UDK 37.036.5

DESIGN THINKING AS A MEANS OF ASSISTANCE: CREATING SOCIO-PSYCHOLOGICAL AND PEDAGOGICAL CONDITIONS

Kaliyeva E.I.
Sh. Yessenov Caspian University of Technologies and Engineering
Aktau, Kazakhstan
e-mail: elmira.kalieva.73@mail.ru
Janissenova A.M.
Sh. Yessenov Caspian University of Technologies and Engineering
Aktau, Kazakhstan
e-mail: aliya.janissnova@yu.edu.kz

Abstract. The article is devoted to the study of the technology of design thinking in the training of future teachers, the concept of "design thinking" is considered, various approaches to its definition, technologies and the main purpose are analyzed. The authors describe the process of design thinking, which is always focused on creating a better future, as well as on finding new ways to solve complex problems in various fields. The characteristics of this technology are highlighted, which make it possible to use this technology in the practical professional training of future teachers.

Keywords: design thinking technology, project work, future teachers, creative thinking, prototyping, stages of design thinking technology, project thinking.

Introduction

One of the largest universities in the world, the Open University (UK), publishes an annual report on innovations in pedagogy. In 2017, British academic experts identified 10 existing innovations that will have the most significant impact on education in the world in the coming years [1]. One of these innovations is the technology of design thinking, which, from our point of view, is an effective means of professional training of students.

Design Thinking is a means of developing students ' creativity and creative potential. One of the most important skills of the XXI century is creative thinking, the ability to communicate, work in a team.

Design thinking provides a systematic approach to solving the problem, focused on the interests of the end user.

The technology of design thinking (project thinking) is a model of joint team activity that allows to develop new ideas most effectively and productively, as well as find unique solutions. This method of teamwork in conditions of uncertainty, when there is no obvious solution to the problem or insufficient information, makes it possible to implement projects that are beyond the power of one person, because the collective mind can always find a more rational solution than a single person.

Design thinking, which is different from linear thinking, accompanies the process of creating something new, focused on people (human-centered design). Using the tools of this method, you can go beyond the standard vision of the problem and find new approaches to solving the tasks, increase the speed and efficiency of their solution.

Literature review

The process of design thinking is always focused on creating a better future, as well as on finding new ways to solve complex problems in a variety of areas. This was first written about in 1969 by the American scientist Herbert Simon in his book "The Science of the Artificial". According to the author, design can be a process of creating a better future in general, transforming existing conditions into desired ones [2].

The concept of design thinking was summarized in 1980 by Professor Brian Lawson in his work "How do designers think?". Teachers at Stanford University have introduced the methodology of design thinking in education, which helps to develop the skills of active involvement of students in solving practical, real problems, teaching its basic principles, such as: a person-oriented approach to creating innovations, prototyping, etc.

In the process of studying academic disciplines at the university, including pedagogical ones, the use of design thinking is one of the best tools for teaching skills of the XXI century, since students must solve problems by searching and sorting information, which in turn allows them to develop such professional competencies as creativity, teamwork, people orientation, the desire to learn and optimism, creating innovations based on the use of different opinions, group discussions and communications. While solving such problems, students will learn how to integrate their knowledge, put forward solutions based on real knowledge or experience, and give feedback.

David Kelly in his book "Creative Confidence" notes that the technology of design thinking relies on the natural human ability to be intuitive, find patterns and come up with ideas that are not only emotionally attractive, but also functional [3]. According to the author, the main feature of design thinking is not critical analysis, but a creative process in which unexpected ideas lead to a better solution to the problem. Thus, the technology of design thinking in the world of science is considered as an effective means of developing reflection and the ability to think unconventionally.

Results of the research

Based on the above, these characteristics make it possible to use this technology in the practical professional training of future teachers.

The use of design thinking as a means of professional training of students of pedagogical specialties, contributes to:

- creation of socio-psychological and pedagogical conditions for successful learning and development of students in the educational process, ensures that their individual characteristics are taken into account and helps to build an individual trajectory of their educational activities;
- formation of the necessary professional competencies. They are:
- ability to work in a team, to tolerate the differences (social, cultural, personal) of the participants;
- the ability to provide training, education and development of students, taking into account their social, age, psychophysical and individual characteristics and educational needs;
- the ability to carry out psychological and pedagogical support of the educational process and to direct the educational and cognitive activities of students;
- the ability to design the trajectory of their professional and personal development;
- willingness to apply the system of theoretical and practical knowledge in the formulation and solution of research problems in education, etc.

At the present stage of university education, it is very important to use the tools of design thinking in the organization of project work of students. Project work of students is an important component in the organization of the entire learning process at the university. It is in the process of project work that students learn to solve practically important tasks, acquire the necessary knowledge, skills and abilities that are in demand in further educational and professional activities [4].

The famous American scientist Herbert Simon identified the following interrelated stages in design thinking:

- Identify the problem.
- The study.
- Formation of ideas.
- Prototyping.
- Choosing the best solution.
- Implementation of the solution.
- Evaluation of the results [2].

These stages refer to the divergent or convergent phase of thinking. Divergence involves expanding the angle of view, combining all the findings and ideas. Convergence involves narrowing the focus and choosing a priority idea, which is further tested and refined on the next repeated actions. The focus of attention expands and narrows, allowing to collect ideas, and then select priority ones and refine them.

It should be remembered that design thinking is a well-defined process that involves moving from uncertainty at the initial stage of research to insights (the prototyping stage), and then to clarity and focus (the final stage-the creation and launch of the project).

Let's take a closer look at the stages of design thinking. In the first stage, students study the problem in depth. It is very important to achieve a common understanding of the task between the team members. For this purpose, various methods are used: the method of brainstorming, the method of quick understanding of the project tasks, and others. As a result, at this stage, a specific project goal should be formulated (what, for whom it is being done), a detailed description of the user (problems, needs) should be given, and restrictions should be identified.

The next stage of work on the project is focused on the search for problematic situations - "insights". At this stage, the issue of collecting information that will allow to identify the problem, determine possible ways to solve it, as well as restrictions that prevent the solution of the task. At the moment, there is a process that includes:

- identification of factors related to people's behavior and their motives;
- formation of cause-effect relationship, collection of primary information, processing, classification and use to gain understanding;
- understanding (empathy), which allows a better study of the consumer, putting yourself in his place, only then it will be possible to develop and offer him the most appropriate product for his needs and expectations.

The use of such methods as in-depth interview (confidential conversation), observation, immersion in the user experience helps to achieve an understanding of the needs of the end user. In doing this, data recording (notes, sketches, photos, audio and video), focuses on the consumer ideas for product under development all the time relate to user needs. Students should understand the need to understand the focus of problems, a clear vision of difficulties. To the considered stages of "insights" is added the study of the needs of target users. That is, after the collected information about problems in a particular area, then the focus is selected (what problem will we solve?), which assumes the formulation of the problem that we plan to work on, focused on a specific user, and which are currently considered unsolvable or no one solves. Also, by adding an analysis of the external environment, it is possible to identify constraints that could constrain the solution of this problem. Thus, a point of view on the problem is formed, which should be clearly and in more detail formulated, only then it will be possible to develop a solution to this problem more clearly and easily.

Having identified the subject of close attention, we proceed to the actual generation of ideas, using the methods of brainstorming, mental maps, storytelling, discussing different ideas. The main task of the stage is to offer as many possible ways to solve the problem as possible, to collect a pool of ideas for solving a focused problem. But these ideas are not final, you can always go back to adding to the pool of ideas. Before the prototype is developed, 2-4 ideas are selected, usually by voting. Then the selected ideas are translated into prototypes.

Prototyping is an iterative process that allows you to generate new ideas, improve old ones, and get a clearer idea of the problem and its solution. This process involves the creation of a minimum viable product or service, with a set of characteristics sufficient to satisfy users. A prototype can be anything that can be interacted with: physical prototypes (models, mockups, prototypes, etc.), sketches, computer products, techniques, role-playing scenarios, etc. It is important that the user can get their experience from the prototype, feel it in action. And the team of performers collects their observations of the user's interaction with the prototype for its subsequent refinement [5].

The stage of choosing the best solution and implementing it involves testing the selected ideas. It is necessary to use a thought experiment, role-playing games, a survey, or any other method that will allow you to get feedback on the viability of the idea and make appropriate corrections to the proposed solutions. At this stage, the task is also checked (was it formulated correctly?). The final stage requires the involvement of end users to evaluate the prototype and retest the revised version.

Sample topics of group project tasks that can be used in practical classes in the pedagogical discipline: "Magic squares" or QR codes – how a teacher can effectively use them in the educational process", "Giftedness – how to help a student realize their place in the world around them", "Individual project-how to teach a high school student to perform it" and others.

Table 1-Example of organizing a group project task using design thinking technology

Stages of design thinking technology	The content of the stages of design thinking technology by G. Simon	The purpose of the stages of design thinking technology	Pedagogical support of the teacher
Determination of the problem	Correctly identify what the problem is. If it is not correctly determined, then the solution that will be reached in the process will be the solution of a different problem, and not the one that needed to be solved. Next, you also need to determine who is the end user (whose problem is being solved?) and what result should be achieved (what is the successful result of the project?)	Promote students' awareness of individual needs of practical acquaintance with one of the latest means of interactive learning, the development of primary skills and skills of their use in the educational process.	Problem conversation "How will these “magic squares” interest me?" and how can I use them in my work?". Brainstorming technique "Why is it important for me to learn and use this technology in practice?". Get acquainted with general information and view QR codes for academic subjects, discuss the features of using the interactive learning tool. Training (development of skills in using free mobile QR code applications for Android and Apple products)
Resaerch	It starts with an overview of the history of the problem: was the QR code used in education? How did you try to solve this issue? Whether the practice is successful or not? Why? The review of history helps to avoid repetitions and those mistakes that have already been made before us. At this stage, it is also important to interact with the end users-teachers – you can talk to them and hear their opinion about this idea of effective learning (these ideas may still be useful). Sometimes the most effective way to learn something about a problem is to observe classes using QR codes.	It is conducted in order to form students' understanding of the final result of the effective use of interactive learning tools. A number of possibilities of their use at different stages of the lesson and reception options are clearly formulated.	Combining of students in a creative group with the provision of the topic of the project work. Discussion of a number of tasks on the study of the use of QR codes in education as the basis for the accumulation of material for the project. Discussion of possible organizational and substantive difficulties, ways to solve them. Demonstrate to students the successful experience of using QR codes in the educational process and overcoming difficulties in the course of using this learning tool and performing project work.
The formation of ideas	At this stage, all available information is collected to help understand the effectiveness of using QR codes in the educational	Detailed study, consultation of practitioners, visit to an educational	Theoretical and practical study of the issue, the formation of the basis for the analysis of the features of the effective use of this training tool. Discussion of

	process. Then, using the method of brainstorming, they identify all sorts of ideas and techniques of QR codes that help solve the problem of effective learning. In teamwork, it is important to try to come up with and consider the problem from different points of view, this will help sometimes come to the most unexpected, interesting and at the same time constructive ideas. You can't criticize ideas during a brainstorming session.	institution in order to collect information that will help you find a way to solve the problem of the project.	the received search results. Conducting a brainstorming session to solve the problem posed in the project topic.
Prototyping	Once all possible ideas for solving the problem are identified, you can now combine them, improve them, and choose the best ones. At this stage, it is important to get feedback: show your final decisions to the specialists of pedagogical activity. Use feedback from them to improve your product.	Determining how to solve a project problem.	Systematization of search results and generalizations on the problem posed in the project work. The choice of strategies for solving the problem of the project task. Determination of an effective way to solve the problem of the project task. Development of the project plan and content.
Choosing the best solution	At this stage, from all the developed and proposed options, you need to choose effective work strategies.		
Implementing the solution	At this stage, you will have to create and implement your own working product or solution. Identify resources, assign tasks, complete them, and present the product to end users-educators.	Protection of the final project work. Getting feedback from experts about the effectiveness of a particular way to solve a project problem.	The choice of the form of presentation of the project results, its design and presentation. Protection of project work. Determination of the prospects for further research of the problem posed in the topic of the project work.
Evaluation of results	At the last stage, it is important to evaluate the results of the implementation of the educational product, to outline ways to improve it, and possible changes. It is	Approbation of the method of solving the project problem in practical and	Introduction of a way to solve the problem of project work in the educational process. Analysis and evaluation of the results of practical and research work on the project.

	also important to get feedback from the users of the product.	research activities.	Correction of the way to solve the problem of project work.

Conclusion

Thus, the technology of design thinking allows the teacher not only to organize the creative process of team interdisciplinary work, but also to reveal the personal potential of the student. In addition, such a technique helps future specialists to create an innovative product at the stage of obtaining professional skills, to see and realize the effectiveness of any pedagogical and psychological techniques, and also forms their ability to work in a situation of uncertainty.

The technology of design thinking allows you to make team work on the project the most effective, which is a systematic approach to developing a solution to the problem. This approach combines teamwork, creativity, creative thinking, active communication, openness, design and visualization. Such a process of solving real problems received from the external environment contributes to the formation of students' necessary communication skills, public speaking skills, entrepreneurship, practical skills, skills and experience that will be in demand in professional activities.

REFERENCES

1. Polyaevskaya A. Innovations in education. – 2016. – URL: http://nitforyou.com/ innovacii-v-obrazovanii-2016
2. Simon G. A. The science of the artificial / translated from the English by E. L. Nappelbaum. - 2nd ed. - Moscow: Editorial URSS, 2004. - 146 p.
3. Kelly T., Kelly D. Creative confidence. How to release and realize your creative powers / translated from English by T. Zemlyanskaya. - Moscow: Azbuka-Atticus, 2015. - 288 p.
4. Danilov S. V. Education of entrepreneurship // Interactive approaches to providing educational activities in institutions of higher and secondary education. – 2017. – p. 53-60.
5. Zavyalova N. B., Saginova O. V., Stukalova A. A., Maksimova S. M. The place and role of project work in training specialists for the modern economy // Russian entrepreneurship. - 2017. - No. 19. - p. 259-268.

ӘЛЕУМЕТТІК-ПСИХОЛОГИЯЛЫҚ ЖӘНЕ ПЕДАГОГИКАЛЫҚ ШАРТТАРДЫ ҚҰРУДА КӨМЕК КӨРСЕТУ КУРАЛЫ ДИЗАЙН

Калиева Э.И. - Ш.Есенов атындағы Каспий технологиялар және инжиниринг университеті, Ақтау, Қазақстан.

Джанисенова А.М. - Ш.Есенов атындағы Каспий технологиялар және инжиниринг университеті, Ақтау, Қазақстан.

Аңдатпа. Мақала болашақ мұғалімдерді даярлауда дизайнерлік ойлау технологиясын зерттеуге арналған, «дизайнерлік ойлау» ұғымы қарастырылып, оны анықтауға, технологияларға және негізгі мақсатына әр түрлі көзқарастар талданған. Авторлар әрдайым жақсы болашақ құруға, сонымен қатар әр түрлі саладағы күрделі мәселелерді шешудің жаңа жолдарын табуға бағытталған дизайнерлік ойлау процесін сипаттайды. Бұл технологияның сипаттамалары атап көрсетілген, бұл болашақ мұғалімдердің кәсіби кәсіби дайындығында осы технологияны қолдануға мүмкіндік береді.

Түйінді сөздер: жобалау ойлау технологиясы, жобалық жұмыс, болашақ мұғалімдер, шығармашылық ойлау, прототиптеу, жобалау ойлау технологиясының кезеңдері, жобалық ойлау.

ДИЗАЙН-МЫШЛЕНИЯ КАК СРЕДСТВО ПОМОЩИ СОЗДАНИЯ СОЦИАЛЬНО-ПСИХОЛОГИЧЕСКИХ И ПЕДАГОГИЧЕСКИХ УСЛОВИЙ

Калиева Э.И. - Каспийский университет технологий и инжиниринга им. Ш. Есенова, Казахстан, г.Актау.

Джанисенова А.М. – Каспийский университет технологий и инжиниринга им. Ш. Есенова, Казахстан, г.Актау.

Аннотация. Статья посвящена изучению технологии дизайн-мышления в обучении будущих учителей, рассмотрено понятие «дизайн-мышление», проанализированы различные подходы к его определению, технологиям и основному назначению. Авторы описывают процесс дизайн-мышления, которое всегда ориентировано на создание лучшего будущего, а также на поиск новых способов решения сложных проблем в различных областях. Выделены особенности данной технологии, позволяющие использовать данную технологию в практической профессиональной подготовке будущих учителей.

Ключевые слова: технология дизайн-мышления, проектная работа, будущие учителя, креативное мышление, прототипирование, этапы технологии дизайн-мышления, проектное мышление.