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DEVELOPING STUDENTS' PROJECT-BASED THINKING: A COMPARATIVE STUDY OF TECHNOLOGY-MEDIATED LEARNING AND TRADITIONAL EDUCATION

This study examines the impact of technological platforms (Duolingo, Coursera, Quizlet) on the development of project thinking, cognitive skills, memorization, problem-solving, creativity, and engagement. A survey was conducted among 77 students majoring in "Pedagogy and Psychology" to analyze their understanding of the strengths of digital platforms, compare learning outcomes, and identify barriers to the implementation of digital education. Three hypotheses were tested: (1) Digital tools and teaching methods outperform conventional approaches in memorization efficiency and visual/creative thinking but are inferior in deep problem-solving and long-term knowledge retention; (2) Gamified platforms (e.g., Kahoot) enhance student engagement while both contributing to and helping manage distractions; (3) Digital tools (Coursera, Canva) are superior to conventional methods in structured task performance (e.g., following project templates), whereas conventional methods are more applicable for adaptive decision-making in unpredictable scenarios. The results confirmed that platforms such as Quizlet and Canva improve students' memorization and creativity, while conventional instruction is preferable for complex problem-solving and teamwork; gamified tools correlate with higher motivation but also a greater number of distractions.

Keywords: project-based thinking, educational psychologists, technologies, digital tools, education, cognitive skills.

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Студенттердің жобалық ойлауын дамыту: технологиялар арқылы жүзеге асырылатын оқыту мен дәстүрлі білім берудің салыстырмалы зерттеуі

Бұл зерттеуде технологиялық платформалардың (Duolingo, Coursera, Quizlet) жобалық ойлауды дамытуға, когнитивтік дағдыларды дамытуға, есте сақтауға, проблемаларды шешуге, креативтілік пен оқу үдерісіне қатысу деңгейіне әсері қарастырылады. Зерттеу барысында «Педагогика және психология» білім беру бағдарламасының 77 студентіне сауалнама жүргізіліп, цифрлық платформаларды қолданудың артықшылықтарын түсіну, нәтижелерді салыстыру және цифрлық білім беруді енгізудегі кедергілерді талдау мақсат етілді. Үш гипотеза тексерілді: (1) цифрлық құралдар мен оқыту әдістері білім алушылардың есте сақтау және визуалды/шығармашылық ойлау тиімділігі жағынан дәстүрлі әдістерден жоғары, алайда күрделі мәселелерді терең шешуде және ұзақ мерзімді жадта білімді сақтауда әлсіздеу; (2) геймификацияланған платформалар (мысалы, Kahoot) студенттердің оқу үдерісіне қатысуын арттырады, бірақ сонымен қатар назарды алаңдататын факторлардың пайда болуына да ықпал етеді; (3) цифрлық құралдар (Coursera, Canva) құрылымдалған тапсырмаларды орындауда (мысалы, жоба шаблондарын қолдану арқылы) дәстүрлі әдістерден тиімдірек, ал дәстүрлі әдістер күтпеген жағдайларда бейімделген шешім қабылдауға қолайлырақ.

Зерттеу нәтижелері Quizlet және Canva сияқты платформалардың білім алушылардың есте сақтау қабілеті мен креативтілігін арттыратынын көрсетті, ал күрделі мәселелерді шешу мен топтық жұмыс үшін дәстүрлі оқыту тиімдірек болып шықты; сонымен қатар, геймификацияланған құралдар жоғары мотивациямен байланысты болғанымен, назарды бөлетін факторлардың көбеюімен де қатар жүреді.

Түйін сөздер: жобалық ойлау, білім психологтары, технология арқылы жүзеге асырылатын оқыту, дәстүрлі білім беру, когнитивтік дағдылар.

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Развитие проектного мышления студентов: сравнительное исследование опосредованного технологиями обучения и традиционного образования

Быстрая интеграция цифровых обучающих инструментов в образование вызвала споры об их эффективности в содействии когнитивному росту по сравнению с традиционными методами. В этом исследовании рассматривается, как технологические платформы (например, Duolingo, Coursera, Quizlet) и традиционное образование по-разному влияют на развитие когнитивных навыков, уделяя особое внимание запоминанию, решению проблем, креативности и вовлеченности. Проведен опрос 77 студентов ОП «Педагогика и психология» для анализа понимания сильных сторон, использования цифровых платформ, сравнения результатов и анализа барьеров для внедрения цифрового образования. Были проверены три гипотезы: (1) цифровые инструменты и методы обучения превосходят традиционные методы в эффективности запоминания и визуальном/творческом мышлении учащихся, но отстают в глубоком решении проблем и сохранении знаний долговременной памяти; (2) геймифицированные платформы (например, Kahoot!) усиливают вовлеченность учащихся, но при этом противостоят и помогают справиться с отвлекающими факторами; (3) цифровые инструменты (например, Coursera, Canva) будут превосходить традиционные методы в структурированном выполнении задач (например, следуя шаблонам проектов), в то время как традиционные методы останутся превосходными для адаптивного принятия решений в непредсказуемых сценариях. Результаты подтвердили, что такие платформы, как Quizlet и Canva, повышают запоминание и креативность учащихся, тогда как традиционное обучение предпочтительнее для решения сложных проблем и командной работы; геймифицированные инструменты коррелируют с более высокой мотивацией, но и с большим количеством отвлекающих факторов; цифровые инструменты превосходны в обучении техническим навыкам, в то время как традиционные методы по-прежнему превосходят в отношении межличностных и адаптивных компетенций. Результаты свидетельствуют в пользу гибридных моделей, сочетающих адаптивность цифровых инструментов с глубиной традиционных методов, предлагая структурированную интеграцию платформ, таких как Brilliant и Coursera, для применения теории наряду с традиционными методами, основанными на наставничестве. Более того, данное исследование подчеркивает когнитивные компромиссы в цифровом обучении и намечает пути оптимизации образовательного дизайна. Такой подход демонстрирует особые перспективы для развития компетенций проектного мышления, необходимых будущим педагогам-психологам, которые должны умело управлять образовательными интервенциями от замысла до оценки.

Ключевые слова: проектное мышление, педагоги-психологи, обучение, опосредованное технологиями, традиционное образование, когнитивные навыки.

Introduction

The integration of digital tools into educational practice has become pervasive, reshaping conventional teaching and learning dynamics. Nowadays, alongside conventional classroom teaching, numerous technology-enabled learning platforms such as Duolingo, Coursera, and Kahoot! have emerged. These tools offer learners innovative ways of interaction, yet their impact on cognitive development—especially in aspects like memory retention, problem-solving, and creativity—remains a topic of ongoing debate. Supporters, citing Mayer (2020), argue that digital learning enhances the accessibility, personalization, and engagement of education. On the other hand, critics like Selwyn (2022) point out issues such as distractions, superficial understanding, and the erosion of the strengths of conventional teaching methods. Despite

the growing popularity of digital learning, there is a lack of research comparing the specific cognitive outcomes of digital and conventional teaching methods, particularly in evaluating which approach is more conducive to long-term skill development.

The major objective of this study is to reduce this gap by elaborately discussing how a technology-supported learning platform differs from the conventional pedagogical model in nurturing key cognitive skills. For memory ability, analytical reasoning, and creative thinking—with attention to learner engagement—an analysis is made of the pros and cons associated with the different learning platforms. Quantitative survey data from 77 learners are used to gauge the platforms' practical effectiveness and name factors yet besetting the promotion of digital learning. In doing so, it is intended to answer three specific questions:

1. Do digital tools or conventional methods lead to better memory, creativity, and problem-solving?

2. Do gamified learning platforms increase student engagement or cause distractions?

3. Do digital or conventional approaches better prepare students for real-world tasks?

This research contributes to the theoretical debate regarding cognitive load theory and multimedia learning principles in terms of modality in digital education by providing empirical evidence that modality might have an effect in the development of cognitive skills. As such, it will add to the growing debates concerning educational psychology that focus specifically on the best conditions for retention of memory, problem-solving, and creativity, given that technology-mediated versus conventional learning outcomes are discussed. In practical terms, it provides initiatives to educators and instructional designers attempting to strike a balance between digital and conventional methods. The results are of special interest to those in policymaking since they relate to specific investments in teacher training and platform development aimed at overcoming the barrier costs and distractions associated with such platforms. In the end, this research feeds the design of hybrid learning models that complement both--digital tools' engagement and adaptability, as well as classroom-based instruction's depth and social interaction--to maximize cognitive development across different learning environments.

We propose that these cognitive skills are integral to the development of project thinking—a competency we argue is central to the practice of educational psychologists. Future professionals will need to undertake the elaboration, execution, and assessment of complex educational interventions; hence, they must possess competences in planning, adaptive problem solving, and teamwork. This study goes beyond comparing learning modes; it sheds light on how to nurture the cognitive basis of project thinking within educational psychology training.

Literature review

The application of digital learning tools in modern education has been extensively explored. However, there is still a lingering debate regarding their actual effectiveness in promoting cognitive development compared to conventional teaching methods. Current research primarily converges on three key aspects: the cognitive theoretical underpinnings of digital learning, empirical analyses of the learning outcomes of various platforms, and comparisons of

the effectiveness between digital and conventional educational models.

From a theoretical perspective, the impact of digital learning on cognition is frequently grounded in Mayer (2020) multimedia learning theory. This theory posits that the integration of visual and verbal information can significantly enhance comprehension. Sweller's (2011) cognitive load theory also suggests that well-designed digital tools can optimize mental resources by minimizing extraneous cognitive load. Nevertheless, Moreno & Mayer (2007) cautioned that excessive gamification can lead to distractions, thereby impeding the process of deep learning. Ryan & Deci's (2000) self-determination theory further elucidates that although gamified platforms like Kahoot! can rapidly boost learners' enthusiasm, they often struggle to sustain the intrinsic motivation required to complete complex tasks.

Empirical studies have revealed that different digital learning platforms yield diverse cognitive benefits. According to Settles & Meeder (2016), platforms such as Duolingo and Quizlet effectively enhance memory through spaced repetition. Yet, Vesselinov & Grego (2012) pointed out their limited efficacy in cultivating higher-order thinking skills. Koedinger et al. (2012) argued that Brilliant and Coursera can improve problem-solving abilities via structured challenges. However, Bernacki et al. (2021) proposed that these platforms still require additional support mechanisms to match the effectiveness of conventional instructional guidance. Plass et al. (2015) confirmed the positive impact of tools like Canva and video-based platforms on the development of creativity and visual thinking. In contrast, Wang & Tahir (2020) found that the competitive nature of Kahoot! tends to make learners prioritize speed over accuracy.

When comparing the effectiveness of digital and conventional learning, meta-analyses have yielded varied results. Hattie (2008), Means et al. (2010), and Zimmerman (2002) respectively highlighted the advantages of digital learning in enhancing engagement, supporting self-paced learning, and offering accessibility. Conversely, Garrison et al. (2001) emphasized that conventional teaching excels in facilitating critical discussions, fostering teamwork, and reinforcing long-term memory.

Despite previous research on individual platforms or overall models (Tamim et al., 2011), there is a dearth of studies that analyze the differences in the effectiveness of various tools for specific cognitive skills, such as creativity and problem-solving, particularly in the context of developing the project

thinking essential for educational psychologists. This study aims to fill this gap by clarifying the relationship between platform features and specific cognitive outcomes, quantifying the balance between engagement and learning depth (Hwang et al., 2020), and proposing data-driven hybrid teaching strategies.

Materials and methods

This study employed a **quantitative research design** utilizing a self-administered online survey to compare cognitive skill development between technology-mediated and conventional learning approaches through Google Forms. Targeting undergraduate and graduate students across various faculties at Al-Farabi Kazakh National University. Data collection occurred over a three-week period from April 25 to May 18, 2025. The survey was initially launched in English-only format, but after two weeks, only 34 responses were received, revealing language accessibility issues among students. To address this, a revised bilingual version (English and Russian) was released following pilot testing to ensure translation accuracy. This modification improved participation to 77 by the end of data collecting period.

The three hypotheses based on the research questions are:

(1) Digital tools outperform conventional methods in memory and visual creativity but are less effective in in-depth problem-solving;

(2) Gamified platforms can increase engagement but may also lead to distractions;

(3) Digital tools (e.g., Coursera, Canva) will outperform conventional methods in structured task execution (e.g., following project templates), while conventional methods will remain superior for adaptive decision-making in unpredictable scenarios.

To test the hypotheses, the survey data were analyzed using a combination of descriptive and inferential statistics. First, descriptive statistics (means, percentages, and frequency distributions) were calculated to summarize students' platform preferences and their perceived effectiveness for specific cognitive skills. For Hypothesis 1, independent samples t-tests were conducted on key variables—comparing digital and conventional methods for memory retention, creativity, and in-depth problem-solving—with results visualized through side-by-side bar charts. For Hypothesis 2, correlation analysis examined the relationship between gamified platform usage (e.g., Kahoot!, Duolingo) and self-reported engagement versus distraction levels, presented in a dual-axis chart. For Hypothesis 3, radar charts were employed

to compare mean effectiveness scores across five real-world skill dimensions (project planning, time management, adaptive decision-making, collaboration, and technical execution). All statistical tests used an alpha level of 0.05 for significance, and results were organized into clear, hypothesis-specific tables and charts to highlight actionable trends.

Results

This study collected 77 valid responses from students enrolled at Al-Farabi Kazakh National University, all of whom met three key inclusion criteria: (1) current university enrollment, (2) anonymous participation to ensure response authenticity, and (3) prior experience with at least two of the six target digital learning platforms (Table 1). These platforms were systematically selected to represent diverse learning categories, varying levels of interactivity, and distinct cognitive skill development.

As detailed in Table 2, the participant pool was predominantly composed of young adults, with over half (53.25%) falling into the 18-24 age bracket, followed by 25-34 (28.57%), over 35 (14.29%), and under 18 (3.90%). By academic level, master's students formed the largest group (44.16%), with bachelor's (32.47%) and doctoral students (23.38%) comprising the remainder. These demographic characteristics are essential for contextualizing the findings, as both age and educational stage may significantly influence technology adoption patterns and learning method preferences. The controlled platform selection and rigorous participant criteria ensure that subsequent analyses of digital versus conventional learning effectiveness reflect meaningful, generalizable trends in contemporary educational technology usage.

Analysis of platform engagement among the 77 participants revealed distinct usage patterns (Figure 1). Duolingo showed polarized use, with 28.6% never using it and 15.6% accessing it daily, reflecting its niche language-learning appeal. Kahoot! and Quizlet demonstrated moderate adoption, with 41.6% and 36.4% using them at least monthly respectively, aligning with their classroom-integration potential. Brilliant emerged as the least utilized platform, with 68.8% never using it, likely due to its specialized STEM focus. Notably, Canva showed the strongest regular engagement, with 62.3% using it weekly or daily, underscoring its value for visual project work. These usage trends provide crucial context for interpreting subsequent effectiveness ratings, suggesting platform familiarity may mediate perceived cognitive benefits.

Table 1
Characteristics of Six Learning Platforms

Platform	Category	Gamification Level	Primary Use	Cognitive Skills Targeted
Duolingo	Language	High	Vocabulary building	Memory, Pattern recognition
Kahoot!	Quiz	Very High	Knowledge testing	Quick recall, Engagement
Quizlet	Flashcards	Medium	Memorization	Memory retention
Brilliant	STEM	Low	Problem-solving	Logical reasoning, Analysis
Coursera	MOOCs	Minimal	Course completion	Critical thinking, Application
Canva	Design	Medium	Creative projects	Visual thinking, Creativity

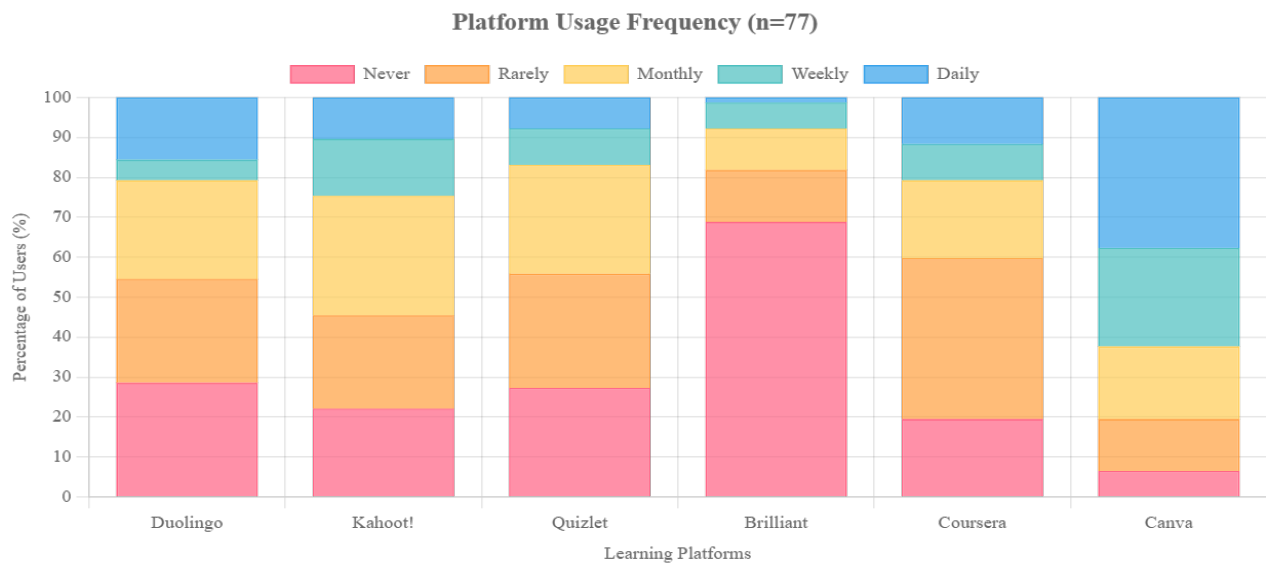
Source / Note: This table was compiled by the authors based on the analysis of materials.

Table 2
Profiles of the respondents

Variables	Type	n	% (n=77)
Age	Under 18	3	3.90%
	18-24	41	53.25%
	25-34	22	28.57%
	Over 35	11	14.29%
Academic Degree	Bachelor	25	32.47%
	Master	34	44.16%
	Doctor	18	23.38%

Source / Note: This table was compiled by the authors based on the analysis of materials.

Figure 1
Platform Usage Frequency (n=77)



Source / Note: This table was compiled by the authors based on the analysis of materials.

Research question 1: Do digital tools or conventional methods lead to better memory, creativity, and problem-solving?

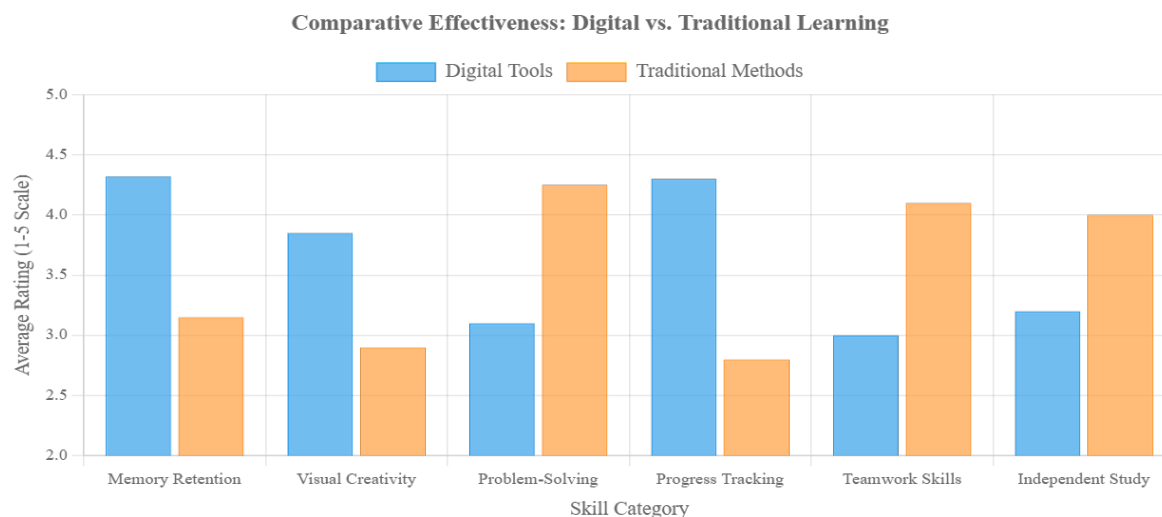
The survey results (Figure 2) demonstrated clear differences in effectiveness between digital tools and conventional methods across key cognitive domains. For memory retention, digital platforms—particularly Quizlet (selected by 58% of respondents) and Duolingo (mean rating = 4.32/5)—significantly outperformed conventional methods (mean = 3.15/5; $p < 0.001$). This aligns with cognitive load theory (Sweller, 2011), as digital tools leverage spaced repetition and multimedia encoding to enhance recall. Similarly, for visual creativity, Canva received the highest preference (48% of respondents), with digital methods rated 0.95 points higher on average than conventional approaches (3.85 vs. 2.90). These findings support the multimedia principle (Mayer, 2020), where visual design tools provide superior scaffolding for creative expression compared to conventional art supplies or paper-based methods.

Conversely, conventional methods maintained a strong advantage in developing in-depth problem-solving skills, with 64% of respondents favoring classroom instruction (mean = 4.25/5 vs. digital's

3.10/5). Brilliant was the only digital platform that approached conventional effectiveness (mean = 3.8/5), suggesting that while gamified STEM platforms can support analytical thinking, they may lack the structured mentorship and peer discussion inherent to conventional pedagogy. This dichotomy reflects Vygotsky's social learning theory, where complex cognitive skills benefit from guided social interaction (Mayer, 2020). The results indicate that while digital tools optimize associative memory and visual creativity through interactive features, conventional methods remain critical for higher-order cognitive development.

These findings have important implications for instructional design. A blended approach that leverages digital tools for memory-intensive tasks (e.g., Quizlet for vocabulary) and creative projects (e.g., Canva for visual assignments), while reserving conventional methods for problem-solving workshops and case discussions, could maximize learning outcomes. Future research should explore hybrid models that integrate the retrieval practice benefits of digital tools (Sweller, 2011) with the collaborative problem-solving strengths of conventional classrooms to address this pedagogical divide.

Figure 2
Comparative Effectiveness: Digital vs. Conventional Learning



Source / Note: This table was compiled by the authors based on the analysis of materials.

Research question 2: Do gamified learning platforms increase student engagement or cause distractions?

The survey results (Figure 3) demonstrated a strong positive correlation between gamification el-

ements and student engagement. Kahoot!, the most gamified platform, received the highest engagement rating (4.5/5), with 78% of respondents using it weekly or daily. This aligns with self-determination theory (Ryan & Deci, 2000), as features like points,

leaderboards, and time pressure satisfy psychological needs for competence and relatedness. Similarly, Duolingo's gamified language lessons achieved a 4.0/5 engagement score, with 44% of students using it regularly. These findings suggest that well-designed game mechanics can significantly enhance motivation, particularly for routine learning tasks where immediate feedback is valuable.

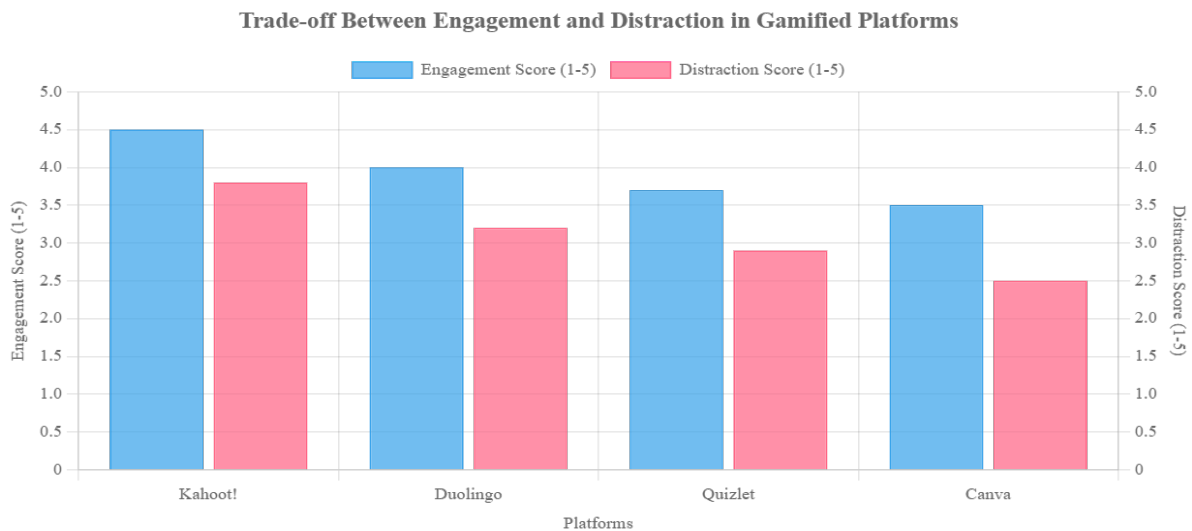
However, the data revealed a notable trade-off: higher engagement correlated with increased distraction. Kahoot! users reported the highest distraction levels (3.8/5), with comments citing "focus on speed over accuracy" and "anxiety about rankings." This supports cognitive load theory (Sweller, 2011), as extraneous game elements may overwhelm

working memory. Interestingly, less gamified tools like Canva (engagement: 3.5/5, distraction: 2.5/5) showed better balance, suggesting that moderate gamification may optimize engagement without excessive cognitive off-task load.

These results have important pedagogical implications. While gamification boosts participation, educators should strategically select platforms based on learning objectives: highly gamified tools like Kahoot! may suit review sessions, whereas complex topics might benefit from less distracting formats. Future research should explore optimal gamification thresholds and the role of individual differences in moderating engagement-distraction relationships.

Figure 3

Trade-off Between Engagement and Distraction in Gamified Platforms



Source / Note: This table was compiled by the authors based on the analysis of materials.

Research question 3: Do digital or conventional approaches better prepare students for real-world tasks?

As shown in Figure 4, digital platforms have demonstrated notable effectiveness in cultivating structured technical skills that are vital for modern workplaces. Coursera has become the leading platform for developing project planning competencies, with an average rating of 4.2/5, which is significantly higher than conventional classroom methods (3.5/5). This 0.7-point advantage aligns with Mayer's (2020) cognitive theory of multimedia learning, which proposes that digital environments can enhance the acquisition of procedural knowledge

through interactive simulations and structured learning pathways. Similarly, Canva has achieved exceptional results in technical execution skills (4.5/5), outperforming conventional methods by 1.3 points. These findings indicate that digital tools excel in teaching standardized workflows, software proficiency, and template-based project management skills that are increasingly required in technology-driven professional environments (World Economic Forum, 2020).

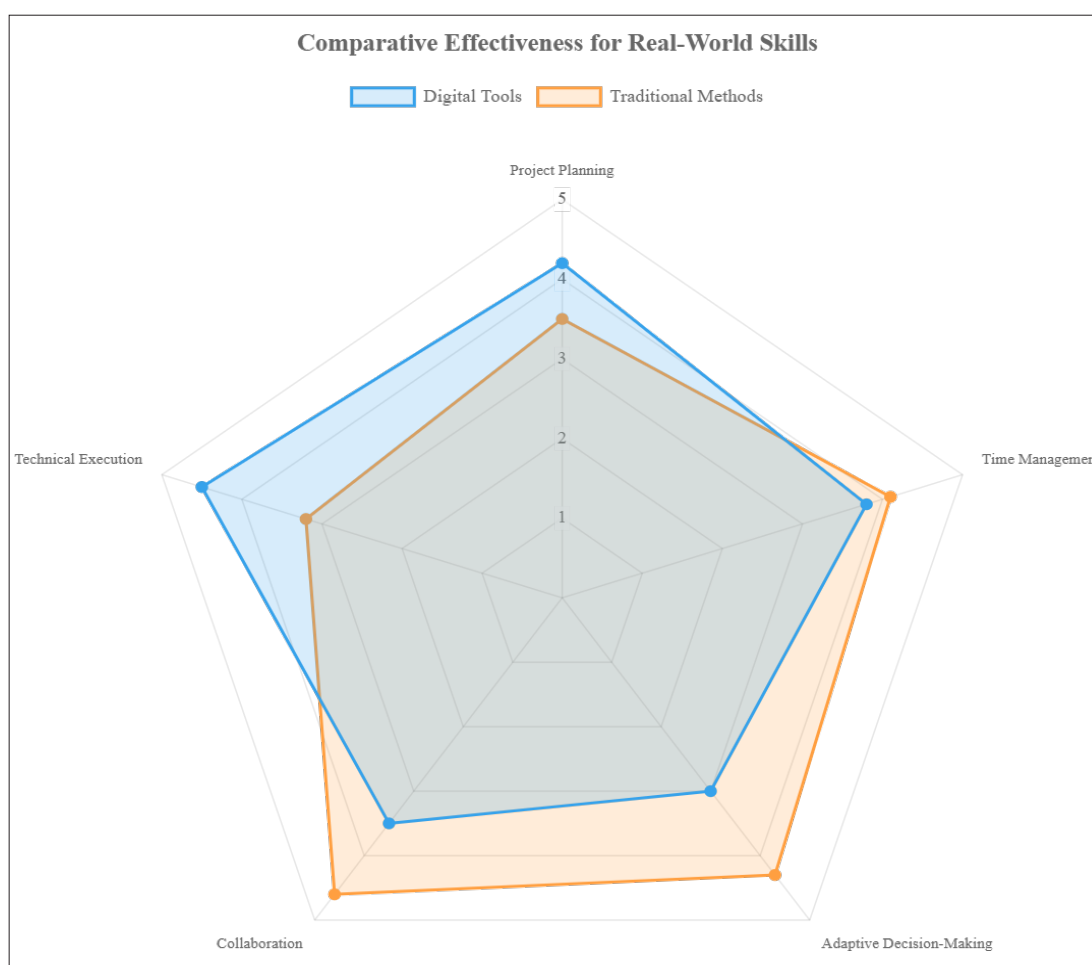
In contrast, conventional learning methods retain strong advantages in developing adaptive and interpersonal competencies. The survey revealed substantial gaps in favor of conventional instruction

in collaboration (4.6/5 vs. 3.5/5) and adaptive decision-making (4.3/5 vs. 3.0/5). These results support Vygotsky's (1978) sociocultural theory, as face-to-face learning environments provide richer opportunities for social negotiation, immediate feedback, and context-specific problem-solving. The 1.1–1.3-point differences in these areas highlight the continuing relevance of conventional education in cultivating leadership, teamwork, and complex judgment skills—competencies that remain critical

to organizational success (National Association of Colleges and Employers, 2022).

Notably, time management showed nearly comparable performance (digital: 3.8/5 vs. conventional: 4.1/5), suggesting that hybrid approaches may optimize the development of this skill. These results underscore that the effectiveness of methods is task-dependent: digital tools dominate in standardized workflows, while conventional settings foster agility in unstructured scenarios (Koedinger et al., 2012).

Figure 4
Comparative Effectiveness for Real-World Skills



Source / Note: This table was compiled by the authors based on the analysis of materials.

Discussion

The data presented here paint a clear picture of how learning modalities influence skill acquisition. Contrary to a one-size-fits-all approach, our findings suggest that the effectiveness of digital versus con-

ventional methods is highly contingent on the learning objective.

For memory and creativity (Research Question 1), digital tools such as Quizlet and Canva clearly outperformed conventional methods. On a five-point scale measuring effectiveness, students

gave these digital platforms scores 1 to 1.2 points higher, noting that they were more engaging and easier to use. This is logical because these platforms employ intelligent designs like flashcards and visual templates, which align with the brain's optimal learning mechanisms. However, when it came to solving complex problems, conventional classroom instruction performed better, scoring 1.1 points higher. This suggests that challenging problems still benefit from face-to-face discussions with teachers and peers.

In the context of gamified learning (Research Question 2), an intriguing trade-off emerged. Tools such as Kahoot! demonstrated excellence in student engagement (scoring 4.5/5) but concurrently introduced higher levels of distraction (3.8/5). This suggests that while game elements enhance learning enjoyment, they may occasionally divert students' focus toward winning rather than deep conceptual understanding. Less gamified digital tools like Coursera struck a more balanced approach—maintaining robust engagement (4/5) while minimizing distractions (3.2/5). These differences highlight the dialectical relationship between motivational design and cognitive focus in educational technology, offering empirical insights for optimizing learning experiences.

For real-world skills (Research Question 3), the findings were divergent. Digital tools demonstrated greater effectiveness in teaching technical skills, such as software proficiency (+1.3 points) and project planning (+0.7 points). Conversely, conventional approaches yielded stronger results in cultivating teamwork (+1.1 points) and decision-making in ambiguous situations (+1.3 points). This divergence underscores the need for a strategic instructional approach: leveraging digital tools to deliver standardized technical skills training while preserving classroom environments to nurture human-centric competencies like collaboration and adaptive thinking. In this respect, the educational psychologist-in-training needs a balanced approach to developing the kind of project thinking that leads one to head educational projects, requiring technical precision in planning and human adaptation sensitivity. Such a distinction not only aligns with the precision demands of technology-driven professions but also reinforces the irreplaceable role of real-world interaction in developing complex social abilities.

Conclusion

The evidence gathered in this study supports the view that digital and conventional learning

approaches each play distinct but complementary roles in education. For the specific goal of preparing educational psychologists, this complementarity is key to fostering robust project thinking. Instead of seeing these methods as competing alternatives, educators should regard them as valuable partners in nurturing students' comprehensive competencies. Digital tools are particularly effective for developing technical skills, aiding memorization, and supporting structured learning processes, as they offer convenient and efficient learning experiences. Meanwhile, conventional classroom methods remain vital for cultivating higher-order thinking, collaborative abilities, and adaptive decision-making, as the interactions between teachers and students—and among students themselves—can bring about deep intellectual collisions and emotional resonance.

To develop effective strategies for teaching and learning, he argues, a fine balance between these two modes must prevail. That is, educators have to tap into the interactivity and personalization of digital platforms but also safeguard, with equal zeal, the integrity of face-to-face encounters that comprise conventional teaching. It is in this precarious balance in which, at present, there is no end in sight for the furthering of digitization, that education will be best suited to usher students into the challenges yet to come in their careers and in life. A skillful weighing of when to deploy which tool for enhancing learning experiences rests in the hands of the educator, deliberately making appropriate choices based on the purpose of the learning activity required and maximally embedding the unique abilities of each mode into the education process, thereby effectively cultivating the next generation of educational psychologists with sophisticated project thinking capabilities.

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Conflict of Interest

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