ABSTRACT
of the dissertation of PhD doctoral student
of the educational program
8D01301 – "Pedagogy and Methodology of Primary Education"
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on the topic:
"Development of Cognitive Interest of Primary School Students through Teaching Robotics"

Research topic: Development of cognitive interest of primary school students through teaching robotics.

Research objective: To theoretically substantiate the development of cognitive interest of primary school students based on the use of robotics tools, to develop a methodology, and to experimentally prove its effectiveness through pedagogical experimentation.

Research objectives:

– To determine the content of developing cognitive interest of primary school students through robotics.

– To identify the pedagogical conditions for developing cognitive interest of primary school students through robotics.

– To develop a structural-content model for developing cognitive interest of primary school students through robotics tools.

– To develop a methodology for developing cognitive interest of primary school students through robotics, to test its effectiveness through experimental work, and to analyze the results.

Research methods: Theoretical (analysis, synthesis, generalization, comparison, specification, and modeling of results based on psychological, pedagogical, and scientific-theoretical literature, higher education experience, regulatory and instructional documentation); empirical (questionnaire survey, observation, diagnostics, experimental work); statistical (mathematical-statistical processing of obtained results, graphical presentation, analysis).

Main provisions submitted for defense:

1. In determining the scientific-theoretical foundations for developing cognitive interest of primary school students through teaching robotics, the psychological and pedagogical essence and content of the concepts "cognition," "cognitive interest," and "educational robotics" were analyzed, and cognitive interest was specified as an integrative quality of a primary school student reflecting stable motivation for educational-cognitive activity, active engagement, inquisitiveness, and orientation toward research activity.

2. The pedagogical conditions for developing cognitive interest through teaching robotics were identified; they include integration of robotics educational content with primary education content, consideration of students' age and psychological characteristics, systematic organization of

practical-research activities, and formation of a stimulating educational environment.

3. A structural-content model for developing cognitive interest through teaching robotics was developed based on the interconnection of target, content, activity, and result blocks, aimed at the step-by-step formation of cognitive interest.

4. An author's program for developing cognitive interest through teaching robotics (modular structure, educational topics, system of practical tasks and projects) was developed, introduced into the educational process, and its effectiveness was proven through experimental work.

5. The results of the experimental work showed that systematic and purposeful use of robotics contributes to an increase in the level of cognitive interest of primary school students, stabilization of learning activity, and conscious acquisition of knowledge; based on this, scientific and methodological recommendations were developed.

Description of the main research results:

– The essence of the concepts "cognition," "cognitive interest," and "educational robotics" was clarified, and the scientific-theoretical foundations for developing cognitive interest through teaching robotics were determined;

– The pedagogical conditions for developing cognitive interest through robotics were identified;

– A structural-content model for developing cognitive interest through robotics was created;

– An author's program and methodological system were developed, and their effectiveness was experimentally tested.

Justification of the novelty and significance of the obtained results:

1. The scientific-theoretical foundations for developing cognitive interest of primary school students through robotics were specified, and the issue was comprehensively considered within the context of educational robotics;

2. Pedagogical conditions and a structural-content model aimed at developing cognitive interest were developed, and their interrelation was scientifically substantiated;

3. The effectiveness of the author's program and methodological system was proven through experimental work.

Practical significance of the research:

The practical significance is determined by the development of an author's program based on the use of robotics aimed at increasing the cognitive interest of primary school students and by the proof of its effectiveness through pedagogical experimentation. The author's program was developed and piloted within the framework of the "Educational Robotics" project implemented under the "Jas Galym 2024" grant competition for commercialization of scientific and scientific-technical results at I. Zhansugurov Zhetysu University, which confirms its practical value and applied nature.

The proposed structural-content model, author's program, and instructional-methodological materials enable primary school teachers, robotics club leaders,

and supplementary education organizations to effectively use robotics in primary school settings as a motivational-pedagogical tool for increasing cognitive interest.

Compliance of the research with directions of scientific development or state programs:

The research fully complies with the main regulatory and legal documents of the Republic of Kazakhstan in the field of education. In particular, the research content is based on the updated State Compulsory Standard of Secondary Education, model curricula for primary education, as well as the regulations "On Approval of the State Compulsory Standards of Preschool Education and Training, Primary, Basic Secondary and General Secondary, Technical and Vocational, Post-Secondary Education" and "On Approval of Model Curricula for General Education Subjects, Elective Courses and Facultatives for General Education Organizations." The research results are consistent with the objectives set forth in these standards for the development of students' functional, research, and digital competencies.

Description of the Doctoral Candidate's Contribution to Each Publication: Based on the results of the research, 10 scientific papers have been published. Within the framework of the study, the following 10 publications were made:

1. Publication included in Scopus database: 1. The Impact of Educational Robotics on Cognitive Outcomes in Primary Students: A Meta-Analysis of Recent Studies // *European Journal of Educational Research*. – 2023. – Vol. 12, №4. – P. 1683–1695. – DOI: 10.12973/eu-jer.12.4.1683. – URL: https://www.scopus.com/pages/publications/85168263336 The doctoral student's contribution to writing the article is 75% (co-authors: Ybyraimzhanov K.T. – 10%, Naubayeva Kh.T. – 5%, Mamekova A.T. – 5%, Almukhambetova B.Zh. – 5%).

2. *Articles published in journals recommended by the Committee for Quality Assurance in the Field of Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan – 3 articles*:

1) Влияние курса робототехники посредством визуально-блочного программирования Scratch на вычислительное мышление младшеклассников // *ҚазҰУ Хабаршысы. Педагогикалық ғылымдар сериясы*. – 2023. – №4 (77). – Б. 101–110. – DOI: https://doi.org/10.26577/JES.2023.v77.i4.09 The doctoral student's contribution to writing the article is 100%.

2) Бастауыш сыныпқа арналған робототехника бойынша білім беру бағдарламаларында есептеу ойлауын дамыту үшін кері байланыстың маңызы // *Л.Н. Гумилев атындағы ЕҰУ Хабаршысы. Педагогика сериясы*. – 2024. – №3 (148). – Б. 123–136. – DOI: https://doi.org/10.32523/2616-6895-2024-148-3-122-136 The doctoral student's contribution to writing the article is 70% (co-authors: Ybyraimzhanov K.T. – 20%, Mamekova A.T. – 10%).

3) Влияние образовательной робототехники на академическую успеваемость учащихся начальной школы // *3i: intellect, idea, innovation – интеллект, идея, инновация*. – 2024. – №4. – Б. 263–270. – DOI: https://doi.org/10.52269/22266070_2024_4_263 The doctoral student's

contribution to writing the article is 70% (co-authors: Ybyraimzhanov K.T. – 20%, Mamekova A.T. – 10%).

3. Author's program: "*Білім беру робототехникасы бойынша жобалық қызметті ұйымдастыру*" – 2023. – Recommended for implementation. The doctoral student's contribution – 100%.

4. Articles published in international and national editions – 5 publications:

1) Development of robotics in elementary school // *Proceedings of International Scientific-Practical Conference «Sustainable Development Goals: Youth Policy and Innovative Technologies».* – Ashgabat, Turkmenistan, 15–16 February 2023. – P. 106–108. – DOI: https://doi.org/10.5281/zenodo.7782633 The doctoral student's contribution – 100%

2) Бастауыш сынып оқушыларының қызығушылығын робототехниканы оқыту арқылы арттыру // *І. Жансүгіров атындағы Жетісу университетінің Хабаршысы.* – 2022. – №1. – Б. 141–145. The doctoral student's contribution – 100%.

3) Развитие образовательной робототехники: тенденции и перспективы // *Бизнес и общество.* – 2024. – №4 (44). – Б. 1–6. – URL: https://busines-society.ru/publ/2024/4_44/razvitie_obrazovatelnoj_robototekhniki_tendencii_i_per spektivy/64-1-0-1604 The doctoral student's contribution to writing the article is 100%.

4) Преподавание робототехники в начальной школе: инновационный подход // *Актуальные проблемы науки и образования: материалы международного форума, посвященного 300-летию Российской академии наук.* – 12–13 декабря 2022 г. The doctoral student's contribution to writing the article is 100%.

5) Lego wedo 2.0 жиынтығын қолдана отырып, бастауыш сынып оқушыларына "білім беру робототехникасы" бағытын жүзеге асыру ерекшеліктері. *Университеттің 50 жылдығына арналған* «Болашақ ұрпағы: ғылым мен білімнің тәжірибесі мен болашағы» *атты халықаралық ғылыми-тәжірибелік конференция материалдары.* Талдықорған, 21 қазан – 2022. 264-268 бб. The doctoral student's contribution to writing the article is 80% (co-author: Medera Xalmatov – 20%).