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Engagement and Incidental L2 Vocabulary Acquisition in Digital Gaming: A Qualitative Perspective of an "In-Denial Gaming Addict" From Hong Kong

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ABSTRACT

An increasing amount of language learning is occurring outside the traditional classroom settings, with digital gaming emerging as a prominent arena. This study presents a case analysis of an individual, Choi, who is a gaming enthusiast or even an "in-denial gaming addict" (in his own words) and demonstrates a paradoxical academic profile: academically underperforming yet possessing an advanced level of English proficiency. Through reflective essays and five rounds of interviews, the study explored Choi's engagement with digital games in relation to vocabulary acquisition. The paper provides a deep insight into the critical events that shape the cognitive, behavioral, and affective dimensions of Choi's language learning engagement in gaming. The paper ends with practical suggestions for those who are interested in leveraging the potential of games in incidental vocabulary acquisition.

摘要

语言学习发生在传统课堂之外已非新鲜事。数字游戏已成为课外语言学习的一个重要领域。本研究对一位名叫崔 (Choi) 的个体进行了案例分析, 他是一位"游戏 痴迷者", 展现出一种矛盾的学术特征:学业表现不佳, 但英语水平却相当高。通过反思 日志和五轮访谈, 本研究探讨了崔与数字游戏的互动如何与词汇习得相关联。论文深入分析了塑造崔在游戏中语言学习参与的认知、行为和情感维度的关键事件。最后, 本研究总结并提出了一系列实用建议,旨在为那些希望通过熟悉游戏促进词汇习得的学习者提供有效指导。

1 | Introduction

Language learning often occurs in a conventionally structured classroom where learners advance their language learning using textbook-driven methods (Hafner and Miller 2019). This approach emphasizes the importance of tests in evaluating language learning outcomes. In recent years, the growing affordability and accessibility of technology have significantly influenced assessment methods (Benson 2011). According to Liu et al. (2024), while the out-of-class learning environment for English learners has evolved, uncertainties still exist about how L2 motivational dynamics affect their engagement in informal digital language learning. Nowadays, there is a growing emphasis on creating optimal learning environments that are flexible, informal, interactive, and learner-centered (Lee 2019; Wu and Miller 2021), particularly for vocabulary learning (Teng et al. 2024). Consequently, digital

gaming has emerged as a valuable tool in education, as it fosters engagement and motivation among learners (Boyle et al. 2012). By incorporating game mechanics and interactive elements, educational games can create immersive experiences that encourage active participation and collaboration. This approach not only enhances language acquisition but also allows learners to practice skills in a dynamic context, making the learning process more enjoyable and effective.

Contrary to structured classroom learning, digital games can afford a unique experience to L2 learners where they are able to acquire the target language in a fully autonomous fashion without being prescribed linguistic goals by teachers (Chik 2014). This in essence reflects the idea of incidental vocabulary acquisition: students focus on doing something else (e.g., reading *Harry Potter* for the plots) other than learning new words (e.g., reading *Harry Potter* to improve their vocabulary), and the lexical acquisition tends to be a by-product during the process (Hulstijn 2008). Therefore, what we now find happening is that digital games offer 'a certain degree of conscious attention' (Arndt 2018, 125), and a sense of metacognition and autonomy (Teng 2024), which is compulsory for incidental learning to happen.

Incidental language learning can take place both in-class (e.g., teacher-led extensive reading) and out-of-class (e.g., digital games). This study specifically examines incidental L2 vocabulary acquisition in the context of digital gaming. Digital games have 'dynamic, unpredictable, and erratic' features (Sauro and Zourou 2019, 1), and a learner's vocabulary acquisition often happens outside of their formal educational environments (Sauro and Zourou 2019). However, digital gaming is also met with skepticism due to its potential for distraction, unproductivity (in terms of time spent on-task learning), and addiction (Godwin-Jones 2014). Research in this field is still emerging because of the ever-changing nature of technology and the lack of theoretical and pedagogical frameworks to guide inquiry and application. Despite these challenges, the significance of focusing on engagement—especially as it pertains to digital gaming in language education—cannot be overstated.

Central to this paper is a qualitative study of an undergraduate student from Hong Kong, who describes himself as an 'in-denial gaming addict'. The insights gleaned from this case study shed light on the intricate dynamics of engagement in incidental vocabulary acquisition within the context of digital gaming. This exploration underscores the potential of digital gaming as a powerful tool for language learning, suggesting that engagement through gaming can lead to significant educational benefits, such as enhanced vocabulary acquisition. By examining how engagement operates in the realm of digital gaming, the study contributes valuable knowledge to our understanding of how learners interact with and absorb language in non-traditional settings. This is particularly relevant in today's digital age, where learners increasingly spend a lot of their time online and seek out alternative and engaging ways to learn languages.

2 | Incidental L2 Vocabulary Acquisition

Incidental L2 vocabulary acquisition, which refers to the unintentional or indirect learning of vocabulary while engaged in other language-related activities (e.g., reading, listening, or speaking), has been a robust area of research within the field of Second Language Acquisition for some time (Webb 2020). This topic has been explored from various perspectives, including extensive reading (Kweon and Kim 2008), song listening (Pavia et al. 2019), video watching (Teng 2021), and mobile dictionary usage (Zhang and Wu 2019).

Numerous factors influence vocabulary acquisition, with word exposure frequency being critical for acquiring word form, meaning, and use. However, findings regarding the number of encounters with unknown words have been inconsistent (Webb 2007). For instance, without sufficient repetitions, word form cannot be fully acquired (Teng 2018); context quality is crucial, but its usefulness can vary (Webb 2008); 'vague, ambiguous, or misleading contexts' can be harmful to inferring meaning (Çetinavcı 2014, 2672); and authenticity is a key factor in context quality, promoting learners' motivations for L2 learning and fostering autonomy (Hafner and Miller 2019). Another often overlooked factor is learning styles, which include sensory, cognitive, and social styles (Oxford 2003). Oxford and Crookall (1990) argued that vocabulary instruction should match learners' style preferences. However, research has not reached a consensus on the most effective learning styles for incidental vocabulary learning.

With the pervasiveness of technology today, the context of learning is no longer limited to paper-based reading, but instead multimodal and multisensory contexts such as digital games have the potential of facilitating L2 learners' incidental vocabulary acquisition.

2.1 | A Framework on Engagement in Language Learning

Engagement in the context of learning is a multifaceted construct that embodies the intricate interplay between a learner's motivation, emotions, and cognitive processes (Mercer and Dörnyei 2020). Fredricks et al. (2004) outline the key components of engagement as behavioral (e.g., effort and attention in learning), cognitive (e.g., meta-cognitive strategies to regulate study), and affective (e.g., interest, boredom, or anxiety in learning) engagement. Understanding the complexity of engagement necessitates recognizing that these dimensions are dynamic and interdependent, continuously interacting and influencing one another in a feedback loop (Svalberg 2009). For example, a learner who finds a particular task interesting (affective engagement) may be more likely to invest effort and attention (behavioral engagement) and employ sophisticated cognitive strategies (cognitive engagement) to complete the task. Conversely, a task that evokes anxiety may hinder a learner's ability to concentrate and engage effectively with the material. Furthermore, the interdependence of these components underscores the need for educational strategies that address all facets of engagement. Learning environments that not only stimulate interest and motivation but also support the development of effective learning strategies and provide opportunities for active participation are essential (Boyle et al. 2012). This holistic approach to fostering engagement can enhance the learning experience, making it more meaningful and effective for learners (Hiver et al. 2021).

Behavioral engagement involves the actions and behaviors learners exhibit during the learning process, focusing on the level of effort, attention, and participation a learner demonstrates while engaging with learning tasks (Fredricks et al. 2004). This might include taking notes, asking questions, participating in class discussions, and completing assignments. Behavioral engagement is often considered the most observable form of engagement. It is crucial because it directly correlates with academic achievement and persistence in educational settings.

Cognitive engagement refers to the mental processes and strategies a learner employs to understand, process, and retain information. It emphasizes the depth and quality of thinking, which might include employing metacognitive strategies (i.e., thinking about one's thinking) to regulate study habits, problem-solving techniques, and critical thinking skills (Hiver et al. 2021). Cognitive engagement demonstrates the learner's willingness to invest mental effort in the learning process and to actively make connections between new information and prior knowledge. This form of engagement is critical for deep learning, as it involves higher-order thinking processes that enable learners to apply knowledge in new contexts and solve complex problems.

Affective engagement involves the emotions and feelings learners experience during the learning process, including interest, enjoyment, boredom, anxiety, and other emotional states that may impact their motivation and commitment to learning (Hiver et al. 2021). Affective engagement is significant because emotions can greatly influence a learner's motivation and persistence. Positive emotions such as interest and enjoyment can enhance motivation and lead to sustained engagement, while negative emotions such as boredom and anxiety can impede learning and reduce engagement.

The three components of engagement—behavioral, cognitive, and affective—play crucial roles in determining how effectively learners engage with the learning process. These interconnected dimensions reflect the complex interplay between a learner's actions, thoughts, and emotions, ultimately shaping their overall learning experience and academic outcomes. The three components of engagement have been used to examine learner engagement in informal learning environments. For instance, Lyu and Lai (2022) investigated learners' engagement on a social networking site from an ecological perspective. Their findings indicate that the three engagement dimensions jointly facilitate the learning ecology for learners and are closely interrelated, with learning behavior affecting affections, and affective changes further modifying behavioral and cognitive engagement. This perspective underscores the importance of understanding the developmental trajectories of multifaceted engagement from a holistic, contextual perspective. In a recent study by Li et al. (2024), Activity Theory was utilized to describe and analyze an out-of-school project involving eight Chinese university students engaged in digital gaming. The learners reported significant improvements in their confidence, vocabulary, listening skills, and oral fluency. Throughout the project, participants encountered various contradictions, and their efforts to address these challenges led to the evolution of the activity system. As a result, the tools, rules, community members, division of labor, and objectives underwent transformations. This dynamic interplay among these components ultimately shaped the project's outcomes into tangible results. Kazu and Kuvvetli (2023) conducted a study with 69 secondary school students, where one experimental group engaged in vocabulary practice through digital gaming, while the control group relied on memorization in their native language. The post-test results revealed a significant impact of digital gaming on vocabulary acquisition. Additionally, content analysis was employed to examine the data, categorizing metaphors and calculating their frequencies. This analysis indicated that participants found the game-based language learning activities enjoyable and beneficial for enhancing their academic skills. However, to our knowledge, no research has explored learner engagement in digital gaming concerning incidental vocabulary acquisition (see an overview by Hiver et al. 2021).

This paper seeks to fill the research gap by examining an EFL learner's engagement from the cognitive, behavioral, and affective aspects of digital gaming to provide contextual interpretations of incidental vocabulary acquisition. In doing so, the study aims to contribute to the broader understanding of learner engagement in digital gaming environments and its potential impact on vocabulary acquisition. By highlighting the significance of considering cognitive, behavioral, and affective engagement in such contexts, the study may offer valuable insights for educators, researchers, and game developers in designing more effective and engaging learning experiences within digital gaming platforms.

3 | Digital Gaming and L2 Learning

Reinhardt and Sykes (2014) provided a framework for understanding game-based and game-enhanced digital gaming and language learning. Differing from game-based language learning that relies on specially-designed digital games (e.g., Wu et al. 2021), game-enhanced language learning (GELL) makes use of the learning opportunities afforded by the digital games but not primarily designed for learning, such as adventure, e-sports, and shooter games.

Over the past decade, a wide range of effectiveness of GELL has been reported mainly regarding linguistic and affective learning. Firstly, educators have explored linguistic improvements in playing digital games. On the one hand, L2 learners may benefit from immersive environments where they have chances to advance the different L2 competencies, such as the four basic language skills, pragmatic, phonetic, and communicative competencies, through interactions with other gamers (Peterson 2016). On the other hand, in a large-scale quantitative investigation of 302 elementary students from South Korea, Suh et al. (2010) reported no significant differences in English learning achievements between one group of learners who participated in digital gaming with the other group that adopted traditional in-class learning. However, three key factors played constructive parts in students' English language learning achievement, namely motivation, internet speed, and students' prior knowledge. Surprisingly, Suh et al.'s study suggested that internet connections outperformed motivation as a key condition for GELL. These authors speculated that network speed determined the students' engagement in online interactions, which further impacted the motivations to keep playing. As such, optimal gaming environments seem to be crucial for learners to capitalize on the linguistic affordances from digital gameplay.

Secondly, the affective dimension of L2 learning has been studied. Studies such as Reinders and Wattana (2015) and Reinhardt and Sykes (2014) have shown a positive outcome of gaming and the improvement of confidence, motivation, and autonomy, together with a reduction of anxiety. For example, drawing on multiple data sources, Chik (2014, 86) found that gamers from Hong Kong were able to exercise their autonomy depending on location, formality, pedagogy, locus of control, and trajectory of GELL. In other words, successful GELL by no means takes place naturally, but the nature of gameplay, game-related activities (e.g., walkthroughs), and game communities (e.g., blogs) compose "the primary driving force" for GELL. Yet, there were also reports about the demotivation of language learning in gaming (e.g., Anyaegbu et al. 2012; Quick et al. 2012) because of learners' preference for in-class learning, the lack of motivational elements in game design, and the competitive nature of games.

In terms of vocabulary learning, a variety of mediating factors have been reported (e.g., Smith et al. 2013; Jensen 2019; Sundqvist and Wikström 2015), including age, gender, length of gameplay, L2 proficiencies, types of games, in-game peer feedback, and cultural attitudes towards the use of digital games in L2 learning. For example, Sylvén and Sundqvist (2012), reported that among 86 Swedish young learners, the high frequency of L2 played a significant part in facilitating incidental L2 vocabulary acquisition. Gamers were able to improve their L2 vocabulary acquisition 'within the ecology of the broader discourses surrounding games' (Sundqvist 2019, 88). In a similar vein, Jensen (2017), by investigating 107 Danish young learners around the age of 8–10, discovered that boys played games more frequently than girls, but gaming played a significant role in improving the young learners' vocabulary learning.

In contrast, a recent survey of 235 Chinese EFL learners revealed that digital gameplay was not perceived as a major means of improving their English learning (Wu 2019). This may be closely associated with the shared belief among different educational stakeholders in China that playing digital games is, to a large extent, a waste of students' time.

While the affordances of digital gameplay have been a research focus over the past decade, most of the students in previous studies did not report frequent use of games, let alone addictions. Furthermore, existing research has centered on cultural contexts that have higher endurance for gameplay in education (e.g., Denmark and Sweden), whereas students from test-dominated societies like Hong Kong deserve more scholarly attention. Also, as mentioned, digital gameplay in L2 learning is often structured and guided by instructors, while GELL studies have not yet fully explored how learners take full charge of their own L2 learning in the wild. Against this backdrop, the present paper reports on a unique, self-identified game addict from a test-dominated society, who shares the stories of his engagement in digital gameplay and how such engagement facilitates incidental vocabulary acquisition. In this paper, we aim to move forward the current understanding of digital games in relation to vocabulary acquisition by answering the question: How does an EFL gaming addict perceive his engagement in digital gaming in benefiting his English vocabulary acquisition?

4 | Method

4.1 | A Qualitative Study Design Based on Semi-Structure Interviews

Rooted in the postmodernist perspective of constructed reality, we conducted a storytelling approach through semi-structured interviews to understand the complexities of human experience, which can enlighten the present and inform the future (Clandinin 2006). Typically, storytellers recount important life moments, filtered by time and retained in memories, that sometimes conflict with their worldview, may bring profoundly positive or negative changes to their behavior, and can only be obtained in retrospect by the storyteller as they are 'unplanned, unanticipated and uncontrolled' (Mertova and Webster 2020, 64). As such, these critical events constitute the data researchers value.

To systematically unfold the critical events, Clandinin and Connelly (2000), propose three analytical dimensions: interactions (e.g., international interactions in digital gaming), temporality (e.g., prior engagement and future plans for language learning), and situation (e.g., the institutional and sociocultural environments that the gamer in which situated in). The present paper will endeavor to understand a gamer's engagement in gameplay and vocabulary acquisition by interpreting the key events from different these three dimensions.

One key implication when carrying out qualitative research is the honesty of a storyteller as the constructed truth usually comes with self-disclosure and exposure to the vulnerability of the person (De Costa et al. 2021). Therefore, building rapport between researchers and storytellers is a prerequisite for enhancing the trustworthiness of the stories. In the study, we used a few techniques to ensure honesty from our gamer 'Choi', such as several rounds of face-to-face informal chats, constant support and care for Choi's university life and career development, and feedback on the purposes, progress, and outcomes of the research project.

4.2 | Choi—A Long-Time Gaming Addict

As part of a larger research project, the present paper focuses on a specially selected undergraduate student at a public Hong Kong university. Choi (pseudonym), a third-year undergraduate student, had over 18 years of offline and online gaming experience, starting from when he was three years old. Upon reflection, he spent at least three hours playing digital games daily. As such, he identified himself as an 'in-denial gaming addict' (his original words from the interviews), and he was aware of his obsessive engagement with games and lack of self-discipline. He further depicted himself as 'a poor student' in academic learning as he had a scarce interest in formal education; however, he demonstrated a surprisingly advanced level of English-speaking skills and vocabulary knowledge based on in-class observations and interactions with the instructor/the second author. It is worth mentioning that he had never spent time studying or living in English-speaking countries. To further evaluate his vocabulary knowledge, Choi completed the Webb et al. (2017) vocabulary levels test on the outset of the project. This test looks at how

well a learner knows useful English words. The test is structured around different vocabulary levels, starting from simpler words and advancing to more complex ones. The test aims to evaluate the test-taker's familiarity with commonly used English words through recognition and association with their meanings, a type of receptive vocabulary knowledge. We found that he mastered an advanced level of English receptive vocabulary knowledge. These characteristics of Choi made him a unique and valuable case to study since the literature points to a potentially detrimental effect of digital gaming in relation to language learning (Zou et al. 2021).

4.3 | Data Collection and Analysis

The study adopted a qualitative approach that details the contextual parameters to form an in-depth, holistic understanding of Choi's acquisition of English vocabulary in digital gaming. First, guided by a list of prompt questions (e.g., Did you enjoy learning English at secondary school? Why? Why not?), Choi wrote reflective essays on the acquisition and use of the English language throughout his school learning and digital gaming. We read his essays multiple times and generated some further questions to discuss in the follow-up interviews.

Second, informed by the initial findings from the essays, five semi-structured, hour-long, and in-depth interviews were organized over six months with Choi. The purposes of the interviews were to explore his English learning and gaming histories, his perceptions of digital gameplay in language learning, and his engagements regarding the acquisition and use of English in digital gaming. We organized the interviews through the medium of English as Choi insisted that it was more comfortable for him to express his thoughts and feelings. The interviews were transcribed and analyzed in a deductive manner through open, axial, and selective coding (Corbin and Strauss 1998). The focus was on Choi's cognitive, affective, and behavioral engagement in incidental vocabulary acquisition through digital gaming.

The following analytical process was adopted to interpret the interview data. In open coding, interview transcripts were read carefully multiple times with two main purposes: (a) to make sense of and identify some critical events shared by Choi; and (b) to label words, phrases, and sentences relevant to the concept of engagement with tentative codes. In axial coding, connections or categories were drawn among the codes from open coding to show the three different dimensions of engagement. Most of the time, we found that sentences could not be labeled with a single dimension of engagement. Thus, sentences were usually coded with one primary engagement dimension and a secondary dimension. An example is when Choi mentioned an interesting episode, 'We would like to look out for each other. We try our best to speak in English. If we don't know the word, we search it up or we correct each other's pronunciation, correct each other's grammar, or just keep asking 'Excuse me? What? What? What? All right'. This excerpt provided evidence of behavioral engagement of Choi as he and his teammates would invest effort in looking for unfamiliar linguistic expressions and participates in corrective feedback practice. However, at the same time, a secondary affective dimension was also reflected as they 'tried to look out for each other'. The axial coding process was contextualized instead of focusing on single decontextualized utterances from Choi. In the final selective coding, a holistic and abstract understanding of Choi's engagement in gaming in relation to incidental vocabulary acquisition was achieved. The data set was analyzed individually and then negotiated between the researchers who reached a census on the final themes according to the research goals.

To further exemplify and supplement the findings from the reflective essays and interviews, Choi was asked to provide a list of words or phrases that are frequently used in his games to help the researchers contextualize the initial findings. Meanwhile, Choi spent over 3 hours in person talking to the researchers through the use of certain words based on his verbal interactions in his recent recorded gaming episodes. Due to the word limit, some selected episodes will be discussed in this paper to offer an emic perspective of Choi's engagement in the gameplay.

5 | Findings

The first subsection here presents readers with the general language learning background of Choi, primarily highlighting his attitudes towards English and Cantonese. The second subsection sheds light on how Choi acquired vocabulary from digital games from the perspective of learner engagement.

5.1 | Unsuitable Language Learning Support

Choi in his reflective essays and interviews consistently presented a self-image of an academically *poor* learner with little interest in school education. First, he remarked that he was not good at his native language of Cantonese. As a local native Cantonese speaker, Choi remarked that he found the Cantonese language challenging and tedious for him due to its complexity. With such a mind-set, Choi discovered that 'it is less of a tongue twister to speak English' (excerpt from interview 1). He preferred to use English in his daily communication with his friends. Yet, his penchant for English was to some extent prohibited by his classmates' over-reliance on Cantonese in their school learning environment.

> Even if you are working on an English learning project, you use Chinese all of the time. Though you write in English, you use Chinese all the other time. There is no practical time when you would use English.

Upon reflection, Choi maintained that his peers tended to refer to Cantonese in collaborative learning projects, which he found not enjoyable or constructive for his attempts to improve his own English learning.

Furthermore, though his negative perceptions of Cantonese drove him to develop a positive attitude towards the English language, he did not quite enjoy taking English lessons in school. As a student in the exam-dominated culture, Choi had no choice but to focus primarily on obtaining high marks in different English tests, which demotivated him in his general language learning. In his interviews, he remarked that,

FIGURE 1 | Visualization of the word 'reinforce'. [Color figure can be viewed at wileyonlinelibrary.com]

> "I would not say I thoroughly enjoyed school, so it is difficult to say that I enjoyed learning English. Much of the focus was put on examination skills, learning some vocabularies and writing organization was fruitful."

Apparently, the traditional, orthodox mode of language learning in Hong Kong seemed unfit for Choi. The test-oriented teaching and dependence on Cantonese among his peers did not construct a conducive environment for him to augment his English language learning. This lack of engagement in conventional classroom settings hindered his ability to fully immerse himself in the language. However, he was able to develop his English linguistic knowledge through digital gaming. This alternative approach provided a more interactive and engaging environment, allowing Choi to practice English in a context that was both motivating and relevant to his interests. Through gaming, he encountered authentic language use and was able to apply his skills in real-time, which significantly enhanced his engagement with the vocabulary learning experience.

5.2 | Choi's Engagement in Digital Gaming and English Vocabulary Acquisition

Since the three types of learning engagement are usually intertwined, we found it difficult to dissect and present them individually in this paper. Hence, we decided to showcase Choi's learning engagement from three aspects, including visual-auditory alignments of English words, authentic input and output of English words, and repetitive exposure and applications of English words.

5.2.1 | Visual-Auditory Alignments of English Words

The engagement in Choi's language learning journey highlights the critical role of multimodal experiences in enhancing vocabulary acquisition and overall language proficiency. One recurring theme from the reflective essays and interviews is the demonstration of English vocabulary in the visual and auditory modalities. Choi identified himself as both a gamer and a learner, benefiting significantly from the visual-auditory stimulation provided by English digital games. This method of learning contrasts sharply with traditional reading-focused approaches, which Choi found less effective due to his self-described struggles with reading in both English and Cantonese.

> I'm more visually and auditory stimulated [*sic*]…I'm a terrible reader and I should be but I'm kind of proud of myself that I didn't really read any books to get where I am now with my English level.

Choi remarked that he was neither an excellent reader nor a book lover in terms of both English and Cantonese. He resorted to a visual-auditory learning style in learning the English language. When asked about reading instructional manuals in digital games, Choi talked about his experience:

> I would say reading those instructions back then, when they were like instruction manuals, like an actual book, I just didn't understand it…But now things are a lot simpler for video games like they can have a visual demonstration of what button does [*sic*]. Then you don't actually read everything as games visualize for you quite easily.

It appeared that Choi's learning style was gradually cultivated in a trajectory akin to the development of digital games when he grew up: from the traditional hardcopy to the current video-based instructions. According to Choi, hard copies of English game instructions were usually challenging for EFL learners with insufficient proficiency, while the video-based instructions improved his motivation and cognitive understanding of the games. The use of explanatory videos reduced the reading comprehension problems for Choi but better helped him behaviorally, cognitively, and affectively focus on the English walkthroughs of games.

To demonstrate his point, Choi talked about his acquisition of the word 'reinforce' from games. As Figure 1 showcased, the audio instruction 'Hold C to reinforce' was visualized through

two hands holding a door bolt to keep the enemies outside the door. It helped him understand the action instead of reading the word abstractly through a textbook. He appreciated the unique routes for students who had little interest in formal schooling to develop the knowledge of English through hands-on gaming, which offered experiential, attentive, and incidental vocabulary acquisition.

To further illustrate the way he acquired English words, Choi provided an example of playing the English version of Minecraft where he encountered and then acquired new words:

> You would see and you kind of have to learn those words so you can enjoy the great game and those words can be pretty specific. It [The Mine craft] is about geography and minerals and stuff so you learn quite a lot more words in that field. Like 'Oh! That tool that the miners use is called a pickaxe, not a pointy thing'.

The above excerpt exemplifies that with appropriate, authentic context, Choi leveraged the chance of developing his English vocabulary knowledge subconsciously through multimodal representations in digital gaming, which stimulated his interest and reinforced his understanding of difficult words. Similar examples were given by Choi such as 'tossing the bomb', 'stay behind the shield', and 'loading new magazine'. Choi's engagement with English language learning through digital gaming thus underscores the transformative potential of interactive and multimodal educational experiences. The shift from hard copy instruction manuals to video-based tutorials within games marks a significant enhancement in Choi's learning engagement.

5.2.2 | Authentic Input and Output of English Words

Choi discussed how digital games enabled him to acquire, learn, and practice his L2. Firstly, authentic audience and purposes were the primary driving force for him to use English consistently when playing digital games. According to Choi, all the digital games he played were online games in which real-time interactions were essential. He shared his experiences with international players:

> We still have to converse in English because we don't want to leave out our American friend.

With international players, it was evident that Choi autonomously resorted to the medium of English so that he could better engage with the other players. In a sense, Choi had unconsciously taken on the identity of an L2 user instead of an L2 learner as the purposes for him to converse in English were authentic and urgent in synchronous gameplay. Such authentic linguistic socialization in games with the time pressure may lead to better understanding and internalizing the meaning of new English words (Jensen 2017). Choi's engagement with English through interaction with international players in digital games highlights the powerful role of authentic communication in language acquisition. By autonomously choosing to use English to engage with other players, Choi shifted from being merely an L2 learner to actively embodying the identity of an L2 user. This transition is significant because it underscores the authentic and immediate need for communication in real-time gameplay, which naturally enhances language engagement.

In addition to the incidental learning of English from the conversations with international gamers, Choi suggested an ecological interplay of authentic input and conscious learning for L2 vocabulary learning:

> "…we would hear a lot more words and I think there are also certain words from, for example, Singapore that they use and it's part of English…I would ask 'What? What did you say?' and then they'll give me a whole definition and like when to use it, what can I use it for and such."

In addition to acquiring the English vocabulary from games, it was noteworthy that digital games offered Choi unique opportunities to learn the use of English words from other gamers. With specific Singaporean English expressions, Choi was motivated to inquire about the meaning and usage of them, which indicated his intentions of advancing his L2 vocabulary knowledge both cognitively and behaviorally from authentic interactions in games. Similar ideas were found in his diaries, interviews, and recorded video clips of his gameplay as he interacted with international gamers from such as the USA, UK, Australia, and Malaysia.

Secondly, due to the exposure to in-game instructions (both daily and technical vocabulary), Choi has attempted to mimic the discourse styles in his speaking. As he discussed in the above excerpt, words were visualized in authentic game texts, which furthered his English vocabulary knowledge. Likewise, Choi shared that he would use certain discoursal expressions with other gamers so that they could understand each other and ensure the progress of the game. An example given by Choi was when he acquired and actively used the word "breach". According to Choi, "breach" was a game word with a high frequency of use and he encountered the word in different ways; sometimes as a noun and sometimes as a verb. Meanwhile, his teammates and he often used the phrase "breach the wall", reinforcing his understanding and usage of this word.

However, one salient feature of the game discourse was the condensed expressions. For example, Choi provided an example of "Someone is in the bedroom." This is a reminder to his partners about paying attention to potential enemies in the room, but due to the urgency in games, he tended to shorten the sentence to "one bedroom" or even "bedroom." Such shortened or one-word expressions were different from our daily expressions whereas they were unique and authentic in the world of games.

5.2.3 | Repetitive Exposure and Applications of English Words

Choi believed that he gained benefits from repetitive exposure to the English language and the different chances to use English in and out of gaming. Situated in authentic contexts, Choi was

able to expand his vocabulary knowledge in games in a repetitive manner:

> "The word itself was "intrinsic". I actually only first heard this word from the video game 'NieR Replicant'. The original line from the game was '…these shades you fight and these verses are intrinsically linked'. Basically, you will hear this word every now and then in this game. Without really understanding the word, I was still able to understand the sentence through context."

The above excerpt exemplified that, with the authentic, contextualized presentation of words, gamers like Choi could leverage the repetitive discoursal styles of game instructions. In other words, due to the repetitiveness of certain words, phrases, or sentences, Choi cognitively picked up words while participating in games behaviorally.

In addition to the incidental way of vocabulary acquisition, Choi also talked about his explicit use of new words in games. Specifically, in the way of in-game interactions with gamers, Choi made extensive use of English, which consolidated, reinforced, and improved his vocabulary knowledge and skills. A typical practice was giving instructions or reporting their situations in the game, during which Choi applied his English vocabulary knowledge in a repetitive manner in different gaming contexts. Choi explained:

> "Yes, it's a lot of repetitive core vocabulary… you say 'oh, planting', 'cover me', or 'drop a smoke'. Those things will definitely be repeated so many times over time."

This excerpt pointed out that Choi recognized that there may exist a core set of English vocabulary for gamers, indicating that some deliberate attempts to memorize and use certain words with other gamers. Moreover, unlike traditional drilling exercises, the repetitiveness of core vocabulary took place over time, which better helped Choi transform a few receptive words into productive words.

Another major reason for the repetitive practice of English expressions was that due to the real-time and cognitively demanding nature of most online games, Choi preferred to repeat his words multiple times so as to reflect a sense of urgency.

> Of course, repeating, for example, 'cover me', 'cover me', 'cover me', gives a sense of urgency.

It indicated that the linguistic repetitiveness was by no means a random choice made by the gamer. Instead, within the limited reaction time, Choi made the contextual decision of using certain English expressions repetitively. This underscores a heightened learning engagement due to time urgency.

Beyond the scope of games, Choi developed his vocabulary knowledge by watching overseas YouTube gamers playing games. By engaging in the international gaming community, Choi reflected that he spent a large amount of time observing professional game competitions, which were organized with the medium of English. He further explained that he started watching such games at a very young age, and he noticed that gamers tended to use similar linguistic expressions. He thus developed the habit of imitating, sometimes studying, and using the newly learned words in his interactions with other gamers. For example, he shared that:

> "When I noticed some words were used repetitively, I sometimes would check out their meaning. Of course, I try to use them later when I play with my mates. I guess it's just righter and more professional to use these words."

It seemed evident that attention was paid to unknown words in Choi's observation of international game competitions. In an attempt to develop his identity as a professional player, Choi consciously included words used by professional gamers in his own gaming experience.

Choi's engagement with English language learning through gaming is significantly enhanced by the authentic and contextualized presentation of vocabulary within the gaming environment. This setting allows gamers like Choi to leverage the repetitive nature of game instructions and dialogues, facilitating both incidental and explicit vocabulary acquisition. The repetitiveness of specific words, phrases, or sentences in games acts as a powerful tool for cognitive absorption. As Choi participates in games, he encounters core vocabulary repeatedly, enabling him to pick up new words and phrases naturally and subconsciously. This process mirrors the way language is learned in immersive environments, where repeated exposure in meaningful contexts helps solidify understanding and retention.

6 | Discussion

The discussion, drawing upon the findings, mainly revolves around the understanding and interpretation of learner engagement in the context of digital gaming. First, collaborative interactions among teammates facilitated learner engagement. Behaviorally and cognitively, Choi needed to execute precise actions in the game and communicate effectively with his teammates, employing appropriate English language skills and expressions to initiate, participate in, and sustain interactions. This aligns with Vygotsky and Cole's (1978) framework on *mind in society*, which posits that social interaction plays a fundamental role in the development of cognition. In the gaming environment, Choi's need to collaborate with teammates provided a context for meaningful language use, which is critical for language acquisition. Affectively, based on the videos shared by Choi, he tended to express his feelings by raising his tone, adjusting intonation, and employing certain emotional expressions during interactions with his teammates. Notably, Choi emphasized the strategic use of repetition to convey urgency, reflecting a deliberate cognitive choice that modified his linguistic behavior. This aligns with Hiver et al. (2021) that strategic use for engagement is a crucial part of the learning process as it pushes learners to process language at a deeper level. Furthermore, the

interactive experiences with global players created distinctive learning opportunities for Choi. To ensure a smooth gaming experience, Choi had to decipher the meaning of his teammates' English expressions. Such interactions drove him to use cognitive resources such as dictionaries or consult with his fellow players. In line with the findings of Li et al. (2024), even those who were not avid gamers effectively utilized resources related to the game. They made conscious efforts to enhance their spoken English through intentional learning strategies, including pronunciation practice, note-taking, and reflective reviews. This proactive approach to learning marks a significant advancement over incidental learning, indicating that these learners have cultivated both the awareness and the skills necessary to leverage the game as a tool for language acquisition. In line with the qualitative findings of Kazu and Kuvvetli (2023), participants expressed positive metaphors about digital gaming, highlighting its effectiveness in the learning process. Digital gaming not only enhanced academic performance on tests by facilitating long-term vocabulary retention but also motivated students through engaging in-game bonus features. Furthermore, learners felt empowered to pursue their studies independently and limitlessly, free from the fear of failure. Hence, digital gaming can be an effective strategy for promoting incidental vocabulary learning by enhancing motivation, providing excitement, and reducing fear of failure. As reported by Choi, the immersion in authentic interactions further motivated him in acquiring and using English while gaming, highlighting the importance of authentic communicative contexts in language learning.

Second, repetitive and authentic exposure to the English language improved Choi's engagement. Affectively, authentic and contextual exposure to the language motivated Choi to become familiar with linguistic expressions and usage. As Choi commented, when repeatedly hearing some expressions, he would start to pay more attention to the input, motivating him to work out the meaning and usage. Behaviorally and cognitively, he self-regulated his L2 learning by practicing the vocabulary knowledge acquired through repetitive in-game instructions. Metacognitive awareness is a key component of the digital gaming process, which emphasizes the role of personal initiative and control for a language learning community (Teng 2024). In the present study, Choi intentionally used new words or phrases acquired in gaming with his fellow players so he could fully participate in the gaming community. This practice allows us to argue for the importance of situated learning, where learning occurs most effectively within a community of practice.

Third, in contrast to traditional pen and paper learning methods, digital gameplay offers chances for gamers to engage in multimodal and multisensory learning contexts. Multimodal learning encompasses cognitive, behavioral, and affective dimensions. Our finding suggests that individuals who are visual and auditory learners may exhibit a strong inclination towards game-enhanced vocabulary learning since the multimodal presentations in games well align with the needs of such learners. Exemplified by Figure 1, the integration of various sensory input and output within gaming environments give rise to increased motivation for Choi in learning (Byun and Loh 2015) with audio cues notably enhancing engagement. Gee (2012, xii) observes that learning through digital games is distinct from traditional classroom learning as games put 'performance before competence … and experiences and actions before words and texts. This means players are learning by doing, and that they have images and experiences to give deep meaning to the words and texts they read later, in order to resource their play and learning.' Previous studies have underscored the benefits of stimulating multiple senses in the learning process. For example, Lee et al. (2023) showcased that engagement levels can be improved for learners with low-proficiency levels through multisensory, experiential learning approaches. Our study further exemplifies that for academically challenged learners like Choi, who struggled with textbook learning, digital gaming serves as an effective alternative to improve their engagement in self-directed learning initiatives.

Fourth, contextual factors jointly influenced Choi's engagement with English language acquisition. For example, his negative emotions towards his native language, Cantonese, gradually led to the development of his identity and a metacognitive decision to use English, his second language, as the primary medium of communication. Though he kept using English in his study and daily life, his use of English was to some extent impeded at school by his peers' preference for Cantonese and his teachers' focus on achieving high scores in English examinations. It was clear that Choi formed an identity as an L2 user instead of a mere learner, which further motivated him toward autonomous language learning. Furthermore, when playing games, he assumed the identity of a professional player, utilizing advanced English vocabulary relevant to gaming. This self-perception motivated him to observe and adopt the linguistic expressions employed by professional gamers, thereby integrating them into his own gaming experiences. In addition, digital gaming mediated Choi's acquisition and communication in English. As he mentioned, time constraints during gaming led to the abbreviation of sentences or phrases, corroborating with Peterson's (2016) finding that gamers 'incorporated a wide range of discourse functions including a simplified register appropriate to the computer-based nature of the interaction' (Peterson 2016, 1187). This finding suggests the cognitive choice made by Choi, leading to his behavior of using condensed expressions.

Through illuminating the transformative potential of a fully autonomous gaming environment on language learning, the findings here reveal a multifaceted engagement model where collaborative interactions, repetitive and authentic language exposure, multimodal learning contexts, and contextual factors converge to enhance incidental vocabulary acquisition. Behaviorally and cognitively, the necessity for precise actions and effective communication within the game mandates the use of strategic language skills, fostering a dynamic learning environment that necessitates active participation and cognitive engagement. Affectively, the emotional investment in gaming, as demonstrated through expressive communication and reactions to gameplay, underscores the motivational aspect of learning in a digital context. Moreover, digital gaming, with its rich multimodal and multisensory experiences, aligns well with the needs of diverse learners, offering a compelling alternative to conventional learning methods, particularly for those who find traditional educational approaches challenging. The integration of various sensory inputs within gaming not only enhances engagement but also facilitates a deeper understanding and retention of language. Additionally, the development of a learner's identity and the influence of contextual factors highlight the complex interplay

TABLE 1 | Learner engagement in digital gaming.

Themes	Levels	Explanations
Collaborative interactions	Precise actions	The game's requirements for exact actions promote strategic language skills.
	Effective communication	Tasks and missions within the game necessitate clear and effective communication.
	Immersive experiences	The game environment is immersive and requires active participation.
Repetition and authenticity	Meta-cognitive strategies	Players use meta-cognitive strategies to regulate the use of words in games.
	Motivations	The engaging nature of games increases motivation to learn.
Multimodal and multisensory learning	Input and output	Games provide diverse sensory experiences that cater to different learning styles.
Contextual factors	Attitudes to mother tongues and L2	Players' attitudes towards the use of L2 and mother tongue exert an influence on the acquisition and learning of L2.
	Identity	Players develop new identities within the game, which can influence their learning.
	Nature of the game	The nature of games influences the level of engagement.

between personal, social, and educational elements in language acquisition. The case of Choi exemplifies how digital gaming can mediate language learning, encouraging learners to adopt new identities that motivate autonomous learning and the strategic use of language. This study, therefore, advocates for a broader recognition of digital gaming as a valuable tool in language education, capable of fostering comprehensive engagement and offering unique, effective learning opportunities.

Based on the findings, our understanding of learner engagement in incidental vocabulary acquisition in the context of digital gaming can be advanced from the following aspects (Table 1).

7 | Implications

The study's exploration of a fully autonomous gaming environment as a medium for incidental vocabulary acquisition offers profound theoretical and pedagogical implications for the field of language learning. Theoretically, it underscores the multifaceted nature of learner engagement, extending beyond traditional classroom settings to include digital platforms where behavioral, cognitive, and affective dimensions interplay in a dynamic way. The findings suggest that collaborative interactions in gaming can significantly enhance learner engagement by necessitating precise actions, effective communication, and emotional investment, thereby facilitating a deeper connection with the language being learned. This challenges existing theories of language acquisition by highlighting the importance of authentic, contextualized, and interactive experiences in fostering language learning (Wu et al. 2024).

Pedagogically, the study advocates for the integration of digital gaming into language education curricula as a viable tool for enhancing learner engagement and vocabulary acquisition. It suggests that educators should consider creating learning environments that emulate the immersive, multimodal, and multisensory aspects of digital games. Such environments could cater to diverse learning styles, particularly benefiting visual and auditory learners, and provide authentic language exposure that traditional methods may lack. The study also highlights the potential of digital gaming to serve as an alternative learning pathway for learners who struggle with conventional learning methods, suggesting that games could be strategically used to improve engagement and motivation among academically challenged language learners.

Furthermore, the role of contextual factors and learner identity in language acquisition, as demonstrated by the subject's shift towards using English due to personal and social influences, points to the need for language educators to consider learners' backgrounds, preferences, and identities in designing and implementing language learning interventions. This includes recognizing and leveraging learners' interests, such as gaming, to facilitate language learning in a manner that is both engaging and effective.

Theoretically, the findings underscore the multifaceted nature of learner engagement, extending beyond traditional classroom settings to include digital platforms where behavioral, cognitive, and affective dimensions interplay dynamically. The theoretical understanding of engagement is enriched by recognizing how these dimensions interact within a gaming context. Behavioral engagement manifests through active participation and task completion, while cognitive engagement involves critical thinking and problem-solving as learners navigate game challenges. Affective engagement is reflected in the emotional responses elicited by the gaming experience, such as excitement and enjoyment, which can enhance motivation. Together, these dimensions create a holistic engagement framework that supports incidental vocabulary learning in a meaningful way. When learners are actively engaged—across behavioral, cognitive, and affective dimensions—they are more likely to acquire vocabulary

incidentally. The immersive nature of games creates a rich environment for interaction with language in varied contexts, enhancing retention and understanding. Engaging activities stimulate intrinsic motivation, leading to a greater willingness to explore and learn new vocabulary, as enjoyment transforms learning into a pleasurable experience. Furthermore, the contextual nature of incidental vocabulary learning aligns with engagement principles, emphasizing the importance of meaningful, interactive experiences. By embedding vocabulary within engaging contexts, learners can better grasp and retain new terms. Additionally, games often provide opportunities for social interaction, allowing learners to practice vocabulary collaboratively, thereby reinforcing language learning through peer interactions.

8 | Conclusion

The present study offers some interesting evidence that game addictions could afford a silver lining to incidental vocabulary acquisition based on a student who did not appreciate formal school education. It seems to the game-addicted student that digital gaming can be an effective approach to acquiring English vocabulary in an unorthodox context, where crucial vocabulary acquisition rules such as repetitions, authenticity, and multimodality could be reflected and implemented in the interactions between the gamer, game mates, and the game itself. The study has the potential for inclusive education, especially for learners who fail to perform adequately in class. Because of the complexity of individual differences in language learning, perhaps it is time that educators, parents, and teachers treat learning through digital gaming seriously by carefully planning, organizing, and guiding learners to self-regulate their incidental learning toward a more conducive direction by making the utmost of the unique affordances of gaming.

There are a few limitations to this study. First, the present study adopted a qualitative research paradigm to understand the game addict's lived experiences, making it difficult to generalize to wider contexts. However, few studies have uncovered the experiences of game addicts, and thus this study could serve as a springboard for future research. Second, the game addict in this paper came from a developed area with abundant digital and social resources. It may be of interest to investigate the experiences of game addicts from underprivileged areas or families, which will be more informative to the development of inclusive education. Finally, future researchers can profit more from extended ethnographic perspectives which include multiple players with different linguistic backgrounds (a common occurrence within gaming teams). In this way, common themes of engagement and incidental L2 vocabulary acquisition in digital gaming might be uncovered and be of interest to various educational stakeholders.

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Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Peer Review

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