HNSJ Humanities & Natural Sciences Journal
ISSN: (e) 2709-0833
www.hnjournal.net

Peer-Reviewed Journal
Indexed at: NSP - SJIF
Impact Factor 2022 = 4.91

RESEARCH TITLE

Digital Game-based learning in Elementary EFL Education: Effects on Students' Motivation and Academic Achievement

Walaa Esawi[1]

[1] Al-Najah National University- Nablus. Email: walaa.essawi@gmail.com

Received at 10/01/2026 **Accepted at 20/01/2026** **Published at 01/02/2026**

Abstract

This study investigates the impact of Digital Game-Based Learning (DGBL) on elementary students' motivation and academic achievement in English as a foreign Language (EFL) within an Arab elementary school context. EFL learning at the elementary level is often characterized by low motivation, limited engagement, and modest academic outcomes, particularly in contexts where exposure to English outside the classroom is minimal. Grounded in motivational theories, achievement goal theory, and game-based learning frameworks, this study examines whether integrating digital educational games into formal EFL instruction can enhance students 'intrinsic motivation and learning performance.

A quasi-experimental research design was employed involving two fifth grade classes (N=50). The experimental group received EFL instruction through a digital learning environment enriched with educational games, while the control group learned the same instructional content using computer-based materials without game elements. Students' motivation was measured using a validated questionnaire based on achievement goal theory (Midgley et al, 1996), and academic achievement was assessed through a standardized unit-based test. Data were analyzed using descriptive statistics and independent-samples t- tests.

The results reveal statistically significant differences between the experimental and control groups. Students exposed to digital game-based learning demonstrated higher motivation levels and significantly improved academic achievement. These findings support theoretical perspectives emphasizing intrinsic motivation, learner engagement, flow, and meaningful feedback as central mechanisms for effective learning. The study contributes empirical evidence from an underrepresented educational context and underscores the pedagogical potential of digital educational games in elementary EFL instruction.

Key Words: Digital Game-Based Learning, EFL; Motivation; Academic Achievement; Elementary Education.

عنوان البحث

التعلّم القائم على الألعاب الرقمية في تعليم اللغة الإنجليزية كلغة أجنبية بالمرحلة الابتدائية: الأثر في دافعية التلاميذ والتحصيل الدراسي

المستخلص

يهدف هذا البحث إلى تقصّي أثر **التعلّم القائم على الألعاب الرقمية** (DGBL)في دافعية تلاميذ المرحلة الابتدائية وتحصيلهم الأكاديمي في تعلّم اللغة الإنجليزية كلغة أجنبية(EFL) ، وذلك في سياق مدرسة ابتدائية عربية. وغالبًا ما يتّسم تعلّم اللغة الإنجليزية في المرحلة الابتدائية بانخفاض الدافعية، وضعف المشاركة، وتواضع المخرجات التحصيلية، ولا سيّما في البيئات التي يقلّ فيها التعرّض للغة الإنجليزية خارج الصف الدراسي. وانطلاقًا من نظريات الدافعية، ونظرية أهداف الإنجاز، وأطر التعلّم القائم على الألعاب، يسعى هذا البحث إلى فحص ما إذا كان دمج الألعاب التعليمية الرقمية في التدريس النظامي للغة الإنجليزية يسهم في تعزيز الدافعية الداخلية للتلاميذ وتحسين أدائهم التعليمي.

اعتمدت الدراسة المنهج شبه التجريبي، واشتملت على شعبتين من الصف الخامس الابتدائي بلغ عدد أفرادهما (50) تلميذًا. تلقّت المجموعة التجريبية تعليم اللغة الإنجليزية من خلال بيئة تعلّم رقمية مدعّمة بالألعاب التعليمية، في حين درست المجموعة الضابطة المحتوى التعليمي نفسه باستخدام مواد تعليمية محوسبة خالية من عناصر الألعاب. وتم قياس دافعية التلاميذ باستخدام استبانة محكّمة قائمة على نظرية أهداف الإنجاز (Midgley وآخرون، 1996)، كما تم قياس التحصيل الأكاديمي من خلال اختبار معياري مبني على وحدات دراسية. وجرت معالجة البيانات باستخدام الإحصاءات الوصفية واختبار (t) لعينتين مستقلتين.

وأظهرت النتائج وجود فروق ذات دلالة إحصائية بين المجموعتين التجريبية والضابطة، حيث حقق التلاميذ الذين تعلّموا وفق التعلّم القائم على الألعاب الرقمية مستويات أعلى من الدافعية وتحسّنًا ملحوظًا في التحصيل الأكاديمي. وتدعم هذه النتائج المنظورات النظرية التي تؤكد دور الدافعية الداخلية، ومشاركة المتعلم، وحالة التدفّق، والتغذية الراجعة الهادفة بوصفها آليات محورية للتعلّم الفعّال. كما تسهم الدراسة بتقديم أدلة تجريبية من سياق تعليمي قليل التمثيل في الأدبيات، وتبرز الإمكانات التربوية للألعاب التعليمية الرقمية في تعليم اللغة الإنجليزية كلغة أجنبية في المرحلة الابتدائية.

الكلمات المفتاحية: التعلّم القائم على الألعاب الرقمية؛ تعليم اللغة الإنجليزية كلغة أجنبية(EFL) ؛ الدافعية؛ التحصيل الأكاديمي؛ التعليم الابتدائي.

Introduction

Learning English as a Foreign Language (EFL) in elementary schools presents persistent educational challenges, particularly in non-English-speaking contexts. Young learners often encounter difficulties related to vocabulary acquisition, grammatical understanding, and comprehension, which may lead to frustration, low confidence, and reduced motivation. Motivation has consistently been identified as a critical factor influencing learners' engagement, persistence, and academic success (Deci & Ryan, 1985; Pintrich, 2003).

In Arab elementary school contexts, these challenges are frequently intensified by limited exposure to English outside the classroom and by instructional practices that rely heavily on traditional, teacher-centered approaches. As a result, students may perceive EFL learning as difficult, uninteresting, or irrelevant, which negatively affects both motivation and achievement. Addressing motivational barriers is therefore a central concern in improving EFL instruction at the elementary level.

The integration of digital technologies into education has created new opportunities to enhance learning environments and promote student engagement. One such approach is Digital Game-Based Learning (DGBL), which integrates instructional content within interactive digital games. Digital games are familiar meaningful medium for children and have the potential to transform learning into an engaging and motivating experience (Prensky, 2001).

Previous research suggests that digital educational games can support learning by fostering active participation, immediate feedback, and sustained engagement (Gee, 2005; Fullerton et al., 2008). However, empirical research examining the combined effects of DGBL on motivation and academic achievement in elementary EFL contexts_ Particularly within Arab educational settings_ remains limited. This study seeks to address this gap.

The purpose of the present study is to examine whether integrating digital educational games into EFL instruction enhances elementary students' motivation and academic achievement compared to computer-based instruction without games.

Research Questions

1. Are there significant differences in motivation between students who learn through digital game-based instruction and those who learn without digital games?
2. Are there significant differences in academic achievement between students who learn through digital game-based instruction and those in the control group?

Research Hypotheses

1. Students who learn through digital game-based instruction will demonstrate higher levels of motivation than students who learn without games.
2. Students who learn through digital game-based instruction will achieve higher academic outcomes than students in the control group.

Theoretical Background

Digital Game-Based Learning

Digital Game-Based Learning refers to the use of digital games designed with explicit educational objectives to support learning progresses according to Prensky (2001), Digital Games align with the learning preferences of "digital natives ", who are accustomed to interactive, fast- paced, and multimedia-rich environments. From and education perspective, DGBL transforms learners from passive recipients of information into active participants in the learning process.

Games function as structured systems composed of rules, goals, challenges and feedback mechanisms (Fullerton, Swain, & Hoffman, 2008). These elements create meaningful learning experiences by requiring learners to make decisions, solve problems, and reflect on outcomes. Gee (2005,2007) emphasizes that effective educational games embody powerful learning principles including situated learning, experimentation, and learner empowerment. In EFL contexts, such principles are particularly valuable, as language learning benefits from contextualized use and repeated practice in low-risk environments.

Motivation, Self-Determination, and Self-Efficacy

Motivation plays a central role in learning and achievements. Self- Determination Theory (SDT) distinguishes between intrinsic and extrinsic motivation and emphasizes the importance of autonomy, competence, and relatedness in fostering intrinsic motivation (Deci & Ryan, 1985). Learning Environments that support these physiological needs are more likely to promote sustained engagement and deep learning.

Digital games naturally support these motivational needs. Learners experience autonomy through choice and control, competence through progressive challenges and feedback, and engagement through interactive game play. Bandura's (1994) concept of self-efficacy further explains how repeated success in game-based environments enhances learners' beliefs in their ability to perform academic tasks. Increased self-efficacy leads to greater effort, persistence, and academic achievement.

Achievement Goal Theory and Motivation

Achievement Goal Theory provides a framework for understanding learners' motivational orientations. Midgley et al. (1996) distinguish between mastery goals, which focus on learning and improvement, and performance goals, which emphasize demonstrating ability relative to others. Mastery-oriented goals are associated with deeper learning strategies, persistence, and positive academic outcomes.

Digital Game-Based Learning environments often emphasize mastery through progression, exploration, development rather than external evaluation. By allowing learners to retry tasks and improve through practice, games align closely with mastery goal orientations, thereby enhancing motivation and learning outcomes.

Flow, Feedback, and Learning Engagement

Flow Theory (Csikszentmihalyi, 1990) describes a state of deep engagement characterized by concentration, enjoyment, and a sense of control. Flow occurs when tasks balance challenge and skill while providing clear goals and immediate feedback. Digital games are particularly effective in creating flow experiences due to their adaptive challenges and continuous feedback. Feedback plays a crucial role in learning and motivation. Shute (2008) Emphasizes that formative feedback enhances learning when it is timely, specific, and task-focused. In digital games, feedback is often embedded seamlessly into game play, allowing learners to correct errors and improve without disrupting engagement. Habgood & Ainsworth (2011) further argue that intrinsic integration- embedding learning content directly within game mechanics- is essential for maintaining motivation and supporting meaningful learning.

Cognitive Load, Self-Regulated Learning, and Technology Integration

Cognitive Load Theory suggests that instructional design should minimize extraneous cognitive load to optimize learning (Sweller, 1988). Well-designed digital games can reduce cognitive overload by integrating visual cues, scaffolding tasks, and presenting information gradually.

Digital games also support self-regulated learning by encouraging goal-setting, monitoring progress, and adapting strategies (Zimmerman, 2002). Pintrich (2003) highlights the close relationship between motivation and self-regulation, noting that motivated learners are more likely to engage in self-regulated learning behaviors.

The successful integration of digital games in education also depends on teachers' beliefs and attitudes. Ertmer (1999) emphasizes that teachers' pedagogical beliefs play a crusial role in technology integration. Millstone (2012) found that teachers who perceive digital games as legitimate educational tools report higher student motivation and engagement. Similarly, Dede (2014) and Squire (2011) highlight the importance of aligning digital innovations with pedagogical goals to support meaningful learning.

Methodology

Research Design

The study employed a quasi-experimental design with two intact fifth-grade classes taught by the same EFL teacher. Prior to the intervention, a baseline assessment of students' English achievement and learning readiness was conducted as part of routine classroom practice. This practice-based pre-assessment included vocabulary, grammar, and comprehension tasks aligned with the instructional unit was used by the teacher to inform instructional planning.

Based on these baseline assessments and the teacher's professional judgment, the two groups were considered comparable in terms of academic level, language proficiency, and learning characteristics prior to the intervention.

Participants

The participants were 50 fifth-grade students (29 boys and 21 girls) from an Arab elementary school. Two intact classes with similar academic characteristics were selected. One class served as the experimental group and the other as the control group.

Although the baseline assessment was not administered as a formal research pre-test and was therefore not included in the statistical analysis, it served to ensure initial equivalence between the experimental and control groups. The same teacher administered and reviewed the assessment results for both classes, confirming comparable performance levels prior to the implementation of the digital game-based learning intervention.

Instructional Intervention

Both groups studied the same EFL unit over eight 45-minute lessons.

- Experimental group: instruction was delivered through a digital learning platform enriched with educational games, including memory games, matching tasks, and interactive activities aligned with lesson objectives.
- Control group: instruction relied on digital texts and computer-based exercises without game elements.

The digital game-based learning intervention was systematically integrated into regular EFL instruction. Each 45-minute lesson included two to three game-based activities, each lasting approximately 10-15 minutes. The games were designed to target specific language skills, including vocabulary acquisition, basic grammatical structures, and reading comprehension.

Vocabulary-focused activities included matching and memory games that required students to associate words with images or meanings. Grammar-related activities involved interactive multiple-choice tasks and drag-and-drop exercises embedded within game environments. Reading comprehension activities were based on short digital texts followed by game-based questions that reinforced understanding.

Instruction was primarily individual, allowing students to progress at their own pace. The

instructional approach emphasized mastery and learning progression rather than competition. Immediate automated feedback was provided during gameplay, followed by brief teacher-led reflection to clarify misconceptions and reinforce learning objectives.

Instruments

- Motivation questionnaire: Based on achievement goal theory (Midgley et al., 1996).

The motivation questionnaire demonstrated acceptable internal consistency. Cronbach's alpha coefficients were .75 for mastery-oriented goals and .85 for performance-oriented goals. The questionnaire was adapted linguistically for the target population using a translation and review procedure to ensure clarity, age appropriateness, and conceptual equivalence.

- Achievement test: a standardized unit-based test assessing vocabulary, grammar, and comprehension.

The achievement test was developed to align with the instructional unit and consisted of items assessing vocabulary, grammar, and reading comprehension. The test included a range of item types and was scored on a scale from 0 to 100. Content validity was ensured through alignment with curriculum objectives and instructional material during the intervention.

Data Analysis

Statistical analysis focused on post-intervention comparisons between the experimental and control groups. Independent-samples t-tests were conducted to examine differences in motivation and academic achievement. Because the baseline assessment was practice-based and not designed as a standardized research pre-test, it was not included as a covariate in the statistical analysis. This approach aligns with the quasi-experimental nature of the study.

Results

Descriptive statics indicated higher post-intervention motivation and academic achievement scores for students who participated in digital game-based learning compared to those who received instruction without games.

For motivation, students in the digital game-based group demonstrated significantly higher mastery-oriented goals ($M = 3.42$, $SD = 0.65$) than the control group ($M = 1.84$, $SD = 0.55$), $t \approx -9.30$, $p < .05$, with a large effect size (Cohen's $d \approx 2.6$). Similarly, performance-oriented motivation was higher among the game-based group ($M = 3.44$, $SD = 0.64$) compared to the control group ($M = 2.45$, $SD = 0.54$), $t \approx -5.95$, $p < .05$, indicating a large effect (Cohen's $d \approx 1.7$).

In terms of academic achievement, students who learned through digital educational games achieved significantly higher scores ($M = 83.6$, $SD = 12.23$) than those who learned without games ($M = 71.6$, $SD = 10.30$), $t(23) = 3.26$, $p < .05$. The magnitude of this difference was large (Cohen's $d \approx 1.05$), suggesting that the observed differences were educationally meaningful.

Discussion

The findings demonstrate that digital game-based learning positively influences motivation and academic achievement in elementary EFL instruction. The results align with Self-Determination Theory (Deci & Ryan, 1985), as digital games supported learners' autonomy, competence, and engagement. Increased self-efficacy (Bandura, 1994) likely contributed to greater persistence and improved performance.

The findings also support Flow Theory (Csikszentmihalyi, 1990), as digital games facilitated deep engagement and sustained attention. Consistent with Habgood and Ainsworth (2011),

intrinsic integration of learning content within game mechanics played a crucial role in maintaining motivation.

The interpretation of these findings should be considered in light of the instructional context in which the study was conducted. Prior to the intervention, a baseline assessment of students' English proficiency was carried out as part of routine classroom practice by the same teacher for both groups. The practice-based assessment supported initial group comparability and instructional alignment. Although the assessment was not implemented as a standardized research pre-test and was therefore not included in the statistical analysis, it strengthens the interpretation that post-intervention differences are meaningfully associated with the digital game-based learning approach rather than pre-existing group differences.

From a practical perspective, effective implementation of digital game-based learning requires teacher preparation and thoughtful classroom management. Teachers should be familiar with the digital tools used and plan game-based activities that align with instructional objectives.

Providing feedback during and after gameplay and allowing time for brief reflection can enhance learning outcomes. In addition, digital games should be selected with consideration for learner differences and accessibility to ensure inclusive participation.

Importantly, the study provides empirical evidence from an Arab elementary school context, addressing a gap in the literature and highlighting the relevance of DGBL in culturally diverse educational settings.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, although a baseline assessment of students' English proficiency was conducted as part of routine classroom practice by the same teacher for both groups, it was not implemented as a standardized research pre-test and was therefore not included in the statistical analysis. This limits the ability to statistically control for initial differences between groups.

Second, the study employed a quasi-experimental design with intact classes in a single school, which may limit the generalizability of the findings. Third, the sample size was relatively small, restricting the use of more advanced statistical analysis. Finally, although the same teacher instructed both groups to ensure instructional consistency, teacher-related effects cannot be entirely ruled out.

Conclusion and Recommendations

This study demonstrates that integrating digital educational games into elementary EFL instruction enhances students' motivation and academic achievement. Digital game-based learning represents a powerful pedagogical approach for addressing motivational challenges in EFL education.

It is recommended that EFL teachers integrate digital educational games into instructional practices to promote engagement and support meaningful language learning. In addition, curriculum designers are encouraged to embed game-based elements within digital learning platforms to align instructional objectives with learners' motivational needs.

Future research should examine the long-term effects of digital game-based learning and explore its implementation across different subjects, grade levels, and educational contexts.

References

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71–81). New York, NY: Academic Press.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York, NY: Harper & Row.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum Press.

Dede, C. (2014). *The role of digital technologies in deeper learning*. Boston, MA: Jobs for the Future.

Ertmer, P. A. (1999). Addressing first- and second-order barriers to change. *Educational Technology Research and Development*, 47(4), 47–61.

Fullerton, T., Swain, C., & Hoffman, S. (2008). *Game design workshop* (2nd ed.). Burlington, MA: Morgan Kaufmann.

Gee, J. P. (2005). Learning by design. *E-Learning*, 2(1), 5–16.

Gee, J. P. (2007). *What video games have to teach us about learning and literacy*. New York, NY: Palgrave Macmillan.

Habgood, M. P. J., & Ainsworth, S. E. (2011). Motivating children to learn effectively. *Journal of the Learning Sciences*, 20(2), 169–206.

Midgley, C., et al. (1996). Achievement goal orientations. *Contemporary Educational Psychology*, 21(2), 113–131.

Millstone, J. (2012). *Teacher attitudes about digital games in education*. New York, NY: Joan Ganz Cooney Center.

Pintrich, P. R. (2003). Student motivation. *Journal of Educational Psychology*, 95(4), 667–686.

Prensky, M. (2001). *Digital game-based learning*. New York, NY: McGraw-Hill. Richter, G., Raban, D. R., & Rafaeli, S. (2014). Gamification and motivation. In *Gamification in education and business*. Springer.

Shute, V. J. (2008). Formative feedback. *Review of Educational Research*, 78(1), 153–189. Squire, K. (2011). *Video games and learning*. New York, NY: Teachers College Press.

Sweller, J. (1988). Cognitive load theory. *Cognitive Science*, 12(2), 257–285. Zimmerman, B. J. (2002). Self-regulated learning. *Theory Into Practice*, 41(2), 64–70.