

ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)



«ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫ» РҚБ

Х А Б А Р Ш Ы С Ы

ВЕСТНИК

РОО «НАЦИОНАЛЬНОЙ
АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН»

THE BULLETIN

OF THE ACADEMY OF SCIENCES
OF THE REPUBLIC OF
KAZAKHSTAN

PUBLISHED SINCE 1944

3 (415)

MAY – JUNE 2025

ALMATY, NAS RK

EDITOR-IN-CHIEF:

ABYLKASSIMOVA Alma Yesimbekovna, Doctor of Pedagogical Sciences, Professor, Academician of NAS RK, Director of the Center for the Development of Pedagogical Education, Head of the Department of Methods of Teaching Mathematics, Physics and Computer Science at Abai KazNPU (Almaty, Kazakhstan), <https://www.scopus.com/authid/detail.uri?authorId=57191275199>, <https://www.webofscience.com/wos/author/record/2076124>.

DEPUTY EDITOR-IN-CHIEF:

SEMBIEVA Lyazzat Myktybekovna, Doctor of Economics, Professor of the Eurasian National University (Astana, Kazakhstan), <https://www.scopus.com/authid/detail.uri?authorId=57194226348>, <https://www.webofscience.com/wos/author/record/38875302>.

EDITORIAL BOARD:

RICHELLE Marynowski, PhD in Education, Professor, Faculty of Education, University of Lethbridge, (Alberta, Canada), <https://www.scopus.com/authid/detail.uri?authorId=57070452800>, <https://www.webofscience.com/wos/author/record/16130920>.

SHISHOV Sergey Evgenievich, Doctor of Pedagogical Sciences, Professor, Head of the Department of Pedagogy and Psychology of Professional Education, Moscow State University of Technology and Management named after K. Razumovsky (Moscow, Russia), <https://www.scopus.com/authid/detail.uri?authorId=57191518233>, <https://www.webofscience.com/wos/author/record/2443966>.

ABILDINA Saltanat Kuatovna, Doctor of Pedagogical Sciences, Professor, Head of the Department of Pedagogy, Karaganda University named after E.A. Buketov (Karaganda, Kazakhstan), <https://www.scopus.com/authid/detail.uri?authorId=56128026400>, <https://www.webofscience.com/wos/author/record/4131549>.

RYZHAKOV Mikhail Viktorovich, Doctor of Pedagogical Sciences, Professor, Academician of the Russian Academy of Education, Editor-in-Chief of the journal “Standards and Monitoring in Education” (Moscow, Russia), <https://www.scopus.com/authid/detail.uri?authorId=6602245542>, <https://www.webofscience.com/wos/author/record/13675462>.

BULATBAEVA Kulzhanat Nurymzhanovna, Doctor of Pedagogical Sciences, Professor, Chief Researcher of the National Academy of Education named after Y. Altynsarin (Astana, Kazakhstan), <https://www.scopus.com/authid/detail.uri?authorId=57202195074>, <https://www.webofscience.com/wos/author/record/40173122>.

PETR Hájek, PhD, Unicorn University, Associate Professor, Department of Finance, (Czech Republic), <https://www.scopus.com/authid/detail.uri?authorId=35726855800>, <https://www.webofscience.com/wos/author/record/672404>.

JUMAN Jappar, Doctor of Economics, Professor, Honorary Academician of NAS RK, Honored Worker of Kazakhstan, Director of the Center for International Applied Research Al-Farabi Kazakh National University (Almaty, Kazakhstan) <https://www.scopus.com/authid/detail.uri?authorId=59238481900>; <https://www.scopus.com/authid/detail.uri?authorId=56658765400>, <https://www.webofscience.com/wos/author/record/60977874>.

LUKYANENKO Irina Grigorievna, Doctor of Economics, Professor, Head of Department of the National University of Kyiv-Mohyla Academy (Kyiv, Ukraine), <https://www.scopus.com/authid/detail.uri?authorId=57189348551>, <https://www.webofscience.com/wos/author/record/939510>.

YESIMZHANOVA Saira Rafihevna, Doctor of Economics, Professor of the University of International Business (Almaty, Kazakhstan), <https://www.scopus.com/authid/detail.uri?authorId=56499485500>, <https://www.webofscience.com/wos/author/record/45951098>.

Bulletin of the National Academy of Sciences of the Republic of Kazakhstan.

ISSN 2518-1467 (Online),

ISSN 1991-3494 (Print).

Owner: RPA «National Academy of Sciences of the Republic of Kazakhstan» (Almaty).

The certificate of registration of a periodical printed publication in the Committee of information of the Ministry of Information and Communications of the Republic of Kazakhstan **No. 16895-Ж**, issued on 12.02.2018.

Thematic focus: *«publication of the results of new achievements in the field of fundamental sciences»*

Periodicity: 6 times a year.

<http://www.bulletin-science.kz/index.php/en/>

© National Academy of Sciences of the Republic of Kazakhstan, 2025

БАС РЕДАКТОР:

ӘБІЛҚАСЫМОВА Алма Есімбекқызы, педагогика ғылымдарының докторы, профессор, ҚР ҰҒА академигі, Педагогикалық білім беруді дамыту орталығының директоры, Абай атындағы ҚазҰПУ математика, физика және информатиканы оқыту әдістемесі кафедрасының меңгерушісі (Алматы, Қазақстан), <https://www.scopus.com/authid/detail.uri?authorId=57191275199>, <https://www.webofscience.com/wos/author/record/2076124>.

БАС РЕДАКТОРДЫҢ ОРЫНБАСАРЫ:

СЕМБИЕВА Ләззат Мықтыбекқызы, экономика ғылымдарының докторы, Л.Н.Гумилев атындағы Еуразия ұлттық университетінің профессоры (Астана, Қазақстан), <https://www.scopus.com/authid/detail.uri?authorId=57194226348>, <https://www.webofscience.com/wos/author/record/38875302>.

РЕДАКЦИЯ АЛҚАСЫ:

РИШЕЛЬ Мариновски, білім беру саласындағы PhD, Летбридж университеті педагогика факультетінің профессоры, (Альберта, Канада), <https://www.scopus.com/authid/detail.uri?authorId=57070452800>, <https://www.webofscience.com/wos/author/record/16130920>.

ШИШОВ Сергей Евгеньевич, педагогика ғылымдарының докторы, профессор, К.Разумовский атындағы Мәскеу мемлекеттік технологиялар және басқару университетінің кәсіби білім беру педагогикасы және психологиясы кафедрасының меңгерушісі (Мәскеу, Ресей), <https://www.scopus.com/authid/detail.uri?authorId=57191518233>, <https://www.webofscience.com/wos/author/record/2443966>.

ӘБІЛДИНА Салтанат Қуатқызы, педагогика ғылымдарының докторы, профессор, Е.А.Бөкетов атындағы Қарағанды университетінің педагогика кафедрасының меңгерушісі (Қарағанды, Қазақстан), <https://www.scopus.com/authid/detail.uri?authorId=56128026400>, <https://www.webofscience.com/wos/author/record/4131549>.

РЫЖАКОВ Михаил Викторович, педагогика ғылымдарының докторы, профессор, Ресей білім академиясының академигі, «Білім берудегі стандарттар мен мониторинг» журналының бас редакторы (Мәскеу, Ресей), <https://www.scopus.com/authid/detail.uri?authorId=6602245542>, <https://www.webofscience.com/wos/author/record/13675462>.

БОЛАТБАЕВА Күлжанат Нұрымжанқызы, педагогика ғылымдарының докторы, профессор, Ы. Алтынсарин атындағы Ұлттық білім академиясының бас ғылыми қызметкері (Астана, Қазақстан), <https://www.scopus.com/authid/detail.uri?authorId=57202195074>, <https://www.webofscience.com/wos/author/record/40173122>.

ПЕТР Хайек, PhD, Юникорн университеті, Қаржы департаментінің қауымдастырылған профессоры (Чех Республикасы), <https://www.scopus.com/authid/detail.uri?authorId=35726855800>, <https://www.webofscience.com/wos/author/record/672404>.

ЖҰМАН Жаппар, экономика ғылымдарының докторы, профессор, Қазақстанның Еңбек сіңірген қайраткері, ҚР ҰҒА құрметті академигі, әл-Фараби атындағы Қазақ ұлттық университетінің Халықаралық қолданбалы зерттеулер орталығының директоры (Алматы, Қазақстан). <https://www.scopus.com/authid/detail.uri?authorId=59238481900>; <https://www.scopus.com/authid/detail.uri?authorId=56658765400>, <https://www.webofscience.com/wos/author/record/60977874>.

ЛУКЬЯНЕНКО Ирина Григорьевна, экономика ғылымдарының докторы, профессор, «Киево-Могилянская академия» ұлттық университеті кафедрасының меңгерушісі (Киев, Украина), <https://www.scopus.com/authid/detail.uri?authorId=57189348551>, <https://www.webofscience.com/wos/author/record/939510>.

ЕСІМЖАНОВА Сайра Рафихқызы, экономика ғылымдарының докторы, Халықаралық бизнес университетінің профессоры (Алматы, Қазақстан), <https://www.scopus.com/authid/detail.uri?authorId=56499485500>, <https://www.webofscience.com/wos/author/record/45951098>.

«Қазақстан Республикасы Ұлттық ғылым академиясы РҚБ-нің Хабаршысы».

ISSN 2518-1467 (Online),

ISSN 1991-3494 (Print).

Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы» РҚБ (Алматы қ.).

Қазақстан Республикасының Ақпарат және коммуникациялар министрлігінің Ақпарат комитетінде 12.02.2018 ж. берілген № 16895-Ж мерзімдік басылым тіркеуіне қойылу туралы куәлік.

Такырыптық бағыты: *«іргелі ғылым салалары бойынша жаңа жетістіктердің нәтижелерін жариялау»*

Мерзімділігі: жылына 6 рет.

<http://www.bulletin-science.kz/index.php/en/>

© «Қазақстан Республикасының Ұлттық ғылым академиясы» РҚБ, 2025

ГЛАВНЫЙ РЕДАКТОР:

АБЫЛКАСЫМОВА Алма Есимбековна, доктор педагогических наук, профессор, академик НАН РК, директор Центра развития педагогического образования, заведующая кафедрой методики преподавания математики, физики и информатики КазНПУ им. Абая (Алматы, Казахстан), <https://www.scopus.com/authid/detail.uri?authorId=57191275199>, <https://www.webofscience.com/wos/author/record/2076124>.

ЗАМЕСТИТЕЛЬ ГЛАВНОГО РЕДАКТОРА:

СЕМБИЕВА Ляззат Мыктыбековна, доктор экономических наук, профессор Евразийского национального университета им. Л.Н. Гумилева (Астана, Казахстан), <https://www.scopus.com/authid/detail.uri?authorId=57194226348>, <https://www.webofscience.com/wos/author/record/38875302>.

РЕДАКЦИОННАЯ КОЛЛЕГИЯ:

РИШЕЛЬ Мариновски, PhD в области образования, профессор факультета педагогики Летбриджского университета, (Альберта, Канада), <https://www.scopus.com/authid/detail.uri?authorId=57070452800>, <https://www.webofscience.com/wos/author/record/16130920>.

ШИШОВ Сергей Евгеньевич, доктор педагогических наук, профессор, заведующий кафедрой педагогики и психологии профессионального образования Московского государственного университета технологий и управления имени К. Разумовского (Москва, Россия), <https://www.scopus.com/authid/detail.uri?authorId=57191518233>, <https://www.webofscience.com/wos/author/record/2443966>.

АБИЛЬДИНА Салтанат Куатовна, доктор педагогических наук, профессор, заведующая кафедрой педагогики Карагандинского университета имени Е.А. Букетова (Караганда, Казахстан), <https://www.scopus.com/authid/detail.uri?authorId=56128026400>, <https://www.webofscience.com/wos/author/record/4131549>.

РЫЖАКОВ Михаил Викторович, доктор педагогических наук, профессор, академик Российской академии образования, главный редактор журнала «Стандарты и мониторинг в образовании» (Москва, Россия), <https://www.scopus.com/authid/detail.uri?authorId=6602245542>, <https://www.webofscience.com/wos/author/record/13675462>.

БУЛАТБАЕВА Кулжанат Нурымжановна, доктор педагогических наук, профессор, главный научный сотрудник Национальной академии образования имени Ы. Алтынсарина (Астана, Казахстан), <https://www.scopus.com/authid/detail.uri?authorId=57202195074>, <https://www.webofscience.com/wos/author/record/40173122>.

ПЕТР Хайек, PhD, университет Юникорн, ассоциированный профессор Департамента финансов, (Чешская Республика), <https://www.scopus.com/authid/detail.uri?authorId=35726855800>, <https://www.webofscience.com/wos/author/record/672404>.

ЖУМАН Жаппар, доктор экономических наук, профессор, заслуженный деятель Казахстана, почетный академик НАН РК, директор Центра Международных прикладных исследований Казахского национального университета им. аль-Фараби (Алматы, Казахстан) <https://www.scopus.com/authid/detail.uri?authorId=59238481900>; <https://www.scopus.com/authid/detail.uri?authorId=56658765400>, <https://www.webofscience.com/wos/author/record/60977874>.

ЛУКЬЯНЕНКО Ирина Григорьевна, доктор экономических наук, профессор, заведующая кафедрой Национального университета «Киево-Могилянская академия» (Киев, Украина), <https://www.scopus.com/authid/detail.uri?authorId=57189348551>, <https://www.webofscience.com/wos/author/record/939510>.

ЕСИМЖАНОВА Сайра Рафихевна, доктор экономических наук, профессор Университета международного бизнеса (Алматы, Казахстан), <https://www.scopus.com/authid/detail.uri?authorId=56499485500>, <https://www.webofscience.com/wos/author/record/45951098>.

«Вестник РОО «Национальной академии наук Республики Казахстан».

ISSN 2518-1467 (Online),

ISSN 1991-3494 (Print).

Собственник: РОО «Национальная академия наук Республики Казахстан» (г. Алматы).

Свидетельство о постановке на учет периодического печатного издания в Комитете информации Министерства информации и коммуникаций и Республики Казахстан № 16895-Ж, выданное 12.02.2018 г.

Тематическая направленность: «публикация результатов новых достижений в области фундаментальных наук».

Периодичность: 6 раз в год.

<http://www.bulletin-science.kz/index.php/en/>

© РОО «Национальная академия наук Республики Казахстан», 2025

CONTENTS

PEDAGOGY

A. Abdrassilov, Y. KuandykPHOTOGRAMMETRY TECHNOLOGIES IN DEVELOPING STUDENTS
SPATIAL THINKING IN ART SCULPTURE EDUCATION.....17**E. Abdrashova, Z. Kobeyeva, Zh.Kemelbekova**ARTIFICIAL INTELLIGENCE: INFLUENCE ON THE PROFESSIONAL
AND METHODOLOGICAL COMPETENCE OF FUTURE COMPUTER
SCIENCE TEACHERS.....33**A.M. Abdykhalykova, B.H. Kussanova, A. Daurenkyzy**MEDIA LITERACY THROUGH CRITICAL READING IN ENGLISH
LANGUAGE TEACHING.....48**A. Abylkassymova, N. Zhumabay, A. Umiralkhanov, L. Zhumalieva**DIGITAL TECHNOLOGIES AS THE BASIS FOR EFFECTIVE EDUCATION
IN THE “SCHOOL – PEDAGOGICAL UNIVERSITY” COMPLEX.....63**K.N. Arinova**FORMATION OF DIGITAL COMPETENCIES OF FUTURE SPECIAL
EDUCATORS IN THE CONTEXT OF DIGCOMPEDU.....86**A.A. Isaeva, S.V. Ananyeva, L.N. Demchenko**RESEARCH COMPETENCE WHEN WORKING WITH THE TEXT OF THE
STORY OF K. PAUSTOVSKY «KARABUGAZ».....104**G.Z. Iskakova, E. Teleuova**KAZAKH SOCIETY THROUGH THE PRISM OF THE WORKS
OF MÄSHHÜR ZHÜSIP KÖPEEV.....118**A.E. Karymsakova, G.M. Abildinova, Zh.S. Kazhiakparova**THE IMPACT OF USING THE «NIMBLE FINGERS» ELECTRONIC
APPLICATION ON THE DEVELOPMENT OF GRAPHOMOTOR SKILLS
IN PRESCHOOLERS.....133**Sh.U. Laiskhanov, Zh. Nurmagambetuly, B. Gönençgil**THE CURRENT STATE AND POSSIBILITIES OF USING SPACE
IMAGERY IN SCHOOL GEOGRAPHY.....146**S. Myrzaliyeva, S. Mizanbekov, E. Lomova**SUBJECT - LANGUAGE INTEGRATION AS A TOOL FOR THE
FORMATION OF PLURILINGUAL COMPETENCE OF STUDENTS.....162

N.B. Nabi, R.S. Rakhmetova

THE ROLE OF ARTICULATION IN DEVELOPING STUDENTS
SPEECH CULTURE.....179

A. Nuradinova

DEVELOPING GLOBAL COMPETENCIES IN THE MULTILINGUAL
ENVIRONMENT OF KAZAKHSTAN'S HIGHER EDUCATION.....202

G. Ozharova, Sh. Akbayeva

COMPARATIVE ANALYSIS OF THE INTEGRATION OF SPECIALIZED
DESIGN DISCIPLINES INTO ART AND PEDAGOGICAL EDUCATION
IN FINLAND AND KAZAKHSTAN.....221

B.D. Orazov, Zh. Sydykova, E. Tasbolat

METHODOLOGICAL FEATURES OF THE ORGANIZATION OF
LABORATORY WORK ON VIRTUAL PROGRAMS FOR FUTURE
PHYSICS TEACHERS.....237

T.M. Sadykov, G.T. Kokibasova, Z.O. Unerbaeva

THE FEATURES OF THE APPLICATION OF THE CASE STUDY
METHOD IN CHEMISTRY AND BIOLOGY LESSONS.....253

L.E. Sapartayeva

PEDAGOGICAL POSSIBILITIES OF USING THE WORKS
OF KAZAKH POETS AND ZHYRAU.....269

K. Temirkhanova, B. Baimukhanbetov, G. Myshbayeva

DEVELOPMENT OF SCIENTIFIC AND COMMUNICATION SKILLS
OF TEACHERS OF FUTURE PRESCHOOL ORGANIZATIONS.....281

U. Tuyakova, A. Orynbekova, L. Alekeshova

FORMATION OF EMOTIONAL AND SOCIAL INTELLIGENCE OF FUTURE
TEACHERS IN THE EDUCATIONAL PROCESS OF UNIVERSITIES.....300

G.Sh. Shaikhislamova, K.A. Avsydykova, O. Zengin

THE READINESS OF FUTURE SOCIAL WORKERS TO FORMATION
PROFESSIONAL COMPETENCIES AT THE UNIVERSITY.....315

G. Shubayeva, T. Bersugirova, R. Baimukhamet

FEATURES OF HEALTHCARE COMPETENCIES OF CHILDREN
WITH SPECIAL EDUCATIONAL NEEDS.....335

ECONOMICS

A.M. Abdullaev, M.B. Kadyrova, A.A. Kuralbaev THE IMPACT OF MODERNIZATION OF LOCAL GOVERNMENT ON THE SOCIO-ECONOMIC DEVELOPMENT OF REGIONS.....	349
S. Aldeshova, A. Kazhmukhametova, K. Utepkaliyeva ORGANIZATION OF AUDIT OF RAILWAY FREIGHT BUSINESS PROCESSES IN THE CONTEXT OF DIGITAL TRANSFORMATION.....	371
A. Akhmetov, L. Omarbakiyev, E. Aynabekov EFFECTIVE RISK MANAGEMENT MODEL FOR SMALL BUSINESS LENDING IN KAZAKHSTAN: INTERNATIONAL PRACTICES.....	391
N.S. Dosmaganbetov, A.A. Alshanskaya, E.K. Zhakupov VISION OF THE DEVELOPMENT OF TERRITORIAL CLUSTERS IN THE REGIONS OF KAZAKHSTAN: DOMESTIC AND FOREIGN EXPERIENCE.....	408
Zh. Yerzhanova, A. Dossanova, A. Tapalova PROVIDING THE AGRICULTURAL MARKET WITH YOUNG SPECIALISTS: PROBLEMS AND SOLUTIONS.....	426
R.A. Yesbergen, N.M. Sherimova, A. Azimkhan THE PROBLEM OF POVERTY IN KAZAKHSTAN AND MEASURES TO REDUCE IT.....	439
A. Yesmurzayeva, A. Kozhakhmetova, A. Anarkhan RENEWABLE ENERGY SOURCES IN THE REPUBLIC OF KAZAKHSTAN: CASE STUDY ANALYSIS AND DEVELOPMENT PROSPECTS.....	453
Y.B. Zhangazinov, N.E. Yermek, L.I. Kusainova IMPROVEMENT OF THE HEALTHCARE HUMAN RESOURCE MANAGEMENT SYSTEM IN THE REPUBLIC OF KAZAKHSTAN: PROBLEMS, PROSPECTS, AND SOLUTIONS.....	472
G.M. Zhiyenbayeva, A.M. Berzhanova, F.K. Mukhambetkalieva DIGITAL TRANSFORMATION OF ENTERPRISES AND ITS IMPACT ON THE DEMAND FOR NEW PROFESSIONS IN THE WEST KAZAKHSTAN REGION.....	489
J. Juman, A.V. Khamzayeva, Zhai Xuan COOPERATION BETWEEN CHINA, RUSSIA AND CENTRAL ASIAN COUNTRIES IN THE NATURAL GAS SECTOR.....	509

B.M. Zhurynov, A.F. Tsekhovoy

ANALYSIS OF MODELS AND METHODS OF PROJECT
MANAGEMENT IN LARGE ORGANIZATIONS
OF THE REPUBLIC OF KAZAKHSTAN.....525

M.A. Kanabekova, L.A. Medukhanova., S.N. Abieva

WAYS TO INCREASE THE INVESTMENT ATTRACTIVENESS
OF KAZAKHSTAN'S ECONOMY.....537

M. Konyrbekov, A.B. Bekmukhametova, K.S. Daurenbekova

ANALYSIS OF THE DEVELOPMENT OF INNOVATIVE FINANCIAL
TECHNOLOGIES IN THE CONTEXT OF FINANCIAL MARKET
DIGITALIZATION.....553

G.Y. Maulenkulova, A.M. Appazova, A.A. Mutaliyeva

IMPROVING TAXATION OF PRIVATE INVESTORS IN THE STOCK
MARKET OF THE REPUBLIC OF KAZAKHSTAN.....568

A.O. Syzdykova

COMPARISON OF METHODS USED TO DETERMINE THE
BRAND VALUE OF AN ENTERPRISE.....589

Hongge Jia, G.J. Tayauova, N. Ketenci

OPPORTUNITIES FOR THE DEVELOPMENT
OF ENTREPRENEURIAL STRUCTURES IN THE AGRO-INDUSTRIAL
SECTOR OF KAZAKHSTAN.....602

МАЗМҰНЫ

ПЕДАГОГИКА

А.И. Абдрасилов, Е. Қуандық

КӨРКЕМ МҮСІНДІК БІЛІМ БЕРУДЕ СТУДЕНТТЕРДІҢ КЕҢІСТІКТІК
ОЙЛАУЫН ДАМУДАҒЫ ФОТОГРАММЕТРИЯ
ТЕХНОЛОГИЯЛАРЫ.....17

Э.Т. Абдрашова, З.С. Кобеева, Ж.С. Кемельбекова

ЖАСАНДЫ ИНТЕЛЛЕКТ: БОЛАШАҚ ИНФОРМАТИКА
МҰҒАЛІМДЕРІНІҢ КӘСІБИ-ӘДІСТЕМЕЛІК ҚҰЗЫРЕТТІЛІГІНЕ
ӘСЕРІ.....33

А.М. Абдыхалыкова, Б.Х. Құсанова, А. Дәуренқызы

АҒЫЛШЫН ТІЛІН СЫНИ ОҚУ АРҚЫЛЫ ОҚЫТУДАҒЫ МЕДИА
САУАТТЫЛЫҚ.....48

А.Е. Әбілқасымова, Н. Жұмабай, А.Н. Умиралханов, Л.Д. Жумалиева

ЦИФРЛЫҚ ТЕХНОЛОГИЯЛАР «МЕКТЕП – ПЕДАГОГИКАЛЫҚ
ЖОҒАРЫ ОҚУ ОРНЫ» КЕШЕНІНДЕ ТИІМДІ БІЛІМ БЕРУДІҢ НЕГІЗІ
РЕТІНДЕ.....63

К.Н. Аринова

DIGCOMPEDU КОНТЕКСТІНДЕ БОЛАШАҚ АРНАЙЫ ПЕДАГОГТАРДЫҢ
ЦИФРЛЫҚ ҚҰЗЫРЕТТІЛІКТЕРІН ҚАЛЫПТАСТЫРУ.....86

А.А. Исаева, С.В. Ананьева, Л.Н. Демченко

К. ПАУСТОВСКИЙДІҢ «ҚАРАБҰҒАЗ» ПОВЕСІНІҢ МӘТІНІМЕН
ЖҰМЫС ІСТЕУ КЕЗІНДЕГІ ЗЕРТТЕУ ҚҰЗЫРЕТІ.....104

Ғ.З. Искакова, Э.Т. Телеуова

ҚАЗАҚ ҚОҒАМЫ МӘШҰР ЖҮСІП КӨПЕЕВ ШЫҒАРМАЛАРЫ
ПРИЗМАСЫ АРҚЫЛЫ.....118

А.Е. Карымсакова, Г.М. Абильдинова, Ж.С. Кажиякпарова

«ЕПТІ САУСАҚТАР» ЭЛЕКТРОНДЫ ҚОСЫМШАСЫН ҚОЛДАНУДЫҢ
МЕКТЕП ЖАСЫНА ДЕЙІНГІ БАЛАЛАРДЫҢ ГРАФОМОТОРЛЫҚ
ДАҒДЫЛАРЫН ДАМУДАҒЫ ӘСЕРІ.....133

Ш.У. Лайсханов, Ж. Нұрмағамбетұлы, В. Gönençgil

МЕКТЕП ГЕОГРАФИЯСЫНДА ҒАРЫШТЫҚ ТҮСІРІЛІМДЕРДІ
ПАЙДАЛАНУДЫҢ ҚАЗІРГІ ЖАҒДАЙЫ МЕН МҮМКІНДІКТЕРІ.....146

С. Мырзалиева, С. Мизанбеков, Е. Ломова.

ПӘНДІК-ТІЛДІК ИНТЕГРАЦИЯ СТУДЕНТТЕРДІҢ КӨПТІЛДІЛІК
ҚҰЗЫРЕТТІЛІГІН ҚАЛЫПТАСТЫРУ ҚҰРАЛЫ РЕТІНДЕ.....162

Н.Б. Нәби, Р.С. Рахметова

ОҚУШЫЛАРДЫҢ СӨЙЛЕУ МӘДЕНИЕТІН ДАМУДА
Артикуляцияның алатын рөлі.....179

А. Нұрадинова

ҚАЗАҚСТАННЫҢ ЖОҒАРЫ БІЛІМ БЕРУ ЖҮЙЕСІНДЕГІ КӨПТІЛДІ
ОРТАДА ЖАҒАНДЫҚ ҚҰЗЫРЕТТЕРДІ ДАМУ.....202

Г.М. Ожарова, Ш.А. Ақбаева

ФИНЛЯНДИЯ МЕН ҚАЗАҚСТАНДАҒЫ КӨРКЕМ ПЕДАГОГИКАЛЫҚ
БІЛІМ ЖҮЙЕСІНІҢ ДИЗАЙН САЛАСЫНДАҒЫ АРНАЙЫ ПӘНДЕРДІ
ИНТЕГРАЦИЯЛАУДЫҢ САЛЫСТЫРМАЛЫ ТАЛДАУЫ.....221

Б.Д. Оразов, Ж.К. Сыдыкова, Е.Б. Тасболат

ПЕДАГОГИКАЛЫҚ ЖОҒАРЫ ОҚУ ОРЫНДАРЫНДА МОЛЕКУЛАЛЫҚ
ФИЗИКАДАН ВИРТУАЛДЫ ЗЕРТХАНАЛЫҚ ЖҰМЫСТАРДЫ
ҰЙЫМДАСТЫРУ ЖӘНЕ ӨТКІЗУ ӘДІСТЕМЕСІ.....237

Т.М. Садыков, Г.Т. Кокибасова, З.О. Унербаева

ХИМИЯ ЖӘНЕ БИОЛОГИЯ САБАҚТАРЫНДА CASE-STUDY ӘДІСІН
ҚОЛДАНУ ЕРЕКШЕЛІКТЕРІ.....253

Л. Сапартаева

ҚАЗАҚ АҚЫН-ЖЫРАУЛАРЫНЫҢ ШЫҒАРМАЛАРЫН
ПАЙДАЛАНУДЫҢ ПЕДАГОГИКАЛЫҚ МҮМКІНДІКТЕРІ.....269

К.Ш. Темирханова, Б. Баймуханбетов, Г.М. Мышбаева

БОЛАШАҚ МЕКТЕПКЕ ДЕЙІНГІ ҰЙЫМ ПЕДАГОГТЕРІНІҢ ҒЫЛЫМИ
КОММУНИКАЦИЯЛЫҚ ДАҒДЫЛАРЫН ДАМУ.....281

У.Ж. Туякова, А.С. Орынбекова, Л.Б. Алекешова

ЖОҒАРЫ ОҚУ ОРЫНДАРЫНЫҢ БІЛІМ БЕРУ ПРОЦЕСІНДЕ БОЛАШАҚ
ПЕДАГОГТЕРДІҢ ЭМОЦИОНАЛДЫҚ ЖӘНЕ ӘЛЕУМЕТТІК
ИНТЕЛЛЕКТІСІН ҚАЛЫПТАСТЫРУ.....300

Г.Ш. Шайхисламова, К.А. Авсыдыкова, О. Зенгин

ЖОҒАРЫ ОҚУ ОРНЫНДА БОЛАШАҚ ӘЛЕУМЕТТІК
ҚЫЗМЕТКЕРЛЕРДІҢ КӘСІБИ ҚҰЗЫРЕТТІЛІГІН ҚАЛЫПТАСТЫРУҒА
ДАЙЫНДЫҒЫ.....315

Ғ. Шубаева, Т. Берсүгірова, Р. Баймухамет

ЕРЕКШЕ БІЛІМ БЕРУ ҚАЖЕТТІЛІГІ БАР БАЛАЛАРДЫҢ ДЕНСАУЛЫҚ
САҚТАУ ҚҰЗЫРЕТТІЛІГІНІҢ ЕРЕКШЕЛІКТЕРІ.....335

ЭКОНОМИКА

- А.М. Абдуллаев, М.Б. Қадырова, А.А. Құралбаев**
ЖЕРГІЛІКТІ БАСҚАРУДЫ ЖАҢҒЫРТУДЫҢ ӨНІРЛЕРДІҢ
ӘЛЕУМЕТТІК-ЭКОНОМИКАЛЫҚ ДАМУЫНА ӘСЕРІ.....549
- С. Альдешова, А. Кажмухаметова, К. Утепкалиева**
ЦИФРЛЫҚ ТРАНСФОРМАЦИЯ ЖАҒДАЙЫНДА ТЕМІРЖОЛ ЖҮК
ТАСЫМАЛЫ БИЗНЕС-ПРОЦЕСТЕРІНІҢ АУДИТІН ҰЙЫМДАСТЫРУ...371
- А. Ахметов, Л. Омарбакиев, Е. Айнабеков**
ҚАЗАҚСТАНДАҒЫ ШАҒЫН БИЗНЕСКЕ НЕСИЕ БЕРУ ҮШІН
ТӘУЕКЕЛДЕРДІ БАСҚАРУДЫҢ ТИІМДІ МОДЕЛІ: ХАЛЫҚАРАЛЫҚ
ТӘЖІРИБЕ.....391
- Н.С. Досмаганбетов, А.А. Альшанская, Е.К. Жакупов**
ҚАЗАҚСТАН ӨНІРЛЕРІНДЕ АУМАҚТЫҚ КЛАСТЕРЛЕРДІ ДАМУ
ПАЙЫМЫ: ОТАНДЫҚ ЖӘНЕ ШЕТЕЛДІК ТӘЖІРИБЕ.....408
- Ж. Ержанова, А. Досанова, А. Тапалова**
АГРАРЛЫҚ НАРЫҚТЫ ЖАС МАМАНДАРМЕН ҚАМТАМАСЫЗ ЕТУ:
МӘСЕЛЕЛЕРІ МЕН ШЕШІМДЕРІ.....426
- Р.Ә. Есберген, Н.М. Шеримова, А. Азимхан**
ҚАЗАҚСТАНДАҒЫ КЕДЕЙЛІК МӘСЕЛЕСІ ЖӘНЕ ОНЫ ТӨМЕНДЕТУ
ШАРАЛАРЫ.....439
- А. Есмұрзаева, А. Қожахметова, А. Анархан**
ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДАҒЫ ЖАҢАРТЫЛАТЫН ЭНЕРГИЯ
КӨЗДЕРІ: КЕЙС-ТАЛДАУ ЖӘНЕ ДАМУ ПЕРСПЕКТИВАЛАРЫ.....453
- Е.Б. Жангазинов, Н.Е. Ермек, Л.И. Кусаинова**
ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДАҒЫ ДЕНСАУЛЫҚ САҚТАУ
ЖҮЙЕСІНІҢ КАДРЛЫҚ РЕСУРСТАРЫН БАСҚАРУДЫ ЖЕТІЛДІРУ:
МӘСЕЛЕЛЕР, ПЕРСПЕКТИВАЛАР ЖӘНЕ ШЕШУ ЖОЛДАРЫ.....472
- Г.М. Жиенбаева, А.М. Бержанова, Ф.К. Мухамбеткалиева**
БАТЫС ҚАЗАҚСТАН ӨНІРІНДЕГІ КӘСІПОРЫНДАРДЫҢ ЦИФРЛЫҚ
ТРАНСФОРМАЦИЯСЫ ЖӘНЕ ЖАҢА МАМАНДЫҚТАРҒА ДЕГЕН
СҰРАНЫСҚА ӘСЕРІ.....489
- Ж. Жұман, Ә.У. Хамзаева, Чжай Сюань**
ҚЫТАЙ, РЕСЕЙ ЖӘНЕ ОРТАЛЫҚ АЗИЯ ЕЛДЕРІ АРАСЫНДАҒЫ
ТАБИҒИ ГАЗ СЕКТОРЫНДАҒЫ ЫНТЫМАҚТАСТЫҚ.....509

Б.М. Жұрынов, А.Ф. Цеховой

ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ ІРІ ҰЙЫМДАРЫНДАҒЫ
ЖОБАЛАРДЫ БАСҚАРУДЫҢ ҮЛГІЛЕРІ МЕН ӘДІСТЕРІН
ТАЛДАУ.....525

М.А. Қанабекова, Л.А. Медуханова, С.Н. Абиева

ҚАЗАҚСТАН ЭКОНОМИКАСЫНЫҢ ИНВЕСТИЦИЯЛЫҚ
ТАРТЫМДЫЛЫҒЫН АРТТЫРУ ЖОЛДАРЫ.....525

М.Ж. Қонырбеков, А.Б. Бекмухаметова, Қ.С. Дауренбекова

ҚАРЖЫ НАРЫҒЫНЫҢ ЦИФРАНДЫРЫЛУЫ ЖАҒДАЙЫНДА
ИННОВАЦИЯЛЫҚ ҚАРЖЫЛЫҚ ТЕХНОЛОГИЯЛАРДЫҢ
ДАМУЫН ТАЛДАУ.....541

Г.Е. Мауленкулова, А.М. Аппазова, А.А. Муталиева

ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ ҚОР НАРЫҒЫНДА ЖЕКЕ
ИНВЕСТИТОРЛАРҒА САЛЫҚ САЛУДЫ ЖЕТІЛДІРУ.....556

А.О. Сыздықова

КӘСІПОРЫННЫҢ БРЕНД ҚҰНЫН БАҒАЛАУДА ҚОЛДАНЫЛАТЫН
ӘДІСТЕРДІ САЛЫСТЫРУ.....577

Цзя Хунгэ, Г.Ж. Таяуова, Н. Кетенджи

ҚАЗАҚСТАННЫҢ АГРОӨНЕРКӘСІПТІК САЛАСЫНДАҒЫ
КӘСІПКЕРЛІК ҚҰРЫЛЫМДАРДЫ ДАМУЫ МҮМКІНДІКТЕРІ.....590

СОДЕРЖАНИЕ

ПЕДАГОГИКА

А.И. Абдрасилов, Е. Куандык

ТЕХНОЛОГИИ ФОТОГРАММЕТРИИ В РАЗВИТИИ
ПРОСТРАНСТВЕННОГО МЫШЛЕНИЯ СТУДЕНТОВ В ПРОЦЕССЕ
ОБУЧЕНИЯ ХУДОЖЕСТВЕННОЙ СКУЛЬПТУРЕ.....17

Э.Т. Абдрашова, З.С. Кобеева, Ж.С. Кемельбекова

ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ: ВЛИЯНИЕ НА ПРОФЕССИОНАЛЬНО-
МЕТОДИЧЕСКУЮ КОМПЕТЕНТНОСТЬ БУДУЩИХ УЧИТЕЛЕЙ
ИНФОРМАТИКИ.....33

А.М. Абдыхалыкова, Б.Х. Кусанова, А. Дауренкызы

МЕДИАГРАМОТНОСТЬ ЧЕРЕЗ КРИТИЧЕСКОЕ ЧТЕНИЕ В
ПРЕПОДАВАНИИ АНГЛИЙСКОГО ЯЗЫКА.....48

А.Е. Абылкасымова, Н. Жумабай, А.Н. Умиралханов, Л.Д. Жумалиева

ЦИФРОВЫЕ ТЕХНОЛОГИИ КАК ОСНОВА ЭФФЕКТИВНОГО
ОБРАЗОВАНИЯ В КОМПЛЕКСЕ «ШКОЛА – ПЕДАГОГИЧЕС.....63

К.Н. Аринова

ФОРМИРОВАНИЕ ЦИФРОВЫХ КОМПЕТЕНЦИЙ БУДУЩИХ
СПЕЦИАЛЬНЫХ ПЕДАГОГОВ В КОНТЕКСТЕ DIGCOMPEDU.....86

А.А. Исаева, С.В. Ананьева, Л.Н. Демченко

ИССЛЕДОВАТЕЛЬСКАЯ КОМПЕТЕНЦИЯ ПРИ РАБОТЕ С ТЕКСТОМ
ПОВЕСТИ К. ПАУСТОВСКОГО «КАРАБУГАЗ».....104

Г.З. Исакова, Э.Т. Телеуова

КАЗАХСКОЕ ОБЩЕСТВО СКВОЗЬ ПРИЗМУ ПРОИЗВЕДЕНИЙ
МАШХУР ЖУСУПА КОПЕЕВА.....118

А.Е. Карымсакова, Г.М. Абильдинова, Ж.С. Кажиякпарова

ВЛИЯНИЕ ИСПОЛЬЗОВАНИЯ ЭЛЕКТРОННОГО ПРИЛОЖЕНИЯ «ЛОВКИЕ
ПАЛЬЧИКИ» НА РАЗВИТИЕ ГРАФОМОТОРНЫХ НАВЫКОВ
У ДОШКОЛЬНИКОВ.....133

Ш.У. Лайсханов, Ж. Нурмагамбетулы, В. Gönençgil

СОВРЕМЕННОЕ СОСТОЯНИЕ И ВОЗМОЖНОСТИ ИСПОЛЬЗОВАНИЯ
КОСМИЧЕСКИХ СНИМКОВ В ШКОЛЬНОЙ ГЕОГРАФИИ.....146

С. Мырзалиева, С. Мизанбеков, Е. Ломова

ПРЕДМЕТНО-ЯЗЫКОВАЯ ИНТЕГРАЦИЯ КАК ИНСТРУМЕНТ
ФОРМИРОВАНИЯ ПЛЮРИЛИНГВАЛЬНОЙ КОМПЕТЕНЦИИ
ОБУЧАЮЩИХСЯ.....162

Н.Б. Наби, Р.С. Рахметова

РОЛЬ АРТИКУЛЯЦИИ В РАЗВИТИИ РЕЧЕВОЙ КУЛЬТУРЫ

УЧАЩИХСЯ.....179

А. Нурадинова

РАЗВИТИЕ ГЛОБАЛЬНЫХ КОМПЕТЕНЦИЙ В ПОЛИЯЗЫЧНОЙ

СРЕДЕ ВЫСШЕГО ОБРАЗОВАНИЯ КАЗАХСТАНА.....202

Г.М. Ожарова, Ш.А. Акбаева

СРАВНИТЕЛЬНЫЙ АНАЛИЗ ИНТЕГРАЦИИ СПЕЦИАЛЬНЫХ

ДИСЦИПЛИН СФЕРЫ ДИЗАЙНА В ХУДОЖЕСТВЕННО-

ПЕДАГОГИЧЕСКОЕ ОБРАЗОВАНИЕ ФИНЛЯНДИИ

И КАЗАХСТАНА.....221

Б.Д. Оразов, Ж.К. Сыдыкова, Е.Б. Тасболат

МЕТОДИКА ОРГАНИЗАЦИИ И ПРОВЕДЕНИЯ ВИРТУАЛЬНЫХ

ЛАБОРАТОРНЫХ РАБОТ ПО МОЛЕКУЛЯРНОЙ ФИЗИКЕ

В ПЕДАГОГИЧЕСКИХ ВУЗАХ.....237

Т.М. Садыков, Г.Т. Кокибасова, З.О. Унербаева

ОСОБЕННОСТИ ПРИМЕНЕНИЯ МЕТОДА CASE-STUDY НА УРОКАХ

ХИМИИ И БИОЛОГИИ.....263

Л. Сапартаева

ПЕДАГОГИЧЕСКИЕ ВОЗМОЖНОСТИ ИСПОЛЬЗОВАНИЯ

ПРОИЗВЕДЕНИЙ КАЗАХСКИХ ПОЭТОВ И ЖЫРАУ.....269

К.Ш. Темирханова, Б. Баймуханбетов, Г.М. Мышбаева

РАЗВИТИЕ НАУЧНЫХ КОММУНИКАТИВНЫХ НАВЫКОВ БУДУЩИХ

ПЕДАГОГОВ ДОШКОЛЬНЫХ ОРГАНИЗАЦИЙ.....281

У.Ж. Туякова, А.С. Орынбекова, Л.Б. Алекешова

ФОРМИРОВАНИЕ ЭМОЦИОНАЛЬНОГО И СОЦИАЛЬНОГО

ИНТЕЛЛЕКТА БУДУЩИХ ПЕДАГОГОВ В ОБРАЗОВАТЕЛЬНОМ

ПРОЦЕССЕ ВУЗОВ.....300

Г.Ш. Шайхисламова, К.А. Авсыдыкова, О. Зенгин

ГОТОВНОСТЬ К ФОРМИРОВАНИЮ ПРОФЕССИОНАЛЬНЫХ

КОМПЕТЕНЦИЙ БУДУЩИХ СОЦИАЛЬНЫХ РАБОТНИКОВ В ВУЗЕ.....315

Г. Шубаева, Т. Берсугирова, Р. Баймухамет

ОСОБЕННОСТИ ЗДОРОВЬЕСБЕРЕГАЮЩИХ КОМПЕТЕНЦИЙ ДЕТЕЙ

С ОСОБЫМИ ОБРАЗОВАТЕЛЬНЫМИ ПОТРЕБНОСТЯМИ.....335

ЭКОНОМИКА

- А.М. Абдуллаев, М.Б. Кадырова, А.А. Куралбаев**
ВЛИЯНИЕ МОДЕРНИЗАЦИИ МЕСТНОГО УПРАВЛЕНИЯ НА
СОЦИАЛЬНО-ЭКОНОМИЧЕСКОЕ РАЗВИТИЕ РЕГИОНОВ.....349
- С. Альдешова, А. Кажмухаметова, К. Утепкалиева**
ОРГАНИЗАЦИЯ АУДИТА БИЗНЕС-ПРОЦЕССОВ ЖЕЛЕЗНОДОРОЖНЫХ
ГРУЗОВЫХ ПЕРЕВОЗОК В УСЛОВИЯХ ЦИФРОВОЙ
ТРАНСФОРМАЦИИ.....371
- А. Ахметов, Л. Омарбакиев, Е. Айнабеков**
ЭФФЕКТИВНАЯ МОДЕЛЬ УПРАВЛЕНИЯ РИСКАМИ ПРИ
КРЕДИТОВАНИИ МАЛОГО БИЗНЕСА В КАЗАХСТАНЕ:
МЕЖДУНАРОДНАЯ ПРАКТИКА.....391
- Н.С. Досмаганбетов, А.А. Альшанская, Е.К. Жакупов**
ВИДЕНИЕ РАЗВИТИЯ ТЕРРИТОРИАЛЬНЫХ КЛАСТЕРОВ В РЕГИОНАХ
КАЗАХСТАНА: ОТЕЧЕСТВЕННЫЙ И ЗАРУБЕЖНЫЙ ОПЫТ.....408
- Ж. Ержанова, А. Досанова, А. Тапалова**
ОБЕСПЕЧЕНИЕ АГРАРНОГО РЫНКА МОЛОДЫМИ СПЕЦИАЛИСТАМИ:
ПРОБЛЕМЫ И РЕШЕНИЯ.....426
- Р. Есберген, Н.М. Шеримова, А. Азимхан**
ПРОБЛЕМА БЕДНОСТИ В КАЗАХСТАНЕ И МЕРЫ ПО ЕЕ
СНИЖЕНИЮ.....439
- А. Есмурзаева, А. Кожаметова, А. Анархан**
ВОЗОБНОВЛЯЕМЫЕ ИСТОЧНИКИ ЭНЕРГИИ В РК: АНАЛИЗ КЕЙСОВ
И ПЕРСПЕКТИВЫ РАЗВИТИЯ.....453
- Е.Б. Жангазинов, Н.Е. Ермек, Л.И. Кусаинова**
СОВЕРШЕНСТВОВАНИЕ СИСТЕМЫ УПРАВЛЕНИЯ КАДРОВЫМИ
РЕСУРСАМИ ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ КАЗАХСТАН:
ПРОБЛЕМЫ, ПЕРСПЕКТИВЫ И ПУТИ РЕШЕНИЯ.....472
- Г.М. Жиенбаева, А.М. Бержанова, Ф.К. Мухамбеткалиева**
ЦИФРОВАЯ ТРАНСФОРМАЦИЯ ПРЕДПРИЯТИЙ И ЕЁ ВЛИЯНИЕ
НА СПРОС НА НОВЫЕ ПРОФЕССИИ В ЗАПАДНО-КАЗАХСТАНСКОМ
РЕГИОНЕ.....489
- Ж. Жуман, А.В. Хамзаева, Чжай Сюань**
СОТРУДНИЧЕСТВО МЕЖДУ КИТАЕМ, РОССИЕЙ И СТРАНАМИ
ЦЕНТРАЛЬНОЙ АЗИИ В СЕКТОРЕ ПРИРОДНОГО ГАЗА.....509

Б.М. Журынов, А.Ф. Цеховой АНАЛИЗ МОДЕЛЕЙ И МЕТОДОВ ПРОЕКТНОГО УПРАВЛЕНИЯ В КРУПНЫХ ОРГАНИЗАЦИЯХ РЕСПУБЛИКИ КАЗАХСТАН.....	252
М.А. Канабекова, Л.А. Медуханова, С.Н. Абиева ПУТИ ПОВЫШЕНИЯ ИНВЕСТИЦИОННОЙ ПРИВЛЕКАТЕЛЬНОСТИ ЭКОНОМИКИ КАЗАХСТАНАМ.....	537
М. Конырбеков, А.Б. Бекмухаметова, К.С. Дауренбекова АНАЛИЗ РАЗВИТИЯ ИННОВАЦИОННЫХ ФИНАНСОВЫХ ТЕХНОЛОГИЙ В УСЛОВИЯХ ЦИФРОВИЗАЦИИ ФИНАНСОВОГО РЫНКА.....	553
Г.Е. Мауленкулова, А.М. Аппазова, А.А. Муталиева СОВЕРШЕНСТВОВАНИЕ НАЛОГООБЛОЖЕНИЯ ЧАСТНЫХ ИНВЕСТОРОВ НА ФОНДОВОМ РЫНКЕ РЕСПУБЛИКИ КАЗАХСТАН.....	568
А.О. Сыздыкова СРАВНЕНИЕ МЕТОДОВ, ИСПОЛЪЗУЕМЫХ ПРИ ОЦЕНКЕ СТОИМОСТИ БРЕНДА ПРЕДПРИЯТИЯ.....	589
Цзя Хунгэ, Г.Ж. Таяуова, Н. Кетенджи ВОЗМОЖНОСТИ РАЗВИТИЯ ПРЕДПРИНИМАТЕЛЬСКИХ СТРУКТУР В АГРОПРОМЫШЛЕННОЙ ОТРАСЛИ КАЗАХСТАНА.....	602

BULLETIN OF NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
ISSN 1991-3494
Volume 3. Number 415 (2025), 133–145

<https://doi.org/10.32014/2025.2518-1467.956>

UDC 376.37

© **A.E. Karymsakova, G.M. Abildinova*, Zh.S. Kazhiakparova, 2025.**

L.N. Gumilyov Eurasian National University, Astana, Kazakhstan;
West Kazakhstan Innovative Technological University, Uralsk, Kazakhstan.
E-mail: gulmira_2181@mail.ru

THE IMPACT OF USING THE «NIMBLE FINGERS» ELECTRONIC APPLICATION ON THE DEVELOPMENT OF GRAPHOMOTOR SKILLS IN PRESCHOOLERS

A.E. Karymsakova — candidate of pedagogical sciences, L.N. Gumilyov Eurasian National University, Astana, Kazakhstan,

E-mail: hatae@mail.ru, ORCID: <https://orcid.org/0000-0001-8982-1662>;

G.M. Abildinova — candidate of Pedagogical Sciences, Associate Professor of the Department of informatics of the L.N. Gumilyov Eurasian National University, Astana, Kazakhstan,

E-mail: gulmira_2181@mail.ru, ORCID: <https://orcid.org/0000-0001-9054-6549>;

Zh.S. Kazhiakparova — candidate of pedagogical sciences, associate professor, West Kazakhstan Innovative Technological University, Uralsk, Kazakhstan,

E-mail: ghadira@rambler.ru, ORCID: <https://orcid.org/0000-0002-2347-911X>.

Abstract. The purpose of this study was to study the impact of using the «Nimble Fingers» electronic application on the development of graphomotor skills in preschool children. The study was conducted based on a model of causal comparison of quantitative research methods. The sample included 92 children aged 4 to 6 years, of whom 46 (n=46) participated in learning using the «Nimble Fingers» app, while 46 (n=46) did not use it. Concentration tests and a scale for assessing the visual-motor coordination and graphomotor skills of preschoolers were used to collect data. The study results showed that children who used the «Nimble Fingers» electronic application demonstrated a higher level of graphomotor skills development compared to those who did not use this application. The level of fine motor skills development did not depend on the gender and age of the children, but differences were observed in the development of hand coordination. The results of this study confirmed the hypothesis that the «Nimble Fingers» electronic application has a significant effect on the development of graphomotor skills in preschoolers. The children using the app demonstrated a higher level of hand-eye coordination and graphomotor skills and attention concentration compared to the control group, which is consistent with previous research in the field of digital learning. It is especially noteworthy that the

differences in the development of graphomotor skills were statistically significant, which confirms the effectiveness of using digital tools.

Keywords: Nimble Fingers, electronic application, graphomotor skills, preschool children, visual-motor coordination

Funding information. *This research is funded by the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan (AP19679894 “Development of graphomotor skills in children of 4 - 6 years of age through the electronic application “Nimble Fingers”, scientific supervisor A.E. Karymsakova.*

© А.Е. Карымсакова, Г.М. Абильдинова*, Ж.С. Кажиақпарова, 2025.

Л. Н. Гумилев атындағы Еуразия ұлттық университеті, Астана, Қазақстан;
Батыс Қазақстан инновациялық-технологиялық университеті, Орал,
Қазақстан.

E-mail: gulmira_2181@mail.ru

«ЕПТІ САУСАҚТАР» ЭЛЕКТРОНДЫ ҚОСЫМШАСЫН ҚОЛДАНУДЫҢ МЕКТЕП ЖАСЫНА ДЕЙІНГІ БАЛАЛАРДЫҢ ГРАФОМОТОРЛЫҚ DAҒДЫЛАРЫН ДАМУҒА ӘСЕРІ

А.Е. Карымсакова — педагогика ғылымдарының кандидаты, Л.Н. Гумилев атындағы Еуразия ұлттық университетінің информатика кафедрасының аға оқытушысы, Астана, Қазақстан,
E-mail: hatae@mail.ru, ORCID: <https://orcid.org/0000-0001-8982-1662>;

Г.М. Абильдинова — педагогика ғылымдарының кандидаты, Л.Н. Гумилев атындағы Еуразия ұлттық университетінің информатика кафедрасының қауымдастырылған профессоры, Астана, Қазақстан,

E-mail: gulmira_2181@mail.ru, ORCID: <https://orcid.org/0000-0001-9054-6549>;

Ж.С. Кажиақпарова — педагогика ғылымының кандидаты, қауымдастырылған профессор, Батыс Қазақстан инновациялық-технологиялық университеті, Орал, Қазақстан,
E-mail: ghadira@rambler.ru, ORCID: <https://orcid.org/0000-0002-2347-911X>.

Аннотация. Бұл зерттеудің мақсаты «Епті саусақтар» электронды қосымшасын қолданудың мектеп жасына дейінгі балалардың графомоторлық дағдыларын дамытуға әсерін зерттеу болды. Зерттеу сандық зерттеу әдістерін себептік салыстыру моделі негізінде жүргізілді. Тәжірибеге 4 пен 6 жас аралығындағы 92 бала қатысты, олардың 46-сы (n=46) «Епті саусақтар» қосымшасы арқылы оқуға қатысты, ал 46-сы (n=46) оны пайдаланбады. Деректерді жинау үшін мектеп жасына дейінгі балалардың көру-қимылын үйлестіру және графомоторлық дағдыларын бағалауға арналған концентрациялық тесттер мен шкала қолданылды. Зерттеу нәтижелері көрсеткендей, «Епті саусақтар» электронды қосымшасын қолданған балалар бұл қосымшаны қолданбағандармен салыстырғанда графомоторлық дағдыларды дамытудың жоғары деңгейін көрсетті. Ұсақ моториканың даму

деңгейі балалардың жынысы мен жасына байланысты емес, бірақ қолды үйлестіруді дамытуда айырмашылықтар байқалды. Осы зерттеудің нәтижелері «Nimble Fingers» электронды қосымшасы мектеп жасына дейінгі балалардың графомоторлық дағдыларын дамытуға айтарлықтай әсер етеді деген гипотезаны растады. Қолданбаны пайдаланатын балалар бақылау тобымен салыстырғанда визуалды-моторлы координацияның, графомоторлық дағдылардың және шоғырланудың жоғары деңгейін көрсетті, бұл цифрлық оқыту саласындағы алдыңғы зерттеулерге сәйкес келеді. Графомоторлық дағдыларды дамытудағы айырмашылықтар сандық құралдарды қолданудың тиімділігін растайтын статистикалық маңызды болғанын ерекше атап өткен жөн. Әсердің шамасы орташадан елеуліге дейін ауытқиды, бұл анықталған айырмашылықтардың практикалық маңыздылығын көрсетеді. Бұл балалардың жеке ерекшеліктеріне, сондай-ақ қолданбаны пайдалану қарқындылығындағы айырмашылықтарға байланысты болуы мүмкін. Қосымша талдау гендер қол-көзді үйлестіру және графомоторлық дағдыларды дамытуға әсер ететінін көрсетті: қыздар ұлдармен салыстырғанда графомоторлық дағдылардың жоғары деңгейін көрсетті. Дегенмен, шоғырлану бойынша жыныстар арасында айтарлықтай айырмашылықтар болған жоқ. Бұл нәтижелер мектепке дейінгі жастағы ұлдар мен қыздардың когнитивті дамуындағы айырмашылықтарды көрсететін алдыңғы зерттеулердің нәтижелерімен сәйкес келеді.

Түйін сөздер: Епті саусақтар, электронды қолдану, графомоторлық дағдылар, мектеп жасына дейінгі балалар, визуалды-моторлы үйлестіру

© А.Е. Карымсакова, Г.М. Абильдинова*, Р.С. Кажиақпарова, 2025.

Евразийский национальный университет имени Л.Н. Гумилева,
Астана, Казахстан;

Западно Казахстанский инновационно-технологический университет,
Уральск, Казахстан.

E-mail: gulmira_2181@mail.ru

ВЛИЯНИЕ ИСПОЛЬЗОВАНИЯ ЭЛЕКТРОННОГО ПРИЛОЖЕНИЯ «ЛЮВКИЕ ПАЛЬЧИКИ» НА РАЗВИТИЕ ГРАФОМОТОРНЫХ НАВЫКОВ У ДОШКОЛЬНИКОВ

А.Е. Карымсакова — кандидат педагогических наук, старший преподаватель кафедры информатики Евразийского национального университета имени Л.Н. Гумилева, Астана, Казахстан,

E-mail: hatae@mail.ru, ORCID: <https://orcid.org/0000-0001-8982-1662>;

Г.М. Абильдинова — кандидат педагогических наук, ассоциированный профессор кафедры информатики Евразийского национального университета имени Л.Н. Гумилева, Астана, Казахстан,

E-mail: gulmira_2181@mail.ru, ORCID: <https://orcid.org/0000-0001-9054-6549>;

Ж.С. Кажиақпарова — кандидат педагогических наук, ассоциированный профессор, Западно Казахстанский инновационно-технологический университет, Уральск, Казахстан,

E-mail: ghadira@rambler.ru, ORCID: <https://orcid.org/0000-0002-2347-911X>.

Аннотация. Целью данного исследования было изучение влияния использования электронного приложения «Ловкие пальчики» на развитие графомоторных навыков у детей дошкольного возраста. Исследование проводилось на основе модели причинно-следственного сравнения количественных методов исследования. В выборку вошли 92 ребенка в возрасте от 4 до 6 лет, из которых 46 ($n=46$) участвовали в обучении с помощью приложения «Ловкие пальчики», в то время как 46 ($n=46$) им не пользовались. Для сбора данных использовались тесты на концентрацию внимания и шкала для оценки зрительно-моторной координации и графомоторных навыков дошкольников. Результаты исследования показали, что дети, которые пользовались электронным приложением «Ловкие пальчики», продемонстрировали более высокий уровень развития графомоторных навыков по сравнению с теми, кто этим приложением не пользовался. Уровень развития мелкой моторики не зависел от пола и возраста детей, но наблюдались различия в развитии координации движений рук. Результаты данного исследования подтвердили гипотезу о том, что электронное приложение «Ловкие пальчики» оказывает существенное влияние на развитие графомоторных навыков у дошкольников. Дети, использующие приложение, продемонстрировали более высокий уровень зрительно-моторной координации, графомоторных навыков и концентрации внимания по сравнению с контрольной группой, что согласуется с предыдущими исследованиями в области цифрового обучения. Особенно примечательно, что различия в развитии графомоторных навыков были статистически значимыми, что подтверждает эффективность использования цифровых инструментов. Величина эффекта варьировалась от умеренной до значительной, что свидетельствует о практической значимости выявленных различий.

Ключевые слова: Ловкие пальчики, электронное приложение, графомоторные навыки, дети дошкольного возраста, зрительно-моторная координация

Introduction. Modern requirements for education, technology, and business determine the need for preschoolers to develop key skills, including coordination of movements, motor activity, and the ability to perform complex graphomotor tasks. In the context of digitalization and the introduction of innovative teaching methods, it is important not only to develop traditional forms of training but also to use modern electronic tools, such as the «Nimble Fingers» application, to form graphomotor skills. The development of such technologies contributes to the effective development of fine motor skills and the preparation of children for further education, which meets modern educational standards (Brophy, S., 2008:369-387).

Research confirming the positive impact of e-learning programs contributes to their active implementation in the educational environment. In preschool institutions, digital tools such as the «Nimble Fingers» app can be used through special courses, exercises, and educational activities. It is noted that the use of such programs contributes to the development of graphomotor skills and cognitive abilities of

children. The basis for successful learning is interest, attention, and perception, with up to 80% of the information children receive through vision. Developing graphomotor skills, including hand-eye coordination and spatial perception, plays a key role in preparing preschoolers for further education. An insufficient level of these skills can lead to learning difficulties and negatively affect a child's social development.

Research on the use of digital educational technologies in preschool education, especially in the context of graphomotor skills development, has intensified since 2017 (Gabaľová, 2024:7557-7562). However, most of the studies are focused on elementary and secondary school students. At the same time, there is a limited number of studies confirming that e-learning applications contribute to the development of motor skills and coordination in preschool children, and the impact of such technologies on graphomotor skills and spatial perception remains poorly understood.

In this regard, it is relevant to study how the use of the electronic application «Nimble Fingers» affects the development of graphomotor skills of preschoolers. It is also important to consider the influence of factors such as age and gender to better understand the features of motor coordination formation at an early age (Tronick & Cohn, 1989: 85-92). This study will not only expand knowledge in the field of digital learning for preschoolers, but it can also become the basis for early pedagogical intervention in the development of graphomotor skills. Based on this, the main purpose of the study is to study the impact of using the «Nimble Fingers» electronic application on the development of graphomotor skills of preschool children. To achieve this goal, the following research questions were formulated:

- Are there significant differences in the level of concentration development of preschoolers, depending on whether they use the electronic application «Nimble Fingers» or not?
- Are there significant differences in the level of development of hand-eye coordination and graphomotor skills among preschoolers depending on the use of the «Nimble Fingers» electronic application?
- Do the levels of concentration development of preschoolers using the «Nimble Fingers» app differ depending on the gender factor?
- Do the levels of development of hand-eye coordination and graphomotor skills of preschoolers using the «Nimble Fingers» app differ depending on the gender factor?
- Do the levels of concentration development of preschoolers using the «Nimble Fingers» app vary depending on age?
- Do the levels of development of hand-eye coordination and graphomotor skills of preschoolers using the «Nimble Fingers» app differ depending on age?
- Do the concentration levels of preschoolers using the «Nimble Fingers» app vary depending on the length of their preschool education?
- Do the levels of development of hand-eye coordination and graphomotor skills of preschoolers using the «Nimble Fingers» app differ depending on the duration of their preschool education?

Materials and methods. This study, which is a causal analysis, examined the impact of using the «Nimble Fingers» electronic application on the development of graphomotor skills in preschoolers. Causal studies are aimed at identifying the effects of certain factors without direct intervention by the researcher, as well as at analyzing variables that may influence the process under study.

Since the study involves comparing two groups of children using and not using the «Nimble Fingers» app, it follows the logic of experimental research, but without the active intervention of a researcher. In this case, the fact of using an electronic application in an educational environment arose naturally, without additional influence from the researcher. The level of development of graphomotor skills of preschoolers was analyzed depending on the use of the application, which made it possible to determine its effect on coordination of movements, fine motor skills, and hand preparation for writing.

The study includes children aged 4-6 years attending preschool educational institutions in Astana, Republic of Kazakhstan, in the 2023-2024 academic year. To form the working group, a targeted sampling method was used, which is used in cases where research objects must meet certain criteria.

The research group included 92 children, of whom 46 used the «Nimble Fingers» electronic application in the learning process, while 46 did not. When selecting participants, variables such as age, gender, and educational institution were taken into account to ensure that the groups were parallel.

The training using the «Nimble Fingers» app was conducted five days a week, following the principle of gradually increasing the complexity of tasks. As part of the program, the children performed exercises aimed at developing graphomotor skills: drawing, shading, tracing, connecting dots, working with patterns, and other tasks related to hand-eye coordination. The data was collected using measuring instruments, taking into account that the children were educated for at least one academic period. The data used in the study were collected by preschool education methodologists with experience in the field of pedagogy and psychology of preschool children.

The study used a questionnaire with personal information, a concentration test for children aged 4-6 years (Frankfurter Test Fur Funjahrige Konzentration), and a scale of hand-eye coordination and graphomotor skills as data collection tools. The questionnaire with personal information was developed by the researcher to collect demographic data of the participants, including age, gender, and educational experience, to analyze the variables of the study in more detail.

The concentration test for children aged 4-6 years was developed in Germany by Ratz and Mehling in 1968. It was initially standardized and applied to 266 children, and in 1970 to 1,170 children. In 1969, the reliability of the test was verified by repeated testing, and the reliability coefficient was $r = 0.79$ in a sample of 100 children (Kalkan, A., 2015:1369-1391). In 1971, a similar study involving 29 children showed a reliability coefficient of $r = 0.85$. In Kazakhstan, the Frankfurter Test Fur Funjahrige Konzentration began to be used in research related to the cognitive development of preschoolers in the early 2000s (Elsen S., 2014:274-280). In 2015, a study was

conducted that confirmed its reliability and validity in a Kazakh sample of 5-6-year-olds, where the reliability coefficient was $r = 0.76$. Within the framework of preschool education programs in Kazakhstan, this test is used to diagnose children's attention levels and develop adaptive educational programs. In the test, the child must complete a series of tasks for connecting lines, and shapes and repeating the alphabet within 90 seconds. The total score is determined by the number and then adjusted according to age and gender.

The scale of visual-motor coordination and graphomotor skills was developed by Kalkan and Arslan in 2015 for children aged 4-6 years based on a study conducted with the participation of 312 children (Kalkan A., 2015). The test includes three subscales: discrimination, perception of shape and background, and comparison. In total, the scale consists of 20 points.

The reliability check by repeated testing showed a coefficient of $r = 0.74$, which confirms the stability of the measurements. To assess the constructive validity, an opening factor analysis (EFA) and a confirmatory factor analysis (CFA) were performed. In addition, the validity of the scale was confirmed by an expert assessment based on the criteria of substantive and external validity (Balogun H., 2024:100790).

In Kazakhstan, the scale of visual-motor coordination and graphomotor skills began to be used in 2018 in research related to the development of cognitive and motor abilities in preschoolers. A validation study in the Kazakh sample conducted in 2020 confirmed the reliability of the scale, where the retest coefficient was $r = 0.78$. Currently, the scale is used in kindergartens and educational centers in Kazakhstan to diagnose and develop individual programs for the development of graphomotor skills and hand-eye coordination (Nurseitova Z., 2023:4686).

During the data collection process, permits for the use of the scale were first obtained, followed by approval by the Ethics Committee of the Ministry of Education and Science of the Republic of Kazakhstan. The kindergarten administration, educators, and parents were informed in advance about the study, as well as about obtaining the appropriate permission from the Department of National Education of Astana City. After that, the written consent of the parents was obtained, and the children participated in the study in a familiar educational environment in the group.

The analysis of the data obtained during the study was carried out using statistical methods of information processing on a computer. Before choosing statistical criteria for the analysis, the indicators of the normality of the data distribution, including the mean, median, kurtosis, skewness, and peak coefficients, were considered (Guzik P., 2023: e869). The proximity of these values to each other indicates a normal distribution of data. According to Morgan et al., the normal distribution of data is confirmed if the kurtosis coefficient is within ± 1 . Additionally, if the values of the kurtosis and skewness coefficients divided by their standard errors do not exceed ± 1.96 , this also indicates the normality of the data. If the number of observations is less than 50, it is recommended to use the Shapiro-Wilk criterion to verify normality. In this study, the normality of the data distribution was assessed using this test. A value of $p > 0.05$ indicates that the data corresponds to a normal distribution, which allows the use of parametric analysis methods.

The analysis of normality carried out for each group within the framework of the study showed that the average value, median, peak value, coefficients of kurtosis, and skewness were close to unity, and coefficients of kurtosis and skewness were within ± 1 . The significance values of the normality test also exceeded 0.05, which indicates a normal distribution of data.

In this regard, the t-test for independent samples was used for two group comparisons, and one-factor analysis of variance (ANOVA) was used to analyze differences between three or more groups.

When identifying statistically significant differences between the average values, the magnitude of the effect was additionally estimated using the coefficients d and n^2 (eta-squared). According to Cohen (1977), a value of $d = 0.2$ corresponds to a small effect, $d = 0.5$ to an average effect, and $d = 0.8$ to a large effect. The value of n^2 is interpreted as follows: 0.01 is a low level of influence, 0.06 is medium, and 0.14 is high.

Research results. *Research 1.* The results of the t-test for independent samples conducted under the first research hypothesis are presented in Table 1.

Table 1. The results of the t-test for independent samples of the concentration test in children aged 4-6 years.

Groups	n		s	sd	t	P
The experimental group	46	37.65	5.15	90	2.34	0.021
The control group	46	34.93	5.93			

There is a significant difference between the average score of children who used the «Nimble Fingers» electronic application to develop graphomotor skills (average score = 37.65) and the average score of children who did not use the application (average score = 34.93) [$t(90) = 2.34$, $p = 0.021$]. Children using the app showed better results in developing graphomotor skills compared to children who did not participate in the training. The calculated effect value ($d = 0.2$) indicates that this difference is moderate.

Research 2. The result of an unrelated sample t-test performed by its subgoal is shown in Table 2.

Table 2. The result of the t-test of an unrelated sample of scores on the scale of hand-eye coordination and graphomotor skills

Groups	n		s	sd	t	P
The experimental group	46	87.13	10.18	81.792	3.385	0.001
The control group	46	78.43	14.13			

Apparently, there is a significant difference between the average score of children who used the «Nimble Fingers» electronic application to develop graphomotor skills (average score = 87.13) and children who did not use the application (average score = 78.43) [$t(81.792) = 3.385$, $p = 0.001$]. Children using the app showed the best results in developing graphomotor skills. The calculated effect value ($d = 0.7$) indicates that this difference is significant.

Research 3. The result of an unrelated sample t-test performed in accordance with its subgoal is shown in Table 3.

Table 3. Unrelated T-test result samples of concentration test results for children aged 4-6 years by gender

Groups	n		s	sd	t	P
Girls	21	38.61	5.15	44	1.170	0.248
Boys	25	36.84	5.12			

Girls using the «Nimble Fingers» electronic application to develop graphomotor skills showed an average level of development of these skills (average score for girls = 38.61), while boys using the application demonstrated a slightly lower indicator (average score for boys = 36.84). However, statistical analysis showed that the difference between the results of girls and boys is not significant [$t(44) = 1,170$, $p = 0.248$].

Research 4. Unrelated samples made according to the t-test subgoal. Their results are shown in table 4.

Table 4. Unrelated T-test result samples of hand-eye coordination and graphomotor skills by gender. Unrelated sample t-test result

Groups	n		s	sd	t	P
Girls	21	92.28	8.10	44	3.524	0.001
Boys	25	82.80	9.84			

Apparently, there is a significant difference between the average index of hand-eye coordination and graphomotor skills of girls using the «Nimble Fingers» electronic application to develop graphomotor skills (average score for girls = 92.28) and the average for boys (average score for boys = 82.80) [$t(44) = 3.524$, $p = 0.001$]. Girls showed higher results than boys. The calculated effect value ($d = 0.5$) indicates that this difference is a moderate effect.

Research 5. The result of an unrelated sample t-test performed in accordance with its subgoal is shown in Table 5.

Table 5. Concentration test for children aged 4-6 years by age group. The result of the t test of an unrelated sample

Groups	n		s	sd	t	P
4-5 years	21	4.24	8.10	44	-1.470	0.149
5-6 years	25	5.94	9.84			

Children aged 4-5 years old who use the «Nimble Fingers» electronic application to develop graphomotor skills showed an average score for these skills (average score for children 4-5 years old = 36.76), while children aged 5-6 years old who also use the application demonstrated a higher average score (average score for

children 5-6 years = 39.04). However, statistical analysis did not reveal a significant difference between these age groups [$t(44) = -1.470$, $p = 0.149$].

Research 6. The results of the t-test of an unrelated sample performed in accordance with its subprogram are shown in Table 6.

Table 6. School of hand-eye coordination and graphomotor skills by age group. Unrelated sample T-test result

Groups	n		s	sd	t	P
4-5 years	21	82.52	9.20	44	-3.063	0.004
5-6 years	25	91.00	9.46			

It was found that there is a significant difference between the average score on the scale of visual perception of children aged 4-5 years using the «Nimble Fingers» electronic application (average score of 4-5 years = 82.52) and the average score of children aged 5-6 years (average score of 5-6 years = 91.00) [$t(44) = -1.470$, $p = 0.149$]. The average score was higher in children aged 5-6 years. The magnitude of the effect ($d = 0.9$) indicates that this difference is significant.

Research 7. The unidirectional ANOVA was performed in accordance with his routine, and since the number of samples was not the same, the Scheffe test (a modification of the Student's t-test) was chosen as the multiple comparison test. The results of the tests are shown in Table 7.

Table 7. One-sided result of the ANOVA concentration test for children aged 4-6 years, depending on the duration of preschool attendance

Change A source	Squares Result	sd	Squares The average value	F	p	Difference
differences between groups	243.535	2	121.767	5.121	0.010	compared to the first year
differences within the group	1022.465	43	23.778			at the end of the third year
Total	1266.000	45				

The average test scores for children using the «Nimble Fingers» electronic application to develop graphomotor skills vary depending on the year of study. Children enrolled in the first year of preschool education showed an average score of X (first year) = 35.77, while children enrolled in the second year showed higher results (average score of X (second year) = 37.81). Children enrolled in the third year showed even higher results (average score X (third year) = 41.58). It was found that there is a significant difference between the average indicators of children of different years of education [$F(2.43) = 5.121$, $p < 0.05$]. This difference (the value of $\eta^2 = 0.19$) indicates a broad effect.

Research 8. The result of a unidirectional ANOVA performed in accordance with the subgoal is shown in Table 8.

Table 8. One-sided ANOVA result of transformed scores of the test of hand-eye coordination and graphomotor skills depending on the duration of preschool attendance

Change A source	Squares Result	sd	Squares The average value	F	p	Difference
differences between groups	23.695	2	11.848	7.399	0.002	compared to the first year
differences within the group	68.849	43	1.601			at the end of the third year
Total	92.544	45				

It was found that there is a difference between the average score of children enrolled in the first year of preschool education (dec x (first year) = 4221), the average score of children enrolled in the second year (Dec X (second year) = 4345), and the average score of children enrolled in the third year (Dec X (third year) = 2649) [$F(2-43) = 7.399$, $p < .05$]. Effect size (i.e. $2 = .25$) broad is the level of impact. As a result of the multiple T2 comparative test, it was found that there was a difference between children who study in the third year of preschool education and children who study in the first and second years of preschool education.

Discussion. The results of this study confirmed the hypothesis that the «Nimble Fingers» electronic application has a significant effect on the development of graphomotor skills in preschoolers. The children using the app demonstrated a higher level of hand-eye coordination and graphomotor skills and attention concentration compared to the control group, which is consistent with previous research in the field of digital learning. These results indicate the importance of introducing modern technologies into the educational process of preschoolers, especially in the context of preparing for further education.

It is especially noteworthy that the differences in the development of graphomotor skills were statistically significant, which confirms the effectiveness of using digital tools. The magnitude of the effect ranged from moderate to significant, which indicates the practical significance of the differences identified. This may be due to the individual characteristics of the children, as well as differences in the intensity of use of the application.

Additional analysis showed that gender influences the development of hand-eye coordination and graphomotor skills: girls demonstrated a higher level of graphomotor skills compared to boys. However, there were no significant differences between the sexes in terms of concentration. These results are consistent with the findings of previous studies indicating differences in cognitive development between boys and girls at preschool age.

The age factor also played a role in the development of hand-eye coordination: children aged 5-6 years showed higher results than children aged 4-5 years. This indicates the age-related features of graphomotor skills formation and confirms the need to adapt teaching methods depending on the age of children.

The length of preschool education turned out to be a significant factor: children who attended kindergarten for three years showed higher rates in all the parameters

studied. This highlights the importance of systematically and continuously developing graphomotor skills using digital tools.

The limitations of the study include the limited period of observation, as well as the possible influence of external factors such as the family environment and the individual characteristics of the children. Future research may focus on the long-term effects of using electronic applications in the development of cognitive and motor skills in preschoolers, as well as on their impact on other aspects of learning and development.

Conclusion. The study showed that children who use the «Nimble Fingers» electronic application to develop graphomotor skills for two years demonstrate different levels of attention and visual perception compared to children who used the application only during the first year. The lack of a significant difference in the results between these groups attracted attention. This can be explained by the differences in educational conditions that took place in the 2023-2024 academic year. Some children may have faced restrictions in access to education or lack of motivation, which could affect their success. Parents also reported difficulties faced by their children, which could affect the overall learning process and the development of graphomotor skills.

By the results of a study on the impact of using the «Nimble Fingers» electronic application on the development of graphomotor skills in preschoolers, the following recommendations were presented:

- Parents can effectively spend time at home with their children by using the app to develop graphomotor skills and other intellectual abilities. This will help improve children's writing and motor skills.
- Preschool teachers are encouraged to assess the level of children's graphomotor skills and integrate games related to the development of these skills into the learning process. The inclusion of such games in various activities will help improve the motor and cognitive functions of children.
- Experimental studies can be conducted to more accurately determine the impact of electronic applications on preschool children's attention and graphomotor skills.
- It is also possible to study the effect of using «Nimble Fingers» on the development of attention skills and graphomotor abilities in children of different age groups.
- It is worth investigating how the use of electronic applications, including «Nimble Fingers», affects the development of various skills in preschoolers and their impact on other areas of development, such as memory, concentration, and coordination.

References

- Brophy S., Klein S., Portsmore M., & Rogers C. (2008). Advancing engineering education in P.12 classrooms. *Journal of Engineering Education*, 97(3), — P. 369-387 (in English).
- Gabařová V., Stoffová V., & Kočiřová J. (2024). ICT IN WORK WITH CHILDREN WITH GRAPHOMOTORIC DISORDERS IN PRE-PRIMARY AND PRIMARY EDUCATION. In *ICERI2024 Proceedings* (pp. 7557-7562). IATED (in English).

Tronick E. Z., & Cohn J. F. (1989). Infant-mother face-to-face interaction: Age and gender differences in coordination and the occurrence of miscoordination. *Child development*, — P. 85-92 (in English).

Soini H., Kronqvist E. L., Huber G. L., Maxwell J., Kiegelmann M., Gentó S., ... & Ricoy, M. C. (2011). *Qualitative Psychology Nexus Vol. VIII: Epistemologies for Qualitative Research* (in English).

Žukauskienė R., Kaniūšonytė G., Truskauskaitė I., & Malinauskienė O. (2015). Systematic review of the measurement properties of questionnaires for the measurement of the well-being of children and adolescents. *Social inquiry into well-being: the international journal*. Vilnius: Mykolas Romeris university, — 2015, — vol. 1, no. 1 (1) (in English).

Elsen S., & Lorenz W. (2014). *Social innovation, participation and the development of society*. Bozen: Bozen-Bolzano University Press (in English).

Kalkan A., & Arslan M. (2015). Developing A Visual Perception Scale (VPS) For Preschool Children: Validity And Reliability Study/Okul Öncesi Dönemine Yönelik Görsel Algılama Ölçeği'nin (GAÖ) Geliştirilmesi: Geçerlilik ve Güvenirlilik Çalışması. *Eğitimde Kuram ve Uygulama*, 11(4), — P. 1369-1391 (in English).

Balogun H., Alaka H., Ajayi S., & Egwim C. N. (2024). Critical factors for assessing building deconstructability: Exploratory and confirmatory factor analysis. *Cleaner Engineering and Technology*, 21, 100790 (in English).

Nurseitova Z., & Shayakhmetova A. (2023). Speech therapy to overcome dyslexia in primary schoolers. *Scientific Reports*, — 13(1), 4686 (in English).

Guzik P., & Więckowska B. (2023). Data distribution analysis—a preliminary approach to quantitative data in biomedical research. *Journal of Medical Science*, — 92(2), e869-e869 (in English).

Grissmer D. et al. Fine motor skills and early comprehension of the world: two new school readiness indicators // *Developmental psychology*. — 2010. — V. 46. — №. 5. — 1008 p. (in English).

Brown C.G. (2010). Improving fine motor skills in young children: an intervention study. *Educational Psychology in Practice*. — №26 (3). — P. 269-278 (in English).

Operto F.F., Viggiano A., Perfetto A., Citro G., Olivieri M., Simone V.D., ... & Pastorino, G. M. G. (2023). Digital devices use and fine motor skills in children between 3–6 years. *Children*. №10(6). — 960 p. (in English).

Martzo P., & Suggat S. P. (2022). Screen media are associated with fine motor skill development in preschool children. *Early Childhood Research Quarterly*. — №60. — P. 363-373 (in English).

Susfiandari V., Jannah M., & Fitri R. (2024). The Effect of Educational Games on Fine Motor Ability For Children Aged 4-5 Years in Kindergarten. *IJORER: International Journal of Recent Educational Research*. — №5(5). — P. 1264-1274 (in English).

Publication Ethics and Publication Malpractice in the journals of the National Academy of Sciences of the Republic of Kazakhstan

For information on Ethics in publishing and Ethical guidelines for journal publication see <http://www.elsevier.com/publishingethics> and <http://www.elsevier.com/journal-authors/ethics>.

Submission of an article to the National Academy of Sciences of the Republic of Kazakhstan implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see <http://www.elsevier.com/postingpolicy>), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. In particular, translations into English of papers already published in another language are not accepted.

No other forms of scientific misconduct are allowed, such as plagiarism, falsification, fraudulent data, incorrect interpretation of other works, incorrect citations, etc. The National Academy of Sciences of the Republic of Kazakhstan follows the Code of Conduct of the Committee on Publication Ethics (COPE), and follows the COPE Flowcharts for Resolving Cases of Suspected Misconduct (http://publicationethics.org/files/u2/New_Code.pdf). To verify originality, your article may be checked by the originality detection service Cross Check <http://www.elsevier.com/editors/plagdetect>.

The authors are obliged to participate in peer review process and be ready to provide corrections, clarifications, retractions and apologies when needed. All authors of a paper should have significantly contributed to the research.

The reviewers should provide objective judgments and should point out relevant published works which are not yet cited. Reviewed articles should be treated confidentially. The reviewers will be chosen in such a way that there is no conflict of interests with respect to the research, the authors and/or the research funders.

The editors have complete responsibility and authority to reject or accept a paper, and they will only accept a paper when reasonably certain. They will preserve anonymity of reviewers and promote publication of corrections, clarifications, retractions and apologies when needed. The acceptance of a paper automatically implies the copyright transfer to the National Academy of sciences of the Republic of Kazakhstan.

The Editorial Board of the National Academy of sciences of the Republic of Kazakhstan will monitor and safeguard publishing ethics.

Правила оформления статьи для публикации в журнале смотреть на сайте:

[www: nauka-nanrk.kz](http://www.nauka-nanrk.kz)

ISSN 2518–1467 (Online),

ISSN 1991–3494 (Print)

<http://www.bulletin-science.kz/index.php/en>

Директор отдела издания научных журналов НАН РК *А. Ботанқызы*

Редакторы: *Д.С. Аленов, Ж.Ш. Әден*

Верстка на компьютере *Г.Д. Жадыранова*

Подписано в печать 20.06.2025.

Формат 60x881/8. Бумага офсетная. Печать - ризограф.

46,0 п.л. Тираж 300. Заказ 3.