Место и значение игр и игрушек в социализации ребенка

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Аннотация
В данной статье рассматривается роль и значение игрушек и игр в социализации ребенка. Целью данного исследования является анализ того, как личность взрослого человека связана с процессом развития и социализации в детстве. С одной стороны, культура определяет основные черты личности человека, с другой стороны, человек сам влияет на свою культуру. В свою очередь, различные культурные переживания, составляющие культуру современного детства, дают ребенку возможность быть и их объектом, и их субъектом. Социализация представляет собой сложный диалектический процесс взаимодействия ребенка с окружающей средой. Нередко современный ребенок пытается решить стоящие перед ним задачи самостоятельно, и его решение нередко находит в игровой деятельности, отношениях со сверстниками, игрушках в процессе игрового общения. С помощью используемого в исследовании метода предполагается определить отношение родителей к ребенку.
Ключевые слова: социализация, игра, воспитание, адаптация, гендер, развитие.

The place and importance of games and toys in the socialization of the child

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Abstract
This article discusses the role and importance of toys and games in the socialization of the child. The purpose of this study is to analyze how the personality of an adult is related to the process of development and socialization in childhood. On the one hand, culture determines the main features of a person's personality, on the other hand, a person himself influences his culture. In turn, the various cultural experiences that make up the culture of modern childhood give the child the opportunity to be both their object and their subject. Socialization is a complex dialectical process of the child's interaction with the environment. Often, a modern child tries to solve the problems facing him on his own, and often finds his solution in play activities, relationships with peers, toys in the process of playing communication. Using the method used in the study, it is supposed to determine the attitude of parents to the child.
Keywords: socialization, game, education, adaptation, gender, development.

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BUILDING STEAM COMPETENCE AMONG STUDENTS OF PEDAGOGICAL SPECIALITIES

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Abstract
The article analyzes the prerequisites for the emergence of the STEAM approach in education that deals with the training of future educators in higher education to prepare them to work in STEAM education conditions by focusing on the necessity of building STEAM competence among students of pedagogical specialties. In training future educators, the STEAM approach is considered to be effective. STEAM practice in teaching and

learning is of great interest to scientists. We analyzed foreign researchers' existing STEM/STEAM competence models and tried to describe components like STEAM literacy, STEAM skills, STEAM competence, and mastery concept. We identified the factors affecting STEAM competence building among students of pedagogical specialties and developed STEAM competence structure. The article aims to theoretically justify and organize the content of STEAM competence of future educators. We referred to international articles and reports on the competency-based approach in education and articles regarding STEAM competence. We gave the examples of STEAM education and competence research in Kazakhstan's higher education institutions. We used analytical, comparative, and generalizing research methods and presented the survey results with the teachers and students at Korkyt Ata Kyzylorda University.
Keywords: STEM, STEAM competence, STEM literacy, STEAM skills, future teachers.

Introduction

For the last few decades, humanity has been experiencing global changes like the technological revolution and the digital transformation in all spheres from the economy to education, which resulted in the disappearance of several professions and the emergence of new ones. Students have to self-educate and self-develop in order to ensure good job opportunities, be competitive in their future workplace and be successful in their careers. These days the job market seeks young people who are not just well-educated but also have 21st-century skills. The educational system of countries around the world is facing new challenges. It has to prepare students for an unpredictable future. On the one hand, this future promises the rapid development of information technology and digitalization. On the other hand, global threats and challenges as climate change, environmental pollution, and the very recent experience of humanity with COVID-19. To address these issues, educational leaders from all over the world are concerned about their education system, working on its modernization and educating the professionals who can proactively and creatively solve social problems. STEAM (science, technology, engineering, art, and mathematics) education, which is a new educational paradigm in the 21st century, has come to help. STEAM approach prepares young people for contemporary life who have integrated powerful and convergent knowledge, capable of dealing with complex situations, and develops students' critical and creative thinking skills. It is increasingly important to improve STEAM teaching and learning practices, critical and scientific thinking, the ability to solve various problems innovatively, and research skills so that they can change life practices [Anisimova T., 2020; Morze T., 2021; Kurup P.M., 2021; Kim B.-H., 2016]. The term Art, which (A) is STEAM is added to the classical STEM teaching (Science, Technology, Engineering, and Mathematics) to enrich science classrooms with creative interventions and to make science learning more attractive, involving, easy and engaging. With the integration of arts and creativity, STEM curricula may benefit because students can make up creative solutions in lessons [Conradty C., 2020].

Recently emerged STEAM education has to enhance the student's understanding and interest in subjects such as science, technology, engineering, and mathematics, and develop problem-solving skills based on science and technology. STEAM education has been implemented in most countries' curricula to enhance the scientific literacy of youth so that they can contribute to the environment, country, and world. For example, Indonesian education works using the National Curriculum of 2013 that aims to prepare creative, productive, innovative, and effective Indonesians. A goal of this curriculum is similar to STEAM education. Shidiq, Rochintaniawati, and Sanjaya describe the term "mastery concept" as the student's ability to understand the meaning of learning and apply it in their daily life, Anderson and Krathwohl state that mastery concept is crucial in the learning process because it makes it meaningful and it can improve students' intellectual and problem-solving skills [Wandari G.A, 2018; Shidiq A., 2017; Anderson L.W., 2001]. South-Korean educational reforms operate on the following definition of STEAM: "education for increasing students' interest and understanding in scientific technology and for growing STEAM literacy based on scientific technology and the ability to solve problems in the real world" [Kofac, 2023, P.3]. This approach

introduces the following two key terms: 1. Education based on scientific technology, and 2. Ability to solve problems in the real world [Kofac, 2023]. A group of scientists thinks it is worth teaching STEAM because STEAM learners get motivated when they work in an authentic environment with hands-on activities. Abstract thinking abilities of students can be activated while learning mathematics in an informal, out-of-school setting with the elements of autonomy, creativity, and personal inquiries [Thuneberga H.M., 2018].

Science, technology, engineering, and mathematics (STEM) education has got internationally recognized as underpinning economic growth and training students who possess 21st-century skills and competencies, deal with the challenges of a highly technological society, and meet current requirements such as ensuring sufficient and sustainable energy, efficient healthcare and technology development. STEM is recognized as a powerful sector in education that prepares qualified STEM professionals for the global market that requires employees to be STEM-aware and better educated in one or more of its disciplines. STEM jobs are considered as the jobs of the future in the 2013 report from the U.S. Committee on STEM Education. Thus, STEM competencies are in employers' requirements [English L.D., 2017]. The Malaysian government is aware of the significance of STEM fields. The practice shows that STEM specialists create ideas and applications that become commercialized, and generate new patents that enter the marketplace. The prosperity and secure economy of the country rely on the development of STEM education, students' involvement, and proficiency in STEM-related subjects. The results of the 2012 Program for International Student Assessment (PISA) showed that Malaysia was in 39th place out of 65 participating countries, which is below the international Organization for Economic Co-operation and Development (OECD) average [Shahali, 2016].

Policymakers meet the challenges in the 21st century and make STEM literacy an educational priority in higher education so that students deal with every situation they encounter in their lifetime and professional life and apply content knowledge and practices in STEM disciplines. Higher education has to prepare teachers to be STEM literate and gain STEM skills. Consequently, content knowledge and understanding of STEM affect students' achievement at school. To achieve goals and make STEM teaching effective, teachers must have content knowledge, namely four disciplines of STEM, pedagogical content knowledge of STEM content, STEM teaching ability, pedagogical strategies, practical knowledge, and different approaches to STEM teaching. Even though there are similarities between STEM literacy and STEM competencies, there are differences between them. STEM competencies focus more on future career skills whereas STEM literacy is more comprehensive and content-related knowledge [Huang X., 2022]. All students should be STEM-literate, aware of the nature of science, technology, engineering, and mathematics and be familiar with some of the fundamental concepts from each discipline. Through an integrated STEM curriculum STEM learning become more relevant, less fragmented, and more stimulating. Thus, student's interest in STEM and motivation towards STEM has been improved, which can lead to increasing numbers of STEM professionals. There are difficulties solving real-world problems while teaching separate disciplines at school. People need skills to solve these problems. Studies have shown that students involved in an integrated curriculum outperform their peers in traditional instruction with separate disciplines [Thibaut L., 2018]. Practical training is not that effective if there is no creativity and innovative thinking in the learning process at the university. For this reason, Spanish scholars have tried to find a new learning model that combines STEM areas with STEAM competences and focuses on the disciplines essential for the future where students can enhance their flexible thinking and creativity [Santamarina-Campos V., 2020].

The Ministry of Education in Korea has stated the importance of STEAM education in raising talents with convergent knowledge and creative skills, who cross over various STEM areas and can strengthen science, technology, engineering, arts, and mathematics (STEAM) education in primary and secondary schools. Accordingly, the Korean government presented an educational plan to achieve the goals. In the United States, science, technology, engineering, and mathematics (STEM) education

teacher training programs are not enough that may enrich teachers' professional knowledge in STEM areas and methodologic knowledge simultaneously. In this respect, it is necessary to consider teacher training courses to develop teachers' competency. Teaching competency is an integration of the knowledge, skill, and attitude required for the successful implementation of subjects in education. It is a necessary part of professional teaching in class. Previous studies prove that identical factors of teaching competency cannot be applied to various educational activities with different learning environments, methods, and subjects and therefore teaching competency has to be enhanced [Kim B.H., 2016].

In our society, digital technologies are embedded as working and learning tools, and teachers' and students' digital competencies are at various educational levels and have to be developed. In the COVID-19 era educational organizations experienced not only students' vulnerability in these aspects but also teachers who showed lower technological competence and shortcomings in this field. The digital transformation of education is developing increasingly fast. The reason for that is making education available in a distance learning form. Throughout the pandemic period learning distantly was possible through the effective use of appropriate educational electronic resources, digital tools, and sites. Improving the level of digital competence of students, teachers, educators, and parents has become a priority of the government [Leoste J., 2022].

In Kazakhstan scholars has been doing a research on STEAM education and researchers from Karaganda Technical University implementing the project "Capacity Development of Innovative Training of Engineers through STEAM-education" which was approved by priority "Research in Education and Science" for 2021-2023 with the financial support of the Committee of Science of the Ministry of Education and Science. Through this project the authors create the conditions to build the scientific knowledge and practical skills base of the engineers through innovative training technology and develop the potential for innovativeness and creativity in technical vocational training programs. The application of STEAM-education methodology in training technology will contribute to the development of key competencies of creative industry, namely creativity, cooperation, creative communication and critical thinking. They emphasized the importance of building "hard skills" and "soft skills" in professional training [Jantassova D.D., 2021].

A group of scientists from Kazakhstan believe that the development of psychological and pedagogical skills of pedagogical students is one of the most important aspects of improving the quality of professional training and the critical thinking development in students cannot be improved in traditional training. Critical thinking can be developed when it is trained constantly. They introduced the experimental course into the educational process and it proved the effectiveness of using STEAM for critical thinking development in professional training of future teachers. After the course, experimental group students improved their skills in systematization and generalization of knowledge, in making good decisions and solving problems on their own. [Zharylgassova P., 2021].

Methods

To indicate and substantiate the issues of the article, we used such methods as theoretical analysis of foreign literature on the problem of research; study and synthesis of advanced pedagogical experience; description and comparison; pedagogical observation.

Results and discussion

Regarding the STEM competencies, we consider the study conducted by the Global STEM Alliance (the New York Academy of Science) [STEM education framework, 2018] to be best categorized and described for future STEM specialists. Two clusters of competencies - Essential Skills and Supporting Attributes are presented in the following table.

Table1

Two main clusters of STEM competence

№	Skills	Brief description
Essential Skills		
1	Critical Thinking	Skill to evaluate multiple sources of information, evidence, and primary material; select appropriate material to support arguments; critique the work of others; and differentiate evidence from inference and opinion
2	Problem Solving	Skills to develop their ability to generate solutions to a range of STEM-based problems and scenarios, including organizing ideas, defining goals and milestones, and executing plans. Materials support the use and evaluation of a range of approaches to problem solving, including the scientific method and design thinking
3	Creativity	Skill to approach problems from many different perspectives, including own. Novel approaches or solutions are explicitly valued
4	Communication	Frequent and varied opportunities to practice and demonstrate ability to communicate clearly, accurately, and/or persuasively about STEM topics to multiple audiences, both formal and informal
5	Collaboration	Frequent opportunities to engage in group work. Teacher and/or student supports are included to help students work together to plan, organize, and execute activities.
6	Data Literacy	Skill to engage with qualitative and quantitative data as part of analytical tasks such as problem solving, investigation, and design
7	Digital Literacy and Computer Science	Computer science concepts are integrated into STEM content when appropriate (e.g., as part of problem solving, critical thinking, and logic-based reasoning). Skill of technology tools usage, the digital literacy skills needed to use the tools
Supporting Attributes		
8	STEM Mindset	Skill to approach problems with an open mind, consider a range of solutions, seek innovation, and express their ideas in a variety of modes. (e.g., empiricism, design thinking, mathematical proof) and productive STEM dispositions (e.g., curiosity, objectivity, flexibility)
9	Agency and Persistence	Possibility to allow adequate time for exploration of problem-solving approaches, setbacks, and adoption of new approaches as obstacles are encountered
10	Social and Cultural Awareness	Skills to use cultural perspectives and address the value of social and cultural awareness, sensitivity, and empathy in STEM professional work and in society, especially as related to global citizenship and global STEM challenges
11	Leadership	Possibility to get leadership roles and practice leadership skills. Skills such as taking initiative, building consensus, and communicating effectively in groups are needed
12	Ethics	Knowledge of ethics as part of STEM professional work and its application

There is an alternative classification of STEM competencies designed by the International Society for Technology in Education (ISTE) [Standards for students, 2007]. The following standards focus on technological skills, which are crucial qualities for any STEM professional:

- Creativity and innovation;
- Communication and Collaboration;
- Research and information fluency;
- Critical thinking, problem-solving, and decision making;
- Digital citizenship;
- Technology operations and concepts.

Apart from that, the Common Core State Standards for Mathematics [Common Core State Standards for Mathematics, 2015] and offer a view on what constitutes the main competencies in the sphere of STEM:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. A model with mathematics.

5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Standards for Technological Literacy (International Technology Education Association) [Standards for Technological Literacy: Content for the Study of Technology, 2007] are organized into five major categories:
1. The Nature of Technology.
2. Technology and Society.
3. Design.
4. Abilities for a Technological World.
5. The Designed World.

STEAM competences which are relevant for future professionals are presented in "The Future of Jobs Report 2020". Top 10 skills and 4 type of skills for 2025 are listed below in Table 2 and Figure 1 [The Future of Jobs Report, 2020].

Table 2

Top 10 skills for 2025

№	Type of skill	Top skills
1		Analytical thinking and innovation
2		Active learning and learning strategies
3		Complex problem-solving
4		Critical thinking and analysis
5		Creativity, originality and initiative
6		Leadership and social influence
7		Technology use, monitoring and control
8		Technology design and programming
9		Resilience, stress tolerance and flexibility
10		Reasoning, problem-solving and ideation

The knowledge component of STEAM competence is based on the academic knowledge of future teachers acquired in secondary schools and higher education institutions. During secondary education, learners acknowledge about various scientific ideas and laws. In higher education students expand their competencies in varied STEAM disciplines, master the methods of implementing interdisciplinary links and integrating STEAM disciplines and study natural sciences, socio-humanities, general professional and special topics, and elective courses.

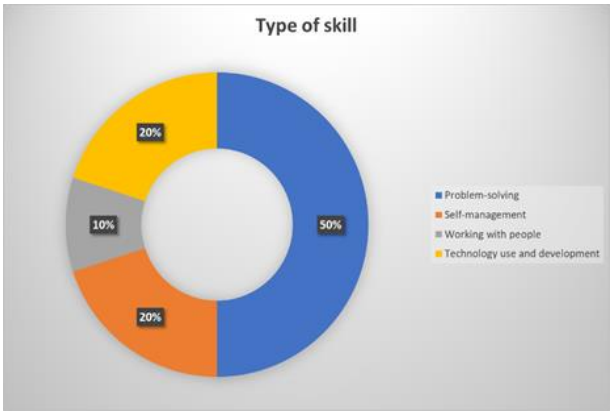

Figure 1. Type skill

The ability to understand the integrated subjects and the role of STEAM education in training future professionals depends on the degree of development of the knowledge component. Future teachers learn the main principles of organization of teaching and methodological work on the implementation of interdisciplinary links, project, and problem-based learning, and integration of STEM disciplines in educational content while studying academic subjects such as "Methods of teaching chemistry"; "Methods of teaching biology"; "Methods of teaching geography"; the study of the basis of professional skills, which are all provided by the educational standard of higher education.

The "Skills" component is formed and developed during the lifetime and based on the main activities and approaches in STEAM education:
- integrative approach;
- practice-oriented approach;
- the problem-based approach;
- project activity;
- research activity;
- personal activity approach;
- experimental activity;
- scientific research activities;
- the use of information and communication technologies in education;
- engineering design [Sologub N.S, 2022].

Analyzing the components of the above structures and models of STEM/STEAM competence, it should be noted that each of them (in addition to the knowledge, skills and abilities in the field of STEM/STEAM) contains activity and/or value-motivational components. Based on the analysis of the above structures and models of STEM/STEAM competence, the experience of implementing STEAM education of foreign scientists and practitioners, we developed the following STEAM competence structure in Figure 2:

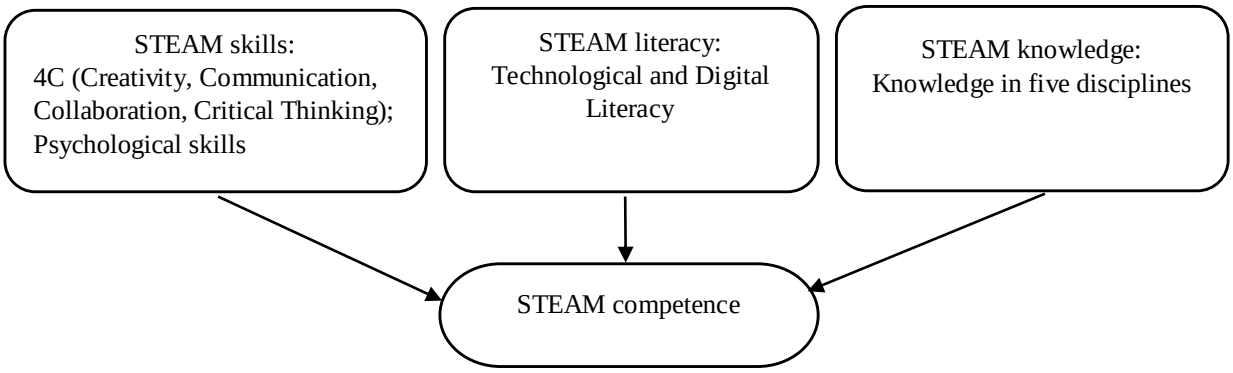

Figure 2. STEAM competence structure

To build STEAM competence among students of pedagogical specialties at Korkyt Ata Kyzylorda University, we planned to implement a task practically in the following areas:
1. Training of students studying in pedagogical specialties (Chemistry, Biology, Physics, Mathematics) to work in STEAM education.
2. Advanced training of University teachers on the methodology of STEAM teaching.
3. Retraining and advanced training of teachers of schools, school educational institutions on STEAM education.

The first direction is to be implemented through the inclusion of elective disciplines as "Basics of STEAM education" and "Tutoring in STEAM education" in the working curricula of educational programs, which aims to form future teachers' STEAM competencies and to prepare them for STEAM education. The second direction is aimed at an in-depth understanding of the methodology

of STEAM teaching to University teachers. The purpose of the third one is to introduce school teachers and trainers of educational institutions to a wide variety of STEAM activities.

The study of these disciplines provides:
- knowledge and skills formation of students regarding STEAM education;
- systematization, analysis, and specification of educational material;
- enriching teachers' lessons with STEAM activities

We surveyed students and university teachers to find out if they have ever heard of or know about STEAM education. The number of respondents is 66 students. The results of the survey are shown in Figure 3.

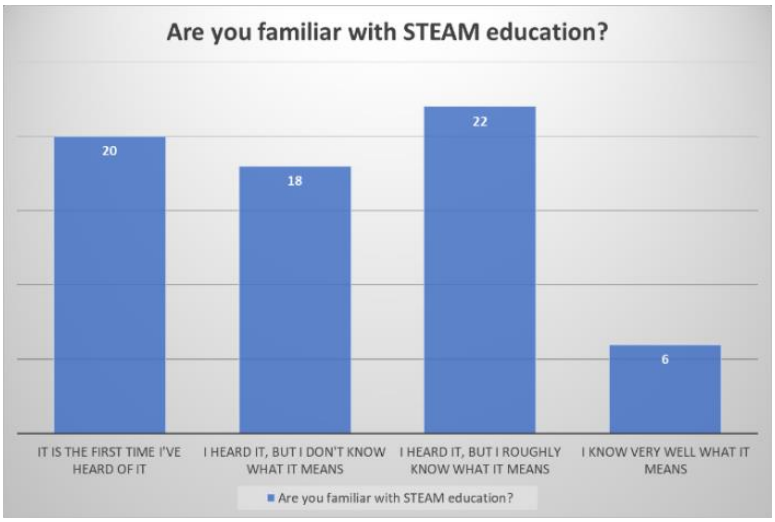

Figure 3. STEAM awareness

The survey results showed that almost all students are not aware of STEAM education, only a few of them know well what it means. Twenty students said that it was the first time they had heard of STEAM, eighteen students heard of it, but they do not know what meaning this approach has. Twenty-two students have heard of this approach, but they roughly know what this method means.

It confirms that future teachers have a shortage of knowledge in STEAM knowledge and the need for professional training of STEAM teachers. We can draw the following conclusion: the readiness of future STEAM teachers largely depends on the level of STEAM teaching programs by providing them with a set of necessary pedagogical conditions.

In this regard, we planned to develop a program to enhance awareness regarding the STEAM approach and to improve STEAM literacy and skills of students of pedagogical specialties. The program includes such events as a discussion on "STEAM education is the basis of economic growth"; a workshop "Creative STEAM projects through the use of art and design"; a training seminar on "The specifics of teaching in a STEAM environment"; discussion "STEAM professionals. Why do the country need them?", watching a social video "Lava Lamp Extravaganza" and training seminar "I want to know more about STEAM" and others. Another form of work on developing STEAM competencies among future teachers will be design and research projects and activities. Students gain experience by collaborating with their peers in groups. Students make significant progress by working together in a STEAM environment. Many competitions for STEAM projects are held all over the country every year. It is an immense opportunity for students to show up and present their unique ideas and work. These events should expand students' knowledge and develop skills about STEAM education, reveal the essence of STEAM education and its value, and teach them to analyze and evaluate chances and conditions for successful learning.

Conclusion

STEAM literacy and STEAM skills play a crucial role in a future teacher. If the students of pedagogical specialties gain knowledge and skills in the time of the 4-year period at the educational institutions they will become more comfortable and confident with the process and teaching STEAM at school. Building STEAM competence among future teachers should be comprehensive and include the following areas:

- inclusion of specialized elective disciplines in the working curricula of educational programs;
- advanced training of university teachers on the methodology of teaching students with STEAM education;
- development of retraining and advanced training programs for teachers of schools and educational institutions. Such training of future teachers solves the problem of the lack of professional competencies in the field of STEAM education.

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Педагогикалық мамандықта оқитын студенттердің STEAM құзыреттілігін қалыптастыру

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Аңдатпа
Мақалада жоғары мектепте болашақ педагогтарды STEAM білім беру жағдайында жұмыс істеуге дайындауда білім берудегі STEAM тәсілінің пайда болу алғышарттары талданады және педагогикалық мамандықтағы студенттердің STEAM-құзыреттілігін қалыптастыру қажеттілігіне назар аударады. Болашақ педагогтарды дайындауда STEAM тәсілі тиімді болып саналады. STEAM-дің оқыту мен оқудағы тәжірибесі ғалымдар үшін үлкен қызығушылық тудырады. Біз шетелдік зерттеушілердің қолданыстағы STEM/STEAM құзыреттілік модельдерін талдадық және STEAM сауаттылығы, STEAM дағдылары, STEAM құзыреттілігі және шеберлік тұжырымдамасы сияқты компоненттерді сипаттауға тырыстық. Біз педагогикалық мамандықтар студенттерінің STEAM құзыреттілігін қалыптастыруға әсер ететін факторларды анықтадық және STEAM құзыреттілік құрылымын әзірледік. Мақаланың мақсаты - болашақ мұғалімдердің STEAM құзыреттілігі мазмұнын теориялық тұрғыдан негіздеу және жүйелеу. Біз білім берудегі құзыреттілік тәсіл туралы халықаралық мақалалар мен баяндамаларға және STEAM құзыреттілігі жайында жазылған академиялық мақалаларға жүгіндік. Қазақстанның жоғары мектептеріндегі STEAM білімі мен құзыреттілігін зерттеу мысалдары келтірілді. Біз зерттеудің аналитикалық, салыстырмалы және жалпылама әдістерін қолдандық және Қорқыт Ата атындағы Қызылорда университетінің оқытушылары мен студенттерінен алынған сауалнама нәтижелерін ұсындық.
Түйін сөздер: STEM, STEAM-құзыреттілігі, STEM сауаттылығы, STEAM дағдылары, болашақ мұғалімдер.

Формирование STEAM компетенции студентов педагогических специальностей

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Аннотация
В статье анализируются предпосылки возникновения STEAM-подхода в образовании, который касается подготовки в высшей школе будущих педагогов к работе в условиях STEAM-образования, акцентируя внимание на необходимости формирования STEAM-компетентности у студентов педагогических специальностей. В подготовке будущих педагогов подход STEAM считается эффективным. Практика STEAM в преподавании и обучении представляет большой интерес для ученых. Мы проанализировали существующие модели STEM/STEAM компетентности зарубежных исследователей и попытались описать такие компоненты, как STEAM грамотность, STEAM навыки, STEAM компетентность и концепция мастерства. Мы выявили факторы, влияющие на формирование STEAM-компетентности у студентов педагогических специальностей, и разработали структуру STEAM компетентности. Цель статьи - теоретически обосновать и систематизировать содержание STEAM компетентности будущих педагогов. Мы обратились к международным статьям и отчетам о компетентностном подходе в образовании и академическим статьям, посвященным компетенции STEAM. Приводятся примеры исследования STEAM образования и компетентности в высших школах

Казахстана. Мы использовали аналитический, сравнительный и обобщающий методы исследования и представили результаты опроса преподавателей и студентов Кызылординского университета имени Коркыт Ата.
Ключевые слова: STEM, STEAM-компетенции, STEM-грамотность, STEAM-навыки, будущие учителя.

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КОММЕРЦИАЛИЗАЦИЯ ТЕХНОЛОГИЙ В ВУЗЕ КАК ФАКТОР ПОВЫШЕНИЕ АКТИВНОСТИ ОБУЧАЮЩИХСЯ

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Аннотация
Сегодня в Казахстане не так много примеров успешной коммерциализации технологий, связанное с тем, что у участников коммерциализации технологий не совсем правильные представления о механизмах использования текущего рынка объектов интеллектуальной собственности и возможности их использования. Поэтому целью данной статьи является использование в процессе обучения основ коммерциализации технологий как фактора повышения активности и развития познавательной деятельности обучающихся вуза. В работе представлены некоторые проблемы и вопросы, с которыми сталкиваются организации в процессе коммерциализации технологий. Двигаясь за мировым уровнем и преодолевая все встречающиеся препятствия на пути коммерциализации технологий, у казахстанской высшей школыв процессе обучения молодежи основам этого направления, имеет неплохое начало. Но в то же времянеобходимо студентам, магистрантам, докторантам, а также ученым университета налаживать сотрудничество с бизнесом и коммерциализировать свои научные достижения, проявлять себя в вопросах лицензирования интеллектуальной собственности.
Ключевые слова: коммерциализации технологий, обучающиеся вуза, анкетирование, интеллектуальная собственность, повышение активности.

Введение

В настоящее время при изменении названия министерств в Республике Казахстан (разделение на два министерства: МНиВО РК и МП РК) требуются преобразования в казахстанской науке, которые в первую очередь связаны с изменениями в системе управления и схемах финансирования исследований [Заседание ПравительстваРеспублики Казахстан, 14.02.2023]. Кроме того, наука в стране по-прежнему считается государственной - организация в значительной степени принадлежит ему и платит заработную плату ее служащим. Если говорить о западных странах, то в большинстве их значительная доля научных исследований и разработок проводится в лабораториях и исследовательских центрах, имеющих частную форму собственности [Tu Yibo, 2023].

А связанные с этим вопросы задаются самими иностранными экспертами на встречах с представителями офисов трансферта и коммерциализации технологий казахстанских научно-исследовательских институтов и учебных заведений. Как отметили зарубежные эксперты - частные инвесторы готовы спонсировать научные проекты только в случае гарантированной последующей прибыли. Более того, если частные инвестиции [Hsu D.H., 2023],