

Exploring Online Games as Educational Techniques

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Abstract: This study explores the use of online games in high school education, focusing on students' experiences, perceived benefits, challenges, and strategies for effective integration. It further examines how online games contribute to students' learning development, particularly in terms of engagement and motivation. Using a qualitative-descriptive research design, the researchers collected data through semi-structured interviews with twelve high school students from Tianjin Eco-City Affiliated School of Beijing Normal University in China, all of whom possess extensive experience with online gaming. Thematic analysis was employed to examine students' perspectives and identify recurring patterns in their responses. Findings reveal that online games enhance students' engagement and learning motivation by transforming traditional lessons into interactive and enjoyable learning experiences. Students reported that game-based learning supports experiential and active learning, improves understanding of complex concepts, and develops essential skills such as critical thinking, problem-solving, collaboration, and digital literacy. Moreover, online games were found to facilitate the application of theoretical knowledge to real-world contexts. However, several challenges were identified, including technical issues, limited access to devices, misalignment between game content and instructional objectives, classroom management concerns, and time constraints, particularly among senior students. The study further highlights that online games are most effective when used as supplementary tools for lesson introduction, practice, and review rather than as core instructional tools. Successful integration of games into teaching demands explicit teaching objectives, suitable game design, guided teacher support, and purpose-oriented control over game application. Overall, the study underscores the potential of online games to enrich teaching and learning when strategically implemented. The findings provide valuable insights for educators and policymakers in designing meaningful, engaging, balanced, and supportive game-based learning environments in high school settings.

Keywords: Online Games, Game-based Learning, Student Engagement, Experiential Learning, Educational Technology, High School Education.

1. Introduction

The integration of technology into education has significantly reshaped traditional approaches to teaching and learning. Among the many technological tools available, online games have emerged as a promising medium for enhancing educational practices. [1] Owing to their interactive and immersive nature, online games offer unique opportunities to engage learners, promote collaboration, and support active participation in the learning process [2]. Consequently, their educational potential has attracted growing attention from researchers, educators, and policymakers in recent years.

The use of games as educational tools is not a new concept. Historically, games have been utilized to facilitate skill development, knowledge acquisition, and critical thinking. [3] However, the advancement of digital technologies has significantly expanded the scope, accessibility, and impact of such tools. In particular, online games provide dynamic and flexible environments where learners can explore complex concepts, experiment with strategies, and receive immediate feedback. [4] These features strongly align with constructivist learning theory, which emphasizes active engagement and learning through experience. [5] Moreover, the real-time interactivity of online games allows learners to take ownership of their learning, thereby fostering deeper cognitive involvement.

Recent studies further highlight the effectiveness of online games across various subject areas. For example, platforms such as "Minecraft: Education Edition" have been widely used to teach mathematics, science, and history by enabling students to visualize abstract ideas and engage in problem-

solving tasks. [6] Similarly, simulation-based games like "SimCity" provide learners with opportunities to understand urban planning and environmental sustainability by simulating real-world systems. [7] Through such applications, learners are not merely passive recipients of information but active participants who construct knowledge through meaningful experiences. These examples illustrate the versatility of online games as instructional tools capable of bridging theory and practice.

Despite these advantages, the integration of online games into educational settings is not without challenges. Issues such as potential gaming addiction, variability in content quality, and insufficient teacher training have been identified as barriers to effective implementation. [8] Additionally, the success of game-based learning largely depends on how well these tools align with curricular goals, instructional contexts, and learner needs. [9] Without careful design and implementation, the educational value of online games may be diminished. Thus, there is a need for a more systematic understanding of how online games can be effectively integrated into teaching and learning processes.

In response to these gaps, this study aims to examine the potential of online games as educational tools for improving learning outcomes, enhancing student engagement, and addressing implementation challenges. Furthermore, it seeks to contribute to the broader academic discourse by providing insights into both the advantages and limitations of online games in education. Ultimately, this research endeavors to offer evidence-based recommendations for educators and policymakers to support the effective integration of online games into curricula, thereby enriching learning experiences in the digital age.

1.1. Theoretical and Conceptual Framework

The use of online games as educational tools is anchored in several interrelated theoretical perspectives that explain how learning occurs in interactive environments. This study draws upon constructivist learning theory, experiential learning theory, and gamification principles to provide a comprehensive framework for understanding how online games can support educational outcomes. Collectively, these theories emphasize active participation, experience-driven learning, and motivation-key elements inherent in game-based learning environments.

1.2. Constructivist Learning Theory

Constructivist learning theory, rooted in the works of Piaget (1954) and Vygotsky (1978), posits that learners actively construct knowledge through interaction with their environment. Learning, therefore, is not a passive process but an active and social one. Online games align closely with this perspective by offering immersive environments where learners engage in exploration, experimentation, and problem-solving. Online games promote active learning by requiring players to make decisions and solve challenges, reinforcing the idea that knowledge is constructed through action. They also incorporate scaffolding mechanisms, such as guided prompts and adaptive difficulty, which support learners within their zones of proximal development. [5] Furthermore, many online games encourage collaboration, allowing learners to interact, communicate, and work toward shared goals, which is an essential component of constructivist learning. In this study, constructivism provides a foundational lens for understanding how online games facilitate meaningful learning experiences through engagement, interaction, and knowledge construction.

1.3. Experiential Learning Theory

Experiential learning theory, proposed by Kolb (1984), emphasizes learning through experience, reflection, and application. Accordingly, learning occurs in a cyclical process involving four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Online games naturally support this cycle. [10] They provide direct experiences through simulated environments where learners actively participate in tasks. These experiences are followed by reflection, often facilitated through in-game feedback systems that help players evaluate their actions. Over time, learners develop conceptual understanding by recognizing patterns and forming strategies. Finally, games encourage active experimentation, allowing learners to test new ideas and approaches in a low-risk environment. This theoretical lens enables the study to explore how online games create opportunities for learners to engage in meaningful, reflective, and applied learning processes.

1.4. Gamification Principles

Gamification involves the integration of game design elements into non-game contexts to enhance engagement and motivation. [11] In educational settings, gamification leverages features such as points, rewards, and challenges to make learning more engaging. A key aspect of gamification is intrinsic motivation, in which learners are driven by curiosity, autonomy, and the desire for mastery rather than external rewards. Online games also provide immediate feedback, enabling learners to adjust their strategies in real time, which

aligns with formative assessment practices. Additionally, the concept of progression and mastery encourages continuous skill development through increasingly challenging tasks. Finally, social interaction within games fosters collaboration and a sense of community. In this study, gamification principles help explain how game design elements can enhance learner engagement and sustain motivation.

1.5. Statement of the Problem

To be able to achieve the aim of this research, this study explored the impact of online games on Chinese high school students by examining and analyzing the answers to the following research questions:

- 1) What are the experiences of high school students in using online games as learning tools in the classroom?
- 2) What are the perceived values, challenges, and barriers associated with using online games as educational tools in high school classrooms?
- 3) How can online games be effectively integrated into the high school curriculum to enhance student engagement and improve learning outcomes?

1.6. Significance of the Study

This study holds substantial significance in the context of modern education, where digital technologies are increasingly shaping teaching and learning practices. By examining the role of online games as educational tools, this research contributes to both theoretical understanding and practical application. Online games offer a means of transforming traditional education by shifting from passive learning to active participation. They foster student engagement and motivation, addressing one of the most persistent challenges in education. Additionally, they support inclusive and personalized learning, as they can be adapted to different learning styles and paces. Moreover, online games play a crucial role in developing 21st-century skills, including critical thinking, collaboration, and digital literacy. They also provide innovative solutions to existing educational challenges, such as limited resources and student disengagement. Importantly, this study offers valuable insights for policy and practice, guiding educators and decision-makers in implementing effective game-based learning strategies. It also contributes to academic research by providing empirical evidence on the impact of online games on education. In essence, this study underscores the transformative potential of online games while addressing practical considerations for their integration. By bridging theory and practice, it aims to support educators in leveraging online games as meaningful and effective tools for learning in the digital era.

2. Methodology

This study adopted a qualitative-descriptive research design to explore students' experiences and insights into online games as educational tools. Qualitative descriptive research is appropriate for capturing rich, straightforward descriptions of participants' experiences as they naturally occur, without manipulating variables or imposing theoretical interpretations beyond the data. [12] This design enabled an in-depth exploration of students' perceptions, emotions, and behaviors associated with online gaming and their relationship to learning engagement. The qualitative approach was particularly suited to the objectives of the study, as it allowed participants to articulate their personal experiences

and the value of using online games as educational techniques in their own words. Through semi-structured interviews, the study elicited nuanced narratives that illuminated how online gaming intersects with students' physical, emotional, social, intellectual, and digital balance. By foregrounding student voices, the study sought to generate contextualized insights relevant to educational practice and learner support.

2.1. Participants

The study was conducted at Tianjin Eco-City Affiliated School of Beijing Normal University, China, an institution recognized for its academic rigor and commitment to holistic student development. The school was chosen as the research site on account of its diverse student body and full access to digital teaching facilities, rendering it a suitable context to investigate adolescents' experiences and practices of utilizing online games within classroom instruction. The participants were evenly distributed across Grade 10 to Grade 12 levels, aged approximately 15 to 18 years old, with four (4) students from each grade. Each group consisted of an equal number of male and female participants (2 females and 2 males), ensuring gender balance. The study employed purposive sampling to select participants who possessed characteristics relevant to the research objectives. At the same time, random selection within each grade level was applied to maintain fairness and representation.

A fundamental inclusion criterion required participants to have at least five years of experience in online gaming. This requirement ensured that respondents possessed sufficient familiarity and sustained engagement with online gaming environments, enabling them to provide deeper insights into their experiences, behaviors, and perceptions. Such prolonged exposure is essential for capturing nuanced perspectives on the educational potential of online games. To maintain the integrity and focus of the study, students with less than five years of online gaming experience were excluded. In addition, individuals who were not affiliated with Tianjin Eco-City Affiliated School of Beijing Normal University were not included in the sample. This delimitation ensured that the findings accurately reflected the experiences and perspectives of students within the specified institutional and cultural context. By narrowing the scope, the study was better positioned to generate context-specific insights and more relevant recommendations.

2.2. Data Gathering Tools

The primary data collection instrument for this study was a semi-structured interview guide grounded in three key theoretical frameworks: constructivist learning theory, experiential learning theory, and gamification principles. The instrument was designed to explore students' perspectives on online games as educational technology, as well as their perceived impact on knowledge acquisition and skill development. The interview guide aimed to capture both the positive and negative implications of online games in contemporary education. Its design reflected the intention to generate meaningful insights that could inform the effective integration of game-based learning into classroom practices. To ensure validity and reliability, the instrument underwent expert validation. Specialists in the field reviewed the guide to assess its clarity, relevance, and capacity to elicit in-depth responses from adolescent participants. This validation process strengthened the tool's effectiveness in capturing meaningful qualitative data related to gaming behaviors and

educational experiences. Content validity was established through expert review and pilot interviews with 12 randomly selected students, who helped identify and revise unclear items. The use of five themed sections ensured construct validity, while uniform interview questions were employed to maintain procedural reliability.

The interview guide was organized into five sections. Section one was for Demographic and Gaming Profile. This section gathered background information, including participants' gaming experience, preferred game types, and gaming habits. These data provided contextual grounding for interpreting their responses. Section two was for Constructivist Learning and Engagement. This section explored how online games supported active learning, interaction, and knowledge construction. Section three was for Experiential Learning and Skill Development. Questions in this section examined how games contributed to experiential learning processes, including reflection, strategy-building, and real-world application. Section four was for Gamification and Motivation. This section focused on motivational aspects such as rewards, feedback, progression, and engagement. Section five was for Challenges and Suggestions. The final section gathered participants' views on the limitations of online games and their recommendations for improving their use as educational tools.

2.3. Data Gathering Procedure

To collect relevant and in-depth data, the researchers utilized a semi-structured interview approach informed by constructivist learning theory, experiential learning theory, and gamification principles. Prior to data collection, participants were informed of the study's purpose, procedures, and ethical considerations, including confidentiality, anonymity, voluntary participation, and their right to withdraw at any time without penalty. Informed consent was obtained from all participants, and parental consent was secured for minors. To support reflective and meaningful responses, the interview guide was shared in advance, allowing participants to prepare thoughtfully and reduce anxiety, thereby promoting mental health during the research process.

Face-to-face interviews were conducted in quiet, private rooms within the school, creating a comfortable and distraction-free environment. This setting helped foster psychological safety and supported participants' social and emotional stability during the interaction. The offline format minimized technical disruptions and enabled the researcher to observe participants' nonverbal cues, enhancing the depth and authenticity of the data collected. Each interview lasted approximately 20 to 30 minutes. The researcher employed active listening and probing techniques to encourage participants to elaborate on their experiences and perspectives. With participants' consent, all interviews were audio-recorded and transcribed verbatim to ensure data accuracy, authenticity, and completeness.

2.4. Treatment of the Data

The collected data were analyzed using thematic analysis, a widely used method in qualitative research for identifying patterns and themes. All interview recordings were transcribed verbatim to ensure accuracy and completeness. The analysis followed an iterative process, involving repeated reading of transcripts, coding of responses, and categorization of emerging themes. These themes were then refined and

interpreted in relation to the study's theoretical frameworks—constructivist learning theory, experiential learning theory, and gamification principles. In addition, the study employed systematic coding procedures [13], which facilitated the organization of qualitative data into structured categories. This approach enabled the identification of recurring patterns and the development of a coherent thematic framework. Supporting excerpts from participants' responses were used to strengthen the interpretation of each theme. Through this rigorous analytical process, the study provided a comprehensive understanding of students' experiences and insights regarding online games as educational tools.

2.5. Ethical Considerations

This study strictly adhered to ethical research standards to ensure the protection of participants. Sensitive topics that could potentially compromise participants' privacy were consciously avoided. Prior to participation, students were fully informed about the nature and purpose of the study, as well as any potential risks, ensuring that participation was based on informed consent. Participants were also informed of their right to withdraw from the study at any point without penalty. Since the participants were minors, parental consent was obtained prior to their involvement in the study. Parents or guardians were provided with sufficient information regarding the research objectives, procedures, and ethical safeguards, enabling them to make informed decisions about their children's participation.

Written parental consent forms were collected and properly archived as official ethical research records before formal data collection. Confidentiality and anonymity were maintained throughout the research process through data anonymization and the secure storage of all collected information, and no identifying details were included in the reporting of findings. Furthermore, the study received approval from relevant academic authorities, ensuring compliance with institutional ethical standards. Measures were also established to address any potential discomfort experienced by participants, including the provision of appropriate support and the maintenance of a respectful and safe research environment. All audio recordings collected during the research would be permanently deleted upon completion of the study to further protect participants' privacy.

3. Results and Discussions

3.1. Students' Experiences in Using Online Games as Learning Tools

The findings indicated that online games greatly improved students' engagement and motivation to learn, while promoting their positive emotional experience and cognitive growth. Many participants emphasized that game-based activities made lessons more appealing compared to traditional methods. For instance, R3 stated, *"It felt like playing, not studying,"* while R2 noted that *"The competition kept me focused."* Similarly, R12 shared that *"Playing games made me feel happier and enjoy studying."* These responses suggest that online games create an engaging learning environment that captures students' attention. This finding supports the idea that games foster deep engagement through interactive and immersive environments. [1] From a constructivist perspective, these experiences reflect active participation in learning, where students are not passive recipients but active constructors of knowledge. [5] The shift

from passive to active learning is evident in students' descriptions of increased involvement and interest.

Moreover, students highlighted the experiential nature of learning through games. R1 explained, *"It showed me how geography works in real time, not just from a book,"* while R7 shared, *"I could experiment and see results, which helped me understand cause and effect."* Likewise, R9 stated, *"I had to make decisions and face consequences."* These responses illustrate how online games enable learners to engage in authentic experiences that deepen understanding. These findings strongly align with experiential learning theory, which emphasizes learning through direct experience, reflection, and application. [10] The ability of games to simulate real-world scenarios also supports the concept that games allow learners to engage in professional-like thinking processes within safe environments. [10]

In addition, the development of critical thinking and problem-solving skills was evident. R5 described, *"I decided whether to attack or defend. That taught me strategy,"* while R11 noted, *"I had to adjust angles and speed in the physics game to hit a target."* Similarly, R1 shared that resource management in a simulation *"took planning."* These findings indicate that online games promote higher-order thinking skills. This supports the finding that games enhance analytical thinking by immersing learners in decision-making contexts. [7] Such environments encourage learners to evaluate options, predict outcomes, and solve problems actively.

Furthermore, students emphasized the role of immediate feedback in learning. R3 stated, *"Instant feedback helped me fix mistakes immediately,"* while R8 noted, *"The game highlighted my mistakes, so I learned from them."* R9 further explained, *"The simulation showed me the results of my choices."* These responses highlight the importance of feedback in reinforcing learning. This aligns with gamification principles, particularly the role of immediate feedback in improving performance and supporting formative assessment. [11]

3.2. Perceived Values, Challenges, and Barriers of Online Games

3.2.1. Perceived Values

A major finding of the study was that online games enhance motivation and enjoyment in learning. Students consistently described game-based learning as enjoyable and less stressful, suggesting a positive impact on students' emotional balance and learning satisfaction. For example, R1 stated, *"It felt like play, not work,"* while R11 shared, *"Physics felt less scary when it was a game."* R12 added, *"It made learning feel like an achievement, not a punishment."* These findings support Prensky (2001), who asserts that digital games align with students' preferences and increase motivation. This is further explained by gamification theory, where elements such as rewards, competition, and progression enhance intrinsic motivation. [11]

In addition, students reported developing various academic and life skills. R7 shared, *"I learned leadership and cooperation,"* while R9 explained, *"I had to analyze market changes and manage resources."* Similarly, R11 stated, *"I learned to try different solutions without giving up."* These responses demonstrated the development of critical thinking, collaboration, and persistence. This is linked to the concept that game-based learning environments promote transferable skills beyond academic content. [7]

Furthermore, students emphasized the real-world

applicability of learning through games. R9 noted, *"It helped me understand real-life budgeting,"* while R6 explained, *"Logic from Minecraft helped with coding and math."* These findings suggest that online games bridge the gap between theory and practice. This parallels the perception that games create meaningful learning experiences by situating knowledge in authentic contexts. [4]

3.2.2. Challenges and Barriers

Despite the benefits, several challenges were identified. Technical issues were frequently mentioned. Additionally, excessive competition and prolonged gameplay could negatively affect students' academic and mental balance if not properly managed. R1 stated, *"Sometimes the game glitched or didn't work properly,"* while R4 noted, *"There were not enough computers or devices for everyone."* R11 added, *"There are technical issues like lag or loading problems."* These findings were consistent with identified infrastructure limitations as a major barrier to implementing game-based learning. [8]

Another challenge was the misalignment between games and lesson objectives. R5 explained, *"The game might not match the lesson perfectly,"* while R6 stated, *"Too much focus on winning, not enough on learning."* Similarly, R10 noted that *"Sometimes the game was too easy or too hard."*

This supported the emphasis on educational games that must be carefully aligned with curriculum goals to ensure effectiveness. Classroom management issues were also highlighted. R2 observed that *"Some students messed around instead of actually learning,"* while R7 noted that *"Some people cheated or refused to participate fairly."* Additionally, R12 mentioned that *"students started comparing scores or competing too much; they forgot to learn."* These findings reflected widespread concerns that competition needs proper management to sustain educational priorities. [2]

Time constraints were another concern, particularly among senior students. R9 stated, *"Time-consuming. We didn't have much time in Grade 12,"* highlighting the pressure of academic demands. Finally, some students noted that games sometimes prioritize entertainment over learning. R3 suggested *"Link the game clearly to the lesson,"* while R4 recommended *"Add explanations after each level."* These insights emphasized the need for a balance between engagement and educational value.

3.2.3. Effective Integration of Online Games in the Curriculum

The findings suggested that online games were most effective when used as supplementary tools for practice, review, and lesson introduction. For example, R1 stated, *"Practice and review. Assessment was too serious for games,"* while R3 noted, *"Introduction and practice. Games made new topics less scary."* R10 added, *"Review. Quick quiz games were great before tests."* This supported Whitton (2010), who argues that games should complement traditional teaching rather than replace it. Students also emphasized the importance of teacher guidance. R1 suggested, *"Teachers should explain the goal before playing,"* while R7 recommended, *"Have a class discussion after the game."* R12 added, *"Provide a summary or notes after the game."* These responses aligned with the concept of scaffolding, where teachers guide learners to achieve deeper understanding. [5]

In terms of game design, students highlighted essential features. R4 recommended *"Multiple difficulty levels for different students,"* while R8 emphasized *"Explanations for*

wrong answers." R9 suggested *"Real-world scenarios and data."* These features reflected gamification principles, particularly feedback, progression, and meaningful context. [11] Students also recommended moderate use of games. R1 stated, *"Once a week. Too often would lose the fun,"* while R6 suggested *"Twice a week, but short sessions."* This indicated that balance is necessary to maintain engagement. Finally, accessibility was identified as a key consideration. R6 noted, *"Not all students have the same devices or internet at home."* This highlighted the need for equitable implementation of educational technologies.

4. Conclusion

The findings indicated that online games could significantly enhance student engagement and interest in learning. Learners described game-based activities as interactive, motivating, and more enjoyable than traditional instruction. Through gameplay, students actively participated in lessons, developed critical thinking skills, and engaged in experiential learning processes. These results supported constructivist and experiential learning theories, which emphasize active involvement and learning through meaningful experiences. In terms of perceived value, online games were found to promote not only academic understanding but also essential skills such as collaboration, communication, problem-solving, persistence, and digital literacy. Students also recognized the ability of games to connect theoretical concepts to real-world applications, making learning more relevant and practical.

However, several challenges were identified, including technical limitations, a lack of resources, misalignment with lesson objectives, classroom management concerns, and time constraints. These findings highlighted that while online games offer significant educational benefits, their effectiveness depends on proper design, accessibility, instructional alignment, and wellness-conscious implementation.

Overall, the study concludes that online games are effective supplementary tools in high school education when used strategically. They are most beneficial for lesson introduction, practice, and review rather than as primary assessment methods. Successful integration requires clear learning objectives, appropriate game design, teacher guidance, equitable access to technology, and strategies that promote balance. When these conditions are met, online games can create a more engaging, student-centered, and supportive learning environment that contributes meaningfully to improved learning outcomes.

References

- [1] Gee, J. P. (2007). *What video games have to teach us about learning and literacy*. Palgrave Macmillan.
- [2] Prensky, M. (2001). *Digital game-based learning*. McGraw-Hill.
- [3] Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals*. MIT Press.
- [4] Shaffer, D. W., Squire, K. R., Halverson, R., & Gee, J. P. (2005). Video games and the future of learning. *Phi Delta Kappan*, 87(2), 104–111.
- [5] Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

- [6] Short, D. (2012). Teaching scientific concepts using a virtual world-Minecraft. *Teaching Science*, 58(3), 55–58.
- [7] Squire, K. (2006). From content to context: Videogames as designed experience. *Educational Researcher*, 35(8), 19–29.
- [8] Bourgonjon, J., Valcke, M., Soetaert, R., & Schellens, T. (2013). Students' perceptions about the use of video games in the classroom. *Computers & Education*, 54(4), 1145–1156.
- [9] Whitton, N. (2010). *Learning with digital games: A practical guide to engaging students in higher education*. Routledge.
- [10] Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.
- [11] Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining “gamification”. In *Proceedings of the 15th International Academic MindTrek Conference* (pp. 9–15). ACM.
- [12] Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). SAGE Publications.
- [13] Gibbs, G. (2007). *Analyzing qualitative data*. SAGE Publications.