AMERICAN JOURNAL OF EDUCATION AND LEARNING
ISSN: 2996-5128 (online) | ResearchBib (IF) = 9.918 IMPACT FACTOR
Volume-3| Issue-6| 2025 Published: |30-06-2025|

MODELS OF DESIGNING AND TEACHING LESSONS BASED ON STEAM TECHNOLOGY IN PRIMARY EDUCATION

https://doi.org/10.5281/zenodo.15578486

Yakubjonova Guzalxon Xasanboy qizi
Kokand State University
Teacher of the Department of Primary Education
yakubjanovaguzalxon@gmail.com

Annotation

This article discusses the current importance of STEAM technologies, their capabilities and achievements, advantages in the education system, application in international experience and methodological and organizational forms, and this article can be used by students, free and independent researchers, and teachers.

Keywords

STEAM technologies, quality of education, abilities, foreign education, integration, science, technology, engineering, art, mathematics, development center, integration.

Today, the introduction of STEAM educational technology in primary education in organizing the teaching process based on modern requirements is one of the urgent issues. This technology serves to form skills such as scientific and practical thinking, creative approach, understanding and analysis of interdisciplinary connections in students. In particular, the use of a methodological approach based on the integration of disciplines in the process of designing lessons creates a wide opportunity to increase the effectiveness of teaching, develop the student as an active, independent and creative person.

In modern education, technologies based on an interdisciplinary approach are widely used in order to form life knowledge and skills in students, prepare them to solve problems related to reality. In particular, the STEAM education model - a system of teaching that combines science, technology, engineering, arts, and mathematics - is proving to be a viable option for elementary school students. This model serves to develop multidisciplinary thinking, creativity, and practical activity in education.

For young students at the primary education level, teaching subjects not in isolation, but in a way that is interconnected and applicable to life is more effective. From this point of view, the methodological foundations of the STEAM model

include integration of educational content, active learning, analysis, design, creation, and presentation activities. For example, observation and experimentation through natural sciences, calculation and analysis through mathematics, creation of modules through technology, aesthetic expression through art, and reflective thinking through reading all contribute to the development of interdisciplinary knowledge.

In this regard, international researchers emphasize the integrative nature of education and the importance of a creative environment. Finnish education reformer Pasi Saalberg emphasizes: "STEAM education not only arouses interest in children in science, but also encourages them to think critically and creatively. If we teach children not only to give answers, but also to ask questions, they will be prepared for future problems."

The methodology for introducing the STEAM model in primary grades is based on centralizing learning activities, activating student thinking, and understanding the connections between disciplines. This serves to form comprehensive competencies in students through the "knowledge - skills - application" chain. The teacher's task in this case is to identify inter-disciplinary connections, integrate the content of the lesson, turn students into active participants, and create a communicative environment through questions aimed at understanding thinking.

Since the educational process at the first stage is aimed not at knowing more, but at understanding and applying, combining the content of disciplines with each other creates the basis for the formation of a completely new knowledge system in students. For this purpose, it is important to combine mathematical, natural, technological and artistic knowledge within the framework of one lesson through the use of STEAM educational technology.

As students in mathematics learn about clocks, time, measurement, geometry and calculation practices, this knowledge becomes the basis for observations, calculations and conclusions in natural sciences. For example, in tasks such as "Measure the temperature of water over time and create a histogram", the student combines mathematical practice and natural science research.

In natural sciences, knowledge about water, air, light, energy, natural phenomena helps to understand real-life observation, research and cause-and-effect relationships. Based on this knowledge, modeling, creating structures, and comparing experimental results are organized in technology and design disciplines.

In technology lessons, students develop multidisciplinary skills such as mathematical accuracy, taking into account the properties of natural substances,

and aesthetic decoration in the process of creating a functional object through modules, models, panels, and handicrafts.

Reading literacy plays a central role in this process in reading, understanding, interpreting, and expressing opinions on a thoughtful text, that is, in forming educational dialogue based on scientific texts. For example, through the tasks of discussing, creating infographics, and writing stories based on the texts in the "Energy" section of the 2nd grade "Natural Sciences" textbook (pages 64-82), students develop potential in interdisciplinary thinking.

By ensuring the compatibility of these disciplines, a complex knowledge system, i.e., multidisciplinary competence, is formed in the student. Researcher M. Khaliqnazarov defines integration in education as follows: "Interdisciplinary integration is not only the connection between different disciplines, but also the organization of the process of knowledge in the student's mind on a vital, logical and systematic basis."

When these models of compatibility in primary education are illustrated not only theoretically, but also through practical activities, the tangible results of STEAM technology are manifested: the student understands, investigates, creates and shares.

A theoretical approach alone is not enough to effectively implement STEAM technology in primary education. How this technology actually affects the educational process and what competencies it ensures the development of students is revealed precisely through practical solutions. STEAM education requires restructuring the content of the lesson through innovative forms such as the integration of disciplines, an inquiry-based approach and project-based learning.

A STEAM-based lesson begins with a problematic situation or a life question. This situation encourages the student to actively search, think, and reflect. For example, "Why is there no life on the moon?", "Why is rainwater not clear?", "How can you collect water from the roof?" are complex but interesting questions that require research in mathematics, natural sciences, technology, and language arts.

One of the most important solutions in organizing a lesson is design. Project-based activities reveal the student not only as a possessor of knowledge, but also as an active creator, researcher, designer, tester, creator, and presenter. For example, projects such as "Creating a model of a water purification device from recycled materials," "Creating geometric shapes from numbers and shapes," and "Creating a panel depicting natural phenomena based on a story" are implemented in educational activities by combining disciplines.

Visual and mobile methods used in STEAM lessons are manifested in such forms as: diagrams, layouts, projects, competitions, experiments, infographics,

mental maps, and creative writing. Through these methods, students assimilate information not only by listening or reading, but also by seeing, feeling, creating, and presenting it.

Group work and role-playing tasks are also important as practical solutions. Each student in the group develops the ability to work together, be responsible, think and solve problems by performing the roles of "engineer", "specialist", "designer", "leader", "accountant". Also, active assessment methods are used in STEAM-based lessons: reflection sheets, self-assessment scales, group result presentations, reflections based on the principle of "peer-analysis" rather than teacher-control.

Through practical solutions of STEAM education, students become active participants not only in acquiring knowledge, but also in applying it. This develops independent thinking, creative approach, readiness to solve real-life problems, interdisciplinary knowledge and research skills. Thus, revising the content of the lesson and organizing it based on practical activities, creative work and experience is the most effective way to introduce the STEAM model in primary education.

In the process of modern education, it is becoming an urgent task to organize lessons not in the traditional way of studying, but on an interconnected, holistic and creative basis. Especially in primary education, ensuring interdisciplinary communication and a creative approach in designing educational activities allows students to express, reflect and connect complex knowledge with life. STEAM educational technology requires the harmony of content, form and methods across disciplines to achieve this goal. In this regard, revising the content of the lesson, designing it based on life and creative problems is one of the important conditions for increasing the effectiveness of education.

In conclusion, it can be said that designing and organizing lessons based on STEAM technology in primary education requires not only harmonizing the content of subjects, but also revising the goals and methods of education. The main feature of the STEAM model is the organization of educational activities in an interdisciplinary unity, close to life, based on problematic and creative tasks. In designing lesson scenarios, the stages of problem situations, interdisciplinary research, project creation and presentation of results reveal the student as an active participant, creator and analyst. Collaborative work forms, design and infographics, experiment and reflection, scientific texts and practical models form a thinking process in students from understanding to application of knowledge, from analysis to creative creation. At the same time, integrative activities in lessons harmoniously develop critical thinking, visual perception, interdisciplinary communication and life responsibility in students. As a result of this approach,

along with the educational content of education, the goals of educational, social and personal development are also realized.

LIST OF REFERENCES USED:

1. "STEM Education: An Overview of the Research" - Margaret Honey, Greg Pearson
2. "Teaching STEM in the Early Years" - Julie E. Wollman
3. "STEM Road Map: A Framework for Integrated STEM Education" - David A. M. Peters
4. "The STEM Shift: A Guide for School Leaders" - Rachael E. Roberts
5. "Integrating STEM into the Classroom: A Guide for Teachers" - Janet S. Twyman
6. Djenis Van Kliv. STEAM fanlar blokidagi fanlar kesimida 200ta tajriba. Qo`llanma. -Moskva: 1995-y.
7. Go'zalkhan, Y. (2023). METHODOLOGY OF TEACHING SCIENCE IN PRIMARY GRADES.
8. Yoqubjonova, G. X. (2024). THE IMPORTANCE OF THE FAMILY AND FAMILY RELATIONS IN EDUCATING THE CHILD AS A PERSON. World of Scientific news in Science, 2(2), 818-824.
9. Go'zalkhan, Y. (2023). METHODOLOGY OF TEACHING SCIENCE IN PRIMARY GRADES. Conferencea, 18-21.
10. Gozalxon, Y., & Nilufarxon, P. (2024, May). BOSHLANGICH SINFLARDA TABIIY FANLAR OQITISHNING DOLZARB MUAMMOLARI. International Global Conference (Vol. 1, No. 7, pp. 99-103).
11.Yigitaliyeva, S. (2023). KONSEPT VA UNING LINGVISTIKADAGI TALQINI. *Scienceweb academic papers collection*.
12.Isog'aliyevna, Y. S. (2023). Boshlang'ich sinflarda mustaqil so'z turkumlarini o'qitishda innovatsion texnologiyalarning ahamiyati.
13.Yigitaliyeva, S. (2023). TUSHUNCHA KOGNITIV LINGVISTIKANING ASOSIY BIRLIGI SIFATIDA. *XORAZM MA'MUN AKADEMIYASI AXBOROTNOMASI–6/4-2023*.
14.Yigitaliyeva, S., & Yo'ldoshboyeva, O. (2023). OLIY TALIMDA ONA TILI FANINI O 'QITISHNING NAZARIY MASALALARI. *Общественные науки в современном мире: теоретические и практические исследования*, 2(8), 41-44.
15.Yigitaliyeva, S. (2023). KOGNITIV TILSHUNOSLIK VA UNDA KONSEPT TUSHUNCHASINING IFODALANISH. *Scienceweb academic papers collection*.

16. Shomurotova, S. X., Farmonova, S. B., Kamolova, N. I., & Movlonova, S. A. (2020). Improving the Methodology of Teaching the role of metals in Biochemical Processes using Pedagogical Texnologies. *Engineering a Management Test*, *83*.

17. Shomurotova, S. X., Movlonova, S. A., & Abdulloyeva, M. R. (2022). Oliy ta‟ lim muassasalarining fizik-kolloid kimyo kursida “Kolloid sistemalarning olish usullari. Maydalash va kondensatlash” mavzularini o‟ qitish metodikasi. In *Conference Zone* (pp. 81-82).

18. Abdukodirovna, M. S. (2022). Methods and their importance in the field of chemistry training. *Asian Journal of Multidimensional Research*, *11*(11), 382-385.

19. Movlonova, S. (2021). Oliy ta‟ lim muassasalarida azotli organik birikmalar mavzularini differensial yondashuv asosida o‟ qitish. *Jamiyat va innovatsiyalar*.

20. Movlonova, S. (2021). Realizatsiya differentsirovannogo podxoda v obuchenii himii. *Scienceweb academic papers collection*.

21. Abdikodirovna, M. S. (2021). Improving the methodology of teaching the topic of nitrogenous organic compounds in higher education institutions on the basis of a differential approach. *European Journal of Research Development and Sustainability*, *2*(10), 5-6.