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EFFICIENCY OF APPLYING "ROBO DIY" TECHNOLOGY IN EVOLVING THE PRESCHOOLERS' COGNİTİVE İNTERESTS

In respect with the modernizing of contemporary education content, advancing the cognitive interests and curiosity, independence, and creating the critical thinking of preschoolers is one of the pressing issues in preschool education field. Present-day children live in the world in which information and communication technologies are speedily growing. Preschool organizations' goal is to educate children from preschool age to be able to work with the given new technologies. Alongside, to develop children's cognitive interest in science and technology.The given article considers the application pecularities of "Robo DIY" technology in developing the preschoolers' cognitive interest. Analyzing the scientific research, "Robo DIY" concept's definition has been given. There were carried out diagnostics aimed at determining the level of cognitive interest, the level of design and skills of independent activity of senior preschool age kids. Study results have been provided as well as growth efficacy of children's cognitive interest due to the new innovative approach in design has been demonstrated. It is pointed out that technology contributes not just to advancing the children's cognitive interests, but also to forming the independent thinking, expanding the knowledge, consolidating the skills, mastering the skills, and educating the moral qualities. The authors substantiate the impact of "Robo DIY" technology on augmentation of key competencies in demand in the current information society.

Key words: cognitive interest, constructive game, engineering thinking, robotics, "Robo DIY", STEM education.

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Мектеп жасына дейінгі балалардың танымдық қызығушылықтарын дамытуда «Робо diy» технологиясын қолданудың тиімділігі

Мектеп жасына дейінгі балалардың танымдық қызығушылықтары мен білуге құмарлығын дамыту, дербестігін ескеру, сын тұрғысынан ойлайтын балаларды қалыптастыру қазіргі таңдағы білім беру мазмұнының жаңаруына байланысты мектепке дейінгі білім беру саласының өзекті мәселелерінің бірі болып саналады. Мектепке дейінгі білім беру ұйымдарының мақсаты – қазіргі балалардың ақпараттық, коммуникациялық құралдардың жылдам даму кезеңінде өмір сүруіне байланысты мектеп жасына дейінгі кезден бастап балаларды сол құралдармен жұмыс жасауға қабілетті етіп тәрбиелеу. Сонымен қатар балалардың техникалық құралдарға және оларды құрастыруға деген танымдық қызығушылығын дамыту.

Бұл мақалада мектеп жасына дейінгі балалардың танымдық қызығушылығын дамытуда «Робо DIY» технологиясын қолданудың ерекшеліктері қарастырылған. Ғылыми зерттеулерді талдай отырып «Робо DIY» ұғымына анықтама берілген. Ересек мектеп жасына дейінгі балалардың танымдық қызығушылығының деңгейін, құрастыру деңгейлері мен өз бетінше әрекет ету дағдыларын анықтауға бағытталған диагностикалық әдістемелер жүргізілген. Зерттеу нәтижесі баяндалып, балалардың танымдық қызығушылығын құрастырудың жаңа инновациялық тәсілі арқылы дамытудың тиімділігі көрсетілген. Технологияның балалардың танымдық қызығушылықтарын дамытуға ғана емес, сонымен қатар ойлаудың дербестігін қалыптастыруға, білімді кеңейтуге, дағдыларды бекітуге, іскерлікті игеруге, адамгершілік қасиеттерді тәрбиелеуге ықпал ететіндігі баяндалады. Авторлар «Робо DIY» технологиясының қазіргі ақпараттық қоғамда сұранысқа ие негізгі құзыреттерді дамытуға ықпалын негіздейді.

Түйін сөздер: танымдық қызығушылық, конструктивті ойын, инженерлік ойлау, робототехника, «Робо DIY», STEM білім беру.

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Эффективность применения «Робо Diy» технологии в развитии познавательных интересов у дошкольников

В связи с обновлением содержания современного образования развитие позновательных интересов и любознательности, самостоятельности, формирование критического мышления дошкольников является одной из актуальных проблем сферы дошкольного образования. Современные дети живут в мире в котором быстро развивается информационные и коммуникационные технологии. Цель дошкольных организаций – с дошкольного возраста воспитать детей способными работать с этими новыми технологиями. А также развивать познавательный интерес детей к науке и к технике.

В данной статье рассмотрены особенности применения технологии «Робо DIY» в развитии познавательного интереса дошкольников. Анализируя научные исследования дается определение понятию «Робо DIY». Проведены диагностики направленные на определение уровня познавательного интереса, уровня конструирования и навыков самостоятельной деятельности детей старшего дошкольного возраста. Изложены результаты исследования и показана эффективность развития познавательного интереса детей с помощью нового инновационного подхода в конструировании. Отмечается, что технология способствует не только развитию познавательных интересов детей, но и формированию самостоятельности мышления, расширению знаний, закреплению навыков, овладению умениями, воспитанию нравственных качеств. Авторы обосновывают влияние технологии «Робо DIY» на развитие ключевых компетенций востребованных в современном информационном обществе.

Ключевые слова: познавательный интерес, конструктивная игра, инженерное мышление, робототехника, «Робо DIY», STEM образование.

Introduction

State required standard of preschool upbringing and education provides for creating the individual qualities, such as development of children's communicative and cognitive abilities in transforming the education content (SRS, 2022). "Model for developing the preschool upbringing and education" of RK Government considered the norms of convention related to child's rights and defined the principal directions of teaching to transform the preschool upbringing and education based on scientific data (PSUE model, 2021). One of the model's major tasks is to create conditions for changing the preschool upbringing and education content due to improving the pedagogical process on the scientific basis. Preschool is the stage of preparation for school, the stage to advance the child's indispensable and vital skills. On account of this, the approach of preschool upbringing and education in the child's life should change from organized activities to generating the conditions for the maximum development of each child's potential, taking into consideration the child's individual characteristics and needs. The priority of any transformation will be aimed at protecting the right of every child to get a quality and affordable education in compliance with their capabilities. As is recognized that the age-appropriate individual qualities of the child are possible only if they master innovations that contribute to development skills, and qualitative indicators of educational work in preschool organizations (A. Mankesh, 2023:154).

Accordingly, we note that the rapid development of innovative trends in information technology and education system obliges to evolve the skills necessary to create "a lifelong learning" system in XXI century. This, in turn, empowers to increase preschoolers' interest in new techniques and allows them to develop creativity, critical and engineering thinking.

State's Head Kassym-Jomart Tokayev(2023) in his "Economic orientation for Fair Kazakhstan" Message to the people of Kazakhstan said: "You all know that I pay special attention to digitalization and innovation issues. Our crucial strategic task is to turn Kazakhstan into an IT state." He noted that priority of artificial intelligence development is evidence of the need to transform the preschool education sphere.

The concept for education development for 2023-2029(2023) "On the basis of combining the modern theories with national characteristics, the integrity of the process of early child evolement is

ensured", therefore, it indicates the need to evolve children from an early age in accordance with the requirements of the times.

In relation to upgrading the education content, the entire level of educational areas is being transformed, and a set of measures for advancing the education system is being implemented. There are several factors that have influenced the transformation of preschool upbringing and education:

- the growth of the digital educational space;
- the lives of present-day children in the era of active informatization, computerization and robotics;
- the significance of developing XXI century skills in education;
- the birth of alpha descendants.

Predicated on the given factors, there is a need to involve children in dynamic activities, independence, evolvement of hard skills as well as soft ones and increase the interest through organizing the work with children in the new format in order to improve preschool education quality. Based on the new education content, the child must energetically act in all processes carried out in preschool organizations. The child fully assimilates the necessary information only when they enter into dynamic activity, become the subject of the educational process. The child is not just a listener or a spectator, they become a creator, organizer of this process and show interest in the mentioned process (A. Mankesh, A. Auezova, 2022:71). Inquisitiveness or curiosity is a complex concept that can be viewed from various angles, a psychological feature that fuels a person's action seeking to comprehend and perceive a certain object. Therefore, the study's main idea is the use of constructive games that ameliorate the skills of design and engineering thinking in evolving children's cognitive interests. During the execution of the research idea, the following provisions were guided: analysis of research of domestic and overseas scientists who had considered the issues regarding the cognitive interest and development of design and engineering thinking skills, as well as justification of the significance of applying the new approaches to constructive games in preschool organizations.

Literature review

The methodological basis of the interest originates in the writings of philosophers of antiquity and the Middle Ages. Even before "interest (inquisitiveness)" term appeared, the ancient Greek philosopher Aristotle defined this phenomenon as aspiration for knowledge, which is the basis of the spiritual nature of an individual. Ibn Sina's opinion ".. if a child is brought up in the team, then they do not get bored, they get motivated and interested in classes, they strive to keep up with others" – is still of a great value (A. Yedigenova, 2004:97).

The great educator Y. Altynsarin(1991:85) considered interest as an incentive for all activities, stating that "Children can bear fruit only if they cultivate an interest in art and education". In conformity with the educator the lessons taught to children in their native language are simple, fascinating, if teachers use stories and fairy tales, examples and poems properly, then kids' interest in gaining the knowledge increases. Zh. Aimauytov (1998), A. Baitursynov (1989:318), M. Zhumabayev (1992:154) stressed that the role related to interest in evolving the art and education is always high. "Children need to be taught easily, in the way that young learners should not feel any pressure or sufferings." A. Baitursynov suggested that if children study without any challenges, they will be interested in learning, as for Zh.Aimautov, "We will not achieve great results if we are not able to arouse interest in our kids while teaching. It is necessary to stimulate the desire in children, at the same time, we should do our best to make our learners be interested in some things", so T. Abdykadyrova(2002:97) showed the significance of interest.

Professor K. Zharykbayev(1996:159) was one of those who paid special attention to the problem of interest in pedagogy and psychology sphere. In his opinion, "Showing an interest is one of manifestations of the rather stable, individual peculiarities of a person, aimed at the active cognition of objects and phenomena in existence.

".... interest often manifests itself depending on the child's propensity for something". Considering that in everyday life a person sets specific goals for themselves and puts their will into doing a certain thing, T. Tazhibayev(1993:240) divided human interest into three groups:

- *the first* – target interest is that a person is interested at some point in achieving the set goal-task;
- *the second* – activity interest lies in the fact that a person does not set goals for themselves, does not worry about the results, but is only interested in the flow of work performed;
- *the third* interest lies in the fact that at some point a person is interested in the work results. He strives to achieve the result, puts all their strength into it.

Based on T. Tazhibayev(1993:240), it is advantageous to group the human interest in this way. After all, interest occupies a significant place in human life and everyday life. Interest directs to doing a certain thing, motivates a person, activates their actions. A.V. Zaporozhets(1969:13) believed that "interest is one of expressions of private features of an individual, aimed at active knowledge of objects and phenomena in the world" . Helvetius (2006:258) argues that "interest is a stimulus that combines the main factors, which affect the human activity".

In line with the Kazakh scientists, J. Y. Namazbayeva(2005:3): "Interest is attention, mood, enthusiasm, focus, curiosity, concentration, benefit, goal, desire, wish" , K. S. Zhumassova (2017:156): "Interest is the most important term of evolving spiritual and physical strength of a person and expands horizons and encourages obtaining the knowledge ". The presence of interest in a child empowers to increase their activeness, also, it leads to quality education, and increase the learning process efficiency.

Cognitive interest is a special kind of interest. Its form is considered to be the cognitive process. Cognition is the basis for evolving the human consciousness. In the course of everyday life, the child strives to identify, cognize, and understand the phenomena and things of the real world. Philosophically, «cognition» is the basis to develop the human consciousness (Abu Nassir Al-Farabi, Abugali Ibn Sina). A complex scope of thought, tending from ignorance to knowledge. Psychologically, «cognition» is a reflection of objects and phenomena in the environment in the human mind (S. L. Rubinstein, V. V. Davydov, E. Ya. Burlina, L. S. Vygotsky). (A. Rysbekova, 2008a:96). Pedagogically, "cognition" is perceived as "a cognitive ability" and reflects the flexibility of a person in performing the activities in being aware, comprehending, applying, thinking deeply etc. (K.D.Ushinsky, E.I. Tikheyeva, F. N. Bleher), on the basis of the given theory, A. Rysbekova(2008) examines in detail the concept of cognition in her study. National scientists Zh. A. Karayev, T.S.Sabyrov, N.D.Khmel, M.A.Kudaikulov, A.E.Abilkassymova, K.K. Zhanpeissova, A. P. Seiteshev and others studied the effective foundations of creating the cognitive interest in their research (D. Issabayeva, 2009:117). Z.B. Yeshimbetova(2007:67) in her "Formation of students' cognitive interest in the process of learning languages" work defined: "Cognitive interest is the real way to deepen the search that contributes to improving the education quality ", Zh. A. Zhussupova(2010:89) wrote: "Cognitive interest is formed from a very early age and the first form of manifestation is being keen on, passion ".

A lot of work has been studied on developing and forming the cognitive interest in preschoolers. Thus, M. L. Semenova (2006:63), Zhang Lissin (2011:109), Yu. Yu. Berezina (2019:87) conducted research on creating the cognitive interest in preschoolers, emphasizing the significance of ameliorating the cognitive interest at an early age. There are researches of A.V. Soboleva (2004:16), N.I. Kashubo (2003:121) related to advancing the children's cognitive interest through mathematical games, of O. V. Porozorova (2001:96) in developing the child's cognitive interest owing to the national pedagogy, of S.B. Gussarova (2000:79), augmenting the cognitive interest through familiarity with everyday objects, of A. U. Deikina (2002:142) related to arising the cognitive interest through media education.

In addition to arousing the interest by introducing the children to the world around them, it is needed to evolve cognitive interest as well. This is due to the fact that only when all cognitive processes are simultaneously activated (vision, hearing, thinking, feeling etc.), any new information will be remembered in the child's memory forever. Concomitant activation of such cognitive processes can be effectually executed in the construction activities of preschoolers.

In preschool pedagogy, construction games occupy a special place in the life of preschoolers that was revealed in many scientists' and researchers' works. In the studies, Z. V. Lishtvan (1979:176), L. A. Paramonova (2002:45), N.N.Podyakov (2009:407) highlighted and studied carefully that construction materials have evolutionary impact on arousing and evolving the child's motor and sensory abilities, as well as cognoscible, cerebral, creative qualities within the play activities. Scientific research bases in new formation conditions were considered as a special scientific orientation in the works of L. V. Kutsakova (2016:58), T. V. Guguman (2017:39), alongside, constructive games were conscientiously discussed in preschool organizations, centers for additional education (CAE) on different characteristics: engineering thinking related to the game, sensory and motor signs, visual activity development of cognitive thought and other issues.

Construction activity is a practical work aimed at obtaining the certain, well-thought-out, functional products. Designing is one of the most principal types of practical activities that contribute to comprehensive evolvement of preschoolers. Within the

process of designing, the child'a sensory abilities are advanced through vision, touch, movement, and ideas about the color, volume, shape, and objects quality are set as well (G. N. Sidoruk 2006:149).

Moreover, children learn to negotiate with friends, working individually and in teams, to express their opinions, to describe things performed. That is, the following criteria for establishing the social language environment are manifested in the child:

- the ability to attentively listen, that is, the ability not to interrupt others and make others listen to their own thoughts;
- to learn to thank for other people's services, apologize and include the word "please" in their requests, to be aware of the difference between a request and a demand;
- the ability to say "thanks" for someone else's services, the ability to express, share, admit their point of view when they do good deeds for others or do something wrong etc.

At each stage of constructive games in developing the children's design abilities, the given criteria should become daily skills (A. Mankesh, A. Abilzhanova 2023:59).

Constructive games' educative and developmental influence is in the ideological content of phenomena reflected in them, in assimilating the building methods by children, in expanding their engineering thinking, in improving the vocabulary, and strengthening positive relationships. This is because children jointly build based on a certain plot due to different tools. In the process of designing, the child learns to set goals for themselves. With the purpose to achieve the goal, the learners draw up their construction plan and operate stage by stage according to the elaborated plan algorithm. It is worthwhile finding out what to do, what materials are needed, and what system should be applied for construction. Planning everything regarding building and solving any construction task can help children expand engineering thinking.

Pedagogical and psychological problems of preschoolers in intellective-cognitive and constructive-creative fields were considered by foreign scientists; the given fact held a leading position in the resources of special global scientific and cited publications. Notably, meaningful conclusions were presented in comparative studies of Gill Althia Francis, William Farr, Silvana Mareva, Jenny Louise Gibson, "Psychological traits of children in the process of localizing the design games in digital format" (Gill Althia Francis, 2019:68), Lisanne Schröer, Richard P. Cooper, Denis Mareschal (2021) "Defining the peculiarities of activity due to Duplo construction game for children".

Currently, in the country, in connection with modernizing the education content in preschool organizations, the primary attention is paid to the growth of children's design skills, increasing children's cognitive interest in technical means and their design. In preschool pedagogy, buiding and constructive games belong to one of the types of creative play. In preschool organizations, construction is divided into two types:

- technical (made of cubes, lego constructors, iron, magnet etc.)
- creative (made of natural materials, paper, fabric etc.). and recently the computer type has been widely used as well.

For the time being, Robotics is widely applied in preschool organizations. Children learn the initial prerequisites of engineering thinking by creating the simple robots using Lego constructors and setting them in motion. We are offering "Robo DIY" technology, a new way of assembly based on our research work. DIY (di ai wai) stands for "Do It Yourself." This type of assembly combines robotics and creative assembly, in other words, building from simple natural materials that empowers to set in motion the constructed product. D. V. Wolf(2016), in his study wrote "A new cultural artifact appears on the basis of a finished substance", and he attributed DIY approach to the field of creativity and considered it as a method of inventing a new object.

In 1998, MIT professor Neil Gershenfeld started his course for students which was called "How to make any object?". He taught students the ways of using digital technologies to realize his ideas. Thereby, DIY method and STEM incorporated education (S.Belhadi, 2016). Specifically, we can define: "Robo DIY technology is an innovative approach combining the robotics and STEM education, which allows to create products made from simple natural materials and set the made products in motion."

Considering that contemporary children are Alpha descendants, they were born with a gadget in their hands. They are born ready for changes. Alpha descendants assimilate information very fast, at some point they cope to perform several actions, in the future they will be able to combine even four or five professions (Williams A, 2015). Consequently, we cannot use the old methods in the process of bringing up and training the alpha generations. Given that they live in the robotics era, in the future we need to advance the interest in creating these ro-

bots on their own, create prerequisites for engineering thinking as well as ameliorate assembly skills. Our goal is to define the possibilities of the proposed "Robo DIY" technology in evolving the children's cognitive interest.

Materials and methods

Experimental work was performed on the topic under consideration, there were applied the following methods:

- theoretical research methods such as analysis, assembling, comparison, generalization, modeling;
- empirical research methods, including observation, question-answer, conversation, survey.

In preschool organizations, children's leading activities are based on games, accordingly, bringing up and training were executed due to games. In our study, the purpose of which is to identify the possibilities of constructive games in developing the children's cognitive interest, several game techniques were used. When determining the level of children's cognitive interests, we used V. S. Yurkevich and E. A. Baranova's questionnaire that contains 7 questions (Table 1). The given survey was conducted by children's parents and group teachers. At the same time, methods for determining the child's cognitive interest were held with the individual child. For this purpose, "Fairy tale" technique by N.I. Ganoshenko and V. S. Yurkevich as well as "Clash of motives" approach by N.I.Gutkina were applied (E. A. Baranova, 2005:77). To determine the level of assembling and independent activity skills of children, a diagnostically organized activity was chosen on "Help the rabbit" topic owing to G. A. Uruntayeva's(2007:304) methodology.. In addition, several natural materials were put up in front of the children and they were asked: "What can be built from these materials?" In the result, the levels of imagination and children's compilation from the mind ability were identified.

The research engaged the senior group's 30 children as an experimental group from LLP "Orkeniyet" nursery-preschool in Almaty region, Zhambyl district, Uzynagash village. 30 children from the senior group of SOPUE # 5 "Ulan" nursery-kindergarten participated as a control group.

Results and discussion

The results of the survey according to V. S. Yurkevich and E. A. Baranova indicated that the rate of children's cognitive interests was between 17-26 points and showed an average indicator. The given indicator was obtained from the responses marked by parents and teachers. Now, as for the methods conducted with individual children, based on "Fairy tale" approach by N.I.Ganoshenko and V. S. Yurkevich, the child is offered to listen to a fairy tale about fruits. But the child should choose only one of the four fairy tales names: apple, pear, apricot, coconut (the last fruit should be unfamiliar to the child). The child is asked what kind of fruit fairy tale he wants to hear. During the data processing, the child's interest in an unfamiliar fairy tale is checked. The child's very question about what an unfamiliar fruit is was fixed (even if he/she decided to listen to a fairy tale about another fruit), because the question about an unfamiliar fruit is itself an obvious degree of interest. 18% of the 60 children who participated in the study decided to listen to the story about coconut, and 17% asked what a coconut is. And the remaining 65% did not ask about coconuts at all. And the remaining 65% did not ask about coconuts at all. According to N.I. Gutkina's "Clash of motives" method, the dominance of cognitive motives in the process of affective needs of the child was exposed. It is recommended to invite the child into the room and look at several toys on the table. Then the child is invited and an unfamiliar fairy tale is started being told. When it comes to the most interesting moment, stopping the fairy tale, the child is asked what hes/he wants to do: play with toys or listen to the continuation of the fairy tale. It was fixed that children who chose to play with toys had a low cognitive interest rate, and children who chose to listen to the continuation of the fairy tale had a high cognitive interest level. 35% of children decided to listen to the fairy tale continuation, and 65% decided to play with toys. The conducted methods results demonstrated an insufficient level of children's cognitive interests. It is known that one of the main needs of preschoolers is free play, free activity, and participation in vigorous activities.

We have set the goal to evolve children's cognitive interest through constructive games considering the facts that one of the principal activities in a preschool organization is – within the construction process the child feels as free as possible, entirely realizes their thoughts, imagination and thinking are fully activated, and vocabulary increases.

In order to determine the level of assembling skills and independent activity ones of children, the diagnostically organized activity was carried out owing to G. A. Uruntayeva's methodology on "Help the rabbit" topic. The children were distributed the

tools needed to assemble the rabbit house and offered to build a house based on the model.

The wall and roof of the house are thick. And the children were given thin volumetric parts, including thick ones. During the process of data handling, the proper ways of assembling were recorded, also, errors made by children. Alongside, children's adherence to consistency in the design process was also taken into consideration. 52% of the children built the house based on the model in accordance with the requirements, 48% completed the assembly of the house with mistakes. Furthermore, with the purpose to determine kids' imagination level and skills, several natural materials are put in front of children (a stick, triangle paper, sponge for washing the dishes) and are asked: "What can be built from these things?". All the kids replied: "We can build a flag, a ship, a house, a plane" and assembled the mentioned things with great interest.

The study results have shown that children are fond of assembly activities. Hence, with the purpose to evolve children's cognitive interests and improve their design skills, we have elaborated the program based on "Robo DIY" technology. In the process of working with children, we executed the organized activities to draw up a program plan with children, moving from simple to complex on the basis of sequence and consistency. Children began to master the prerequisites of engineering thinking, setting in motion the products that they had built from simple natural materials. In each organized activity executed, there was noted an increase in the rate of children's cognitive interests. Since children start asking: "What else are we collecting today?", "What are we using to set it in motion?" And the question, as it is known, is a clear manifestation of interest.

One of the crucial tasks for the latest education system today is to ensure advancing the professional competencies of preschool educational organizations' teachers. To effectively implement "Robo DIY" technology, the work was realized to improve the knowledge of educators. Nurturers were given consultations, there were conducted seminars and master classes as well. Because every future specialist should have fully formed such traits as the ability to master the achievements of dynamically developing scientific technology, the desire for innovative search. Teacher's activity should be aimed not only at transferring the knowledge, fully mastering the subject, but, first of all, at the systematic development of learners' thinking stage by stage (A. Mankesh, L. Anarbek, 2023:39).

Pedagogical and psychological research proves that evolving the cognitive interest is directly connected with observation, memory, thinking, and attention. The essence of cognitive interest, according to G. I. Shchukina (1971:16), lies in the desire to penetrate into the depths of these phenomena, and not only consuming the information about phenomena. It was underlined that under the influence of interest, the child seeks not just to learn the unknown, to replenish knowledge, but also to apply the given knowledge in their practice. In accordance with this, our research is also aimed at creating the opportunities based on "Robo DIY" technology to cause the desire in children to apply the gained knowledge, skills and abilities in everyday life. On that account, to realize the effectiveness of technology in the object-developing environment of the group, a special design zone was established and conditions were created so that at any time children could come up with new products at will.

During the experiment, the results of the initial control and final control were recorded, and a comparative analysis was carried out. As the results of the survey by V. S. Yurkevich and E. A. Baranova (200) demonstrated, the rate of children's cognitive interests was initially between 17-26 points and showed an average indicator, lastly, it can be noted that this indicator is in the range of 27-35, indicators of levels of cognitive interest in children are increased (Table 1 and Table 2).

Table 1 – Content of the questionnaire with parents and teachers based on V. S. Yurkevich and E. A. Baranova's methodology

#	Questions	Answers	Points	Initial cut		Final cut	
1	Is the child interested in mental activity (half an hour, an hour)?	a) regularly	5	3	5%	37	58%
		b) often	3	47	73	25	39%
		c) very rarely	1	14	22	2	3%
2	When the child is asked a riddle, which approach does he prefer?	a) prefers finding the answer on his/her own	5	5	8	39	61%
		b) each time differently	3	42	66	21	33%
		c) so that others can suggest a ready answer	1	17	26	4	6%

3	Does he/she ask you to read a book? Does he/she listen to the end?	a) constantly asks, listens to the end b) often, sometimes listens to the end, sometimes does not listen to the end c) very rarely	5 3 1	12 31 21	19 48 33	47 9 8	73% 14% 13%
4	How does the child perceive the tasks that require mental function?	a) very well, likes b) each time differently c) does not prefer, does not like	5 3 1	10 38 16	16 59 25	45 16 3	70% 25% 5%
5	Does the child ask a lot of questions?	a) regularly b) often c) very rarely	5 3 1	8 32 24	13 50 37	51 12 1	80% 19% 1%
6	Does he/she wait for the answer to the question asked?	a) yes ə) sometimes б) no	5 3 1	10 32 22	16 50 34	39 17 8	61% 26% 13%
7	Is there a sequence of questions in the speech? (Are there any more questions after receiving the answer to one question?)	a) yes, it is always so B) each time differently B) have not noticed	5 3 1	7 31 26	11 48 41	48 12 4	75% 19% 6%

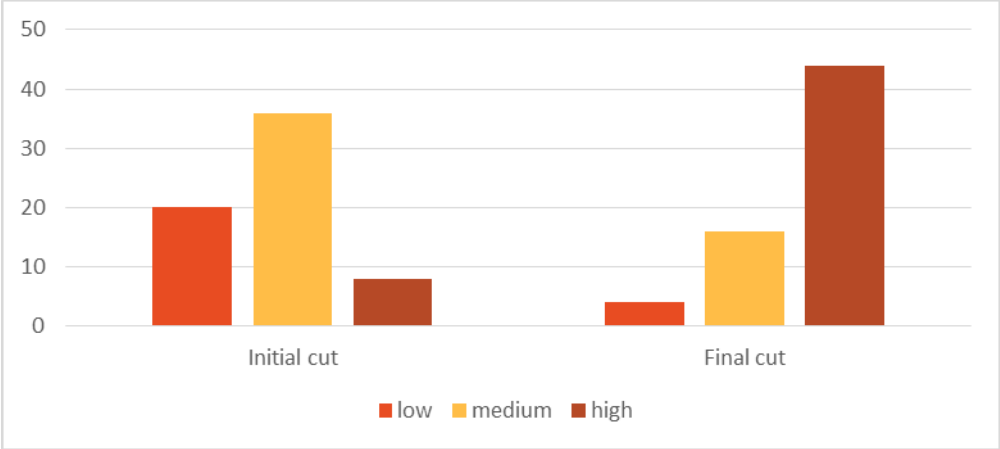

Figure 1 – Diagram of the survey results with parents and teachers based on V. S. Yurkevich and E. A. Baranova's methodology

Table 2 – Children's cognitive interests development dynamics in the process of applying "Robo DIY" technology

Experiment stage	Groups		Levels of cognitive interest development		
			low	medium	high
Initial cut	EG	the number	10	18	2
		%	33,3	60	6,7
	CG	the number	15	14	1
		%	50	46,7	3,3
Final cut	EG	the number t	0	7	23
		%	0	23,3	76,7
	CG	the number	8	13	9
		%	26.7	43,3	30

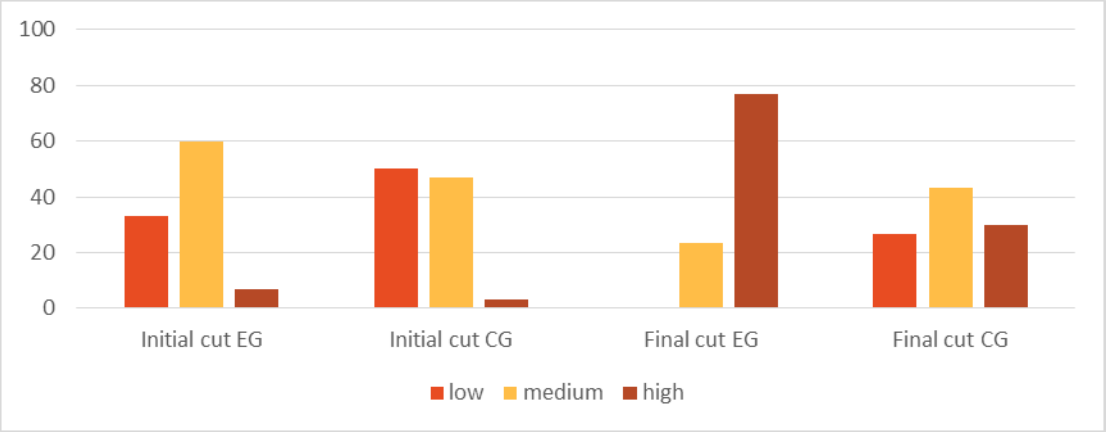

Figure 2 – Diagram of children's cognitive interest development dynamics in the process of applying "Robo DIY" technology

As it is seen from the table and figure, it can be noted that the children's level of cognitive interests increases based on "Robo DIY" technology use. We were convinced of efficiency of the comprehensive program we elaborated and the methods applied in it when we compared the control group results with the results of the experimental group. Thus, the efficiency of the compiled comprehensive program has been determined:

- improves the children's skills of designing, technical design, and mental construction;
- develops creative imagination and engineering thinking;
- improves critical thinking and problem solving skills;
- encourages interest in science, technology, engineering and mathematics (STEM);
- builds communication and teamwork skills;
- increases self-confidence;
- serves as a valuable basis as a tool for career guidance of a future profession;
- evolves the children's cognitive interest based on applying the new innovative approaches.

Conclusion

We discerned that the use of "Robo DIY" technology in preschool education showed its positive results within the study. The given approach, based on children's assembling the objects from natural materials and setting these things in motion, has had a significant impact on the cognitive interests and motivation of children as well as advancing the engineering thinking skills. We were convinced that technology contributes not only to the growth of children's cognitive interests, but also to independent thinking formation, augmenting the knowledge, consolidating the skills, mastering the skills, and educating the moral qualities. Thus, we are certain that "Robo DIY" technology contributes to maturating the key competencies in demand in the contemporary information society, and will enable children to enhance creative and critical thinking skills.

Әдебиеттер

1. Belhadi, S. (2016, April 19). Le «Do-It-Yourself» (DIY): simple phénomène ou nouvelle manière de consommer? http://www.france5.fr/emissions/la-quotidienne/a-la-une/le-do-it-yourself-diy-simplephenomene-ou-nouvelle-maniere-de-consommer
2. Gill, A. F., Farr, W., Mareva, S., & Gibson, J. L. (2019). A comparison of autistic and typically-developing children playing with passive and digital construction toys. Research in Autism Spectrum Disorders, 58, 68–82.
3. Introduction to DiY/counterculture. (2016, April 19). Permanent Culture Now. http://www.permanentculturenow.com/introduction-todiy-counterculture
4. Mankesh, A., & Abilzhanova, A. (2023). Development of social skills of preschool children on the basis of collective communication. In Materials of the VIII International Scientific-Practical Conference (Vol. II, pp. 59–66). Edmonton, Canada.
5. Schröer, L., Cooper, R. P., & Mareschal, D. (2021). Science with Duplo: Multilevel goal management in preschoolers' toy house constructions. Journal of Experimental Child Psychology, 206, Article 103. https://doi.org/10.1016/j.jecp.2021.105553
6. Williams, A. (2015, September 19). Meet Alpha: The next "Next Generation." The New York Times.

7. Аймауытов, Ж. (1998). Бес томбық шығармалар жинағы (Т. 4). Алматы: Ғылым.
8. Алтынсарин, Ы. (1991). Таңдамалы педагогикалық мұралары. Алматы: Рауан.
9. Әбдіқадырова, Т. (2002). Жүсіпбек Аймауытұлының психологиялық-педагогикалық мұраларындағы тұлғаны қалыптастыру мәселесі (Канд. дисс. 13.00.01). Тараз.
10. Байтұрсынов, А. (1989). Шығармалары. Алматы: Жазушы.
11. Баранова, Э. (2005). Диагностика познавательного интереса у младших школьников и дошкольников. Санкт-Петербург.
12. Березина, Ю., & Ерофеева, Т. (2019). Проблемы формирования познавательного интереса у детей дошкольного возраста. Москва: МПГУ.
13. Гельвеций, К. (2006). Адам туралы. In Ж. Ошақбаева (Trans.), Жаңа дәуірдегі француз философиясы. Алматы: Жазушы.
14. Гугуман, Т. (2017). Значение строительно-конструктивных игр в развитии личности ребенка дошкольного возраста. In Актуальные задачи педагогики: материалы VIII Междунар. науч. конф. (Москва) (pp. 39–42).
15. Гусарова, С. (2000). Формирование представлений о технике как средство развития познавательного интереса у детей старшего дошкольного возраста (Канд. дисс. 13.00.07). Москва.
16. Дейкина, А. (2002). Медиаобразование и развитие познавательного интереса дошкольника. Бийск: НИЦ БПГУ им. В.М. Шукшина.
17. Едігенова, А. (2004). Бастауыш сынып оқушыларының қазақ халық ертегілеріне танымдық қызығушылығын қалыптастыру (Канд. дисс. 13.00.01). Алматы.
18. Ешімбетова, З. (2007). Оқушылардың танымдық қызығушылығын тілдерді оқыту үрдісінде қалыптастыру (ағылшын және қазақ тілдері негізінде) (Канд. дисс. 13.00.01). Астана.
19. Жарықбаев, Қ. (1996). Қазақ психологиясының тарихы. Алматы: Қазақстан.
20. Жусупова, Ж. (2010). Оқу әрекеті барысында бастауыш сынып оқушыларының танымдық қызығушылығын қалыптастырудың дидактикалық негіздері (Канд. дисс. 13.00.01). Атырау.
21. Жұмабаев, М. (1992). Педагогика. Алматы.
22. Жұмасова, К. (2010). Психология. Астана: Фолиант.
23. Запорожец, А. (n.d.). О психологии детей раннего и дошкольного возраста. Москва.
24. Исабаева, Д. (2009). Бастауыш сынып оқушыларының танымдық қызығушылығын қалыптастыруда ақпараттық–коммуникациялық технология құралдарын қалыптастыру (Канд. дисс. 13.00.01). Астана.
25. Кашубо, Н. (2003). Психолого-педагогические условия развития познавательного интереса к математике у детей старшего дошкольного возраста (Канд. дисс. 13.00.01). Москва.
26. Куцакова, Л. (2016). Конструирование из строительного материала (4–7 лет). Москва.
27. Қазақстан Республикасында мектепке дейінгі, орта, техникалық және кәсіптік білім беруді дамытудың 2023-2029 жылдарға арналған тұжырымдамасы. (2023). https://adilet.zan.kz/kaz/docs/P2300000249
28. Лиштван, З. (1979). Игры и занятия со строительным материалом в детском саду. Москва: Просвещение.
29. Манкеш, А. (2023). Мектепке дейінгі ұйым педагогтерін дайындаудағы білім мазмұнын трансформациялау. Алматы: Akadem kitap.
30. Манкеш, А., & Анарбек, Л. (2020). Жаңартылған білім беру мазмұны жағдайында мектепке дейінгі ұйым педагогтарының акме дайындығы. Хабаршы. «Педагогика ғылымдары» сериясы, 1(65), 39–43.
31. Манкеш, А., & Ауезова, А. (2022). «Әлеумет» және «Таным» білім беру саласы пәндерін жаңа мазмұнда ұйымдастыру. Альманах. Алматы.
32. Мектепке дейінгі тәрбие мен оқытудың мемлекеттік жалпыға міндетті стандарты. (2022, 3 тамыз). №348. Астана.
33. Мектепке дейінгі тәрбиелеу мен оқытуды дамыту моделі. (2021, 15-наурыз). №422. Астана.
34. Намазбаева, Ж. (2005). Актуальные проблемы психологии высшего образования. Вестник КазНПУ имени Абая. Серия психология, 1(6), 3–8.
35. Параманова, Л. (2002). Теория и методика творческого конструирования в детском саду. Москва.
36. Поддьяков, Н. (2009). Конструирование и художественный труд в детском саду. Программа и конспекты занятий. Москва: ТЦ Сфера.
37. Порозорова, О. (2001). Формирование познавательного интереса у дошкольников средствами народной педагогики: На материале преподавания английского языка (Канд. дисс. 13.00.01). Саратов.
38. Рысбекова, А. (2008). Оқу-тәрбие үрдісінде бастауыш сынып оқушыларының танымдық іс–әрекеттерін мотивацияландырудың педагогикалық шарттары (Канд. дисс. 13.00.01). Түркістан.
39. Семенова, М. (2006). Педагогические условия развития познавательного интереса у дошкольников (методические рекомендации). Челябинск: Образование.
40. Сидорук, Г. (2006). Формирование познавательной активности дошкольников на интегрированных занятиях по математике и конструированию (Канд. дисс. 13.00.01). Москва.
41. Соболева, А. (2004). Развитие познавательного интереса у детей старшего дошкольного возраста в ходе их взаимодействия с воспитателем (Автореф. канд. дисс. 13.00.01). Москва.
42. Тәжібаев, Т. (1993). Жалпы психология. Алматы: Қазақ университеті.
43. Тоқаев, Қ. (2023, қыркүйек). Әділетті Қазақстанның экономикалық бағдары: Қазақстан халқына арнаған Жолдау. Нұрсұлтан. https://www.akorda.kz/kz/memleket-basshysy-kasym-zhomart-tokaevtyn-adiletti-kazakstannyn-ekonomikalyk-bagdary-atty-kazakstan-halkyna-zholdauy-18333

44. Урунтаева, Г., & Афонькина, Ю. (2007). Практикум по дошкольной психологии: Пособие для студ. высш. и сред. пед. учебн. заведений. М.: Издательский центр «Академия».

45. Чжан, Л. (2011). Становление и развитие теории и методов исследований познавательного интереса у детей дошкольного возраста Китая и России (Канд. дисс. 13.00.02). Москва.

46. Щукина, Г. (1971). Проблема познавательного интереса в педагогике. Москва.

References

Abdiqadyrova, T. R. (2002). *Zhusipbek Aimaiuwtulynyn psikologiyalyk-pedagogikalyk muralaryndagy tulgany qalyptastyru masselesi [The issue of personality formation in the psychological-pedagogical heritage of Zhusipbek Aimaiuwtuly]* (Cand. diss. 13.00.01). Taraz. (in Kazakh)

Aimaiutov, Zh. (1998). *Bes tombyq shygharmalar zhinaghy. Tom 4 [Collected works in five volumes. Vol. 4]*. Almaty: Gylym. (in Kazakh)

Altynsarin, Y. (1991). *Tandamaly pedagogikalyk muralary [Selected pedagogical works]*. Almaty: Rauan. (in Kazakh)

Baitursynov, A. (1989). *Shygharmalary [Works]*. Almaty: Zhazushy. (in Kazakh)

Baranova, E. A. (2005). *Diagnostika poznavatelnogo interesa u mladshikh shkolnikov i doshkolnikov [Diagnostics of cognitive interest in younger schoolchildren and preschoolers]*. Sankt-Peterburg.(in Russian)

Belhadi, S. (2016, April 19). Le "Do-It-Yourself" (DIY): simple phénomène ou nouvelle manière de consommer? http://www.france5.fr/emissions/la-quotidienne/a-la-une/le-do-it-yourself-diy-simplephenomene-ou-nouvelle-maniere-de-consommer

Berezina, Yu. Yu., & Erofeeva, T. I. (2019). *Problemy formirovaniya poznavatelnogo interesa u detei doshkolnogo vozrasta [Problems of forming cognitive interest in preschool children]*. Moskva: MPGU [Moscow Pedagogical State University]. (in Russian)

Chzhan, L. (2011). *Stanovlenie i razvitie teorii i metodov issledovanii poznavatelnogo interesa u detei doshkolnogo vozrasta Kitaya i Rossii [Formation and development of theories and research methods on cognitive interest in preschool children in China and Russia]* (Cand. ped. nauk diss. 13.00.02). Moskva. (in Russian)

Deikina, A. Yu. (2002). *Mediaobrazovanie i razvitie poznavatelnogo interesa doshkolnika [Media education and the development of a preschooler's cognitive interest]*. Biisk: NITs BPGU im. V. M. Shukshina. (in Russian)

Edigenova, A. Zh. (2004). *Bastauysh synyp okushylarynyn Qazaq halk ertegilerine tanymdyq qyzygushylygyn qalyptastyrudy [Developing the cognitive interest of primary school students in Kazakh folk tales]* (Cand. diss. 13.00.01). Almaty. (in Kazakh)

Eshimbetova, Z. B. (2007). *Oqushylardyn tanymdyq qyzygushylygyn tilderdi oqytu urdisinde qalyptastyru (aghylshyn zhane Qazaq tilderi negizinde) [Developing students' cognitive interest in the process of teaching languages (based on English and Kazakh languages)]* (Cand. diss. 13.00.01). Astana. in Kazakh)

Francis, G. A., Farr, W., Mareva, S., & Gibson, J. L. (2019). A comparison of autistic and typically-developing children playing with passive and digital construction toys. *Research in Autism Spectrum Disorders, 58,* 68–82.

Ghelvetsii, K. A. (2006). Adam turaly [About man]. In *Zhana dauirdegi frantsuz filosofiyasy [French philosophy of the new era]*. (Trans. Zh. Oshaqbaeva). Almaty: Zhazushy. (in Kazakh)

Guguman, T. V. (2017). Znachenie stroitelno-konstruktivnykh igr v razvitii lichnosti rebenka doshkolnogo vozrasta [The importance of building-constructive games in the development of the personality of a preschool child]. In *Aktualnye zadachi pedagogiki: materialy VIII Mezhdunar. nauch. konf. (Moskva) [Actual problems of pedagogy: materials of the VIII Int. sci. conf. (Moscow)]* (pp. 39–42). (in Russian)

Gusarova, S. V. (2000). *Formirovanie predstavlenii o tekhnike kak sredstvo razvitiya poznavatelnogo interesa u detei starshego doshkolnogo vozrasta [Forming representations about technology as a means of developing cognitive interest in older preschool children]* (Cand. ped. nauk diss. 13.00.07). Moskva. (in Russian)

Introduction to DiY/counterculture. (2016, April 19). *Permanent Culture Now [Permanent Culture Now]*. http://www.permanentculturenow.com/introduction-todiy-counterculture

Isabaeva, D. N. (2009). *Bastauysh synyp okushylarynyn tanymdyq qyzygushylygyn qalyptastyruda akparattyq-kommunikatsiyalyq tekhnologiya quraldaryn qoldanu [Using ICT tools in developing cognitive interest of primary school students]* (Cand. diss. 13.00.01). Astana. (in Kazakh)

Kashubo, N. I. (2003). *Psikhologo-pedagogicheskie usloviya razvitiya poznavatelnogo interesa k matematike u detei starshego doshkolnogo vozrasta [Psychological-pedagogical conditions for developing cognitive interest in mathematics in older preschool children]* (Cand. ped. nauk diss. 13.00.01). Moskva. (in Russian)

Kutsakova, L. V. (2016). *Konstruirovanie iz stroitelnogo materiala (4–7 let) [Construction with building materials (4–7 years)]*. Moskva. (in Russian)

Lishtvan, Z. V. (1979). *Igry i zanyatiya so stroitelnym materialom v detskom sadu [Games and activities with building materials in kindergarten]*. Moskva: Prosveshchenie [Enlightenment]. (in Russian)

Mankesh, A. E. (2023). *Mektepke deyingi uiym pedagogterin daiyndaudagy bilim mazmunyn transformatsiyalau [Transformation of the educational content in preparing preschool organization teachers]*. Almaty: Akadem kitap. (Electronic book)(in Kazakh)

Mankesh, A. E., & Anarbek, L. A. (2020). Zhanartylgan bilim beru mazmuny zhaidainda mektepke deyingi uiym pedagogtarynyn akme daiyndygy [Acme training of preschool organization teachers in the context of updated educational content]. *Khabarshy. "Pedagogika gylymdary" seriyasy [Bulletin. "Pedagogical Sciences" series], 1(65),* 39–43. (in Kazakh)

Mankesh, A. E., & Auezova, A. A. (2022). *"Aleumet" zhane "Tanym" bilim beru salasy panderin zhana mazmunda uiymdastyru [Organizing the subjects of the "Aleumet" and "Tanym" educational areas in a new content]*. Almanakh [Almanac]. Almaty. (in Kazakh)

Mankesh, A., & Abilzhanova, A. (2023). Development of social skills of preschool children on the basis of collective communication. In *Materials of the VIII International Scientific-Practical Conference* (Vol. II, pp. 59–66). Edmonton, Canada.

Mektepke deyingi tarbie men okytudyn memlekettik zhalpygha mindetti standarty [State compulsory standard of preschool education and training]. (2022, 3 tamyz). No. 348. Astana. (in Kazakh)

Mektepke deyingi tarbieleu men okytudy damytu modeli [Model for the development of preschool upbringing and education]. (2021, 15-nauryz). No. 422. Astana. (in Kazakh)

Namazbaeva, Zh. I. (2005). Aktualnye problemy psikhologii vysshego obrazovaniya [Actual problems of psychology of higher education]. *Vestnik KazNPU imeni Abaya. Seriya psikhologiya [Bulletin of Abai KazNPU. Psychology series], 1(6),* 3–8. (in Russian)

Paramanova, L. A. (2002). *Teoriya i metodika tvorcheskogo konstruirovaniya v detskom sadu [Theory and methods of creative construction in kindergarten]*. Moskva. (in Russian)

Poddyakov, N. N. (2009). *Konstruirovanie i khudozhestvennyi trud v detskom sadu. Programma i konspekty zanyatii [Construction and artistic work in kindergarten. Program and lesson plans]*. Moskva: Tsentr Sfera [Sphere Center]. (in Russian)

Porozorova, O. V. (2001). *Formirovanie poznavatelnogo interesa u doshkolnikov sredstvami narodnoi pedagogiki: Na materiale prepodavaniya angliiskogo yazyka [Formation of cognitive interest in preschoolers by means of folk pedagogy: Based on the teaching of English]* (Cand. ped. nauk diss. 13.00.01). Saratov. (in Russian)

Qazaqstan Respublikasinda mektepke deyingi, orta, tekhnikalyk zhane kasiptik bilim berudi damytudyn 2023-2029 zhyldarga arnalgan tuzhyrymdamasy [Concept of the development of preschool, general, technical and vocational education in the Republic of Kazakhstan for 2023-2029]. (2023). https://adilet.zan.kz/kaz/docs/P2300000249 (in Kazakh)

Rysbekova, A. Q. (2008). *Oqu-tarbie urdisinde bastauysh synyp okushylarynyn tanymdyq is-areketterin motivatsiyalandyrudyn pedagogikalyk sharttary [Pedagogical conditions for motivating the cognitive activities of primary school students in the educational process]* (Cand. diss. 13.00.01). Turkistan. (in Kazakh)

Schröer, L., Cooper, R. P., & Mareschal, D. (2021). Science with Duplo: Multilevel goal management in preschoolers' toy house constructions. *Journal of Experimental Child Psychology, 206,* Article 103. https://doi.org/10.1016/j.jecp.2021.105553

Semenova, M. L. (2006). *Pedagogicheskie usloviya razvitiya poznavatelnogo interesa u doshkolnikov [Pedagogical conditions for the development of cognitive interest in preschoolers]* (Metodicheskie rekomendatsii [Methodical recommendations]). Cheliabinsk: Obrazovanie [Education]. (in Russian)

Shchukina, G. I. (1971). *Problema poznavatelnogo interesa v pedagogike [The problem of cognitive interest in pedagogy]*. Moskva. (in Russian)

Sidoruk, G. N. (2006). *Formirovanie poznavatelnoi aktivnosti doshkolnikov na integrirovannykh zanyatiyakh po matematike i konstruirovaniyu [Formation of cognitive activity in preschoolers in integrated lessons in mathematics and construction]* (Cand. ped. nauk diss. 13.00.01). Moskva. (in Russian)

Soboleva, A. B. (2004). Razvitie poznavatelnogo interesa u detei starshego doshkolnogo vozrasta v khode ikh vzaimodeistviya s vospitatelem [Development of cognitive interest in older preschool children during their interaction with the educator] (Author's abstract of Cand. ped. nauk diss. 13.00.01). Moskva. (in Russian)

Tazhibaev, T. (1993). Zhalpy psikologiya [General psychology]. Almaty: Qazaquniversiteti. (in Kazakh)

Tokaev, Q. K. (2023, qyrkuyek). Ädiletti Qazaqstannyn ekonomikalyq bagdary: Qazaqstan halkyna arnagan Zholdaue [The economic course of a just Kazakhstan: Address to the people of Kazakhstan]. Nursultan. https://www.akorda.kz/kz/memleket-basshysy-kasym-zhomart-tokaevtyn-adiletti-kazakstannyn-ekonomikalyk-bagdary-atty-kazakstan-halkyna-zholdauy-18333 (in Kazakh)

Uruntaeva, G. A., & Afonkina, Yu. A. (2007). Praktikum po doshkolnoi psikhologii: Posobie dlya stud. vyssh. i sred. ped. uchebn. zavedenii [Practicum in preschool psychology: A manual for students of higher and secondary pedagogical institutions]. Moskva: Izdatelskii tsentr "Akademiya" [Publishing Center "Academia"]. (in Russian)

Williams, A. (2015, September 19). Meet Alpha: The next "Next Generation." The New York Times.

Zaporozhets, A. V. (n.d.). O psikhologii detei rannego i doshkolnogo vozrasta [On the psychology of infants and preschool children]. Moskva. (in Russian)

Zharıqbaev, Q. B. (1996). Qazaq psikologiyasynyn tarikhy [The history of Kazakh psychology]. Almaty: Qazaqstan.(in Kazakh)

Zhumabaev, M. (1992). Pedagogika [Pedagogy]. Almaty. (in Kazakh)

Zhumasova, K. S. (2010). Psikhologiya [Psychology]. Astana: Foliant. (in Kazakh)

Zhusupova, Zh. A. (2010). Oqu areketi barasynda bastauysh synyp okushylarynyn tanymdyq qyzygushylygyn qalyptastyru dyn didaktikalyk negizderi [Didactic foundations for developing cognitive interest of primary school students during the learning process] (Cand. diss. 13.00.01). Atyrau. (in Kazakh)

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