflects the project-based and problem-oriented approach of STEAM education. Furthermore, he demonstrated the ability to overcome the emerging gap and contradictions between art and science. Art, like science, is a product of rational experience. Both fields (their interrelationship is particularly emphasized) also rely on experience as a criterion for success, and both view the refinement of experience as the primary motivating motive and value. [7]

STEAM emerged as an alternative to the classical STEM model. According to B.M. Sanders, research and practice in integrated STEM education are aimed precisely at this boundary. Through this approach, students are trained in design thinking and master the methodology for integrating disciplines. Integrated learning ensures the logical continuity of subjects, systematizes teaching technologies, and develops professional skills. Indeed, students' professional motivation increases, as attention is focused on the context of social relations, cognitive activity, pedagogical strategies, and experience [8]. Teaching visual arts using the STEAM approach serves as a vivid example of the integrative

potential and constructivist practice. It creates the basis and foundation for systematizing abstract concepts in science, technology, engineering/creativity, art, and mathematics. This encourages students to actively develop contextual knowledge in science and mathematics, thereby enhancing the experience of memorization and the transfer of learning to practice. As C. Atikah notes, the STEAM approach represents the integration of the arts, which is based on several principles: interdisciplinary connections, creativity, learning based on original or real-life experiences, and project-based thinking. Combining art and STEM disciplines through STEAM integration can enhance student engagement, accelerate learning, and foster innovation. By their nature, STEM and art are extremely conducive to experimental learning and product creation [9].

Research Methods

The study utilized a review of scientific and pedagogical literature on the topic, surveys, testing, observation, expert evaluation, a pedagogical experiment, and mathematical and statistical methods. The research concept, developed for the pilot study, was based on the following methods:

1. A questionnaire designed for student respondents and aimed at assessing the current level of knowledge, skills, and abilities of students majoring in Preschool Education in the methodology of visual arts was also developed for teachers teaching at higher education institutions. The purpose of this questionnaire was to study their experiences in improving the "Teaching Visual Arts" curriculum module at higher education institutions, analyze the state of their practical work, and assess their mastery of professional competencies and the presence of a technological approach to the educational process. During the experiment, open-ended questionnaires were used to ensure the most objective assessment of the current state.
2. Designs for discussions, questions, and interviews. The pedagogical experiment confirmed the feasibility of using questionnaires in combination with conversation, question-and-answer, and interview methods. To address limitations and provide respondents with the opportunity to express their thoughts in detail, conversations were also organized. Since the conversations were conducted based on pre-prepared questions, their thoughtfulness, focus on revealing the essence of the problem being studied, clarity, brevity, and the ability

to fully express thoughts were of particular importance. Specific questions were selected for the conversations organized during the experiment.

During the experiment, these developments were effectively used in situations such as organizing questions and answers, conducting conversations and interviews, and studying respondents' impressions of the lessons.

During the experimental work, determining the level of mastery of visual arts methods among students majoring in "Preschool Education" was based on certain criteria, with particular attention paid to the development of the following qualities and skills:

- drawing, sculpting, appliqué, construction;
- using natural materials;
- preparing creative projects;
- making toys from clay and plasticine;
- fantasy, creative thinking, and imagination;
- development of precise hand movements and fine motor skills;
- development of artistic and creative activity;
- development of practical recommendations, etc.

Research Results and Discussion

Based on the results of our research, the teaching method for the "Teaching Visual Arts" module was refined using the STEAM approach.

The main goal of our proposed model is to effectively organize the teaching of visual arts methodology based on the STEAM approach. Its structural components include a methodological approach and the creation of pedagogical conditions in the educational process.

The section "Pedagogical necessity of teaching the "Teaching Visual Arts" module based on the STEAM approach" of this model is explained as follows:

1. Developing "4C" skills. In our study, we incorporated the "4C" model into the structure of the model as essential modern competencies. Specifically:

o Creativity is a creative principle based on the search for new and unique ideas, unconventional problem solving, and discovery. Developing creativity in students improves their preparation for teaching and creates opportunities for self-expression. Creativity is expressed through creative abilities. The creative process has its own specific characteristics and acquires particular significance due to students' independence and their ability to find the right and optimal solution to a

given problem. Creative skills are demonstrated in their creative work, visual arts, and at festivals and exhibitions.

o Critical Thinking – Students engage in critical analysis. Students independently analyze STEAM-based learning tasks and discuss their novelty, uniqueness, and practical applicability. Based on their personal perspectives, they engage in peer discussions of sketches, drawings, and projects created in various visual arts. The teacher guides students through this analysis.

o Collaboration – Students complete learning tasks together as a team and collaborate. They seek solutions to problems, make decisions, and develop proposals. This process fosters interaction, collaboration, creativity, and problem-solving.

o Communication – Students develop active communication and teamwork skills. During communication, they are free to express their opinions. A free discussion environment is created, and most importantly, this process arouses students' keen interest.

2. Integration of theory and practice. During the course of classes, a pedagogical environment is created that closely connects acquired theoretical knowledge with real-life situations, professional activities, and practical tasks. When teaching visual arts, it should be kept in mind that students transform their theoretical knowledge of art history and color science into project work using technological tools and mathematical measurements. Conclusions are drawn by linking the acquired theoretical information with practical results. Students, having seen the practical benefits of their knowledge, strive to thoroughly study the methodology of visual arts.

3. Professional training. Technological literacy. When preparing students for professional work, the use of a technological teaching model is envisaged for the "Teaching Visual Arts" educational module. To help students fulfill their professional responsibilities, special attention is paid to developing the following personal qualities: interactivity, innovative thinking, technical thinking, self-confidence, continuous improvement of their professional skills, and the development of emotional-volitional skills for managing pedagogical processes, as students will apply various approaches in their future teaching careers. Technological readiness is the ability of students to understand and comprehend the essence of technology, use it rationally, manage it, and evaluate its impact on

the educational process. Skills in selecting technology appropriate to the purpose of the lesson and creating models should be developed.

The model's methodological component is based on inquiry-based learning, engineering design, and a contextual approach. Within the STEAM approach, students can create a specific product using various visual activities (e.g., drawing and model making) and conduct experiments.

They create objects from clay, plasticine, and natural and scrap materials, develop a design for their pattern (template) and structure, and determine the steps for a presentation. Students think like engineers, mastering the skills of creating drawings, diagrams, and, most importantly, design through activities such as appliqué and construction. With contextual learning, students acquire knowledge not abstractly, but concretely and purposefully. The STEAM approach teaches students to harmoniously combine acquired knowledge with real-world skills. This gives students the opportunity not only to generate ideas but also to actually use and implement them in practice. It encourages experimentation, model-making, independent music and film production, the transformation of their ideas into reality, and the creation of a final product. Our research prioritizes the following principles:

- Interdisciplinary connection – students recognize that the sometimes tedious theory they are learning has a practical application, and simultaneously strengthen their knowledge across several disciplines: computer science, physics, technology, engineering, and mathematics.
- Connection to real life – STEAM technology is integrated into practice in direct connection with real life. Students engage in creative activities (drawing, working with clay, constructing) based on the environment and reality around them. Their interrelationships and the fact that they constantly encounter them in everyday life are analyzed.

Experiential learning – students develop their intellectual abilities through engaging in scientific and technical creativity. This utilizes a vitagenic approach (relying on personal life experience). This means that students master creative methods based on their own life experiences.

Lack of fear of making mistakes – during classes, students engage in various activities: drawing, creating appliqués, origami, working with clay and plasticine. Mistakes are viewed as an integral part of the learning process. This enhances students' creativity and self-confidence. The practical application of this

technology promotes the development of logical, algorithmic thinking, and constructive abilities.

Collaboration—along with the development of practical skills—encourages students to work together, developing cognitive and creative abilities. Learning tasks are completed in teams (e.g., constructing a house, a bridge, creating collages, etc.).

In our study, we taught students the "Learning Visual Arts" module based on the following components: research, instrumental, projective, creative-aesthetic, analytical, and others.

As is well known, the STEAM approach requires a research component. Engaging future educators in research activities promotes the development of intellectual and creative abilities, scientific thinking, a creative approach to real-life phenomena, the ability to objectively evaluate them, and, of course, helps them acquire additional sources of knowledge.

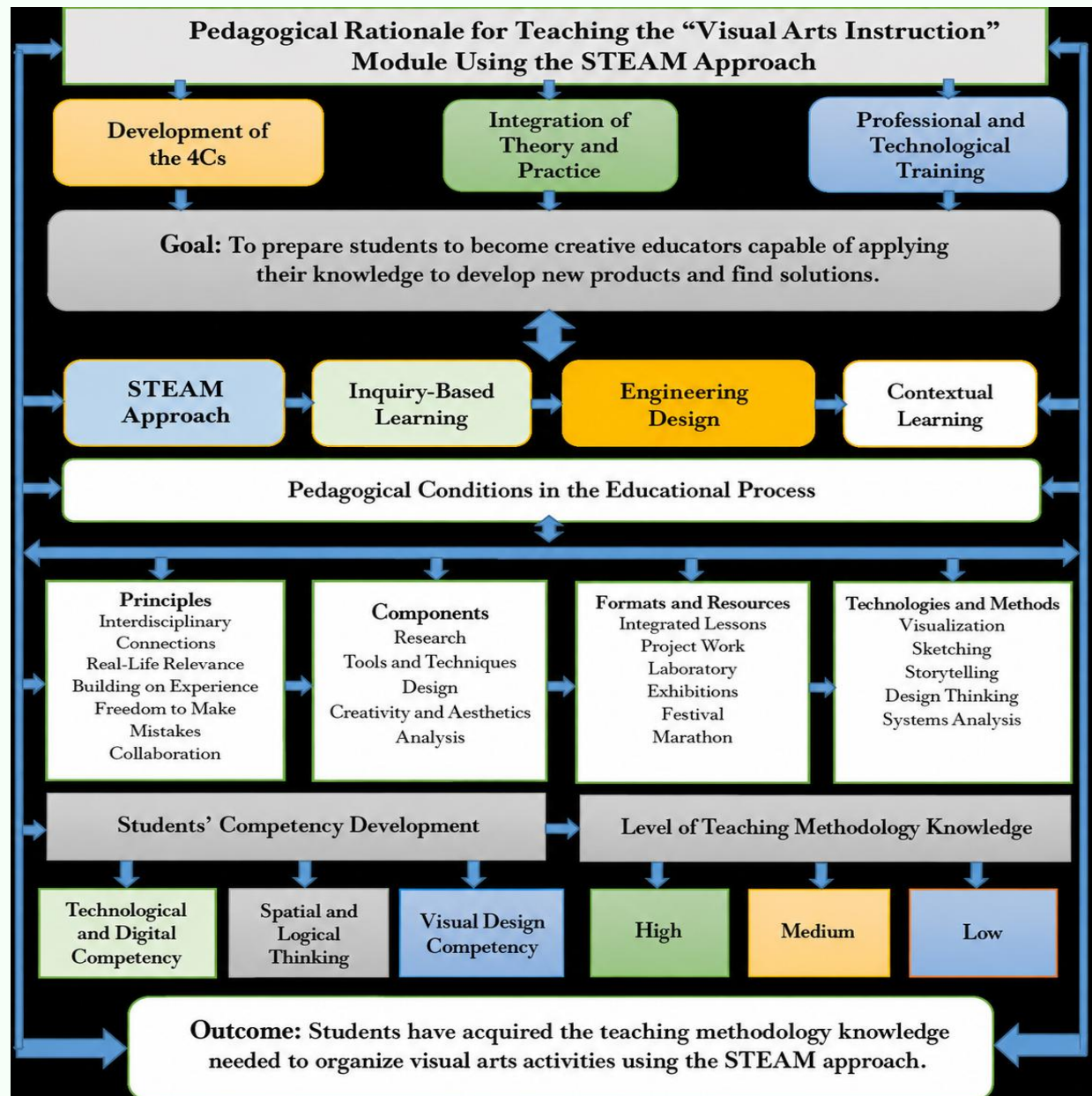
The projective component—students move from theoretical knowledge to practical activities. The student anticipates which drawing, video, or natural object will most quickly spark their creative imagination; they develop a step-by-step drawing or construction algorithm in graphic form. By the end of the lesson, the student plans in advance how to organize an "exhibition" of children's work and the criteria by which to evaluate it.

Instrumental component. While the projective component determines what and how to plan, this component establishes what and how the work should be accomplished. Methodological, technical, and technological tools are distinguished. For example:

- Methodological and game-based methods: storytelling, conversation, use of artistic expression, instructions, demonstrations, slide shows, videos, and samples, exercises, creative tasks, and game situations;
- Traditional materials: pencils, brushes, paints (watercolors, gouache), crayons, plasticine, scissors, glue;
- Non-traditional techniques and digital tools: candle painting, splatter technique, inkblotography, monotype, finger painting, graphic tablets, interactive whiteboards, and specialized design programs.

Creative and aesthetic component. This involves perceiving and understanding the essence of the task, finding a solution, implementing it, testing the solution, and drawing conclusions. In developing a humane and aesthetic attitude towards

nature, it is necessary to develop children's activities in collecting natural materials and reflecting them in artistic creativity.



A Methodological Model for Teaching the "Teaching Visual Arts" Module Based on the STEAM Approach

Visual arts develops an artistic and aesthetic attitude, a desire for beauty, and the ability to think artistically.

Analytical Component. Along with research activities, students' analytical thinking and their own research approach are developed. This can be achieved by providing students with a certain amount of freedom and independence in their

work. Otherwise, academic research will not lead to the activation of students' cognitive activity and may ultimately degenerate into a sequence of standard learning stages, characteristic of a reproductive education system. To select the paths and methods for achieving this goal, it is necessary to formulate the research objectives. The formulation of tasks follows from the research objective and is justified by it. The list of tasks is structured from the simplest to the most complex, and their number determines the depth of the research.

During the pilot work, the methodological system for teaching visual arts based on the STEAM approach was refined. Within its framework, the educational process was organized around an art laboratory focused on the interpretation of specialized disciplines and the analysis of literary works.

This methodological system promotes the simultaneous development of critical thinking and creativity in students. Students act not simply as "performers and artists," but as "creative researchers." The drawings they create acquire not only aesthetic and artistic value, but also scientific value.

In the modern educational paradigm, students' creative activity requires not only the transmission of knowledge but also the active development of their creative and critical research abilities.

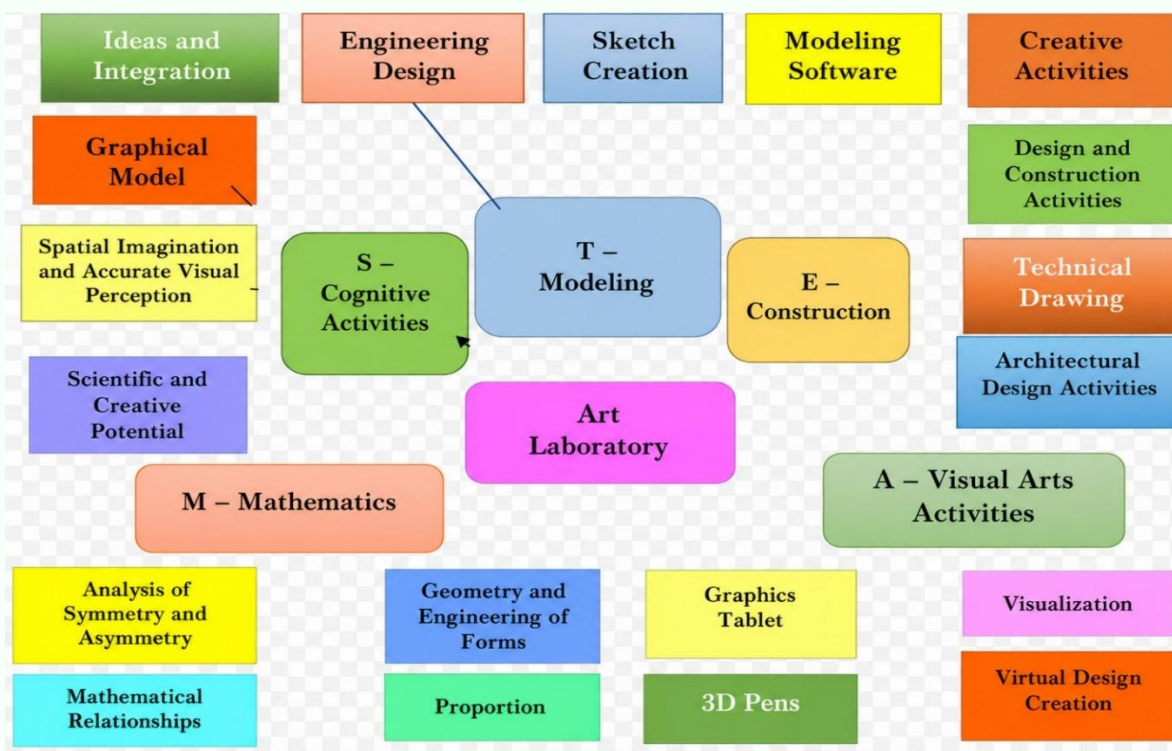


Fig. 2. Methodological system for teaching visual arts using the STEAM approach (based on the Art Lab)

Conclusion

Based on the results of our research, we refined the methodological model for teaching the "Teaching Visual Arts" module using the STEAM approach. Through visual arts, students are given the opportunity to develop their thinking processes (analysis, synthesis, comparison, and generalization). Because STEAM is integrative, students master scientific knowledge, implement technological processes, and also demonstrate engineering, artistic, and mathematical knowledge in a generalized manner. This technology is based on a practical approach and an educational focus, as well as the integration of five areas into a unified educational system. The advantage of STEAM technology is that it ensures the acquisition of new knowledge not in isolation, but in an interconnected manner. It develops new thinking, the ability to find multiple solutions to a single problem, and creative skills in students, which has a positive impact on their future teaching careers. This process develops students' intellectual potential and communication skills. Every aspect of this model enriches the STEAM approach not only with theoretical knowledge but also with practical experience, resulting in students thoroughly mastering the methodology of visual arts.

As a result, the learning process abandons the traditional "lecture and listening" format and relies on active and practical methods. These approaches place students at the center of the lesson.

The results obtained using collaborative pedagogy show that the learning effectiveness criterion for students in the Preschool Education program in the "Teaching Visual Arts" module using the STEAM approach exceeds one, while the knowledge level criterion exceeds zero. This indicates that learning in the "Teaching Visual Arts" module using the STEAM approach is significantly more effective for students assigned to the experimental groups than for those in the control groups. As a result, the effectiveness of the "Teaching Visual Arts" module using the STEAM approach increased by 12% during the study period.

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