

**Exploring the Practices of Digital Game-based Language Learning
through Action Research**

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Abstract

The proliferation of digital games in people's leisure time has sparked growing scholarly interest in games' educational value and potential pedagogical application. This thesis reports on an action research project that consists of three studies designed to explore the practices of digital game-based language learning (DGBLL), with a focus on pedagogical mediation, learning benefits and learner perceptions.

The first study draws upon the framework of community of inquiry to support DGBLL outside classrooms. This study lasted 6 weeks and involved 11 intermediate English learners in China. Mixed methods design was employed to investigate the participants' language development, participation, and perception. The volunteer participants played *Life is Strange*, an interactive adventure game, in an out-of-class setting, with the instructor present and scaffolds available online. Results showed that the participants made statistically significant gains in vocabulary learning. Moreover, it is found that the participants believed that they made progress in listening, reading and improved their ability to learn independently. The findings also showed general satisfaction towards this DGBLL experience and in particular, highlighted the pivotal role of the instructor.

Based on the first study, the second study draws upon the concept of bridging activities to examine the practice of DGBLL in a language classroom where six Japanese students engaged in instructed gameplay of *Life is Strange*. Both qualitative and quantitative data were collected and analyzed so as to measure participants' learning outcomes, document their engagement, and explore their perceptions of

DGBLL. Results suggested progress in vocabulary recall and transfer. Participants also reported gains in writing and listening, satisfaction with the project, along with positive attitude towards DGBLL. Moreover, it is found that the instructor has a crucial role to play in pre-game set-up, in-game guidance, and post-game feedback.

Based on the feedback from the previous two studies, the third study applies activity theory to describe and analyze an out-of-school project in which eight non-gamers played *Phasmophobia*, a massively multiplayer online game (MMOG), to learn English. Based on data collected through questionnaires, journals, recordings and interviews, thematic analysis was performed to identify the recurrent themes, which were then mapped onto the activity system. Four contradictions were identified in the process. Among them, temporary contradictions dominated the early phase of the project and were easily resolved. However, inherent contradictions, mainly manifesting themselves through inadequate competence and learner variation, remained unresolved. Efforts to overcome these tensions resulted in the evolvement of the activity system. In terms of the actual outcomes, there was evidence for the development and exercise of autonomy. Learners also reported enhanced confidence and gains in vocabulary, listening and oral fluency.

The research yields empirical evidence regarding the benefits of DGBLL and holds important pedagogical implications for the integration of games into educational settings. It also contributes to this ever-growing field by revealing how non-gamers make use of digital gaming for language learning in an informal setting. The limitations of this research and future research directions are also discussed.

要約

人々の余暇におけるデジタルゲーム使用の増加は、研究者たちのゲーム教育の価値と潜在的な教育への応用に対する注目を引き出している。本論文は、教授媒介、学習効用と学習者認識という3つの面に焦点を当てて、デジタルゲームに基づく言語学習「Digital game-based language learning 『DGBLL』」の実践を考察する3つの研究からなるアクション・リサーチを報告する。

1つ目の研究は、探究の共同体におけるフレームワークを利用し、教室外でのDGBLLのサポートを考察した。この研究は、中国の中級英語学習者11人を対象に、6週間にわたって行われた。混合研究法デザインを活用し、参加者の言語発達、参加度と認識を調査した。指導者の伴いとオンラインスキヤフォールディング利用可能な授業外環境において、参加者はインタラクティブアドベンチャーゲーム『Life is Strange』をやる。その結果、参加者の統計的に有意な語彙量の増加が示された。それに、参加者はリスニングとリーディングが上達し、自主的な学習能力も向上したと考えていることもわかった。また、DGBLL経験への普遍的な満足が示され、特に指導者の肝心な役割が強調された。

1つ目の研究を踏まえ、2つ目の研究は、ブリッジング活動の概念を用いて、言語教室におけるDGBLLの実践を研究した。言語教室で6人の日本人学生が『Life is Strange』の指導的なゲームプレイに携わっていた。参加者の学習成果を測定し、参加状況を記録し、DGBLLに対する認識を考察するために、実験の質的と量的データを収集・分析した。その結果、語彙想起と語彙変換の進歩が示唆された。また、参加者から、ライティングとリスニングの

上達、プロジェクトへの満足や DGBLL に前向きな姿勢などの報告を受けた。さらに、ゲーム前の設定、ゲーム中の指導、ゲーム後のフィードバックにおいて、指導者が重要な役割を担っていたことがわかった。

前の 2 つの研究からのフィードバックを踏まえ、3 つ目の研究は活動理論を応用し、普段ゲームしない人 8 人に『Phasmophobia』という多人数同時参加型オンラインゲーム (MMOG) をやりながら英語を学ぶというプロジェクトを考察・分析した。アンケート、ゲーム日記、ゲーム記録、インタビュー等からデータを収集し、主題分析を行って繰り返して出た主題を確定し、活動システムにマッピングした。四つの矛盾が確認された。その中で、初期は一時的な矛盾に支配されたが、簡単に解決された。しかし、言語能力不足や学習者のばらつきなどの内的矛盾は未解決のままであった。その局面を乗り越えるための努力は活動システムの進化をもたらした。実際の成果としては、オートノミーの訓練と発展の証拠が発見された。また、学習者から、語彙力、聴解力、会話の流暢さにおいて、自信を高めたという報告があった。

本論文は、DGBLL のメリットに関する実証的証拠を出しており、ゲームを教育現場に取り入れるに関する教育的な示唆を示した。普段ゲームしない人が非公式な環境でどのようにデジタルゲームを活用して言語学習することを解明することで、この成長し続けている領域に新たな知見を貢献した。最後に本研究の限界と今後の研究方向についても議論した。

Acknowledgements

First of all, I'd like to express my sincere gratitude to my supervisor, Professor Mark Peterson, who has expertly guided me through my PhD journey and smoothed the way when the journey got tough. Due to the Covid-19 pandemic, I failed to meet him in person in the past two years, but online discussions with him were always enlightening and I was always able to learn new ways to design, write and think from his timely, detailed and constructive comments. His sense of humor also added a touch of color to this journey. Additionally, I learned what really mattered in doing research: passion and persistence.

To my long-suffering husband, He Li, who was endlessly patient and supportive: thank you for your love, care and understanding and for cheering me up through the ups and downs. This thesis would not have been possible without your constant support and your assistance with all the technical issues.

To my dear friends who kindly helped me along the way: I owe you so much for your encouragement and support. I would particularly like to thank Wang Qiao who encouraged me to embark on this journey. Her support played an integral part in turning my thoughts into actions. To Gong Yu, I cannot thank you enough for carrying on all the Japanese translation. I would also like to thank Wang Haitao for helping me deal with the administrative work while I was away. To Lun Lulu, thank you for all the proofreading and for being at the end of the phone whenever I needed you.

My thanks also go to all the students who participated in the research. Although you are unnamed here, the moments spent with you were special memories.

Table of Contents

Abstract.....	i
Acknowledgements.....	v
Table of Contents	vi
List of Tables.....	xi
List of Figures	xii
List of Abbreviations.....	xiii
Chapter 1. Introduction	1
1.1 Background	1
1.2 Aims and Research Questions.....	3
1.3 Outline of Thesis.....	7
Chapter 2. Literature Review	9
2.1 Literature Review.....	9
2.1.1 Computer Assisted Language Learning	9
2.1.2 CALL and Digital Games	12
2.1.2.1 Digital Games from the Ecological Perspective.	14
2.1.2.2 Digital Games from the Sociocultural Perspective.	16
2.1.2.3 Digital Games from the Cognitive Perspective.	18
2.1.2.4 Digital Games and Language Learning Benefits.....	20
2.1.2.5 DGBLL in Language Classrooms.....	20
2.1.2.6 DGBLL in Out-of-school Settings.....	22
2.1.2.7 Game Genres and Language Learning.....	27
2.1.2.7.1 Adventure Games and Language Learning.....	27
2.1.2.7.2 MMOGs and Language Learning.	29
2.1.3 Research Gaps.....	31
2.2 Theoretical Framing.....	33
2.2.1 Sociocultural Theory.....	33
2.2.2 Community of Inquiry	35
2.2.3 Bridging Activity	37

2.2.4 Activity Theory	39
2.3 Chapter Summary	43
Chapter 3. Methodology	44
3.1 Proposed Methodology	44
3.2 Research Design.....	46
3.3 Research Method	48
3.4 Games Selected for the Research.....	49
3.5 Research Trustworthiness	53
3.6 Ethical Considerations	54
3.7 Chapter Summary	55
Chapter 4. Study one. Using Community of Inquiry to Scaffold Out-of-School Digital Game-based Language Learning	56
4.1 Introduction.....	56
4.2 Methods.....	57
4.2.1 Context and Participants	57
4.2.2 Research Design.....	58
4.2.3 Data Collection	60
4.2.3.1 Vocabulary Tests.	61
4.2.3.2 Questionnaire.	61
4.2.3.3 Semi-structured Interviews.	62
4.2.3.4 Online Postings.	62
4.2.4 Data Analysis	62
4.3 Results.....	64
4.3.1 Research Question 1: What are the Learning Effects of Out-of-school Gaming?	64
4.3.2 Research Question 2: What are the Students' Participation Levels and Patterns?	67
4.3.3 Research Question 3: How Do Students Perceive the Learning Experience of Out-of-school Gaming?	71
4.3.3.1 Student's General Satisfaction.	71

4.3.3.2 Student’s Perceptions of the Scaffolds.....	72
4.3.3.3 Perceptions Concerning the Benefits.....	73
4.3.3.4 Difficulties Encountered and Suggestions for Future Improvement.....	76
4.4 Discussion.....	77
4.5 Chapter Summary.....	81
Chapter 5. Study Two. Digital Gaming in the Language Classroom: Student Language Performance, Engagement, and Perception.....	83
5.1 Introduction.....	83
5.2 Methods.....	84
5.2.1 Context and Participants.....	84
5.2.2 Research Design.....	85
5.2.3 Data Collection.....	87
5.2.3.1 Vocabulary Tests.....	88
5.2.3.2 Questionnaire.....	88
5.2.3.3 Classroom Observation Scale.....	89
5.2.3.4 Online Discussion.....	89
5.2.3.5 Game Reviews.....	90
5.2.4 Data Analysis.....	90
5.3 Results.....	91
5.3.1 Research Question 1: How Can Digital Gaming in the Classroom Facilitate Language Learning?.....	91
5.3.1.1 Vocabulary Retention.....	91
5.3.1.2 Vocabulary Reproduction.....	93
5.3.1.3 Writing improvement.....	95
5.3.1.4 Perceived Learning Gains and Incidental Learning.....	97
5.3.2 Research question 2: How Engaged are the Participants in This Classroom-based DGBLL Study?.....	99
5.3.2.1 Engagement with the Content.....	100
5.3.2.2 Engagement with the Instructor.....	101

5.3.2.3 Engagement with Peers.....	101
5.3.2.4 Online Engagement.....	101
5.3.3 Research Question 3: What Aspects of Teacher Scaffolds Do Learners Find Useful in the Context of DGBLL?	102
5.3.4 Research question 4: How do the Participating Students Perceive Their DGBLL Experience?.....	103
5.3.4.1 General Perception.....	103
5.3.4.2 Game Affordance.	104
5.3.4.3 Difficulties and Suggestions for Improvements.	104
5.4 Discussion.....	105
5.5 Chapter Summary	108
Chapter 6. Study Three. Out-of-school Language Learning through Digital Gaming: a Study from an Activity Theory Perspective	110
6.1 Introduction.....	110
6.2 Methods.....	111
6.2.1 Context and Participants	111
6.2.2 Research Design.....	112
6.2.3 Data Collection	113
6.2.3.1 Autonomy Scale.....	114
6.2.3.2 Exit questionnaire and Semi-structured Interviews.	114
6.2.3.3 Weekly Game Journals.....	115
6.2.3.4 Recordings.	115
6.2.4 Data Analysis	115
6.3 Results.....	117
6.3.1 Research Question 1: What Contradictions Emerged in This Out-of-school DGBLL Project? How Did Learners Experience and Resolve Them?	118
6.3.1.1 Contradiction A: Tool versus Object.....	119
6.3.1.2 Contradiction B: Subject versus Rule.	122
6.3.1.3 Contradiction C: Subject versus Community.....	123

6.3.1.4 Contradiction D: Community versus Division of labor.	124
6.3.2 Research Question 2: What are the Outcomes of the Activity System?	125
6.3.2.1 Development and Exercise of Autonomy.	125
6.3.2.2 Perceptions towards DGBLL.	127
6.3.2.3 Perceived Benefits.	128
6.4 Discussion	130
6.5 Conclusion	134
Chapter 7. Conclusions	136
7.1 Introduction.....	136
7.2 Discussions	136
7.3 Limitations	142
7.4 Future Research	143
References.....	145
Appendix A. Consent Form	174
Appendix B. Examples of the Interfaces of the Tools	176
Appendix C. Words for Vocabulary Tests in Study One	178
Appendix D. Overview of the Supplementary Materials Used in Study Two	179
Appendix E. Student’s Writing Sample with Feedback.....	180
Appendix F. Questionnaire Used in Study Two.....	181
Appendix G. Observation Scheme for the DGBLL Classroom.....	183
Appendix H. Writing Assessment Rubric (Jacobs et al., 1981)	184
Appendix I. Examples of Tracking Tasks and Students’ Notes	187
Appendix J. Learner Autonomy Questionnaire (Murase, 2015).....	188
Appendix K. Exit Questionnaire Used in Study Three.....	191
Appendix L. Weekly Game Journal.....	193
Appendix M. Two Examples of Student Notes (in Study Three)	194

List of Tables

Table 1 The Three stages of CALL (Warschauer & Healey, 1998; Warschauer, 2004).....	10
Table 2 Hypothesized Gains of Using DGBLL from Different SLA Theoretical Perspectives (based on Peterson et al., 2020 and Reinhardt, 2019).....	14
Table 3 Research Questions for Each Study in the Research	32
Table 4 Instruments Used in the Three Mixed-methods Studies	49
Table 5 Evaluation of the Two Games against Chapelle’s Criteria (2001).....	50
Table 6 Operation of CoI Coding Scheme in This Study (based on Garrison et al., 2000)	63
Table 7 New Words Used in Game Journals.....	93
Table 8 Coding Scheme for Contradictions Emerged During Out-of-school DGBLL	116
Table 9 Wilcoxon-signed Rank Test Results on Two Dimensions of Autonomy (n = 8).....	125
Table 10 The Overview of the Three Studies.....	136

List of Figures

Figure 1 Action Research Process Operationalized in this Research (adapted from Lewin,1948).....	6
Figure 2 Community of Inquiry Model (Garrison et al., 2000).....	36
Figure 3 Bridging Activities in the Context of Classroom-based Digital Gaming (Reinhardt, 2019).....	39
Figure 4 Engeström’s Activity System (Engeström, 1987)	40
Figure 5 Theoretical Framework Operationalized in the Study (adapted from Garrison et al., 2000)	59
Figure 6 Vocabulary Test Results of Pre-test, Post-test and Delayed Post-test	65
Figure 7 Perceptions of Perceived Progress.....	66
Figure 8 Participation Levels and Patterns	68
Figure 9 Student’s General Satisfaction with the Project	71
Figure 10 Student’s Perceptions of the Scaffolding.....	73
Figure 11 Perceptions Concerning the Benefits.....	74
Figure 12 Perceptions Concerning the Effect on the Learning Ability.....	75
Figure 13 Application of Bridging Activities in This Study	87
Figure 14 Vocabulary Test Results of the Pre-test, Post-test and Delayed Post-test	92
Figure 15 Scores of the Game Reviews.....	95
Figure 16 Learners’ Engagement Levels.....	99
Figure 17 Model for the Activity System in the Context of Out-of-school DGBLL	113
Figure 18 Activity System in the Context of Out-of-school DGBLL.....	118
Figure 19 Average Time Spent on Gameplay Each Week	126

List of Abbreviations

CALL	Computer-assisted language learning
CEFR	Common European Framework of Reference for Languages
CET	College English test
CLT	Communicative language teaching
CMC	Computer-mediated communication
COTS	Commercial off-the-shelf
DGBLL	Digital game based language learning
EFL	English as a foreign language
ESL	English as a second language
GBLL	Game-based language learning
L1	First language
L2	Second language
MMORPG	Massively multiplayer online role-playing game
MMOG	Massively multiplayer online game
TBLT	Task-based language teaching
TL	Target language
VR	Virtual reality
WTC	Willingness to communicate
ZPD	Zone of proximal development

Chapter 1. Introduction

Digital game-based language learning (henceforth DGBLL) unfolds in the landscape of computer-assisted language learning (henceforth CALL) and is attracting growing academic interest. This chapter provides an overview of the research area by identifying areas of importance and gaps in the literature relating, in particular, to the use of contemporary digital games. Moreover, the rationale for this research and research aims are presented and the possible contributions of this research to the field of CALL are discussed.

1.1 Background

With an annual revenue of \$152 billion and a gaming population of 2.5 billion worldwide (Newzoo, 2019), the gaming industry is developing at breakneck speed and digital games are increasingly pervasive in people's everyday life. More importantly, this trend seems to be long-standing and it even accelerates with technological advance and the widespread proliferation of Internet.

Against this backdrop, educators have made efforts to tap into the educational potential of digital games. As an ardent proponent of using games for educational purposes, Gee (2003) has illustrated in his groundbreaking article *What Video Games Have to Teach Us about Learning and Literacy* the 36 learning principles that “good” games have embodied in the game design. Prensky (2001), another pioneer in this field, proposed the term “Digital Game-Based Learning” to denote the use of computer games in educational contexts and he argued that games can accommodate different learning goals. In addition, an expanding body of empirical research has also

produced evidence that digital gaming can be effective in facilitating knowledge acquisition in diverse domains, ranging from STEM subjects (see Boyle et al., 2016; Connolly et al., 2012) to social science (Hung et al., 2012). There are also findings suggesting that digital gaming can improve computer skills, problem-solving skills, and critical thinking (Baek, 2008; Huang et al., 2022).

As a novel and interdisciplinary research field situated in CALL, DGBLL employs and adapts theoretical and methodological frameworks from a variety of areas ranging from computer and game design to education and second language acquisition (henceforth SLA) (Reinhardt, 2019). To justify the use of digital games for language learning, researchers have elaborated on the various “affordances” (van Lier, 2000) of digital games, namely, their perceived opportunities and potential for language learning.

One affordance noted in the literature is the high degree of immersion and visually appealing simulations provided by digital games (Gerhard et al., 2004). The immersive environments, coupled with the reward and competition system imbedded in games, are conducive to enhancing learner motivation and reducing affective barriers.

Moreover, with goal-orienting and feedback mechanisms, many well-designed digital games also engage learners in tasks and activities, which are perceived as beneficial since they are designed in a way to compel players to undertake increasingly more challenging tasks (Peterson et al., 2020). Many of those in-game tasks require collective problem solving, in that case, it is assumed that digital gaming

can facilitate communication in the target language (henceforth TL) and this affordance for languaging and social collaboration is also identified as noteworthy (Reinhardt, 2019).

An additional affordance emphasized in the literature is the frequent use of narrative (Atkins, 2003) as it is observed that many contemporary digital games contain all the elements of narrative (Murray, 1997; Ryan, 2006). With the multimodal combination of texts, graphs and videos, digital games provide opportunities for contextualized language learning (Dickey, 2006).

As part of learners' everyday life, digital gaming is also considered as a venue for autonomous and extramural learning (Chik, 2014). Gamers are able to engage in language socialization in the online gaming communities referred to as "affinity space" where groups of people are drawn together because of a shared, strong interest or engagement in a common activity (Gee & Hayes, 2012). Learning happens in those spaces and informal learning is a common outcome as they encourage the sharing of knowledge or participation in a specific area (Marone, 2015).

1.2 Aims and Research Questions

Now that studies have provided insights into the affordances of digital games for L2 learning, researchers have also investigated the impact of digital gaming and the current literature provides ample evidence that digital gaming is conducive to enhancing learning motivation (Connolly et al., 2011; Papastergiou, 2009), promoting engagement and interaction (Rama, et al., 2012; Zheng et al., 2015) and facilitating autonomous learning (Chik, 2011; 2014). The bulk of studies have also reported

positive learner perceptions regarding the use of digital games for language learning (Lai et al., 2012). Moreover, many studies presented evidence that digital gaming can not only serve as a motivational tool, but also facilitate learning gains such as vocabulary (Chen et al., 2018; Tsai & Tsai, 2018), listening (deHaan, 2005a; Hwang et al., 2017), speaking (Liu & Chu, 2010; Hofmeyr, 2020), writing (Coleman, 2002; Allen et al., 2014), reading (Suh et al., 2010) and translation (Calvo-Ferrer, 2017).

Findings to date have been promising, but several gaps can be identified. First, despite the growing interest in the use of digital games for the purpose of language learning and teaching, there is limited information regarding how digital games should be implemented in L2 learning contexts. In other words, if the practitioners do take interest in this novel approach, the current literature fails to inform them of the lessons and experiences that they can learn from and the effective practices that they can follow. This can be quite problematic. For one thing, despite the reported benefits of using digital games for language learning, the role of instructors cannot be replaced by digital games. Researchers have repeatedly cautioned against considering digital games as the “silver bullet” as digital gaming cannot translate automatically into learning gains and this is especially true for commercial off-the-shelf (COTS) games which were not designed for educational purposes (deHaan, 2019; Wang, 2019). It is also argued that gaming should be coupled with tasks and activities designed to raise students’ critical awareness of language, game content and gaming experience (Lai et al., 2012). In this sense, scaffolding or assistance is needed to strike a balance between gaming and learning as it is repeatedly emphasized in the literature that

pedagogical scaffolds are essential for learners to take advantage of complex games and their associated learning environments (deHaan et al., 2010; Kulikowich & Young, 2001; Um & deHaan, 2005). However, except for a few studies that provide details regarding pedagogical practices (e.g., Hitosugi et al., 2014; Miller & Hegelheimer, 2006), the literature is less well articulated with respect to the descriptions regarding the role of teachers (York, 2021) and just as Filsecker and B indgens - Kosten (2012) suggested, more research is needed to demonstrate what the instruction should look like. Furthermore, the current field of DGBLL is predominated by researchers instead of practitioners, but without the active involvement of instructors, the real potential of DGBLL cannot be realized and the use of digital games for L2 learning cannot be effectively promoted. The lack of teaching-oriented information results in a disconnection between theory and practice, and this is especially the case given that many instructors still hold skeptical attitudes towards DGBLL (Baek, 2008).

Second, while some studies point to the possibility of using digital games to facilitate autonomous language learning, few have actually measured the impact of digital gaming on autonomy levels. In other words, there is no empirical evidence of the link between digital gaming and learners' autonomy.

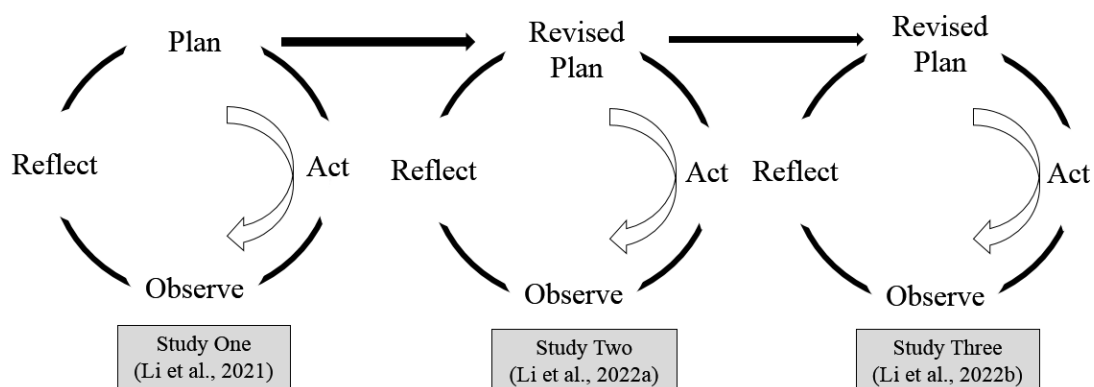
Third, major issues with the prior studies also include their narrow-focused scenarios, limited duration and neglect of non-gamers.

In an attempt to fill these gaps, three process-oriented studies (Li et al., 2021; Li et al., 2022a; Li et al., 2022b) informed by action research were conducted. As

shown in the Figure 1, this action research project aims to explore the practices of using digital games in different contexts, both in-class and out-of-class, and among different learners, both gamers and non-gamers. In doing so, cross-referenced data from three separate scenarios were collected so as to provide a more accurate and comprehensive account of the practice of DGBLL. Moreover, by triangulating their results and providing an integrated discussion of their findings, this thesis enhances and expands on these three studies.

Figure 1

Action Research Process Operationalized in this Research (adapted from Lewin, 1948)



This research would be particularly relevant for instructors as it can equip them with the necessary information for effective pedagogical choices. Moreover, it provides useful suggestions for autonomous learners who wish to utilize digital games for language learning on their own. It also contributes to the literature by

involving non-gamers in the DGBLL research for the first time and providing more evidence regarding the learning outcome, process and learner perceptions of DGBLL.

1.3 Outline of Thesis

The body of this thesis is made up of seven chapters. This introductory chapter is followed by a chapter which presents the literature review. Chapter 2 starts with a discussion of the current status of the research in the field and critically examines the most relevant empirical research. Then it moves on to explore the theoretical grounding that underpins the research. Chapter 3 deals with the methodology and related issues. It first introduces the methodology adopted and provides the rationale for its use. After that, it describes the overall research design of the thesis, introduces the digital games used and discusses the trustworthiness and ethical considerations of the work. Chapter 4 reports on a study that draws upon the framework of the community of inquiry (COI) to support out-of-school DGBLL. The study provides a detailed description of the scaffolds developed based on the COI framework and also investigates learning outcomes and learner perceptions. Based on findings of the first study, the second study reported in Chapter 5 uses the same game and engages six Japanese university students in in-class instructed digital gaming. This study measures participants' learning outcome, documents their engagement, and explores their perceptions of DGBLL. The findings highlight the pivotal role of the instructor in terms of pre-game set up, in-game guidance, and post-game feedback. The third study presented in Chapter 6 applies Activity Theory (AT) to describe and analyze an out-of-school project in which eight Chinese non-gamers utilize a massively multiplayer

online game (MMOG) to learn English for six weeks. As the first study to target non-gamers in the literature, this research documents learners' instructor-supported DGBLL practices, with a focus on the contradictions and the resolutions throughout the process. Findings also highlight the positive impact of digital gaming in terms of higher levels of autonomy, perceived learning gains and positive attitudes. The final chapter (Chapter 7) discusses the overall findings of this research, acknowledges its limitations and notes the key contributions and implications. It also provides a critique of the research methods and proposes possible future directions.

Chapter 2. Literature Review

The previous chapter has set the scene for this research by placing it into its context. This chapter presents a review of relevant literature. It consists of two main sections. The first section commences with a brief description of CALL, moves on to briefly review the field of DGBLL and outlines the research questions. The second section elaborates on the theoretical groundings that underpin this research by introducing the key theories and concepts.

2.1 Literature Review

This section begins with an overview of CALL with regard to its definition and how the field has evolved over time. The second section reviews the field of DGBLL, with a focus on its place in CALL, the classroom-based DGBLL, the DGBLL research in out-of-school settings and the potential of two game genres for L2 learning.

2.1.1 Computer Assisted Language Learning

Computer assisted language learning (CALL) is often described as “the search for and study of applications of the computer in language teaching and learning” (Levy, 1997, p.1). Nowadays, with the advance of technologies and digital devices, CALL has also evolved to a broad discipline that covers diverse topics and its definition has been further extended to “learners learning in any context with, through, and around computer technologies” (Egbert, 2005, p.4), indicating that CALL studies can be conducted using a myriad of technologies, from different perspectives and in a variety of contexts. This extensive definition speaks to the

breath and scope of the CALL and also attests to the fact that CALL has come a long way since its inception in 1960s.

In their well-known classification, Warschauer and Healey (1998) identified 3 developmental stages of CALL: structural CALL (1970s-1980s), communicative CALL (1980s-1990s) and integrative CALL (2000s), the characteristics of which are as shown in Table 1.

Table 1

The Three stages of CALL (Warschauer & Healey, 1998; Warschauer, 2004)

Stage	1970s-1980s: Structural CALL	1980s-1990s: Communicative CALL	21 ST Century: Integrative CALL
Technology	Mainframe	PCs	Multimedia and Internet
English-Teaching Paradigm	Grammar- translation & Audio-Lingual	Communicative Language Teaching	Content-based ESP/EAP
View of language	Structural (a formal structural system)	Cognitive (a mentally- constructed system)	Socio-cognitive (developed in social interaction)
Principal use of computers	Drill and Practice	Communicative Exercises	Authentic Discourse
Principal Objective	Accuracy	Fluency	Agency

Structural CALL, also termed as behavioristic CALL, is heavily influenced by Audio-Lingual and Grammar-Translation teaching method and thus featured drill and practice programs and computer software (Warschauer, 2004). Communicative CALL corresponded to the growing popularity of Communicative Language Teaching (CLT) and demonstrated a shift of focus to authentic communication. At the theoretical level, this phase is characterized by the dominance of the cognitive account of SLA which stressed that language learning is an internal mental phenomenon that occurs in the mind of the individual learner (Lafford, 2007). From this perspective, learners develop language primarily through input and interaction, therefore, CALL applications at that time were mainly used for the purpose of exposing learners to authentic input and providing them with opportunities to engage in interaction. The 21st century heralded the arrival of integrative CALL, which coincided with the advent of multimedia and ubiquitous Internet access. This period also witnessed the rise of theories of SLA that stress the social nature of learning (Block, 2003) and that language learning is deemed as a social phenomenon instead of a solely inner mental process (Zuengler & Miller, 2006). In this account, language serves as a mediating tool that enables learners to engage in cognitive development through social interaction with others (Lantolf & Thorne, 2006).

It should be noted that these three stages “did not occur in a rigid sequence” and they may be “combined for different purposes” (Warschauer, 2004, p.24). Moreover, to reflect the changes elicited by recent technological developments such as digital games, virtual reality, eyetracking and corpora, Chun (2016) also suggested

adding a fourth phase termed as “ecological CALL” which is informed by the ecological perspective of SLA (van Lier, 2004), focusing on the opportunities to learn language beyond the classroom and potential of using technologies to foster digital literacy or multiliteracies.

It is true that classifications like these are not without critics (Bax, 2003), but they do provide insights into the transformation of the CALL field and two points that merit attention emerge from this brief review of CALL history. First, CALL development mirrors technological advances and the field has a long history of embracing and harnessing the vast assortment of technology resources to promote foreign language learning and teaching, from the drill-and-practice programs in the early days to more recent manifestations such as corpora, virtual reality, and social media. Therefore, it is safe to conclude that in nature, CALL is a constantly changing field, with CALL researchers making efforts to keep abreast of the latest technology development and always on the lookout for the novel technologies to introduce and integrate into language learning and teaching. Second, although CALL research accommodates diverse theoretical groundings, its development is heavily influenced by the dominant SLA theory of the time. Moreover, the affordances of the latest technologies also exert an impact upon the educational and theoretical choices made by CALL researchers.

2.1.2 CALL and Digital Games

Digital games figure prominently in the current media landscape (Li et al., 2022a). To leverage this influential media for language learning, CALL researchers

have conducted a growing number of studies to investigate the use of digital games in language learning and teaching. This trend is evidenced by the recent reviews which found that publications in the field has boomed (Cornillie et al., 2012; Sykes, 2018) and digital games are among the most frequently investigated topics in CALL (Chen, et al., 2021; Lim & Aryadoust, 2021).

Ever since its inception, many labels have been proposed for this field. The early adoption of digital games in CALL can be traced back to 1970s when many games utilized were serious games, namely games developed for educational purposes. Due to the limitations of technology, those games were just another form for drills, lacking sophistication and appeal to learners, so they were often deemed as “chocolate-covered broccoli” (deHaan, 2019; Habgood & Ainsworth, 2011). Moreover, games at that time were only implementable in computer labs (Jordan, 1992), so they remained on the fringe and the related research was mostly anecdotal and conceptual. During the past two decades, however, technological advances such as pervasive Internet access and affordable digital devices have led to rekindled interest in the use of current generation of digital games in CALL (Peterson et al., 2020). In 2001, Prensky coined the term “digital game based learning”, which was then adapted by CALL researchers into “digital game-based language learning” to refer to this field. Later, to distinguish the different foci, Reinhardt (2019) suggested dividing the field into game-based (focusing on educational games), game-enhanced (focusing on commercial games), and game-informed (focusing on gamification).

More recently, researchers also advocated for the separation of digital game-based language teaching (DGBLT) from DGBLL (York et al., 2021).

Despite the diverse terminology, the term DGBLL is adopted in this research since it is the most widely used in CALL research. As with other CALL research, existing studies on DGBLL draw upon different theoretical groundings. Table 2 lists the hypothesized gains of using DGBLL from major influential SLA theoretical perspectives.

Table 2

Hypothesized Gains of Using DGBLL from Different SLA Theoretical Perspectives

(based on Peterson et al., 2020 and Reinhardt, 2019)

Ecological Perspective	Sociocultural Perspective	Cognitive Perspective
Linguistic environment conducive to language learning	Language socialization Access to communities of practice	Authentic input Opportunities to engage in meaning negotiation
Access to paratext or attendant discourse	Opportunities to enhance cross-cultural skills and knowledge of the TL culture	Lower affective barriers Enhanced motivation

2.1.2.1 Digital Games from the Ecological Perspective. Taking an ecological view, researchers have widely adopted the concept of “affordance” (van Lier, 2000) to refer to games’ perceived opportunities and potential for language learning. This

strand of research has emphasized that gameplay is a part of a larger ecology of game-related paratext (Apperley & Beavis, 2011) or attendant discourses (Thorne et al., 2009). From this perspective, language is viewed as “an emergent set of resources for enacting linguistic activities” (van Lier, 2004, p.108), therefore, language learning results from not only mere gameplay, but also the ecology surrounding it including the broader discourses and activities in and around games (Reinhardt & Thorne, 2016). To investigate the L2 learning potential of the gaming ecology, Thorne et al. (2012) compiled a corpus which consisted of the language the players are exposed to in and out of the game *World of Warcraft* (WOW) (<https://worldofwarcraft.com/en-us/>). The analysis revealed that the game presented players a linguistically diverse and complex environment which serves as an arena for language socialization.

As an example of how such linguistic ecology of digital gaming can be leveraged for L2 learning, Zhao (2016) examined the languaging experiences, namely the linguistic activities in actual communication and thinking (Linell, 2009), of two English learners in the game *Guild Wars 2* (<https://www.guildwars2.com/en/>) based on data collected through questionnaire, interviews, recorded gaming sessions and gaming journals. It was found that the participants have distinct preferences when engaging with the game discourses and the researcher called for more research into the learner variation from the ecological perspective. Similarly, Ibrahim (2016, 2017, 2018) argued that a better understanding of the effects of different ecological factors on game-based L2 learning is necessary to harness the potential of digital games for language learning. In a case study, Ibrahim (2017) investigated the ecology of player-

game interaction based on the L2 use and learning of six learners of Arabic who were asked to play a simulation-management video game called *Baalty*

(<https://fluencylearningapps.com/baalty-my-shop-entrepreneurial-training-game/>).

Data were obtained through a variety of sources including questionnaires, think-aloud protocols, observations, walk-throughs, gaming journals and interviews. The analysis indicated that player–game interaction was deeply embedded in the gaming ecology and that learners’ L2 proficiency, L2-learner identities, and gaming experience shaped the L2 learning potential of digital gaming. It was also found that learners deduced L2 meaning from various embedded game narratives and cultural discourses.

2.1.2.2 Digital Games from the Sociocultural Perspective. The sociocultural account of SLA has also been proposed to justify the use of digital games based on the assertion that they provide arenas for social interaction as for many games, collective problem solving is required to advance in the game. Moreover, as mentioned earlier, two core concepts in L2 learning in the sociocultural view are zone of proximal development (ZPD, detailed discussion of this concept can be found in later part of the chapter) and participation in social practices. Well-designed games break down tasks into manageable parts and use game narratives to introduce players to the rules of the game incrementally, scaffolding them into gameplay. In some games, players also team up with experienced players who act as the more competent peer to facilitate ZPD. In addition, for the popular games, players can have access to communities through online forums and livestreaming channels, where they have opportunities to enhance cross-cultural skills and knowledge of the TL culture.

Researchers following this line of inquiry have conducted studies to analyze the in-game actions of players. These studies have produced mounting evidence that many digital games may offer the learner-player an immersive and low-risk setting to engage in social interaction (Zheng et al., 2012; Newgarden et al., 2015; Newgarden & Zheng, 2016) and may elicit in-game language outputs which exhibited patterns identified as crucial in L2 acquisition such as participation and collaboration (Deutschmann et al., 2009; Lee & Gerber, 2013; Peterson, 2012; Rama et al., 2012; Reinders & Wattana, 2014). For example, in an early study, Marsh and Tainio (2009) utilized conversation analysis to analyze the recorded gaming sessions of two Finnish teenagers playing the video game *Final Fantasy* (<https://www.finalfantasyxiv.com/>). The analysis identified four types of repetitions, which offered a resource for gamers to learn and practice TL. Similarly, Peterson (2012) examined the in-game interaction of six English learners in a massively multiplayer online role-playing games (henceforth MMORPG), *Nine Rift*. Text chats were collected during two 90-minute gaming sessions held one week apart, and the discourse analysis showed that to engage in dialogues in TL, learners were able to employ TL management strategies involving transfer and adaptive strategies. The finding also presented evidence of social interaction and collaborative dialogue involving requests and assistance. In another qualitative case study utilizing the game *World of Warcraft*, Zheng et al. (2012) examined the in-game interaction of three EFL learners of intermediate and advanced English proficiency. Based on the data

collected during the single game session, the study presented evidence of extensive TL coaction, values realizing and intercultural communication.

2.1.2.3 Digital Games from the Cognitive Perspective. From the cognitive perspective of SLA, digital games are believed to enhance motivation and lower affective filters (Liu & Chu, 2010; Reinders & Wattana, 2011, 2014, 2015a, 2015b) with their linguistically rich, cognitively engaging, and emotionally motivating learning environment (Bytheway, 2014; deHaan et al., 2010). The cognitive view recognizes that language learning is made possible when players immerse themselves in game content which is rich in language use, interact with in-game narratives and participate in negotiation for meaning with in-game non-player characters or other players.

Dominant themes reported in these studies include enhanced motivation and engagement, lowered affective barriers and positive learner perception. Reinders and Wattana (2011, 2014, 2015a) have conducted a series of studies to investigate the effects of gameplay on learners' willingness to communicate. In Reinders and Wattana (2014), 30 Thai undergraduate EFL learners were asked to play the modified version of the game *Ragnarok Online* (https://store.steampowered.com/app/215100/Ragnarok_Online/). After six 90-minute gaming sessions, participants reported enhanced willingness to communicate. In Richardson's study (2016), 78 advanced EFL students completed challenging language tasks by playing the location-based augmented reality game *Mission Not Really Impossible*. Both student feedback and researcher observation suggested a high

degree of engagement. Similarly, based on gameplay observation and interview, Holden and Skypes's study (2011) demonstrated that the participants are willing and motivated to engage with the local context when playing the place-based mobile game *Mentira* (<http://www.mentira.org/>) to learn Spanish. More recently, Hwang et al. (2017) conducted a study utilizing a problem-based English listening game featuring tasks, rewards, levels and a fantasy narrative. The experimental group consisting of two groups of learners with high and low language learning anxiety were asked to play the listening game, while the control group learned the same content via traditional instruction. It was found that the experimental group outperformed the control group in terms of the listening test, and in terms of the anxiety level, high anxiety learners benefited more from the game than the low anxiety learners. In spite of these encouraging results, the findings also cautioned that researchers should not lose sight of the possible cognitive load during gameplay (deHaan et al., 2010). In an experiment carried out by deHaan et al. (2010), one group of learners played the dance game *PaRappa the Papper* (https://store.playstation.com/en-us/product/UP9000-CUSA05289_00-UCUS987020000001/), while another group watched the gameplay. It was found that both the watchers and players of the game were able to recall the words from the game, but the watchers outperformed the players in delayed retention. This finding, for the first time, draws researchers' attention to the cognitive load experienced by game players, thus highlighting the importance of proper pedagogical considerations when implementing DGBLL.

2.1.2.4 Digital Games and Language Learning Benefits. When it comes to the linguistic gains of digital gaming, only a handful of studies have examined its use to facilitate writing (Allen et al., 2014; Lin et al., 2018; Suh et al., 2010), listening (deHaan, 2005a; Hwang et al., 2017) and speaking (Hwang et al., 2016; Liu & Chu, 2010). Much of the research, however, is dedicated to investigating its impact on vocabulary learning to the extent that researchers were able to contribute three meta-analyses (Chen et al., 2018; Tsai & Tsai, 2018; Yudintseva, 2015) and one systematic review (Zou et al., 2019) to address this issue. In the most comprehensive meta-analysis, Tsai and Tsai (2018) reviewed 26 vocabulary-focused papers published from 2000 to 2017 to evaluate the effectiveness of four research design conditions on using digital games for vocabulary enhancement. The results were in favor of vocabulary learning using digital games over vocabulary learning through traditional instruction and via conventional media, a finding echoed by the vocabulary-focused systematic review (Zou et al., 2019). Moreover, it was also noted that task design and scaffolding play a critical role in securing positive learning outcomes and more research is needed to prove language acquired through digital gaming can be applied in non-gaming contexts. Another issue is that even for the research that reported vocabulary gains, it is only the retention rather than the productive knowledge of words that was investigated.

2.1.2.5 DGBLL in Language Classrooms. Many researchers embraced digital games in the hope of incorporating them into their classrooms (deHaan et al., 2010; Grimshaw & Cardoso, 2018; Ranalli, 2008; Reinders & Wattana, 2014). For

instance, Liu & Chu (2010) introduced the game *HELLO* (Handheld English Language Learning Organization) into a high school language classroom where one group of students studied the learning content using the game while the other group learned in the conventional manner. Statistical analysis of the test scores revealed that the game-based learning group produced better learning outcomes. In a similar vein, Suh et al. (2010) conducted a large-scale classroom-based study in which data from 220 elementary students in Korea were collected. It was found that in terms of writing, listening, and reading, the students who learned English utilizing an online role-playing game *Nori School* outperformed their counterparts who received traditional instruction. Reinders and Wattana (2015b) went a step further to integrate the adapted version of a commercial game *Ragnarok Online* into the current curriculum. For each unit, 30 Thai undergraduate EFL learners were asked to complete a gaming session after the face-to-face classroom sessions. The TL produced in text and voice chats was recorded and analyzed. Compared to the face-to-face activities, participants were found to have engaged more in TL interaction. In addition, the game-based interaction resulted in a wider range of discourse functions than classroom-based interactions.

Although these studies did take place in classrooms, a closer examination reveals that pedagogical practices have not been elucidated. The teacher's role, though repeatedly emphasized in the literature (deHaan, 2019; Reinhardt & Thorne, 2016), tends to be limited to providing gameplay guidance and mediation often comes in the form of materials. In an early study (Miller & Hegelheimer, 2006), three groups of

students were asked to play the simulation game *The Sims* (<https://www.ea.com/games/the-sims?isLocalized=true>) with or without mandatory or optional supplementary materials. Gameplay, coupled with the use of supplementary materials, was found to enhance vocabulary learning. Using the same game in conjunction with supplementary materials in a replication study, Ranalli (2008) concluded that students held positive attitudes toward the use of supplementary materials. Shintaku (2016) designed worksheets and reference lists to scaffold vocabulary learning through a Japanese adventure game *Yuurei Yashiki-no Nazo* (meaning haunted house). It was found that instructor should prepare materials based on students' prior knowledge and the game's design. Additionally, the literature suggests that teacher scaffolding should be present before, during, and after the gameplay and calls for in-class activities for the purpose of orienting, engaging and debriefing (Lai et al., 2012). However, to date, few studies have documented such practices. In an exception, Wang (2019) utilized *The Sims* by resorting to three modes of classroom intervention: in-class activities, peer discussion and teacher instruction. The result confirmed students' positive attitude towards teacher demonstration and instruction. The researcher also called for diverse classroom activities, echoing the claim that there is a need to explore feasible, viable and effective ways to incorporate games into language classrooms (Godwin-Jones, 2014).

2.1.2.6 DGBLL in Out-of-school Settings. As noted earlier, DGBLL researchers have made efforts to integrate digital games into classrooms, but these attempts sometimes meet with many obstacles such as gaming's negative image in

some quarters, incompatibility with current curriculums, insufficient technical support and institutional barriers (deHaan, 2019; Swier & Peterson, 2018). Aware of these constraints, some researchers set out to explore out-of-school DGBLL, that is, a context where learners take the initiative to play the game outside the classroom and in the absence of instructional support and intervention. Some other researchers also call for studies that are removed from the classroom with the belief that games are situated in students' life and "gameplay experience occur extramurally is desirable" (Scholz & Schulze, 2017, p.100).

Some DGBLL studies conducted in Nordic countries have also demonstrated that students' out-of-school digital gaming may be beneficial for L2 learning. For example, based on data obtained through questionnaires and language diaries, Sylvén and Sundqvist (2012a) categorized 86 young learners in Sweden into three groups: frequent gamers, moderate gamers and non-gamers. The results of language proficiency tests showed that in terms of vocabulary, listening and comprehension, frequent gamers performed best while non-gamers had the lowest scores. The findings corroborate Jensen (2017) who investigated the out-of-class learning behaviors of Danish young English learners. The learners were asked to keep a diary of their exposure to English outside the classroom and it was found that playing games with oral and written English input was significantly related to learner' vocabulary gains. In a later study conducted on a larger scale, Sundqvist (2019) surveyed 1069 teenagers and placed them into different groups based on their experience of digital gameplay

involving various game types. It was also found that the duration of game play was positively related to vocabulary test scores and gamers outperformed non-gamers. Moreover, the results also revealed that in comparison with non-gamers, gamers were able to produce more advanced vocabulary. The test scores indicated that for L2 learning, time spent on digital games mattered more than game type. To unravel the complicated gaming process and its relationship with language acquisition, Scholz and Schulze's study (2017) investigated language development from the perspective of near transfer and concluded that players can apply the words picked up during gameplay in non-gaming situations.

Students in the above studies played digital games at their discretion and in the absence of institutional intervention and constraints. It was thus argued that the issue of autonomy, namely 'the ability to take charge of one's own learning' (Holec, 1981, p.3), should be highlighted in such a context. As mentioned earlier, digital games afforded a kind of out-of-school affinity space (Gee & Hayes, 2012) where learners demonstrate a high degree of autonomy in choosing and managing their learning based on interest. Learners are also expected to exercise autonomy so as to navigate the linguistically complicated gaming world (Thorne et al., 2012). Based on data collected from six experienced gamers, Bytheway (2014) noted that the in-game culture of MMORPG underscored the importance of autonomous learning and players were expected to rely on themselves to learn the language essential for gameplay so as to advance in the game.

To obtain a perspective of how players exercise autonomy in their gameplay, Chik (2011) examined the gaming and learning practices of 10 Chinese-speaking Hongkong gamers with at least 5 years of gaming experience. The qualitative analysis of their gaming sessions, interviews and stimulated recalls showed that they were aware of the potential of digital games for language learning and were able to exercise autonomy in selecting the game, finding appropriate gaming/learning materials and participating in discussions with other gamers in the community. It was also noted that gameplay was seen as the motivation for language learning. In a later study, Chik (2014) applied Benson's framework on autonomy (Benson, 2011) to further analyze gamers' out-of-school DGBLL practices from the four dimensions of location, formality, pedagogy and locus of control. The analysis revealed that a new dimension, trajectory, should be added to the framework to reflect how these self-organized practices develop over time. The results further suggested that autonomous digital gaming in an out-of-school setting can result in incidental learning, but the author also cautioned that gamers tended to prioritize gaming over L2 learning.

The studies cited above have provided insights into out-of-school digital gaming, however, several concerns emerge from the literature. First, gameplay alone does not necessarily guarantee satisfactory learning outcomes in that most games, except those serious games aimed at specific educational goals, are not originally designed to facilitate language learning (Yudintseva, 2015). However, little is known about how to harness the potential of out-of-school gaming to facilitate language learning. In other words, the existing research offers little insight into what kinds of

scaffolds need to be put in place so as to support students' out-of-school game-based learning in order to optimize the learning outcomes and experience. Second, there is a lack of a comprehensive and systematic account of learners' experiences of language learning through digital gaming in such a novel and informal setting. For example, what difficulties would learners face in that particular context? How would they deal with those issues? Current studies fail to address the challenges encountered during the whole process, but these issues merit further investigation since they have implications for improving and promoting the practice of DGBLL. Third, the current literature is characterized by a heavy focus on incidental learning outcomes and practices of gamers, which begs the question: how about non-gamers? Their experiences and perceptions should also be investigated so that more uptake of DGBLL activities can be realized and DGBLL practices can be more widely accepted and promoted. In this sense, there is a need for studies dedicated to non-gamers to establish that DGBLL can be effective regardless of prior gaming experience. Fourth, for the studies that report on the practices of autonomy in out-of-school digital gaming, caution is also needed when interpreting findings as the subjects of these studies are experienced gamers of advanced language level. Therefore, it cannot be argued that the autonomy is the result of such practices, indicating more research is needed to investigate the possible relation between autonomy and digital gaming. However, the existing research is still limited in this regard and just as noted by Benson and Chik (2010), digital games, as a landscape for autonomous language learning, remain under-researched.

2.1.2.7 Game Genres and Language Learning. Digital games of different genres can offer varying affordances for second language learning and teaching and researchers have explored a diverse array of digital games for their potential in language learning and teaching from multiple theoretical perspectives (Peterson et al., 2020). Some scholars have developed and implemented serious games, that is, digital games designed for educational purposes, in language education. Despite the compatibility with curricular needs, researchers have cautioned that it would be costly, time-consuming, and difficult to develop educational games that are as engaging and sophisticated as commercial off-the-shelf (COTS) games (Becker, 2009; Godwin-Jones, 2014; Van Eck, 2006). Xu et al.'s (2019) scoping review also suggested that in terms of game design, COTS games should be favored over custom-made educational games. However, these authors argue that they need to be carefully selected and implemented to match the language level and needs of learners. In this sense, it is even more important to explore how to effectively implement commercial games to facilitate language learning. In this research, two kinds of popular games, namely, adventure game and massively multiplayer online games (MMOG), were utilized and the following provides a literature review of the studies in this regard.

2.1.2.7.1 Adventure Games and Language Learning. Adventure games have yet to be extensively researched despite the fact that they can provide rich TL input and access to highly immersive environments. Adventure games distinguish themselves from traditional ways of providing language input with their immersive environment, interactive narrative and character identity. In most adventure games,

players have to shape their behaviors around the delicate narratives of mystery and discovery, finding cues and solving puzzles, hence being exposed to rich TL input through the process (Reinhardt & Thorne, 2016). It is also believed that the “plot hooks” and “emotional proximity” of adventure games can provide motivation (Dickey, 2006).

In spite of the dearth of research in this area, some studies have contributed empirical evidence of this game genre’s beneficial effects on language learning. For instance, to examine the effects of the adventure game *BONE* on language learning, Chen and Yang (2013) conducted two studies, one in-class and one out-of-class. The former study found that gaming group outperformed the non-gaming group in a vocabulary post-test and the latter reported students’ self-reported positive perceptions towards game-based language learning. In another study by Hitosugi et al. (2014), the UN sponsored commercial adventure game, *Food Force* (<https://www.solutions-site.org/node/639>), was introduced into the existing curriculum and it was found that in addition to the positive impact on vocabulary retention, the use of video game may have facilitated enhanced vocabulary knowledge as learning is grounded in a deep cognitive engagement and learners’ vocabulary networks are activated. This finding lends credence to the claim that gamers can develop a deeper understanding of the TL due to the adventure games’ “contextual and visual cues” (Lai et al., 2012, p.186). In addition to the in-game linguistic input, adventure games also provide game-related language learning resources enriched by the gaming community who produce walkthroughs, game discussions and fan

fiction. There remains the question as to how to leverage those resources for language learning. Therefore, it is imperative for more research in order to capitalize upon the affordances of adventure games to facilitate language learning.

2.1.2.7.2 MMOGs and Language Learning. In today's ever expanding body of research on game-based language learning, the most frequently investigated COTS game genre investigated is massively multiplayer online games (MMOGs) (Hung et al., 2018). In MMOGs, players explore a theme-based virtual world in their avatars and they often work in groups to complete in-game tasks. As noted earlier, a large body of research suggests that the anonymity and the low-stress immersive environment provided by MMOGs can positively impact affective factors, resulting in more willingness to communicate (Reinders & Wattana, 2011, 2014, 2015a, 2015b), enhanced motivation (Connolly et al., 2011; Liu & Chu, 2010) and lowered anxiety (Grimshaw & Cardoso, 2018; Horowitz, 2019). As for the learning outcomes achieved, a majority of MMOG-based studies have reported improvement in vocabulary acquisition and highlighted the potential of using MMOGs to promote communicative competence (Jabbari & Eslami, 2019).

One common thread in the literature is that MMOGs can facilitate interaction and socialization as they provide venues where players are compelled to produce TL and gain access to online communities of shared interest. For example, in an early study by Thorne (2008), one native speaker of English and one native speaker of Ukrainian played *World of Warcraft* together. The analysis of the in-game conversation showed that gameplay did elicit extensive TL interaction and the

language produced demonstrated patterns beneficial for L2 learning such as negotiation, requests, repairs, and corrective feedback. Moreover, the two players were found to have developed a ‘social bond’ that extended beyond the game. In another study (Peterson, 2012), four EFL learners played the MMOG *Wonderland* for four 70-minute sessions held over one month. Discourse analysis of chat logs showed that learners managed to engage in dialogue in which they demonstrated a range of strategies related to positive politeness such as greetings, informal language, small talk and humor. Players were also found to engage in peer scaffolding during gameplay.

Taken as a whole, these studies present evidence that MMOGs constitute engaging contexts for L2 development and socialization. However, there is another side to the story. For example, in Rankin et al. (2006), four EFL learners played the game *Ever Quest 2* (<https://www.everquest2.com/home>) for four hours per week over four weeks. Based on interviews and observation, it was found that in comparison with the intermediate and advanced level learners who benefited from gameplay, the beginner learner experienced difficulties in adapting to this new learning environment. Similarly, Rama et al. (2012) investigated the gameplay of two Spanish learners who played *WOW* together. Based on data collected through observation, interviews, chat logs and journal entries, the analysis revealed contrasting experiences of these players. It was found that the expert player with beginner level language proficiency enjoyed the interaction with the gaming community and reported satisfactory experiences, whereas the inexperienced player with advanced language

proficiency struggled with game mechanics and expressed disappointments at her in-game performance. These findings suggested that the affordances of MMOGs for L2 learners may not be universal. Just as Sylvén and Sundqvist (2012b) pointed out, not all students are equally willing and able to use games for language learning, so there is a need for more research into the difficulties and challenges encountered during gameplay, especially the experiences of novice gamers who lack knowledge of game norms.

2.1.3 Research Gaps

The previous discussion offers important insights and highlights knowledge gaps that this research is designed to address. First of all, it is apparent that there is much interest in and research on the affordances of digital games, but not enough is known about how to capitalize upon those affordances. Even though the effectiveness of digital gaming is well established, it is unlikely to produce the educational results desired without proper pedagogical intervention. Therefore, just as noted by Van Eck (2006), there is a need for more studies that can provide practical guidance for how games can be integrated into the learning process so as to maximize their learning potential. In this sense, it is important to investigate the practices, in particular, the pedagogical mediation, of implementing digital games for L2 learning in different contexts.

Another important factor highlighted by the literature review is that when investigating the impact of DGBLL, studies tend to solely focus on the vocabulary gains, in particular, the impact on vocabulary retention. Although the literature has

highlighted other potential learning gains such as writing and learner autonomy, these issues remain under researched.

In addition, the majority of previous research is concerned with gamers, so the practice and voice of non-gamers are neglected in the literature. Drawing these points together, the literature review reveals that conducting studies with an orientation to process and practice would make a valuable contribution to the literature, and this would be particularly true if the studies can investigate the impact of DGBLL in a broader way, in different contexts and with learners of varying backgrounds. With these goals in mind, the researcher conducted a series of three studies in different contexts (detailed in Chapter 4, 5 and 6). The primary research question guiding this investigation is to explore the optimal practice of DGBLL, with a focus on the learning process, outcome and perception. Specifically, the following research questions shown in Table 3 were formulated to guide the three studies:

Table 3

Research Questions for Each Study in the Research

Studies	Research questions
One	<ol style="list-style-type: none"> 1. What are the learning effects of out-of-class gaming? 2. What are the students' participation levels and patterns? 3. How do students perceive the experience of out-of-class game-based language learning?
Two	<ol style="list-style-type: none"> 1. How can digital gaming in the classroom facilitate language learning?

2. How engaged are the participants in this digital game-based language learning study?
 3. What aspects of teacher scaffolding do learners find useful in the context of DGBLL?
 4. How do the participating students perceive their classroom-based DGBLL experience?
- Three
1. What contradictions emerged in this out-of-school DGBLL project? How did learners experience and resolve them?
 2. What are the outcomes of the activity system?
-

2.2 Theoretical Framing

This section elaborates on the theoretical grounding of this study. It first presents an overview of sociocultural theory and its key constructs, with a focus on the relevance for this research. It then continues with a discussion of the three approaches applied to guide the three studies in the thesis, namely, community of inquiry, bridging activity and activity theory, all of which foreground the social and cultural contexts of learning and have roots in sociocultural theory.

2.2.1 Sociocultural Theory

This study is grounded in Sociocultural Theory (SCT), which was developed by Vygostky (1978) on the basis of Marx's Historical Materialism (Poehner, 2016). Central to SCT is the idea that human development and learning originate in social, historical and cultural interactions. Moreover, SCT argues that higher order cognitive functions such as understanding and problem-solving are initially social and subsequently internalized and made available as cognitive resources (Lantolf, 2000).

This process of cognitive development is mediated via the use of tools or signs, the most important of which is language. As Swain and Lapkin (1998) remarked:

language becomes a mediating tool by first having been used to regulate behavior, including cognitive behavior. Through a gradual process of internalization, one comes to be able to use the language of others (and the mental processes that interaction has constructed) to regulate one's own cognitive functioning (p. 321).

From the sociocultural perspective, language use in real-world situations is viewed as fundamental, not ancillary, to learning (Zuengler & Miller, 2006). It is also believed that L2 learning commences externally within interactions that learners participate in and what learners are able to do with the help of others in social interactions gradually becomes internalized. Of particular interest to SLA is the key construct of the theory: the zone of proximal development (henceforth ZPD), which refers to

the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. (Vygotsky, 1978, p. 86)

This means that there are three zones of learning: one is the zone where students can learn on their own; one is the zone where students can learn with help (ZPD); one is the zone where learning is beyond their abilities. ZPD is where the learning potential lies, so for development to take place, it is crucial to advance the

ZPD of learners and to that end, providing learners with the right amount of assistance at the right time, in other words, providing scaffolding, is paramount. Ohta (1995) further elaborated on ZPD to fit into L2 setting, referring it to “the difference between the L2 learner’s development level as determined by independent language use, and the higher level of potential development as determined by how language is used in collaboration with a more capable interlocutor” (p.96). The more capable interlocutor could be an instructor and/or a peer, who “scaffolds” tasks for learners by controlling elements that exceed the learner’s initial capacity (Wood et al, 1976).

Warschauer (2004) suggests that sociocultural theory is an umbrella term which refers to a fairly broad array of related perspectives and researchers should apply the particular perspective to fit their own research. In the case of DGBLL research, studies that are informed by sociocultural theory note that digital gaming can facilitate collaborative dialogue in-game. In addition, digital games also provide learners with access to interlocutors through out-of-game communities of practice (Peterson et al., 2020). With these in mind, in this research, efforts were made to encourage social interaction both in-game and out-of-game and support students in their ZPD. The research design detailed in Chapter 4 would be guided by the understanding of the concepts and frameworks that are extensions of the sociocultural theory and explained in the following sections.

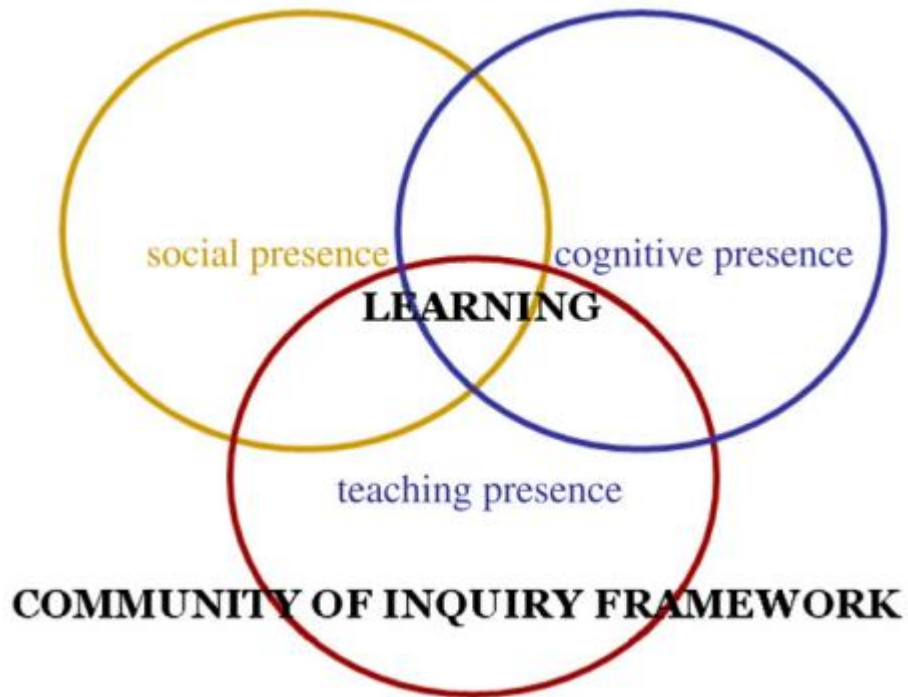
2.2.2 Community of Inquiry

The community of inquiry (CoI) model was employed as the conceptual and analytical framework for study one (detailed in Chapter 5). First envisioned by Pierce

(2012), the community of inquiry (CoI) has its roots in the sociocultural perspective of learning and is extensively applied in the context of online learning so as to define, describe and measure elements supporting the development of online learning communities (Swan & Ice, 2010). As shown in Figure 2, central to this framework are three overlapping and reinforcing components: cognitive presence, social presence and teaching presence (Garrison et al., 2000). Cognitive presence concerns the interaction between the learner and the content and is mostly manifested through knowledge construction and problem- solving (Garrison et al., 2001). Social presence is associated with engagement with participants and often involves the use of emotional expressions and open communication to establish group cohesion (Rourke et al., 1999). Teaching presence points to the instructors' role in terms of course design, organization and learning facilitation (Anderson et al., 2001). It is argued that these three constructs can mould and enhance the learning experience (Kozan & Richardson, 2014) and numerous studies have contributed empirical evidence that “deep and meaningful” education experiences arise when these three “presences” are ensured and facilitated (Garrison et al., 2000).

Figure 2

Community of Inquiry Model (Garrison et al., 2000)



This framework is particularly relevant for online learning and blended learning (Akyol et al., 2009). It is also argued that it can be applied to all educational experience as it outlines the main dimensions of interactions in an educational setting. Therefore, the potential exists to draw upon this framework to frame the first study on out-of-school gaming and the use of it is also well-justified because in study one, all the supports and scaffolds are all made available online.

2.2.3 Bridging Activity

Bridging activity (Thorne & Reinhardt, 2008) was adopted as the learning model for the second study (detailed in Chapter 6). As one of the pioneers that introduced and applied the sociocultural theory into CALL, Thorne and his associates (2009) noted that learners increasingly engage in diverse language-mediated activities online and they, consciously or not, have capitalized upon digital vernacular texts for

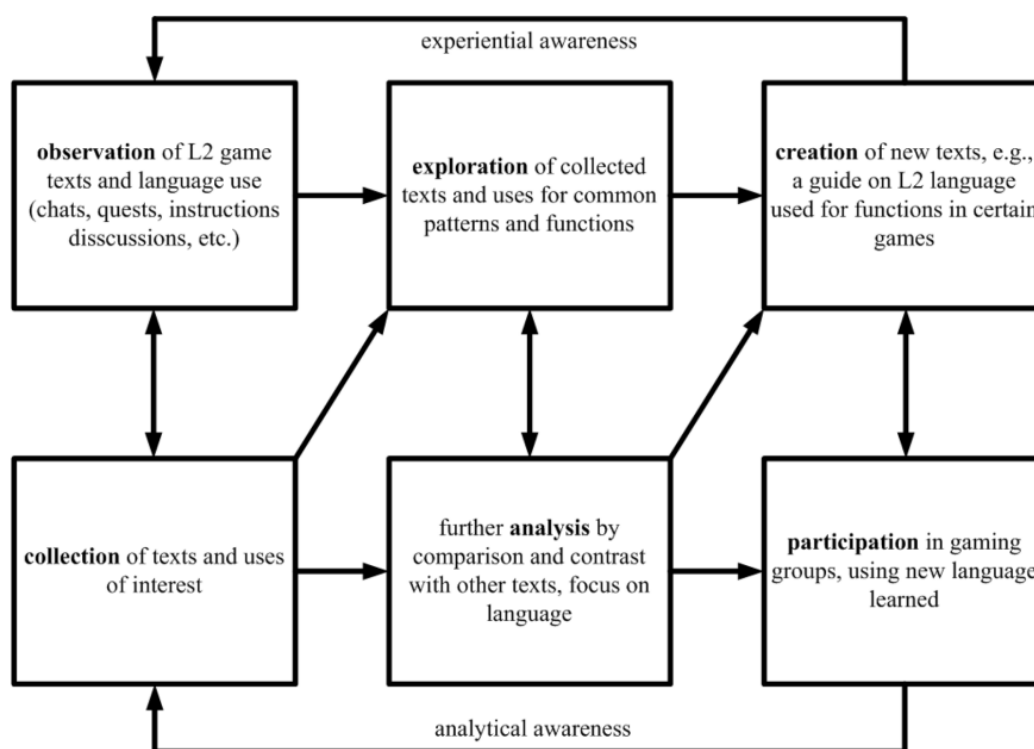
language learning. However, the question remains as to how classroom instructions can be carried out to enhance such learning experiences. To address this need, Thorne and Reinhardt (2008) proposed the concept of bridging activities (BA) to frame the design of learning activities to link with “the wider world of mediated language use” (2008, p.562). This model, specially developed for new media contexts such as social media, online forums, fan fiction and digital gaming, follows a three-phase cycle, namely, 1) observation and collection, 2) guided exploration and analysis, and 3) creation and participation.

Reinhardt (2019) further elaborated on the model to suit the particular setting of classroom-based DGBLL. As illustrated in Figure 3, during the observation and collection phase, learner-players are exposed to in-game texts, thus paving the way for the second phase where they will study and analyze the use, function and pattern of the language associated with the game. As a result of the first two phases, learner-players should develop the awareness and capacity to create new game-related texts, such as fanfiction and online posts, and to participate in discussions with the wider gaming community. It has been noted that the first steps in each phase (observation, exploration and creation) focus on experiential awareness, whereas the second steps (collection, analysis and participation) focus on reflection and analytical awareness (Reinhardt, 2019). Informed by this model, Kim (2016) has designed a TOEIC speaking lesson where the activities were built around the simulation game *The Sims*. Students were asked to observe and analyze the descriptions of game screenshots available on gaming forums and participate in an authentic gaming community by

posting their own descriptions. It was argued that in this manner, students developed the awareness to use context-specific language in their social practice.

Figure 3

Bridging Activities in the Context of Classroom-based Digital Gaming (Reinhardt, 2019)



2.2.4 Activity Theory

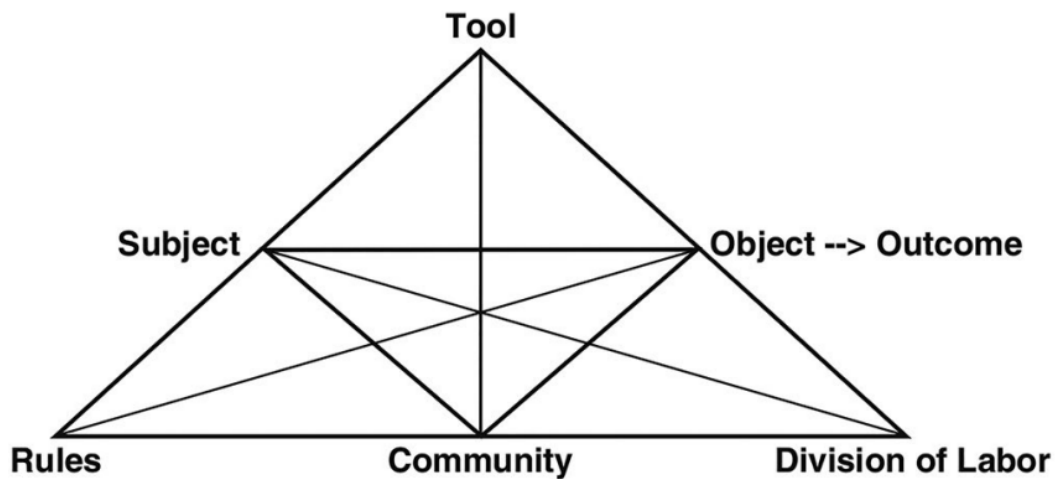
The third study was framed by Activity Theory (AT), which examines human practices and actions both at individual and collective levels (Engeström, 1987). As a sibling approach or the sub-theory of SCT, AT builds upon the principle of social mediation.

Visualized in the form of a triad, it consists of three basic components: the subjects (the actors), the object (the goal or the driving force behind the activity) and mediating artefacts (the tools or the instruments), that is, mediated by the tools, subjects are able to achieve the object. Leont'ev (1978) advanced the theory by adding the social dimension to the landscape, contending that activities take place in socio-culturally specific contexts. Later, Engeström (1987) expanded the model into six components (subject, tool, object, rule, division of labor and community) so as to frame the unit of analysis from a collective perspective.

As illustrated in Figure 4, tools, also referred to as instruments and mediating artefacts, mediate between the subjects and their object, which is the purpose of the activity. The model proposes that the individual does not act in isolation and thus the complex interrelations between the individuals and their community must be considered. The rules, explicit or implicit, govern the interactions within the community, which is organized through a certain division of labor. The object of the activity represents the intention which motivates the activity system as a whole and as a result of the interplay of the six components, object is transformed into the outcome.

Figure 4

Engeström's Activity System (Engeström, 1987)



The activity system does not remain static; instead, it is constantly working through contradictions and ‘equilibrium is an exception, tensions, disturbances and local innovations are the rule and the engine of change’ (Cole & Engeström, 1993, p.8). According to Engeström (2001, p.137), contradictions refer to ‘historically accumulated structural tensions within and between activity systems’ and they cannot be observed directly (Engeström & Sannino, 2011). Researchers have thus examined contradictions through their various manifestations which are termed in the literature as systemic tensions, misfit, disturbance, disruption, ruptures, breakdowns and clashes (Murphy & Manzanares, 2014). Specifically, contradictions may occur within individual components (primary), between components (secondary), between different developmental phases of a single activity (tertiary) or between different activities (quaternary) (Engeström, 1987). As the central concept or principle of the activity theory, contradictions are considered as ‘the source of change and development’ (Engeström, 2001, p.137). It was argued that the success or failure of

the activity system depends on the handling and resolution of contradictions and in this sense, the investigation of how they are addressed sheds light upon the evolution and transformation of the system (Dippe, 2006).

In the field of CALL, researchers have employed AT to explore a wide range of issues such as tele-collaborations (Antoniadou, 2011; Basharina, 2007; Ryder & Yamagata-Lynch, 2014), collaborative writing (Blin & Appel, 2011), digital storytelling (Priego & Liaw, 2017) and autonomy (Blin, 2004). However, to date, it has been rarely used in DGBLL research with a few exceptions. Ryu (2013) described and analyzed how six players of the game *Civilization* participated in the activity of English learning through an AT lens. The analysis showed that during gameplay, players (the subjects) can only learn words and phrases related to the game content. Driven by the contradiction between the desired game level and their current gaming skill, players extended their gameplay to other game-related activities, thus gaining access to expanded learning opportunities through beyond-game culture. The English-only rule on the fan website forced players to write posts in English and within the community, players assumed the role of both teachers and learners (division of labor). In a more recent study, Vosburg (2017) reported players' perception of group dynamics and TL use of two groups of *WOW* players over a period of eight weeks. In line with the theoretical assertion of AT that human activity should be understood under a certain sociocultural condition, the focus of this study was to investigate how the group dynamics affected language output and motivation. The findings highlighted the positive and motivational role the native-speaking language guide had

on the L2 learners, and it was noted that the benefits gained from digital gaming may be heavily dependent on the inter-relationships between players.

These two studies demonstrate the potential of AT as a theoretical framework and data analysis tool to investigate out-of-school DGBLL, but more research is needed to elaborate on how contradictions emerge and how the activity system develops in that particular context.

2.3 Chapter Summary

This chapter has positioned this research within the existing body of CALL research. Empirical studies on the use of digital games for L2 learning were examined and the implications of the literature review for this research were outlined, identifying research gaps that could be addressed. This discussion draws attention to the need for research that explores the practice of DGBLL and draws together teacher support and learner autonomy and when utilizing digital games for L2 learning. This chapter also introduced and reviewed sociocultural theory and the related theories and concepts, which underpinned the pedagogical stance and influenced the practices the researcher employed in her dual role as an instructor and researcher in this study. The next chapter presents the key aspects of the research methodology.

Chapter 3. Methodology

This chapter begins by outlining the methodological principles of action research which is adopted to frame the three mixed methods studies in the thesis. After that, the rationale for and an overview of the research design is provided, which is then followed by a brief introduction of the research methods and the games selected.

3.1 Proposed Methodology

The research in this thesis was carried out under the framework of Action Research (henceforth AR), which in the words of Reason and Bradbury (2005, p.1) refers to

“a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview”.

This definition highlights the participatory nature of AR and the concepts of “researcher as practitioner” and “research in action”. As Koshy (2010) explains, as opposed to other forms of research that are mainly theory led, AR aims to combine both theory and practice, with knowledge being created through these actions. In this sense, the knowledge created through AR is particular, situational and out of praxis. In addition to this combination of practice and theory, another feature that sets AR apart from other approach is the direct involvement of the researcher, who is seen as an agent of change. Holly and Whitehead (1986) have pointed out that in the field of education, AR can be undertaken by an individual teacher, a group of teachers, or a

teacher or teachers working alongside a researcher or researchers in a sustained relationship. So AR is collaborative and it is believed that all the participants' views can contribute to understanding the situation, thus impacting on or improving the practice.

Although AR has its roots in Kurt Levin's work, most of which is concerned with improving social practices (Cohen et al., 2007), it can be applied in almost any setting where improved practice is desired. It also attracts growing interest in education research as it allows participants to identify an issue and then alter practice to improve what is happening in the classroom setting (Kemmis & McTaggart, 1988). Cohen et al. (2007) has specifically noted that for teachers, AR can be used in contexts where a traditional method is replaced by a discovery method or teaching skills are improved or new methods of learning are developed through reflective practices.

As suggested in the literature, the aim of any AR research project is to bring about innovation of practice and the practitioner's better understanding of their practices. Therefore, this approach aligns with the purpose of this research, namely, to gain a better understanding of the use of digital games for L2 learning at the practice level. In other words, the practice-oriented and problem-solving nature of AR makes it particularly suitable for this research which also focuses on understanding and improving the practice of DGBLL. The use of AR to frame the studies in this thesis can be also justified by the dual role the researcher held as researcher and instructor, which means the researcher is directly involved in the process. In AR, the researcher

is recognized as facilitator, guide, formulator and summarizer of knowledge, raiser of issues (Weiskopf & Laske, 2003), which aligns with the assumption that in DGBLL, instructor should remain “on the side” and provide scaffolds when necessary (deHaan, 2019). It is also argued that AR starts small and works toward extensive changes and then even leads to reform of practice (Kemmis & McTaggart, 1998), therefore it fits well with the current thesis which is conducted with a small sample for the purpose of promoting practice. Moreover, data in AR are generated from the direct experience of research participants, so they are contextually embedded and interpreted, and are thus able to provide rich insights into the novel practice of DGBLL.

3.2 Research Design

As an interactive inquiry process, AR consists of a series of spiral cycles in which each cycle increases the researcher’s knowledge of the original question, leading to its solution or a new question (Kemmis & McTaggart, 2013). Of these cycles, the findings in one cycle feed back to its own research questions and provide problem areas and direction for the following cycle. Within each cycle, it is a process of “planning, action and fact-finding about the result of the action” (Lewin, 1948, p. 205) which can be broken down into several stages.

In this thesis, Lewin’s model (1948) is adopted as it is the frequently employed in education research. More specifically, each cycle of AR incorporates the following four main stages: planning, acting, observing and reflecting. According to Lewin (1948), action research commences with a general idea and examination of the current situation, based on which a plan of action is produced. The next stage is the

implementation of the plan, namely, acting, which is often followed or accompanied by observation. During this stage, data are collected and fact-finding is conducted to monitor and evaluate the intervention. During the final stage of reflection, data are “analyzed, synthesized, interpreted, explained and conclusions were developed” (Kemmis & McTaggart, 1988, p. 86). This is a time when the participants and the researcher critically reflected on what the emerging data are telling us about observation and identified the questions that we were left with. In other words, feedback obtained in previous stages feeds forward into another cycle which incorporates revised plan, procedures for implementation, observation and reflection.

This action research project consists of three mixed-methods studies. As shown in Figure 1 (in Chapter 1), each study constitutes one cycle of the AR. To be specific, after a thorough literature review, the researcher identified the inadequacy of practice-oriented studies as one major issue. With this in mind, the researcher conducted the first exploratory study (detailed in Chapter 4), which focused on the online scaffolds that can be utilized to facilitate learners’ out-of-class digital gaming. Reflecting upon findings from the first study, the researcher made adjustments to the research design and conducted another study to explore the practice in the classroom. The second study (detailed in Chapter 5) drew upon the concept of bridging activity to investigate the impact of digital gaming in the classroom, with a focus on the learning gains, engagement and perception. Again, based on the learner feedback and the insights gained from the previous two studies, the researcher conducted the third study (detailed in Chapter 6) which targeted non-gamers, focusing on their

difficulties, autonomy, learning benefits and perceptions in the context of out-of-class digital gaming.

3.3 Research Method

Educational research has traditionally been guided by two foundational paradigms: qualitative and quantitative methods. Since the turn of the century, the approach that blends these two, namely, mixed methods, emerged and gained ground (Ohashi, 2019). As mentioned earlier, the three studies in this thesis adopted the mixed methods approach which “focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies.” (Creswell & Clark, 2007, p. 5). Mixed methods design fits well with DGBLL studies, which is evidenced by the fact that this approach is adopted by the bulk of studies in this field (Hung et al., 2018; Poole, 2020). In particular, it is well-suited for this research as the integration and triangulation of data allows information collected from difference sources to supplement, confirm, cross validate and corroborate one other, thus providing a comprehensive account of the issues under investigation.

Moreover, as action research acknowledges the potential relevance of multiple sources of evidence rather than relying on a single source alone, the mixed-methods design is suitable for action research (Ivankova, 2014). The instruments used to collect both qualitative and quantitative data in this action research project are presented in Table 4 and their detailed description can be found in in the following chapters dedicated to the three studies respectively.

Table 4*Instruments Used in the Three Mixed-methods Studies*

Study	Instruments	
	Qualitative data	Quantitative data
One	Online discussions Semi-structured interviews Researcher's field notes <i>Wechat</i> messages	Vocabulary tests (pre-test, immediate post-test and delayed post-test) Post-questionnaire
Two	Online discussions Semi-structured interviews Researcher's field notes Writing samples	Vocabulary tests (pre-test, immediate post-test and delayed post-test) Post-questionnaire Classroom observation scale
Three	Semi-structured interviews Researcher's field notes Weekly game journals Gameplay recordings Open-ended questions in the exit questionnaire	Post-questionnaire Autonomy scale

It is worth mentioning that as each of the three studies each represents one spiral cycle of the AR, the instruments used in later studies built on the ones used in previous studies. For examples, the items for the questionnaires and questions for semi-structured interviews in study one were then adapted to suit the contexts of later studies.

3.4 Games Selected for the Research

Not every game is suitable for L2 learning, therefore, instructors need to choose appropriate games and evaluate what the potential game candidate teaches and how it can be leveraged or taken advantage of for L2 learning (Reinhardt, 2019). This is especially true in the case of using vernacular games for language learning.

As mentioned in the previous Chapter, games of two different genres were investigated in the research. In the first and second studies, the game investigated is an adventure game called *Life is Strange*

(<https://store.steampowered.com/curator/36149206-Life-is-Strange/list/52625>), while

the game selected for the third study is *Phasmophobia*

(<https://store.steampowered.com/app/739630/Phasmophobia/>), a cooperative MMOG.

As suggested by Reinhardt (2019), the following steps were taken to select and evaluate the game candidate for this thesis: First, the researcher played the games and considered the L2 learning potential of them from an L2 learner perspective. Second, following Wang (2020), the researcher applied the Chapelle's six criteria of CALL appropriateness (2001), namely, language learning potential, learner fit, authenticity, meaning focus, positive impact and practicality, as the standard to choose the game for language learning since this framework "comprehensively considers variables of learning, learners, and implementation" (Reinhardt, 2019, p.152). Table 5 presents the evaluation of these two games against the criteria. Third, the choice of these two games were validated by another two senior CALL researchers.

Table 5

Evaluation of the Two Games against Chapelle's Criteria (2001)

Criteria (Chapelle, 2001)	Features of <i>Life is strange</i>	Features of <i>Phasmophobia</i>
Language learning potential	Rich input	Rich input and output
Learner fit	Beginner friendly Campus life (dialogues common in student's life)	Beginner friendly Immersive environment
Meaning focus	Focus on meanings so as to complete goal-oriented activities (such as solving the puzzles and advancing the plot)	Focus on meanings so as to level up and unlock new maps Teamwork and in-game voice chat
Authenticity	Real-life scenarios Real social and cultural issues	Real-life scenarios Equipment and items used in everyday life
Positive impact	Active engagement and high motivation	Active engagement and high motivation
Practicality	User-friendly and easy control Compatible with standard PCs	User-friendly and easy control Compatible with standard PCs

To be more specific, *Life is strange* is an interactive and narrative-based adventure game played from a third-person view. This game's language learning potential lies in its rich linguistic inputs which take such forms as contextual texts, visual cues, cinematic cut scenes and character conversations simultaneously

presented textually and aurally. As an award-winning video game, it is well-designed in a way that players are drawn to its graphics, narratives and puzzle solving, which ensures the students' interest and engagement. The game also fits learners' needs as the game is highly relevant for learners in terms of its setting and theme. The story unfolds in a high school, so the players can benefit from the authentic dialogues taking place in students' everyday life. Its authenticity is felt not only in the language but also in the cultural and social issues touched upon in the game such as drug issues, mercy killing and school bullying. Moreover, players have to focus on meaning as a correct understanding of the in-game texts and dialogues is a prerequisite to advance in this plot-driven game. As the gaming mechanics allow players to go back in time and make different choices to change the course of events, players can experience a sense of control which elicits higher interaction and engagement. This mechanism also enables players to review the language at will. Furthermore, its compatibility with standard PCs and easy accessibility make it a prime candidate for research.

In terms of *Phasmophobia*, players in this game work in groups to gather information about ghosts by using a variety of equipment so as to identify the type of ghost haunting the specified site. In this sense, it provides abundant opportunities for linguistic input because players are expected to read and watch game-related materials extensively to ascertain gaming tips. As for output, players split up to search for clues in haunted places, so they need to remain in contact with one another through in-game voice chat so as to share real-time information. As teamwork and in-game communication are a must to complete game tasks (henceforth quests), players are

compelled to produce TL in a variety of situations and their interactions need to focus on meaning. In the game, players are placed in such surroundings as a farmhouse, hospital and campus, so they can have access to immersive environments where they may learn useful words and expressions in realistic scenario. The game is also considered appropriate because it is beginner-friendly and its popularity ensures its attractiveness for participants. Lastly, the game is inexpensive per copy and compatible with standard PCs.

3.5 Research Trustworthiness

As the goal of this research is not to test a certain hypothesis, but to provide a thick description and gain a deep understanding of the DGBLL practice, Guba's (1981) criteria for the trustworthiness of natural enquiry was adopted and the following procedures were used to ensure credibility.

1) Triangulation. According to Denzin (1978), triangulation incorporates a variety of data sources, different investigators, different perspectives (theories) and methods are pitted against one another in order to cross check data and interpretations. In this research, data were collected from multiple sources and through different procedures. Moreover, as will be detailed in the following chapters, the analysis of qualitative data was conducted by more than one researcher and this researcher triangulation contributed to the credibility of the findings.

2) Prolonged engagement. According to Terrell (2016), prolonged engagement refers to involving more time with subjects, contexts and data. In terms of the time with data, data generated from students' interactions were examined and revisited

using an iterative process over multiple sessions. For instance, the thematic analysis of interview data followed the six stages suggested by Braun and Clarke (2006), which involved iterative and repeated examination and analysis. These procedures added value to the convergence of data from multiple resources and contributed to the trustworthiness of research findings. In terms of the time with subjects and context, each study in this research lasted more than one month, much longer than the majority of the DGBLL studies which normally report limited durations (Peterson et al., 2020).

3) Peer debriefing. This involves consultation with disinterested and experienced peers during the on-going research process (Cohen et al., 2007; Creswell & Miller, 2000) so that the inquirers have the opportunity to test their growing insights and to expose themselves to searching questions (Guba, 1981). In this research, peer debriefers' assistance and feedback contributed to the prevention of researcher bias and to the consideration of other opinions and perspectives on different stages of the research. Peer debriefers in the research included an assistant professor of Center for English Language Education of *Wasada University* and at that time, a PHD candidate in Translation Studies in the *University of Leeds* who is now a professor of *Chongqing University of Post and Telecommunications*. In addition, the three studies included in this thesis have been published in peer-reviewed journals, which also speaks to the credibility of the findings.

3.6 Ethical Considerations

For all the studies, all the participants are volunteers. Before the studies commenced, all the potential subjects were briefed about the purpose of the study and

the data collection procedures. They were given the opportunity to ask any questions about the study and were aware that (1) they have the right to withdraw from the study at any time and without giving any reasons; (2) they could ask any questions related to the research at any time before and during the study; (3) data such as their personal information, recordings and interviews would be anonymized and used for research purpose only. Then written consents were obtained from every one of them. Another point that is worthy of note is that all the participants were volunteers who received no extra incentives for participating in and completing the research project (see Appendix A for the consent form).

3.7 Chapter Summary

This chapter has set out research methodology employed in this thesis. It discussed issues related to research design and method, which is followed by a brief introduction of the digital games investigated in this research. The chapter concluded with an account of issues of trustworthiness of the research, and ethical considerations. The next chapter will provide a detailed description of the first study in this research.

Chapter 4. Study one: Using Community of Inquiry to Scaffold Out-of-School Digital Game-based Language Learning

4.1 Introduction

This chapter reports on the first cycle of the action research (Li et al., 2021). As noted earlier, the literature suggests, in the context of free gameplay, the lack of scaffolding would “restrain the progress” of learners (Chik, 2014, p.96) and it was instructor-researchers’ original intention to help learners obtain the maximum learning gains from informal gaming by providing structured materials and guidance. With this in mind, this study drew upon the framework of the community of inquiry to provide scaffolds for game-based language learning outside classrooms. Mixed-methods design was employed to collect and analyze both qualitative and quantitative data, with a view to investigating the participants’ language development, participation, and perception. More specifically, the following research questions were formulated to guide the investigation:

1. What are the learning effects of out-of-class gaming?
2. What are the students’ participation levels and patterns?
3. How do students perceive the experience of out-of-class game-based language learning?

Eleven intermediate English learners in China volunteered to participate in this study which lasted 6 weeks. The volunteer participants played the interactive adventure game *Life is Strange* in an out-of-school setting, with the instructor present and scaffolds available online.

4.2 Methods

To answer the research questions, a one-group pretest- posttest design was adopted. Moreover, this study took place under the framework of concurrent nested design which in the case of this study indicates that both the quantitative and qualitative data were collected at the same time, with the former playing the guiding role and the latter the supporting role. This triangulation facilitated a comprehensive understanding of the data and assisted in the goal of answering the research questions.

4.2.1 Context and Participants

The study took place in an out-of-school online setting and lasted 6 weeks starting from July 9, 2019. A total of 17 student volunteers were recruited online from a university in China. However, 6 of them dropped out at the beginning due to scheduling issues. All of the 11 remaining participants (male=2, female=9) completed the project. The participants were either English majors (n=3) or finance majors (n=8) and they were all sophomores aged 19 to 20. According to the pre-questionnaire administered prior to the study, a majority of the participants were non-gamers and only three of them had gaming experience (less than 2 hours a week). At the time of data collection, the English levels of the participants were classified as intermediate as they had all passed the CET 4 (the College English Test Band 4). As the study was conducted during the summer holiday, the learning effects of other courses were excluded. As detailed in Chapter 3, the game selected for this study was *Life is Strange*, an interactive episodic adventure game played from a third-person view that features dialogues, puzzles and choices.

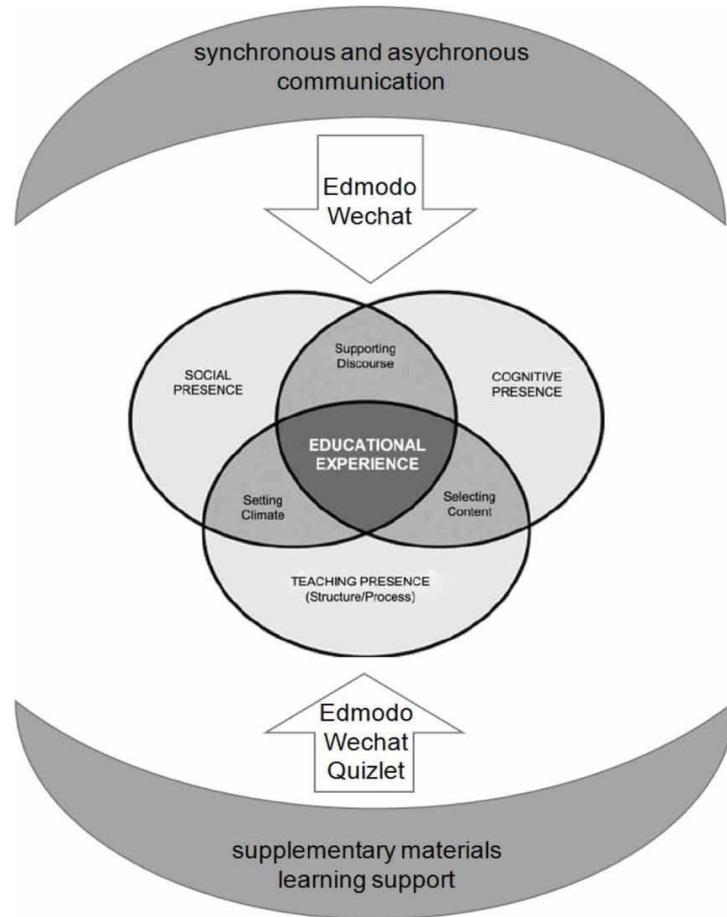
4.2.2 Research Design

As outlined in Chapter 2, the framework of community of inquiry was adopted to conceptualize the research design of the current study and three freely available software programs were incorporated so as to facilitate the establishment of the social, cognitive and teaching presences. To be specific, *Edmodo* (<https://new.edmodo.com/>)¹, the learning management system, was employed to host all the materials and provide a platform for asynchronous discussion and information sharing. *Wechat* (<https://www.wechat.com/>), one of the most popular message applications in China, was chosen because it can integrate synchronous opportunities for learner-learner and learner-instructor interaction. In addition, *Quizlet* (<https://quizlet.com/>) was adopted for word preview and review so as to support gameplay and vocabulary learning. For each episode of the game, a *Quizlet* word set was created where the definition of the word was given together with a screenshot of the game to show how the word was used so as to provide a context for the students to relate to. Another important reason justifying the adoption of these three tools is their easy operation, which would not constitute a technical barrier or burden for participants. In sum, just as illustrated in Figure 5, the use of *Edmodo* and *Wechat* is designed to facilitate the establishment of social and cognitive presence, while social presence is realized through the application of the three tools. The interfaces of these three software tools are shown in Appendix B.

¹ The platform *Edmodo* ceased operation on September 20, 2022.

Figure 5

Theoretical Framework Operationalized in the Study (adapted from Garrison et al., 2000)



As literature suggests that scaffolding is necessary before, during and after gameplay (Lai et al., 2012), the procedure followed three stages: pre-gameplay, gameplay and post-gameplay. In the first week's pre-gameplay stage, the participants were asked to complete a background pre-questionnaire regarding their language proficiency, gaming history and a vocabulary test. In addition, they were invited to join a group chat on *Wechat*, where they were briefed about the procedure of the

study, basics of gameplay and the usage of *Quizlet* and *Edmodo*. The participants were given one week to go through the preparation and introductory materials, install the game, and familiarize themselves with the gaming mechanics and the whole procedure. Starting from the second week, the 5-week gameplay commenced. The participants were asked to play one episode of the game per week and during the gameplay they were provided with the word lists on *Quizlet*. If they had difficulties, they could seek help from the instructor or peers online via *Wechat* or *Edmodo*, or refer to the play throughs uploaded to *Edmodo*. They were also encouraged to go through the supplementary materials, post comments on *Edmodo* and summarize the gaming experience.

It should be noted that as the study was conducted outside of a classroom, all the requirements were not mandatory, which means that the students could play the game in their own way, but with access to the scaffolds provided by the researcher. After finishing playing the five episodes, the participants were required to take an immediate post-test and one week later, the delayed post-test was also administered. In addition, learner opinions were solicited through a post-questionnaire and follow-up interviews (n=4) were conducted until data saturation was reached.

4.2.3 Data Collection

A concurrent triangulation design was employed to collect both the quantitative and qualitative data at the same time, with one supplementing, confirming, cross-validating or corroborating the other. The quantitative data consisted of the participants' scores on a vocabulary pre-test, immediate post- test and

delayed post-test as well as the post-questionnaire results, while the qualitative data were primarily drawn from the participants' *Edmodo* entries and semi-structured interviews, supplemented by the researcher's participant observation and *Wechat* messages. The instruments used were as follows:

4.2.3.1 Vocabulary Tests. Each vocabulary test comprised 50 words and the words for the immediate and delayed post- test were the same (see Appendix C). The words were randomly selected from a self-made word pool, which was constructed by extracting the words from the game's scripts and then excluding the word covered in the CET testing guidelines using *Range* (Cobb, 2005), a programme able to compare the word distribution across a set of two or more texts. Then the researcher went through the list again to manually remove the game-specific words such as proper nouns, swear words and made-up words. In this way, a total of 312 target words were generated. As these target words were not incorporated into the CET 4 curriculum, there was strong likelihood that they are new to the learners, thus constituting a challenge for them to complete the game quests.

4.2.3.2 Questionnaire. As mentioned earlier, the pre-questionnaire was administered to collect the background information on the participants. In terms of the post-questionnaire, it was adapted from Stepp-Greany (2002) and Tseng et al. (2018) to garner the participants' views on game-based language learning in an out-of-school context. The questionnaire consisted of 20 statements under four categories as well as two open questions. The items were constructed to elicit responses concerning the participants' general satisfaction, perceived progress, perceptions of the scaffolds and

autonomous learning on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). It was administered online through *Wenjuanxing* (<https://www.wjx.cn/>) and all participants responded. The Cronbach's alpha of the responses to the post-questionnaire was calculated as 0.718, a figure indicating acceptable reliability.

4.2.3.3 Semi-structured Interviews. In order to illuminate the perceptions of participants, semi-structured interviews were conducted as they allow researchers to “develop in-depth accounts of experiences and perceptions with individuals” (Cousin, 2009, p. 71). Semi-structured interviews typically have a pre-determined list of questions or topics that serve as a guide so that the interviewees are able to answer in flexible ways and the interviewer are able to “adapt, modify and add to the prepared questions if the flow of the interview talk suggests it” (Cousin, 2009, p. 72). In this case, the questions centered around the difficulties the subjects encountered and their suggestions for future projects. Responses to the open questions of the questionnaire were also used to inform the guiding questions of the interviews. Semi-structured interviews were conducted with four participants via *Wechat* calls until data saturation was reached. The interviews were recorded and then transcribed.

4.2.3.4 Online Postings. Another primary source of qualitative data is posts participants published on *Edmodo* and these threads were collected so as to shed a light upon the participation levels and patterns throughout the project.

4.2.4 Data Analysis

The quantitative questionnaire data were entered into *Excel* spreadsheets for descriptive analysis. As for the data regarding the three vocabulary test scores, within-

subjects ANOVA was conducted to determine whether there are statistically significant differences between scores of the pretest, immediate posttest and delayed posttest.

The qualitative analysis of the *Edmodo* entries was mainly based on the CoI coding scheme, which has laid out the categories of each presence in the framework. To ensure reliability, another CALL researcher with 5 years of experiences participated in the coding process. The researcher and another research assistant first coded the posts produced during Week 2 independently and then differences were resolved through discussion to agree upon the coding scheme of this study, which is presented with examples in Table 6. The follow-up interviews were transcribed and analyzed in reference to 6 dimensions of the post-questionnaire.

Table 6

Operation of CoI Coding Scheme in This Study (based on Garrison et al., 2000, p.89)

Presence	Category	Indicators	Examples extracted from <i>Edmodo</i>
Cognitive	Triggering events	Sense of puzzlement	“How can I save Kate?”
	Explorations	Information exchange	“You can refer to the walkthrough.”
	Integration	Connecting ideas	“This reminds me of...”
	Resolutions	Applying new ideas	“We can conclude that this may be caused by...”
Social	Emotional expression	Emotions (Affective)	“I hate the junkyard part.”; “I like Chloe.”
	Open communication	Risk-free expressions (Interactive)	“Same here.”; “Thanks for sharing!”; “Like XXX has said...”
	Group cohesion	Encouraging collaboration	“Let’s find out.”; “We all can ...”

Teaching	Instructional management	Defining and initiating discussion topics	“Who is your favorite character in the game?”
	Building understanding	Sharing personal meaning	“Speaking from my personal experience, you’d better...”
	Direct instruction	Focusing discussion	“You need to ...”

4.3 Results

4.3.1 Research Question 1: What are the Learning Effects of Out-of-school

Gaming?

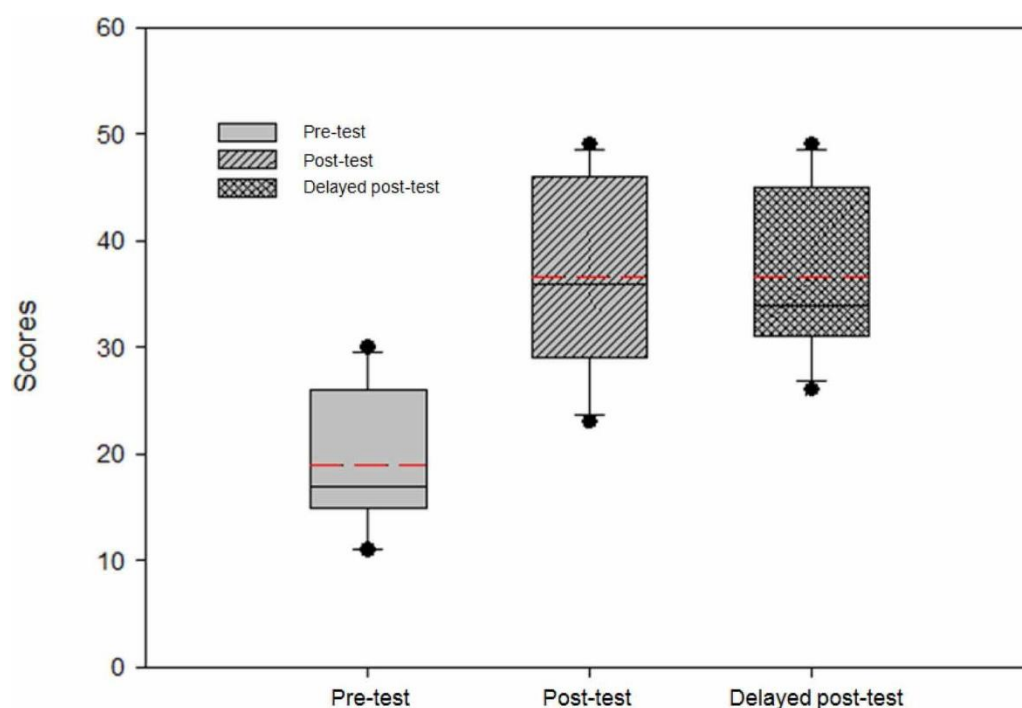
As noted previously, the learning effects were examined from multiple dimensions. The vocabulary scores in pre-test, immediate post-test and delayed post-tests are presented in the box and whisker plot in Figure 6. The medians (marked by the horizontal lines in the box) and the means (marked by red dotted lines in the box) of the post-tests (immediate and delayed) were higher than those of the pre-test. This is the same case for the highest and lowest scores. At a glance, no obvious differences were identified between the three plots in terms of the distribution and the means. The immediate and delayed post- tests appeared to be of basically the same level.

A one-way within-subjects ANOVA was conducted to determine whether the scores of these tests differed from one another. Mauchly’s test indicated that the assumption of sphericity has not been violated, $\chi^2(2)=0.663$, $p=0.718$. The ANOVA results showed that there was statistically significant improvement in learners’ vocabulary ($F(2,20)=77.84$, $p<0.01$). Furthermore, post hoc tests using the Bonferroni correction indicated the scores of the pre-test ($M=18.9$, $S=6.64$) were significantly

lower (at $p < .05$) than those of the immediate post-test ($M=36.54$, $S=8.92$), whereas no statistically significant difference was found between the immediate post-test ($M=36.54$, $S=8.92$) and the delayed post-test ($M=36.63$, $S=7.76$). The results indicated that out-of-class gameplay has significantly enhanced the learners' vocabulary learning and this improvement had a long-lasting effect.

Figure 6

Vocabulary Test Results of Pre-test, Post-test and Delayed Post-test

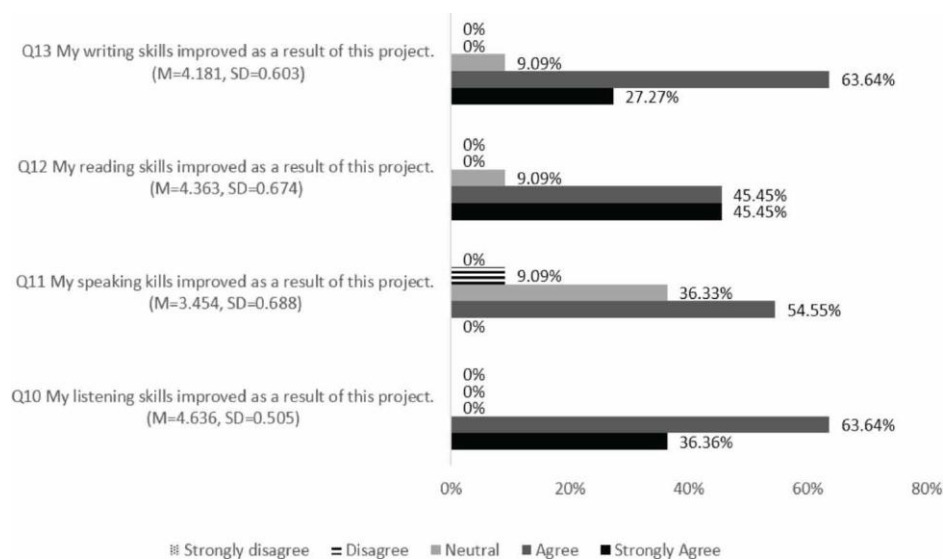


Considering the limited duration of the study and difficulties in truly gauging the learning outcomes, the participants' opinions of the perceived language development were also elicited with a view to gaining a comprehensive picture of the learning effects. As illustrated in Figure 7, there is a consensus among the participants

that the learning experience helped improve their listening. In addition, a majority of participants had positive attitudes to the effects on reading, whereas they were uncertain about the effects on speaking and writing.

Figure 7

Perceptions of Perceived Progress



This finding is understandable as the game and project were not specifically designed to elicit oral output. However, this finding does not necessarily mean the participants' speaking did not improve at all as they were exposed to daily conversations, as one learner commented that:

I can learn informal English by playing the game.

This assertion may also be observed in the following feedback:

In this game, I got to learn about the use of English in daily life instead of the philosophical articles or literature work I was taught in class. This game enables me to see the actual use of language in daily conversations.

These comments demonstrated that learners' speaking benefited in some way, but more efforts are needed to translate this incidental learning into actual progress, which is important as many participants voiced their wish to improve their oral proficiency through digital gaming.

Another issue that should be pointed out is that even though the students were encouraged to write summaries based on the gaming experiences, only three students followed this instruction and all of these three students gave 5 scores to statement 13, which well demonstrated the positive effect on writing. The comments below illustrated this point:

I hated the weekly writing assignments in school. But when I was writing the summaries of the game episodes, I felt as if everything was in my mind. It's a completely different case.

I liked the design that we can write the summary of the game and receive the instructor's feedback accordingly. It's a good mechanism.

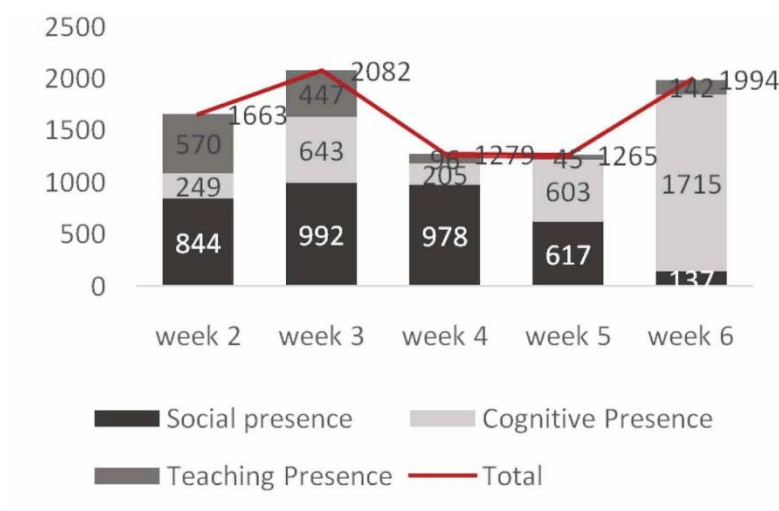
4.3.2 Research Question 2: What are the Students' Participation Levels and Patterns?

The qualitative data readily available from *Edmodo* comments revealed the engagement level and patterns throughout the project. Figure 8 presents the word count of the *Edmodo* entries every week and the proportions of the three presences in

the CoI framework. In total, the participants and the instructor have contributed 8281 words on the platform. The participation level peaked during Week 3. It is true that high participation levels were observed in Week 2 and Week 6, whereas Week 4 and 5 seemed to suffer from a sharp decline. A closer examination of the data, however, revealed another story. If the teaching presence (instructor-participant interactions) was excluded, the participants' contribution, except for a rise in Week 3, stabilized in the initial weeks and peaked in the last week. The active participation in Week 3 can be attributed to the fact that during the game-play that week, a major character died (or not, depending on players' choice), which sparked discussion and reflection.

Figure 8

Participation Levels and Patterns



In terms of the content of engagement, comments conducive to the establishments of social, cognitive and teaching presences were all identified across

the game-play weeks. Teaching presence is mainly manifested through the topics initiated by the instructor on *Edmodo*, for example: “T: What ending did you choose? Why? Can you think of an alternative ending to the game?”

It was obvious that teaching presence accounted for the least proportion of participation and a trend of gradual decrease can be observed. This makes perfect sense since it is natural that guidance and support were most needed during the initial weeks. The most prominent participation pattern identified is social presence. However, three weeks into the project, it started to decline and a dramatic decrease can be detected in the last week. As for cognitive presence, it generally followed an upward trend and reached a peaked in the last week.

Typical examples of social presences included responses to the threads by expressing compliments or agreement, such as “Thank you!”, “You are great” and “Thanks for sharing.” But it should be noted that social presence and cognitive presence are often intertwined in the interaction, as shown in the following excerpts:

Student 1: I finished episode 1 difficultly. I always feel sick when I play the game. So I play it slowly. To be honest, it really makes an appeal to me and I am curious about what is going to happen in the future. In the episode 1, I get nervous every time I saw the sentence that the action will influence the consequence. Do you have the same feelings?

Student 2: Yes! Unlike some interactive games in which you can load again and again, this one even doesn’t allow you rewind sometimes, so, just

follow your heart~hhh. Maybe you can move slowly to relieve your symptom which likely caused by 3D.

As can be observed in the excerpts above, Student 1 first expressed how she felt about the game and then asked a question which elicited a common sentiment. Then this thread was responded to by another participant who first shared her similar experience and then offered a solution. A combination of social and cognitive presences is exhibited. Another typical combination of social and cognitive presences occurred during week 4.

Student 3: It feels like our cute Max has little color in her cheeks since using her super capacity. (Hope she will be fine.) I've been thinking about whether things really changed after rewinding time, or it just change the story line of the world we live in, but in other worlds (like parallel universes), our C and K are dead?

Student 4: Good point! Actually, your comment reminded me of a very interesting movie called Coherence. Have you watched it before? If not, you should definitely check it out! Here's the Douban link:

[https://movie.douban.com/subject/25807345/.](https://movie.douban.com/subject/25807345/)”

Student 3: Thanks for sharing. I heard this one is good, but never got the chance to watch. Maybe now is the time.

Student 5: I like your theory which also reminds me of a movie, Source Code. Highly recommend it. It is also about parallel universe.

Student 3: Thank you for sharing! That sounds interesting!

Student 6: guys, don't forget Interstellar and Edge of Tomorrow!!!

As shown in the above excerpt, one participant first expresses her idea and another three responded by extending the topic and connecting it with the movies they have watched, exhibiting integration (cognitive presence) and emotional expression (social presence) at the same time. In conclusion, it can be argued that throughout the project, social presence was the most salient feature and a rise in cognitive presence can be identified in conjunction with a decline of social and teaching presence.

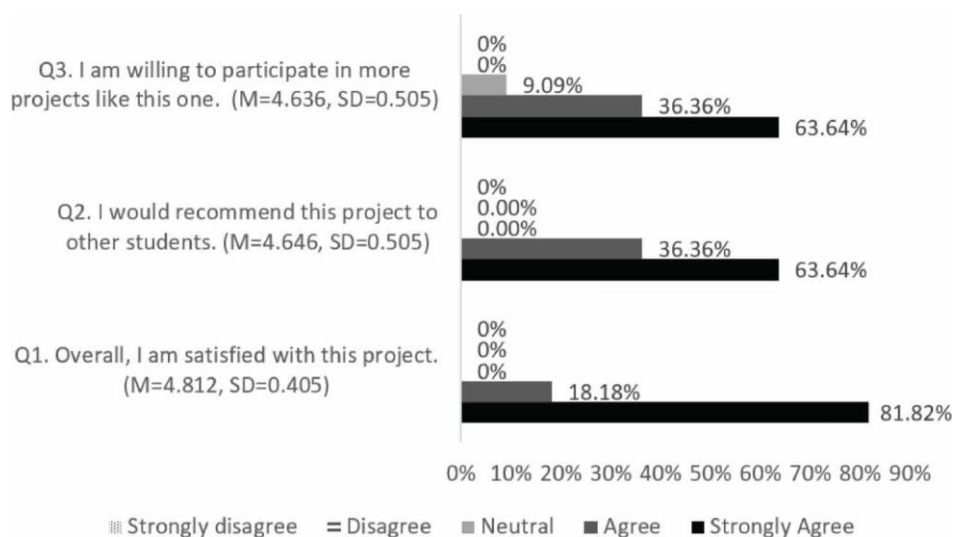
4.3.3 Research Question 3: How Do Students Perceive the Learning Experience of Out-of-school Gaming?

The participants' perceptions of the project were explored with triangulation of the data collected from the post-questionnaire and follow-up interviews.

4.3.3.1 Student's General Satisfaction. As shown in Figure 9, the participants responded very positively toward the project. They were overwhelmingly satisfied (statement 1) and most of them were willing to participate in more projects like this or recommend the project to others.

Figure 9

Student's General Satisfaction with the Project



During the follow-up semi-structured interviews, students also expressed their satisfaction towards the project and the affordances of the game were the most mentioned reason, which was evidenced by comments drawn from the transcript:

What I am most satisfied with the project is that the game enables me to learn English in an interesting way, not a boring way. It can arouse my interest. In particular, I like the graphics and music, very attractive to me.

This way of English learning is better than watching TV or reading a book because you can control the character.

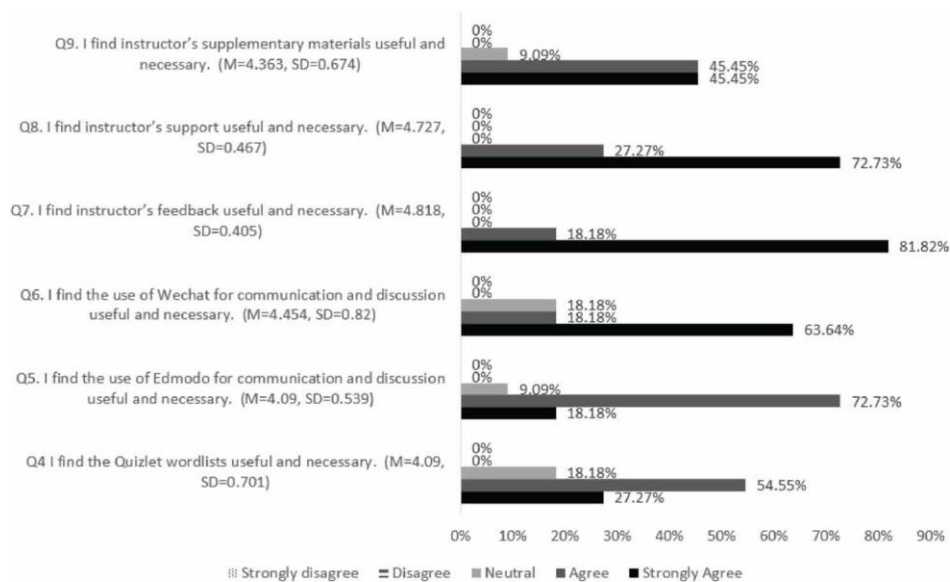
What I liked most about the game is that it is immersive. The music and dialogues were arranged in a way to make you feel that you are really there, with the characters.

4.3.3.2 Student's Perceptions of the Scaffolds. All the scaffolds were generally well-received, in particular, there was agreement that the instructor's feedback and support were useful and necessary. As shown in Figure 10, responses to

the items concerning the three software tools used in the study, were generally positive, with two participants neutral about the usage of *Quizlet* and *Wechat* and one neutral about the usage of *Edmodo*. Participants went on to elaborate on their choices during the interview. The major concern regarding *Quizlet* was the time commitment. In the words of an interviewee, “word lists were ‘good learning material’, but they were just too long and took up excessive time.” In addition, the discussions on *Wechat* and *Edmodo* were considered as insufficient and hopes for more structured discussions were expressed.

Figure 10

Student’s Perceptions of the Scaffolding



4.3.3.3 Perceptions Concerning the Benefits. Not surprisingly, the benefits of the project were recognized by all the participants, as shown in Figure 11. In particular, they believed there was much to gain from the game itself and the

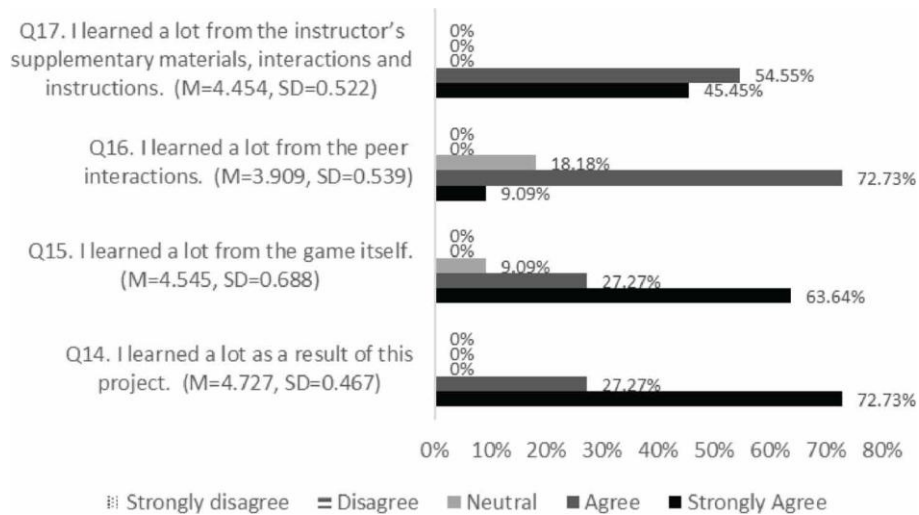
instructor’s supplementary materials, interactions and instructions. This finding was also echoed in the following student’s remarks:

What I liked about the project is that we are provided learning materials for each episode and the whole feedback mechanism.

In general, I like the project, especially the whole design. I get to write summaries and receive feedback. Also I can communicate on the platform to see what others think.

Figure 11

Perceptions Concerning the Benefits



However, the benefits from peer interaction were not that appreciated, which was not unexpected since it was observed by the instructor that the participants tended to favor private messages to the instructor over group messages.

Moreover, as can be observed from Figure 12, the participants felt that after the participation in the project, they were more capable of autonomous learning, with

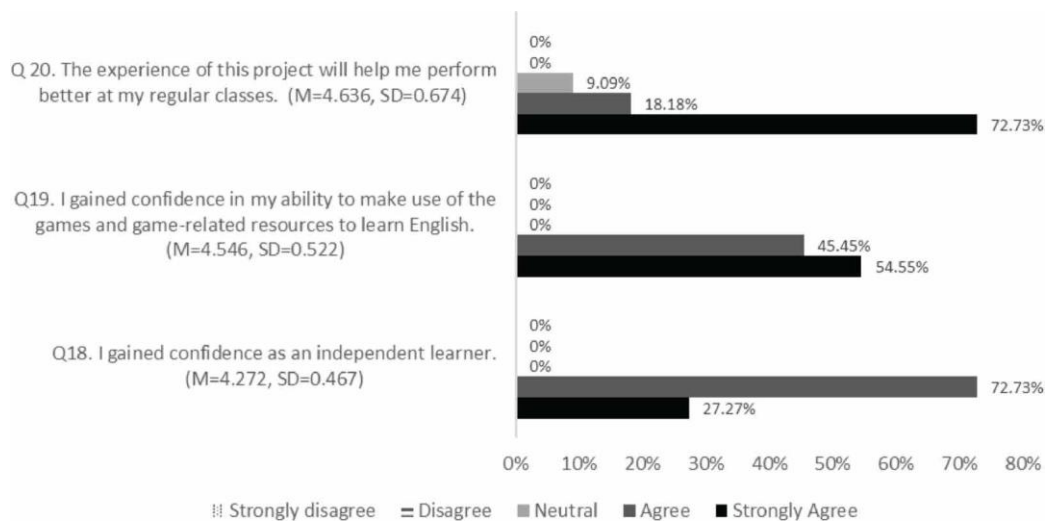
one saying “When playing this game, I felt my ability to learn autonomously has improved.”. Another participant made the following comment:

I think my self-control has improved. To be honest, I’ve been busy with some other stuff, and at some point, I wanted to quit. But I stick to the end and I feel good about it.

Another surprising finding is that they believed this project can help them perform better in regular classes in spite of the fact that it was not exam-oriented. This interesting finding cannot be generalized, however, it implies that out-of-class learning can facilitate language learning by way of increasing learners’ ability to learn independently. This may be reflected by the comment of a participant who said in the interview: “This ability can be conducive to me not only in this project, but also in class.”

Figure 12

Perceptions Concerning the Effect on the Learning Ability



4.3.3.4 Difficulties Encountered and Suggestions for Future Improvement.

The researchers analyzed the answers to the two open questions and the transcripts of interviews, and found three themes emerged as to the difficulties encountered: no difficulties (n=2), difficulties with vocabulary (n=2) and difficulties in gameplay (n=7). With regard to vocabulary, the biggest difficulty lies in the time commitment required, while for the gameplay, participants voiced concerns regarding game operation and checkpoints. As two interviewees remarked:

If we want to exit the game between the checkpoints, some information will be lost. This is troublesome and annoying.

I hated the design that I have to drag the mouse because it's not convenient and I got stuck sometimes.

As for their responses to the suggestions for future improvement, three emerging themes were identified, namely, no suggestions (n=2), instruction and design (n=8) and duration (n=1). In addition to one participant who suggested that it would be

better if the project had lasted longer, a majority of participants indicated that they would like to have more instructions in the form of regular and structured discussion sessions online, as well as explanations of the language and cultural issues raised. One interviewee elaborated:

It's true that it feels free under current design, we can post whatever comments whenever we want, but I believe we can benefit more if we can have structured discussions regularly online.

Similar sentiments were also expressed by other participants:

When I am playing the game, I focus on the story and plot, not the language. Some points may go unnoticed during gameplay, so it would be better if the instructor can highlight those for us.

4.4 Discussion

This study examined out-of-class game-based learning experience from the perspectives of learning outcome, engagement, and perceptions. Important findings are highlighted and discussed in this section.

First, the analysis confirmed that the participants improved their vocabulary knowledge, echoing the findings of previous studies (Franciosi et al., 2016; Hitosugi et al., 2014; Ranalli, 2008; Vasileiadou & Makrina, 2017). Additionally, perceived language development in reading and listening has been reported by the participants, suggesting the need for more studies to verify these linguistic gains and to explore the optimal practices to secure and maximize the learning effects. This finding also has implications for research and practice that aims to leverage video games to foster

language learning from the perspective of the four skills, in both in-class and out-of-class scenarios.

Second, judging from the level and pattern of the game-related discussions, it appears reasonable to assume that gaming, supported and supplemented by other CALL tools, is conducive to the three presences in the CoI model. The active participation observed during the first two and final weeks could be ascribed to the time factor since it is a natural tendency for people to slacken in the middle of a project and it is difficult to sustain high enthusiasm over the entire period of time. Another possible factor affecting the participation level may be the specific gaming experience of each week. For instance, during the week which saw the most rigorous discussion, the players had to persuade a major character out of committing suicide. There are also major plot twists during first and last week of gameplay. With regards to the participation patterns, the findings suggest a dominant role of social presence, as well as a gradual increase of cognitive presence accompanied by a decline of social and teaching presence, which is in line with previous research in the field of blended or online learning (Garrison et al., 2000, 2010a, 2010b). It can be argued that the participants established their cognitive presence as a result of the project, a finding triangulated by the self-reported improvement in learning autonomy. This implies that more detailed and in-depth research is needed to explore the gameplay's effects on the dynamics of the three presences and their relationships.

Third, in a difference from previous studies which focused on unstructured and naturalistic gameplay (Chik, 2011, 2012, 2014; Jensen, 2017; Scholz & Schulze,

2017; Sundqvist, 2019; Sylvén & Sundqvist, 2012a, 2012b), an important issue raised by this research is the pivotal role of the instructor. Multiple sources of data suggest that the instructor has a major bearing on the learning experience, thus affecting the participants' satisfaction. Although instructors may not necessarily be active in the discussion, their presence is necessary as a host of preparation needs to be put in place prior to a project and the learners expect to receive instructor guidance. In light of this, there appears to be a need for more research into the role of instructors in game-based learning beyond the classroom.

Fourth, the participants' general satisfaction with the project confirms the value and feasibility of providing scaffolds for out-of-class gameplay. However, the implementation of such a project was not without difficulties, among which the technical issues stood out. In spite of their complaints about certain features and operations of the game, the participants managed to resolve the problems, which highlights their willingness to undergo and endure challenging experiences for the project. However, this also signals room for improvement. Researchers and practitioners should not be blind to the deficiencies of games and should take measures accordingly to avoid or minimize the negative effects or experiences brought out by those potential limitations. For this project, in particular, the researcher should perhaps have singled out some highlights of each episode for the participants to focus on and present the participants with an alternative to gameplay, for example, watching playthroughs or reading discussion threads online, when they got frustrated with the gameplay. This finding serves as a caution against the blind adoption of

games as researchers need to distinguish the favorable and potentially problematic features of the game. Therefore, more studies are needed to identify these features so as to maximize the gains of game-based learning.

Fifth, as with most research in the field, this present study highlights learners' high motivation, which is evidenced by zero drop-out, active online discussions, and the willingness to devote at least 3 hours a week. The fact that the study took place outside the classroom where the instructor-researchers had no control over the participants and all the activities were not mandatory renders this finding even more compelling. It is also worth mentioning that 3 participants voluntarily wrote about their gaming experiences and another said this study rekindled her interest in English, especially English writing. However, voluntary participation poses a potential concern. As learners of low motivation would be unlikely to volunteer to participate in an out-of-school study like this one, there is a need to investigate the different effects of in-class and out-of-class digital gaming on students with varying motivations, language competences and gaming histories. Further exploration in this area may offer insights into best practices for using digital games for language learning and teaching.

Sixth, promising and encouraging as the findings are, there are a few caveats to consider. The possibility that the vocabulary development is a result of maturation and testing cannot be excluded. The empirical evidence is inconclusive due to a lack of a control group and limited measurement method. To improve the validity of research, future work could introduce a control group or non-equivalent dependent

variables, for example, such as gaming vocabulary and non-gaming vocabulary.

Another possible approach is to examine the learning effects from a wider perspective, such as near transfer (learners' ability to utilize words acquired from the game in non-gaming context), digital literacy such as making walkthroughs and game blogs, and cultural awareness (understanding and reflecting on the social topics covered in the game).

4.5 Chapter Summary

This chapter reports the first study in the AR cycle which examined out-of-class gaming and learning experiences in a holistic manner, with a dual focus on the outcome and process. By doing so, this study adds a new dimension to the current literature concerning out-of-class game-based learning and its novelty lies in the inclusion of the community of inquiry model to investigate the use of a game for the purpose of providing students with learning opportunities and support outside the classroom. Results confirmed vocabulary gains and also pointed to the possible linguistic benefits in terms of reading, listening and writing. The study also identified that with the presence of instructor and online scaffolds, the participants were able to connect with a community, which is conducive to the establishment of cognitive presence. It demonstrated that even if the project is removed from the classroom, the presence of an instructor is desirable and critical to securing learning outcomes. However, the current study is inevitably subject to several limitations. First, it only spanned a limited period which means there may be not enough time for more learning to take place and the learner perceptions may change after the “WOW” factor

wears off. Second, the small sample size and the lack of a control group renders the generalization of results challenging. Third, caution is advised in interpreting the results given the inevitably subjective nature of the self-reported data. Fourth, some important data that may have shed new light on the learning dynamics such as the use of emoji, pictures, participants' comments on their *Wechat*'s personal pages (my moments) and private messages between participants were not investigated. In light of this, future research may benefit from a larger sample size and longer duration. It is also recommended that future research in this area introduce a control group to provide more inclusive findings and focus more closely on the role the instructor can play. The insights and findings of this study laid the foundation for the second study, which is presented in the next chapter.

Chapter 5. Study Two Digital Gaming in the Language Classroom: Student Language Performance, Engagement, and Perception

5.1 Introduction

This chapter reports on the second cycle of the action research (Li et al., 2022a). As noted at an earlier stage of this discussion, the first study investigated the use of the adventure game *Life is Strange* for language learning in an out-of-school context. This study provided evidence that it is feasible and beneficial to use this game for language learning, so the second study went on to apply the same game, but in a different setting, namely, in a classroom. As suggested by the previous research, this study also investigated the impact of digital gaming on vocabulary transfer and writing. Moreover, based on the insights gained previously, the instructor provided more guidance such as singling out some highlights for learners to focus on and presenting learners with alternatives to gameplay, for example, watching playthroughs or reading discussion threads online.

Informed by bridging activities (Thorne & Reinhardt, 2008), the researcher recruited six students to engage in instructed gameplay in class and game-related activities after class. Both qualitative and quantitative data were collected and analyzed so as to measure participants' learning outcome, document their engagement, and explore their perceptions of game-based language learning. Specifically, this study aimed to address the following questions:

1. How can digital gaming in the classroom facilitate language learning?

2. How engaged are the participants in this digital game-based language learning study?
3. What aspects of teacher scaffolding do learners find useful in the context of DGBLL?
4. How do the participating students perceive their classroom-based DGBLL experience?

5.2 Methods

As mentioned earlier, relevant qualitative data were collected and analyzed in combination with the quantitative data to provide a richer and more complete interpretation of the phenomena in focus.

5.2.1 Context and Participants

This study was conducted at a Japanese university. The design was affected by institutional constraints as the language lab can only accommodate up to 10 persons with only 7 computers available. Six freshman students including three males and three females, volunteered to participate. Responses to a pre-study questionnaire indicated that they had an average language learning history of 10.17 years ($SD = 2.92$) and came from a diverse disciplinary backgrounds, including linguistics, applied linguistics, economics, exercise science, education and cognitive science. In terms of their language proficiency, the university's enrollment policy (Admission guidelines, 2018) indicated that they had reached at least level B1 on the CEFR framework (Council of Europe, 2001). Four were non-gamers, one played games every day and the other played games several times a week. They were given no extra incentives for

participation and all signed the consent form, which provided them with information confidentially during data handling.

5.2.2 Research Design

The project lasted 10 weeks and the 6 participating students met once a week for a 90-minute session. Prior to the study, the instructor installed the game onto university computers, prepared and uploaded the supplementary materials onto *Edmodo*. An overview of all the supplementary materials is presented in Appendix D. In the first session, the participants were introduced to the game and briefed on game controls and project requirements. A background survey was administered focusing on the participants' language learning history and gaming experience. Participants also completed a pre-vocabulary test. Starting from the second session, the participants engaged in in-class instructed gameplay and after-class game-related activities, that, as discussed in Chapter 2, were informed by bridging activities. Figure 13 depicts how this model was operationalized in this study.

Specifically, each in-class session included the following four steps:

1. Review and brainstorm. The participants were shown some picture prompts to recap the game plot from the previous session and then were encouraged to brainstorm the possible future plot.
2. Structured gameplay. In addition to playing the game on their own, the participants were also asked to note down important words and information so as to complete the tracking tasks which were designed to help them sustain a language

focus instead of “only watching what takes place on-screen” (deHaan et al., 2010, p.32). When in trouble, they could seek help from the instructor and/or their peers.

3. Post-game discussion. The group discussed the plot or/and the characters in the game.
4. Debriefing. Participants’ attention was drawn to salient language points.

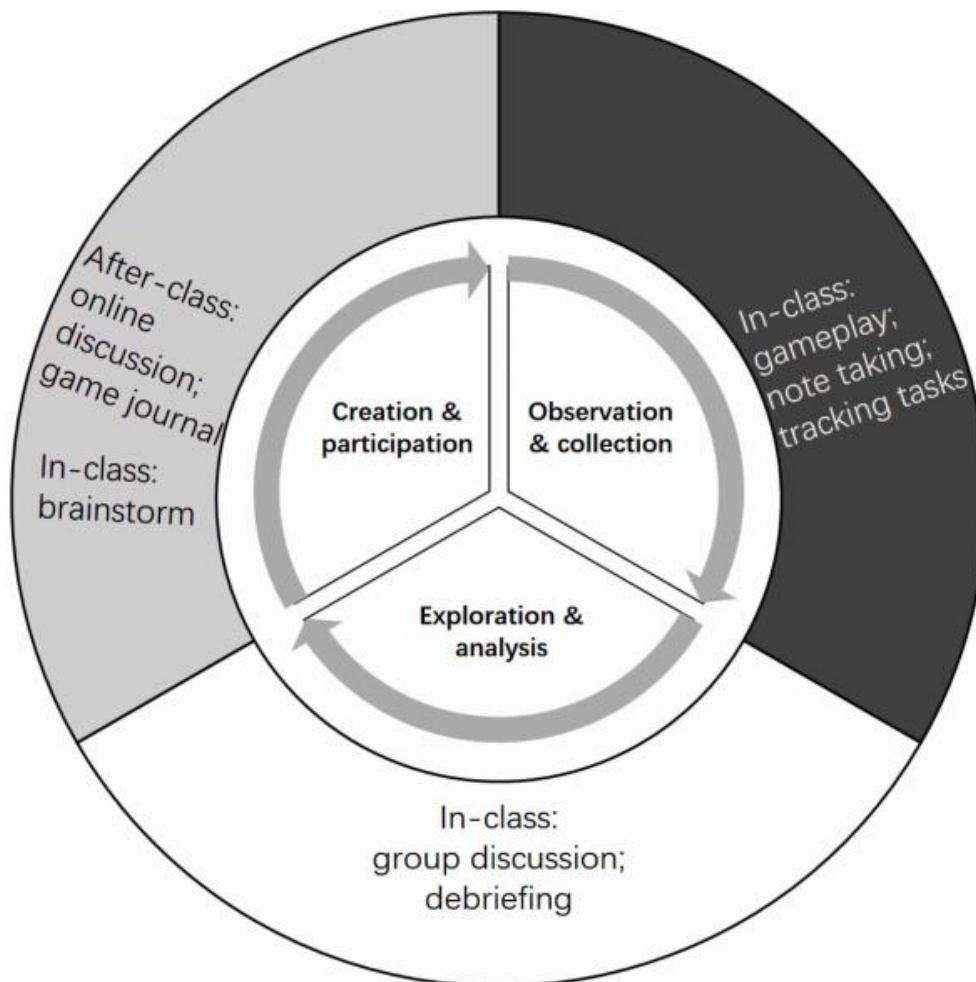
Step 2 was the observation and collection phase where learners interacted with in-game discourse and narratives to complete game quests, while step 3 and 4 constituted the exploration and analysis phase where learners made efforts to reflect upon language use as well as the gaming content through instructor-led discussion. The creation and participation were then realized through step 1 and after-class activities. After class, the participants were encouraged to review the supplementary materials and post threads on *Edmodo*. They were required to keep a game journal that included a summary of the game’s plot and their reflections on the gaming content.

In addition, they were asked to underline newly acquired words in their writings based on which the instructor provided them with timely feedback focusing on grammar, collocations, and sentence variety (see Appendix E for an example). The purpose of the game journal and *Edmodo* posts was to provide the player-learners with an opportunity to actually apply the skills, knowledge and language acquired. At the final session, the researchers administered an exit survey which was developed to elicit their opinions regarding the learning experience and they also took a post

vocabulary test. One week later, participants were asked to take the delayed post-test online.

Figure 13

Application of Bridging Activities in This Study



5.2.3 Data Collection

Primary sources of data included students' vocabulary test scores, writing scores, game journals, online discussions, questionnaire and classroom observation.

The following instruments were employed to collect data:

5.2.3.1 Vocabulary Tests. Following the practice of the previous study (Li et al., 2021), a word pool was first created. As the participants were different from the ones recruited for the first study, the list of 508 target words was generated by excluding the ones not covered in the university's entrance exam guidelines from the word pool as there is a strong likelihood that they were new to the learners. Moreover, another three steps were taken so as to enhance the validity and reliability of the tests: 1) the words in the immediate and delayed post-test were the same, but arranged in a different order; 2) the pre and post tests used in this study were then validated by two senior CALL researchers; 3) Another 20 students were recruited through convenience sampling to take two versions of the tests and their corresponding scores were found to be strongly correlated, $r(18) = 0.929$, $p < .01$, indicating good reliability.

5.2.3.2 Questionnaire. The anonymous questionnaire distributed at the last session was adapted from the previous study (Li et al., 2021) and it incorporated 14 five-point Likert-scale items (1 = Strongly Disagree, 5 = Strongly Agree) and 5 open-ended questions (see Appendix F). The use of a questionnaire was favored over focus groups or interviews to gather the participants' opinions because it was anticipated that anonymity would make the Japanese students more comfortable and willing to express their views (Wang 2019, 2020). As a result, the data elicited were likely to be more authentic and truly represent their voices. The aim of the questionnaire was to

solicit opinions instead of measuring language proficiency, so the participants were free to use either English or Japanese to answer the open questions.

5.2.3.3 Classroom Observation Scale. Classroom observation was carried out to provide information regarding in-class engagement. To the best of the researchers' knowledge, no extant classroom observation scheme was available for a DGBLL classroom, so it was necessary to develop one to fit this particular setting. A literature review (Volpe et al., 2005) on classroom observation identified 6 main target behaviors expected from the instructor (transmitting information, explaining, asking questions, answering questions, providing feedback and giving instruction) and 3 from students (asking questions, responding to questions, and discussing with peers). In the case of a DGBLL classroom, however, another crucial element should be considered, that being the game. With this in mind, the researcher designed an observation scheme based on Bouwmeester et al. (2019) and Lan et al. (2019) to evaluate the classroom from three dimensions: learners' engagement with the content, the instructor and their peers. The target behaviors were scored on a 5-point scale based on the descriptions in the rubric (see Appendix G). The scheme was then confirmed by another senior CALL researcher who silently observed all sessions and then discussed students' engagement with the researcher/instructor each time to ensure the process was faithfully evaluated, thus adding objectivity and reducing bias.

5.2.3.4 Online Discussion. Following the practice of the previous study, the online threads that participants posted on *Edmodo* were collected to measure online engagement.

5.2.3.5 Game Reviews. As demonstrated in the previous study, learners may benefit from writing game reviews. Therefore, in this study, each participant was asked to produce five game reviews for every episode of the game and a total of 30 written samples were collected. As mentioned earlier, learners also underlined the new words in their writings, which served as an indicator for vocabulary reproduction.

5.2.4 Data Analysis

The participants' vocabulary development was measured with a dual focus on retention and reproduction. On the one hand, retention was measured through the test scores on the pre-test, post-test and delayed post-test. Specifically, within-subjects ANOVA was conducted to determine whether there are statistically significant differences between the scores on these tests. On the other hand, the number of the new words in each writing was counted so as to measure vocabulary reproduction.

In terms of the writings, they were scored using the ESL Composition Profile (Jacobs et al., 1981, see Appendix H), which is "one of the best known and widely used analytical scales in ESL" (Weigle, 2011, p.115). Two raters with 5 years of L2 teaching experience in universities were recruited and trained to score the writing samples and the means were adopted as the final score of each writing. The intra class correlation coefficient was calculated as 0,952, considered as excellent inter-rater consistency.

As for the qualitative data generated in the survey, the responses to the open question were first translated (when necessary). Then the researcher and another CALL researcher conducted the analysis following analytical induction and constant

comparison (Miles et.al, 1994). Disputes were resolved through discussion to ensure inter-rater reliability. Salient themes that emerged were categorized and reported together with the students' comments.

5.3 Results

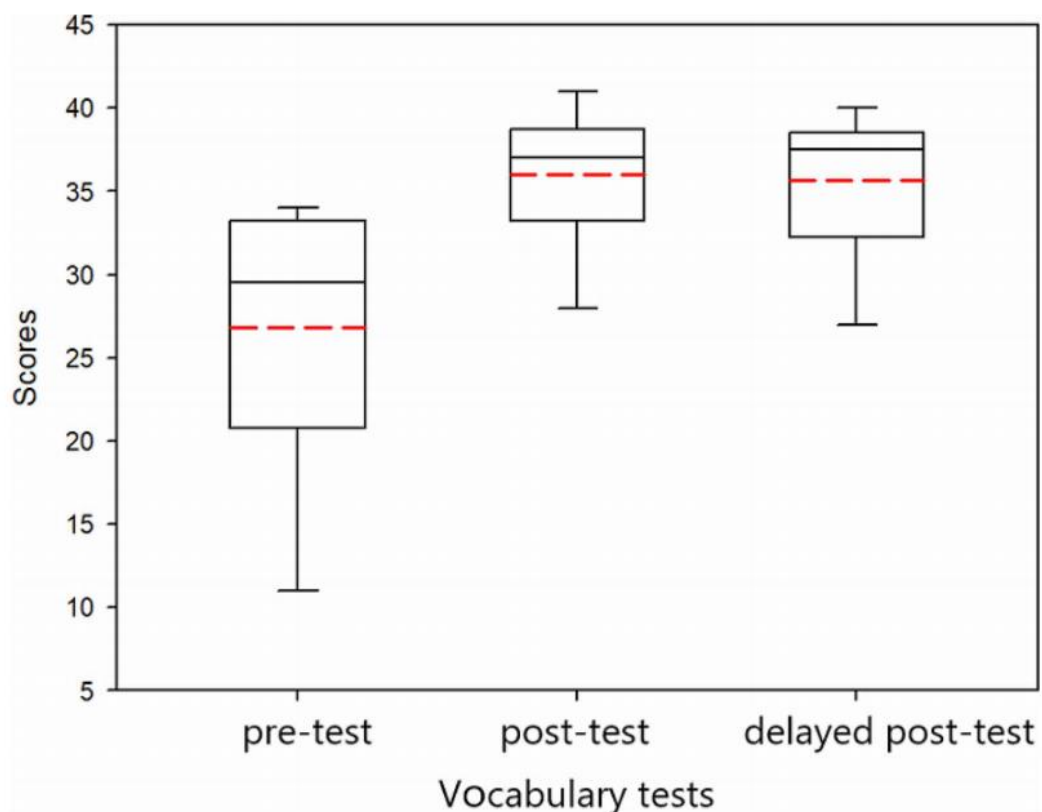
5.3.1 Research Question 1: How Can Digital Gaming in the Classroom Facilitate Language Learning?

5.3.1.1 Vocabulary Retention. The box plot in Figure 14 demonstrates the medians (marked by the horizontal lines in the box), means (marked by red dotted lines in the box), and distributions of learners' scores in the three vocabulary tests. It can be clearly seen that learners performed better in the post-tests (immediate and delayed) than in the pre-test in terms of the means, the medians, the highest and lowest scores. At a glance, no obvious differences can be observed between the immediate and delayed post-tests in terms of the means, whereas the median of the delayed post-test appears slightly higher than that of the immediate post-test. A Shapiro-Wilk's test ($p > 0.05$) and a visual inspection of their histograms, normal Q-Q plots and box plots showed that the three sets of test scores were approximately normally distributed, with a skewness of -1.583 (SE = 0.845) and a kurtosis of 2.502 (SE = 1.741) for pre-test, a skewness of -1.348 (SE = 0.845) and a kurtosis of 2.751 (SE = 1.741) for post-test and a skewness of -1.063 (SE = 0.845) and a kurtosis of 2.628 (SE = 1.741) for delayed post-test. Since the assumption of normal distribution was satisfied, one-way within-subjects ANOVA instead of a non-parametric test was employed to determine whether there were statistically significant differences

between these three tests in spite of the small sample size as parametric tests have more statistical power and are better able to detect significance than their non-parametric equivalents.

Figure 14

Vocabulary Test Results of the Pre-test, Post-test and Delayed Post-test



Mauchly's test indicated that the assumption of sphericity had been violated, $\chi^2(2) = 8.179, p = 0.017$, therefore degrees of freedom were corrected using Green-Geisser correction. The results showed that mean scores of the three tests differed

significantly between time points [$F(1.069, 0.535) = 20.356, p < .05$]. Furthermore, post hoc tests using the Bonferroni correction indicated that scores of the pre-test ($M = 26.83, SD = 8.56$) were significantly lower (at $p < .05$) than those of the immediate post-test ($M = 36, SD = 4.38$) and the delayed post-test ($M = 35.67, SD = 4.67$), whereas no statistically significant difference was identified in the two post-tests. The results suggested that learners made significant progress in vocabulary knowledge and this improvement had a long-lasting effect.

5.3.1.2 Vocabulary Reproduction. According to Reinhardt and Sykes (2011), after the first two phases of the BA cycle, learners are expected to develop the awareness and ability to use the language in their social practice. Therefore, it is important to analyze their language output. In this case, learners' game journals were analyzed in terms of the new words they utilized. Table 7 presents detailed information regarding the number and ratio of the new words utilized by the participants in each game journal. It is clear that on average, every student was able to use 4 to 7.5 words in each of their writings. The number of the new words utilized follow a generally upward trend and peaked in the third writings. Despite the continuous decreases that followed, students' fourth and fifth writing still outperformed their first writings in terms of vocabulary reproduction.

Table 7

New Words Used in Game Journals

New words	Total words	Ratio
-----------	-------------	-------

Game Journal 1	20	2961	6.75‰
Game Journal 2	39	3299	11.82‰
Game Journal 3	45	3400	13.24‰
Game Journal 4	41	3475	11.80‰
Game Journal 5	32	4591	6.97‰

To illustrate learners' ability to reproduce the words they encountered in the project, the following is an excerpt taken from a student's fourth game journal, with the new words identified and underlined by the student himself.

The episode 4 starts from the alternative timeline, when Chloe is handicapped instead of living with William. Max and Chloe spend some bonding time together, and Chloe asked Max to bring her a morphine injector in order to alleviate her headache. After injection, when they were looking at a photo album together, Chloe asked Max to end her life because she knew that her respiratory system was weakening and she was putting off the inevitable.

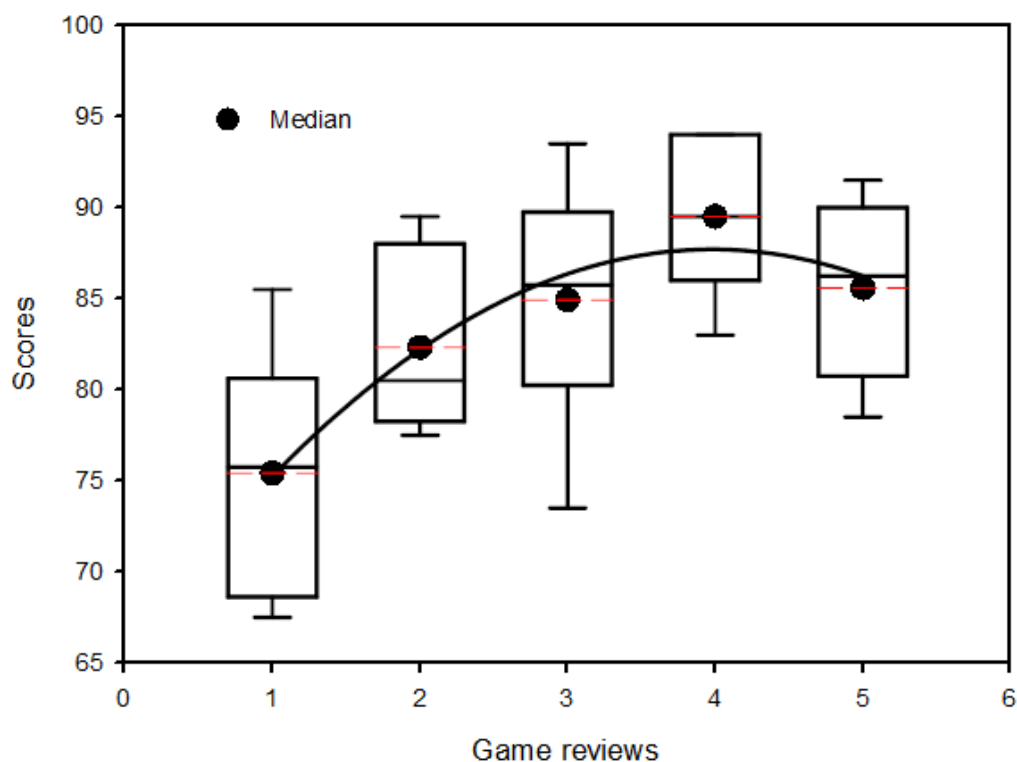
In this passage, words including “morphine injector”, “respiratory” and “putting off” appeared in the fourth episode of the game, while “alternative” and “alleviate” were repeatedly used in in-class discussion and debriefing when the instructor urged the learners to elaborate on their choices between two timelines. This indicates that learners could pick up new words in this instructed gameplay and utilize the newly acquired vocabulary in their own writings. This near transfer of linguistic constructions from gameplay and game-related activities to non-gaming situation may speak to the usefulness of DGBLL (deHaan, 2005b; Scholz & Schulze, 2017). It

should also be noted that there was a steady rise in the total number of words learners managed to produce in their game journals, pointing to the possibility of writing improvement.

5.3.1.3 Writing improvement. In terms of the writing improvement, this factor was examined through the scores of the learners' five game reviews. The box plot and curve in the Figure 15 demonstrates the trend, medians, means and distributions of the overall scores of the learners' game reviews. It can be clearly seen that the participants have made noticeable progress over time. Their performance peaked at the fourth assignment, but was followed by a moderate decline.

Figure 15

Scores of the Game Reviews



Then a one-way within-subjects ANOVA was conducted to determine whether there was significant development in students' writing performance. A repeated measures ANOVA with a Greenhouse-Geisser correction showed that mean score of game reviews differed significantly between time points [$F(1.815, 9.074) = 16.115, p < .05$]. Furthermore, post hoc tests using the Bonferroni correction indicated that scores of the fourth game reviews ($M=89.5, SD=4.22$) are significantly higher (at $p < .05$) than those of the first ($M=75.41, SD=6.76$) and second game reviews ($M=82.33, SD=4.96$), meaning learners made statistically significant progress in their fourth writings. As the decline that followed the fourth writing was not statistically significant, it can be argued that progress in writing performance is not due to chance.

Taken together, despite of the drop in the last writing, improvement was observed over time and participants performed best in their third and fourth writings. Furthermore, according to the survey data, participants generally agree ($M=4.167, SD = 0.763$) that they had made improvements in writing and they felt they were more motivated to write game reviews ($M=4.333, SD=0.816$), with one participant commenting:

Writing game reviews is very helpful because I can really use the new words and organize my thoughts. Then I can also get some feedback to know how to write better.

However, one participant claimed that the writing was "too much" and another one "too difficult". In spite of these issues, the fact that the participants completed all the assignments indicated strong motivation.

5.3.1.4 Perceived Learning Gains and Incidental Learning. Given the novel and exploratory nature of this pedagogical practice, it is important to listen to participants' voices (Conole, 2008) and evaluate the impact on learning from multiple dimensions. Therefore, the researchers also analyzed learners' written outputs and their perceptions, with a focus on perceived gains and incidental learning.

According to the responses to the questionnaire, there was a consensus among the participants that their English improved as a result of the project ($M = 4.16$, $SD = 0.428$). In particular, they generally agreed ($M = 4.167$, $SD = 0.763$) that they had made improvements in writing and they felt that compared to regular writing assignments they were more motivated to write game journals ($M = 4.333$, $SD = 0.816$), with a participant commenting that "after-class writing helps me review the words and the game."

This high motivation is also evidenced by the fact that they were willing and able to produce more words over time. As for the content of the writings, they exhibited the use of a repertoire of critical thinking skills including comprehension, analysis, application, synthesis and evaluation (Bloom, 1956), that are illustrated in the following excerpts from their game journals and *Edmodo* discussions:

I chose to end Chloe's life because that was what she hoped. She was really suffering from pain and guilty. [Application] I thought that it was the best choice for her, of course, I was so sorry for her family and I was so sad.

[Analysis]

Episode 1 is titled ‘chrysalis’ that becomes butterfly.”

[Comprehension] “From this title, I guess that this story is relative to butterfly effect which means ‘a little change may bring big difference in the result’ ...this title may be an indication of the bigger events that will happen as Max use her ability. [Analysis]

I searched and find that different countries have different policies for different reasons. Now in Japan, euthanasia is not allowed, so some Japanese go to Sweden. I can understand their choices... It is so stressful to endure pain for a long time, so I think that euthanasia should be permitted. [Synthesis]

Although he has a responsibility for what he did, I understand how much he was suffering. He seemed to have everything, but, he was lonely and ended up being used by Jefferson. I think if people around him had been concerned about him, this tragedy would not have occurred. [Evaluation]

These excerpts demonstrate that learners took the initiative to interpret the theme, predict the story plot, evaluate the game character and related the gaming content to their own culture, suggesting that gameplay may have encouraged critical thinking. This incidental learning was also reported by learners themselves, who commented:

It pushes me to think deep about serious topics such as depression and suicide.

The game includes serious problems like bullying, euthanasia, and responsibility as a family, etc. I could think of them connecting with my major.

(My major is education philosophy.)

In addition, some participants also believed their listening and speaking improved and they enjoyed higher motivation to improve their listening, as illustrated in the following comments:

In classes, I have to speak English, and I gained the ability to hear and speak English through consultation with friends and dialogue with teachers.

I became (used to) to listen(ing) to English dialogue by utilizing CD and some applications. I don't know my skill improved or not truly, but I become motivated to improve my English more.

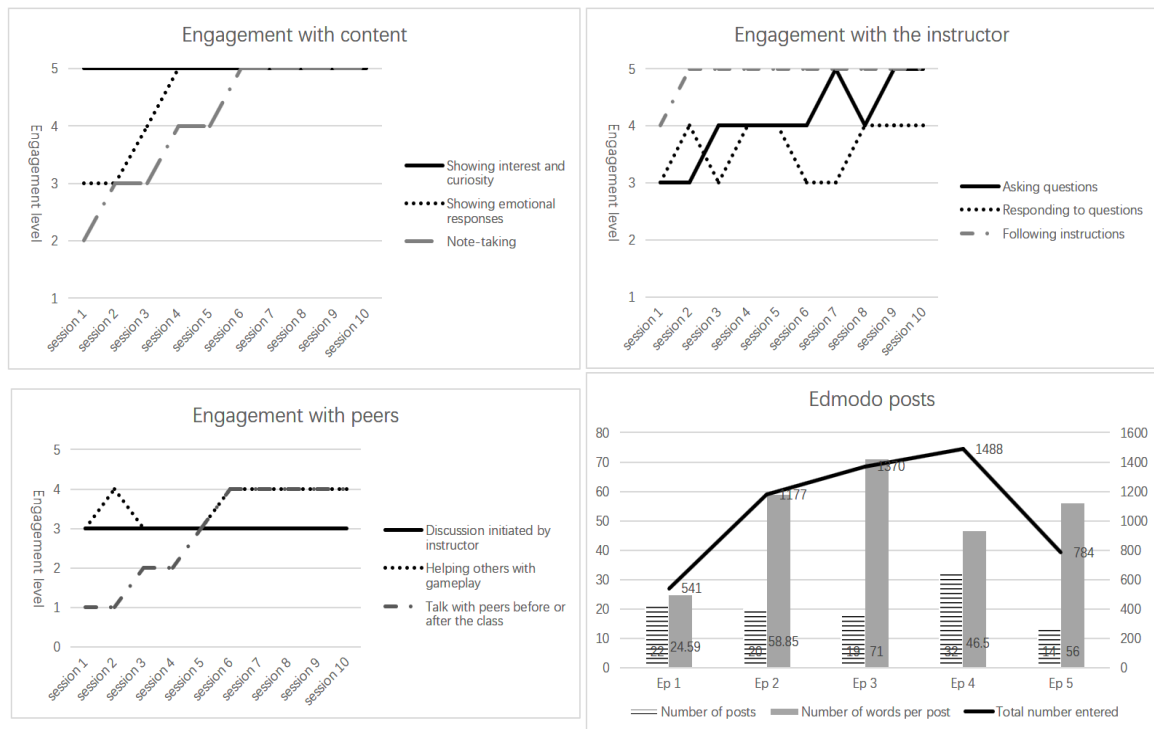
Through this course, I realized my lack of listening to English, and it motivated me to improve my listening skill.

5.3.2 Research question 2: How Engaged are the Participants in this Classroom-based DGBLL Study?

This question is answered from the perspective of classroom engagement and after-class online engagement. As noted earlier, classroom engagement was measured through the three-faceted observation scheme, while online engagement was measured through students' discussion on *Edmodo*. The detailed information is presented in Figure 16.

Figure 16

Leaners' Engagement Levels



5.3.2.1 Engagement with the Content. As shown in Figure 16, learners demonstrated high interest and emotional engagement throughout the sessions. Their commitment was also manifested through perfect attendance records, no tardy arrival, and timely submission of the assignments. A full score was given to the item regarding their interest and curiosity, suggesting that the game and project were attractive to them. It was also observed that one participant shed tears due to the death of a game character during session 8, saying “It’s a game, but I’m so sad” and this event occurred again during the final session. This undoubtedly speaks to the participants’ emotional engagement with the content. It was also noted that the learners started the project with little sense of how to go about the tracking tasks relating to the language points and gaming contents. However, data show they

improved over time (see for an example in Appendix I), suggesting they developed the ability to take advantage of the game for language learning.

5.3.2.2 Engagement with the Instructor. As shown in Figure 16, the analysis results demonstrate that the students were able and willing to follow instructions all along. It was observed that they were generally active in asking questions, especially when they had difficulties advancing the storyline and solving puzzles. However, they were not so active in answering questions, that is, they did not volunteer to answer questions and remained silent, but when called upon by the instructor, they were able to give the right answer or to speak their mind.

5.3.2.3 Engagement with Peers. It was unfortunate to observe that in-class peer interaction remained limited, but things did improve after the 6th session. Figure 16 also demonstrates that the most active interaction observed was helping peers with gameplay. When a participant finished the game earlier than their peers, it was observed that he/she was happy to help others out. As the project proceeded, learners became more familiar with each other and the off-task conversations grew gradually. However, no progress was identified regarding the game-related discussions initiated by the instructor.

5.3.2.4 Online Engagement. Despite the limited peer engagement in class, the data on after-class online engagement shows a somewhat different story. The entries posted on *Edmodo* were grouped together based on the episodes of the game. It can be seen in Figure 16 that the level of online peer interaction was not low throughout the project and it climbed gradually, peaking at episode 3 (by the number of words per

post) or episode 4 discussion (by the total number of words). Participants' *Edmodo* discussions demonstrated their interest in and ability to discuss the gaming content with each other, as shown in the following excerpts:

I disagree with C. I don't think we can forgive Nathan.

I agree with A's opinion. Schools in Japan have the atmosphere that it is good to do the same thing with their students.

Like B has pointed out the butterfly effect, the more times Max uses her power, the worse her condition and climate are possibly.

These discussion threads demonstrate that the asynchronous discussion platform enhanced in-class activities, allowing learners to continue engagement with content and each other after class.

5.3.3 Research Question 3: What Aspects of Teacher Scaffolds Do Learners Find Useful in the Context of DGBLL?

In this study, teacher scaffolding mainly took the form of preparing pre-class materials, giving in-class instructions and providing after-class feedback. According to the survey results, the instructor's presence and mediation were welcomed and appreciated. The two items with the same highest scores related to the instructor's in-class interaction with individuals and support in terms of gameplay and technical issues ($M = 4.833$, $SD = 0.408$). The participants also found in-class instructions and feedback equally useful ($M = 4.667$, $SD = 0.516$). In their responses to the open-ended questions in the survey, the students also emphasized the importance of the instructor's support, guidance and feedback.

I like the teacher's feedback, which was very substantial. (originally in Japanese)

When I cannot advance in the game, I always ask for the instructor's help. I also think (find) the instructor's writing feedback as well as the debriefing in-class very useful. I learned a lot.

Furthermore, the supplementary activities and materials designed and provided by the instructor were generally well-received (Items 13-14, means > 4). A participant pointed out that supplementary materials helped her with review and critical thinking:

There is(are) many details in the game, which I did not notice or paid (pay) attention to. The after-class readings help me think more critically of the game and the topics in the game.

5.3.4 Research question 4: How do the Participating Students Perceive Their DGBLL Experience?

5.3.4.1 General Perception. The students were overwhelmingly positive towards and satisfied with the project ($M = 4.333$, $SD = 0.516$), stating they are willing to recommend it to others ($M = 4.667$, $SD = 0.616$). When asked about what they liked or disliked about the course in the survey, no student gave negative comments and all expressed their enjoyment or listed their reasons for liking the course, as illustrated below:

This was a good project beyond criticism!

The class was easy to understand and meaningful.

I am happy to learn English with the work of Strange Life as the subject matter.

5.3.4.2 Game Affordance. All the respondents spoke highly of the game ($M = 4.833$, $SD = 0.428$), describing it as “fun”, “interesting”, “immersive” and “interactive”. However, to the researcher’s surprise, a majority of participants did not think that the game was easy to play ($M = 2.833$, $SD = 0.408$), with some participants explaining:

I felt a little screen sick...

I was not very good at playing games on personal computers, so it was difficult to advance (in) the game.

The predominant and recurring underscored affordance was the exposure to authentic expression, which they believed is “easier to understand” when contextualized in gameplay. This can be evidenced by the following feedback:

Participants can learn a lot of expressions through the game. Generally, participants just learn expressions directly from their teacher, but in this class, they can learn according to the context of the game, so it is easier to understand.

It’s a good chance to learn useful phrases. Since I live in Japan and I rarely talk with foreigners in English, this class gave me good experiences.

5.3.4.3 Difficulties and Suggestions for Improvements. Difficulties the learners experienced in gameplay included “difficult puzzles” and “fast speed of the dialogue”, with the participants commenting:

At first, I had difficulty getting acquainted with the speed of English in the game.

Some puzzles are difficult. I cannot solve (them) without the teacher's help.

There was a general consensus that the project could benefit from a longer duration. Half of the participants expressed their concerns about "limited time to discuss the game" and "not enough time for vocabulary instruction" while the other half expressed their wish for more time to play, with one learner stating: "I want to rewind every time" and "If possible, I want to play all parts of the game." Moreover, as noted earlier, many participants were positive about the benefit of this novel approach, so they also expressed the desire to improve their oral proficiency through digital gaming, saying "it would be great if the course can focus more on our speaking."

5.4 Discussion

Regarding the learning benefits obtained from this project, the results confirmed learners' progress in terms of vocabulary retention, a finding in line with previous DGBLL studies (Bytheway, 2014; deHaan et al., 2010; Ranalli, 2008; Rankin et al., 2006). Moreover, this study went a step further to provide evidence for the transfer of vocabulary knowledge from gameplay to non-gaming contexts. As noted in the literature (deHaan, 2005b), this evidence may help dispel stigma toward video games and justify their inclusion in educational settings. It is worth mentioning that despite the participants' differences in their disciplinary background and gaming

history, they all managed to make progress in vocabulary retention and reproduction. As for the perceived gains in listening, writing, and critical thinking reported by learners, no conclusive claims can be made due to the small sample and subjective nature of self-reporting data. However, this finding suggests a need for more research into the impact of digital gaming on these areas.

Consistent with earlier studies (Connolly et al., 2011; Liu & Chu, 2010), participants reported and demonstrated high learning motivation in this DGBLL context. Given the fact that the students received no extra incentives for participation, their commitment and cooperation throughout the project also indicated high motivation, which possibly arises from favorable game affordances such as authentic linguistic input, the low stress environment and a sense of agency (García-Carbonell et al., 2001; Li et al., 2009). Moreover, participants expressed satisfaction and enjoyment with this DGBLL experience, supporting the rationale for including digital games into traditional language classrooms, where motivation and engagement are often found to be lacking (Deutschmann et al., 2009).

In terms of in-class engagement, learners demonstrated interest in the game content, however, as noted earlier, in-class peer interaction was limited. This may have been caused by the short planning time and nature of the topics that required deep thinking and detailed knowledge of topic-specific words. As established in the literature, task preparation and task type are linked to task performance (Skehan & Foster, 1997; Ellis, 2009). In this case, the participants were required to talk about challenging topics such as mercy-killing and bullying, therefore more preparation

time and sufficient scaffolding to equip the learners with vocabulary and background knowledge may be necessary. Moreover, a gap was identified between in-class and after-class peer interaction. This may be explained by the asynchronous nature of the online discussion, which allows for additional time to compose and edit posts. Quiet students can feel more comfortable with expressing their opinions on the online platform (Kamhi-Stein, 2000; Sengupta, 2001). Additionally, as other DGBLL studies (Wang, 2019, 2020) conducted in Japanese universities have shown, the fact that many Japanese students tend to be shy and silent in class (Greer, 2000; King, 2013) could be another possible explanation for limited in-class peer interaction. Additional research appears necessary to clarify this issue.

Another issue that merits attention is instructor scaffolding, echoing Peterson's (2016) claim that the teacher has a critical role to play to secure learning outcomes in the DGBLL context. In this case, the instructor took on a substantial workload in terms of meticulous planning and preparatory work such as choosing and evaluating an appropriate game, setting up university computers and preparing supplementary materials. The non-gamers learnt how to play the game as a result of the orientation session. However, this preparation appeared to be insufficient as participants still reported difficulties in later gameplay. This finding indicates the need for more training time, especially for learners without gaming experience. Future study designs may take into consideration learner variation such as gaming literacy levels and gaming preference. In terms of the during-game scaffolding, instructor support and guidance undoubtedly facilitated smooth gameplay. The data show that the tracking

tasks and in-class debriefing helped sustain a linguistic focus. However, learners expressed concern over the course's short duration and the limited time for discussion and debriefing. To address this issue, researchers may consider adopting a flipped (Mehring & Leis, 2018) or blended learning model (eg. Singh, 2021) in which the participants can play the game out-of-class so that in-class time can be freed up for more instruction and discussion. Regarding the post-game scaffolding, instructor feedback enabled a focus on form while the supplementary materials allowed for vocabulary preview and review, as well as a deepened reflection on the gaming content. As participants responded positively to the teacher mediation, it can be argued that in a DGBLL context, instructors are not only irreplaceable by games but also have to take on more responsibility and tackle additional challenges. In addition to the groundwork and planning, the instructor's game literacy as well as technical proficiency appear to be indispensable for an effective DGBLL classroom. However, more studies are needed to establish the impact of different teacher scaffoldings on specific linguistic gains so as to explore best practices in the design, development and delivery of classroom activities and supplementary materials in DGBLL classrooms. Moreover, as Chee et al. (2014) and Blume (2019) suggest, more research dedicated to the perceptions and beliefs of DGBLL practitioners is desirable so as to promote the effective practice of DGBLL in language classrooms.

5.5 Chapter Summary

This chapter elaborated on the second cycle of the AR, which builds upon the previous one in that it investigates the same game in a different setting. Drawing upon

the model of bridging activities, this study investigated the language development, engagement and perceptions of 6 EFL participants who played a digital game, kept game journals and completed game-related activities in a 10-week project. The study yielded empirical evidence that the DGBLL can benefit learners in terms of vocabulary acquisition, knowledge transfer and writing. Participants also reported perceived gains in listening, higher motivation and enjoyment of the learning experience. The findings highlight that the instructor is crucial in pre-game set-up, in-game guidance and post-game feedback. However, as with most research, the study is subject to limitations. First, the small sample size, coupled with limited duration, renders the generalization of results challenging. However, these factors are largely the result of the institutional constraints that are beyond the researchers' control. Second, the learning outcomes were not measured against a control group and the possibility that the improvement may be due to other language courses cannot be fully excluded. Third, the instructor-researcher role could have influenced the data collection. Moreover, the feedback is subject to the well-known limitations on learner self-reporting. In light of these findings, more longitudinal studies with a larger population and a between-subject design are needed to establish the benefits of DGBLL. It is also hoped that future studies can provide more conclusive rather than anecdotal or observational evidence for the positive effects of DGBLL and can explore effective pedagogical practice to integrate digital games into language classrooms.

Chapter 6. Study Three. Out-of-school Language Learning through Digital Gaming: a Study From an Activity Theory Perspective

6.1 Introduction

This chapter reports on the third cycle of the action research (Li et al., 2022b). Several significant findings emerged from the previous two studies: 1) Participants in both studies expressed the desire to improve oral English through digital gaming. 2) It was observed that non-gamers may face many obstacles in the context of DGBLL. 3) Participants in the first study reported enhanced autonomy, but this was not mentioned by the participants in the second study. Based on these findings, coupled with the fact that all the courses were moved to online due to the Covid pandemic, the third study applied Activity Theory to describe and analyze an out-of-school project in which eight Chinese non-gamers utilized a massively multiplayer online game (MMOG) to learn oral English.

As AT provides an integrative framework to examine the development and exercise of autonomy in the context of CALL (Blin, 2004), there exists potential to draw upon this framework to describe and analyze the autonomous practices of learners in this out-of-school study. Applied to this setting, AT can shed new light upon how the subjects' autonomous actions are mediated, what contradictions emerge and how they are handled. With this context in mind, the following research questions were formulated to guide the investigation:

1. What contradictions emerged in this out-of-school DGBLL project? How did learners experience and resolve them?

2. What are the outcomes of the activity system?

6.2 Methods

Due to the exploratory and naturalistic nature of this study, both quantitative and qualitative data were collected and analyzed. In this mixed-methods study, data from multiple sources were garnered to provide a comprehensive account of out-of-school digital gaming. This triangulation can provide corresponding evidence to answer the research questions and address the validity of the findings.

6.2.1 Context and Participants

The study took place in the winter holiday in 2021 and lasted six weeks. The recruitment advertisement was posted on the bulletin board of a comprehensive Chinese university to invite volunteers to play the game *Phasmophobia* in English.

Initially, 14 students responded and completed the entry questionnaire which was designed to solicit information on their backgrounds and gaming histories. As the study focused on the experience of non-gamers, three respondents were removed from the list. Then the remaining 11 students were asked to take the Oxford Placement Test (Geranpayeh, 2003) to measure their language level. One student of beginner level was further excluded as the literature suggests that intermediate learners would benefit most from digital games (Poole & Clarke-Midura, 2020; Rankin et al., 2006). Another two students dropped out during the first week due to scheduling issues. As a result, eight female non-gamers with intermediate language proficiency participated in this study. Their age ranged from 20 to 22 and they came from a diverse disciplinary background including English, linguistics, education, economics and foreign trade.

They all possessed personal computers and home access to the Internet. Moreover, written consents regarding data handling were collected from all volunteers, who were given no extra incentives and were aware of their right to withdraw at any time.

6.2.2 Research Design

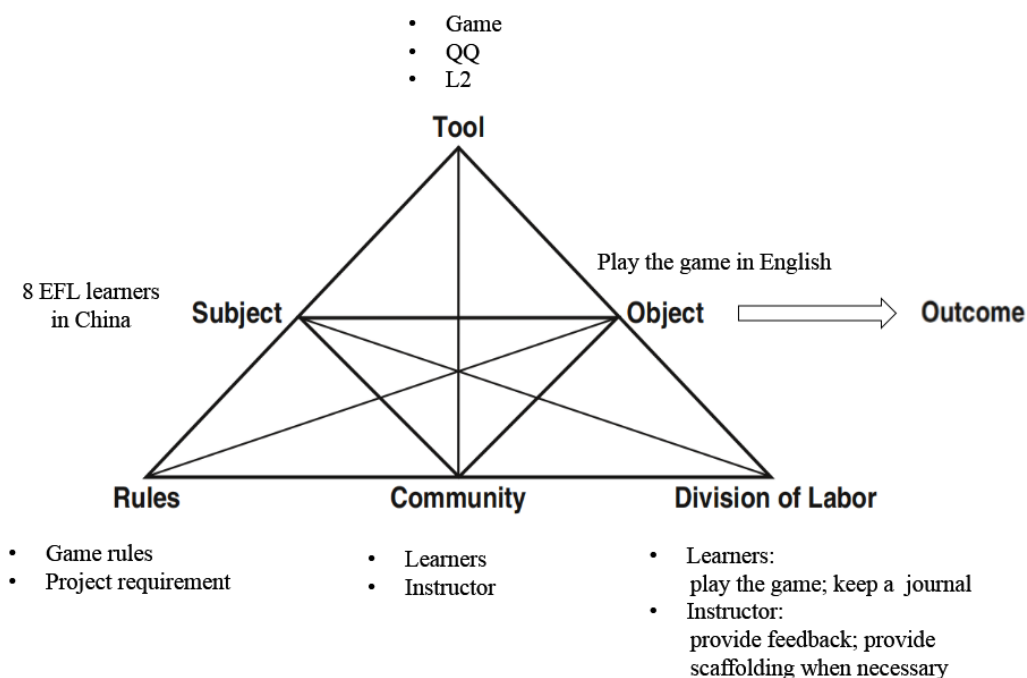
Prior to the project, the researcher set up a group chat in *Tencent QQ*, one of the most popular social networking tools in China, to host all the learning materials and support communication. At the outset, the participants were administered a pre-study questionnaire on their autonomy and they were introduced to the project and the game via group chat and the videos stored in *QQ* files. The participants then installed the game and familiarized themselves with the gameplay through tutorial videos and articles on gameplay strategies. Throughout the project, they were free to play the game at their discretion. The only requirement was to submit at least one recording of their gameplay each week, based on which the researcher gave individualized feedback in terms of grammar, pronunciation and vocabulary. The participants were also asked to keep a weekly journal to reflect upon their own gaming experience and elaborate on their game-related activities. This would offer insights into their daily learning/gaming practices. It should be noted that due to the autonomous nature of this project, no requirement was mandatory. In the last week, an exit questionnaire was administered. In addition to the same items on learner autonomy in the pre-questionnaire, participants were also asked about their attitudes towards this learning experience. Based on responses to the open-ended questions, semi-structured

interviews were conducted for clarification and to provide different perspectives on responses.

To sum up, the activity system proposed for this study can thus be portrayed in Figure 17 which outlines the initial structure of the activity by specifying its different elements from the perspective of participants.

Figure 17

Model for the Activity System in the Context of Out-of-school DGBLL



6.2.3 Data Collection

Both qualitative and quantitative data were obtained so as to gain a comprehensive perspective on the issues under investigation. To be more specific, the

quantitative data came from learner responses to the Likert-scale items in the questionnaire, while the qualitative data consisted of semi-structured interviews, gameplay recordings, weekly journal entries, answers to the open-ended questions in the exit questionnaire, group chat, private messages with the instructor, and the instructor's field notes. The following instruments were employed:

6.2.3.1 Autonomy Scale. Following Sato and Burden (2020), 49 items from the 5-point Likert scale *Measuring Instrument for Language Learner Autonomy* (MILLA) were adopted to measure the autonomy level from the technical and psychological dimension (see Appendix J). Developed based on an extensive review, MILLA (Murase, 2015) has an acceptable level of validity according to the Goodness-of-fit statistics and a high level of reliability (Cronbach alpha =0.936). The technical dimension (items 1-21) consists of behavioral and situational autonomy, focusing on learners' ability to take control of their learning. As for the psychological dimension (items 22-49), the focus is placed on the ability to control learning through motivational strategies, metacognitive strategies and affective factors. A high score indicates a high level of autonomy and the items in the pre and post questionnaire were arranged in different order.

6.2.3.2 Exit questionnaire and Semi-structured Interviews. At the end of the project, an exit questionnaire was distributed. Apart from the items on autonomy, the questionnaire consisted of another 19 items and 2 open questions (see Appendix K), which were adapted from the previous two studies (Li et al., 2021; Li et al., 2022a; Li et al., 2002b) to focus on learner perception, difficulties encountered,

perceived benefits and suggestions for improvement. The Cronbach alpha of these items was 0.872, indicating good reliability. Based on their responses, follow-up semi-structured interviews were conducted via *QQ*. Interviews were transcribed and translated for further analysis.

6.2.3.3 Weekly Game Journals. Participants were asked to keep a weekly game journal (see Appendix L). The journal, validated by two senior CALL researchers, was designed to elicit information regarding the duration of gameplay as well as game-related activities. Participants were free to use either English or Chinese.

6.2.3.4 Recordings. As mentioned previously, participants were asked to submit audio recordings of their gameplay each week. Audio recording was favored over screen recording out of the concern that screen recording may hinder the smooth running of the game, especially given limited RAM and hard drive constraints. As a result, a total of 53 audio files were collected and then transcribed for further analysis.

6.2.4 Data Analysis

Quantitative data were analyzed using SPSS. As for the qualitative data, thematic analysis was adopted in combination with the activity system analysis. Initial coding was performed to generate recurring themes, which were then sorted and grouped under the categories of activity system components operationalized by Mwanza's (2001) Eight-Step-Model. As the activity system from the perspective of the participants was taken as the unit of analysis, this study only focused on the primary and secondary contradictions within the system. In identifying the

contradictions, the researchers were guided by the understanding that contradictions open up new opportunities and call for novel solutions that can lead to transformations in activities (Engeström, 1987). In other words, the transformative power of contradictions is the most relevant for this study, therefore this construct was conceptualized as sources of change, development and innovation. Then the mutual relationship between each component (eg. subject-tool, rule-community) was examined to locate and map the contradictions onto the activity system. The whole coding process was performed by the researcher and another CALL researcher separately. Disagreements were then settled through discussion until agreement was reached so as to finalize the coding scheme for contradictions, as shown in Table 8 and to produce the activity system for presentation, as shown in Figure 18.

Table 8

Coding Scheme for Contradictions Emerged During Out-of-school DGBLL

Code	Theme	Category (Activity system component)
Vocabulary issues	Language-related issues	Contradiction A: tool vs. object
Slow response		
Dissatisfaction with the language quality		
Internet issues	Gameplay-related issues	
Gaming mechanism issues		
Levelling up issues		
Player availability	Teaming-up issues	Contradiction B: subject vs. rule
Scheduling issues		

Dissatisfaction with project requirements		
Unpleasant encounters with online players	Conflicts with online gamers	Contradiction C:
No or limited player communication		subject vs. community
Wish for more scaffolding	Learner	Contradiction D:
Wish for more mandatory requirements	autonomy vs. instructor guidance	community vs. division- of-labor
Preference for independence and autonomy		

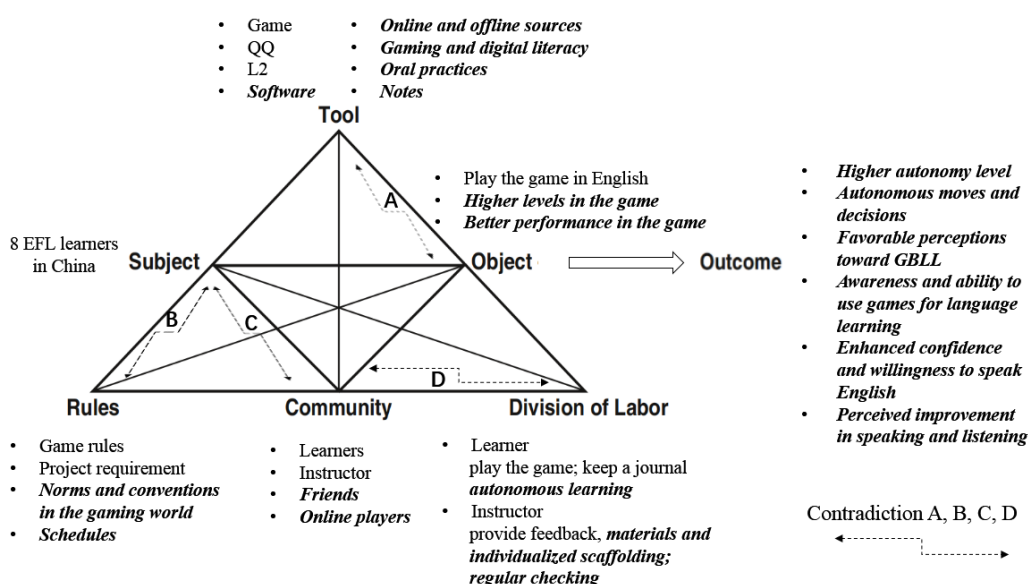
6.3 Results

Based on analysis of the empirical data, the activity system for this out-of-school DGBLL project is portrayed in Figure 18. According to Leont'ev (1978), activities are driven by a motive and are directed towards an object. In this case, the subjects, namely the participants of the project, were motivated by the initial object of playing the game in English, and in attainment of the goal, they carried out a variety of goal-oriented actions. As a result, the activity system has evolved from its initial form (presented earlier in Figure 17) to include more elements in each node (marked in bold and italics in Figure 18). As noted previously, the development or transformation of an activity system is driven by the contradictions that emerge. In Figure 18, dotted arrows represent the four contradictions identified throughout the process. The efforts to resolve them, successful or not, helped transform the object

into actual outcomes. The following section provides a detailed interpretation of the AS from the perspectives of contradictions and outcome.

Figure 18

Activity System in the Context of Out-of-school DGBLL



6.3.1 Research Question 1: What Contradictions Emerged in This Out-of-school DGBLL Project? How Did Learners Experience and Resolve Them?

As figure 18 shows, contradictions are marked by the dotted line with two arrows at the ends and are identified in the three sub-triangles that constitute the activity system: contradiction A in the top sub-triangle (subject-tool-object), contradiction B and C in the bottom-left sub-triangle (subject-rule-community), and contradiction C in the bottom-right sub-triangle (community-division of labor-object).

6.3.1.1 Contradiction A: Tool versus Object. Contradictions arose between tool and object as participants felt incapable of completing the object with the tools at their disposal and their current level of language proficiency and gaming skill.

Gameplay-related Contradiction. Contradictions in this regard quickly emerged with most of learners reporting technical problems in the first two weeks. They complained of an unstable network. However, this issue was easily resolved through the installation of the proxy recommended by the instructor. One learner found that her computer lacked sufficient memory to run the game. This was also resolved when she received technical support from a peer.

Another contradiction in this regard came from the learners' inadequate gaming skills and limited digital literacy in navigating the online gaming world. As non-gamers, this group of participants experienced a steep learning curve when it came to gameplay, as can be seen in the comments below:

This is new for me. I have to learn from the scratch.

I often got lost in the game and don't know how to use the equipment.

At the beginning, the learners had to learn the gaming mechanics and once they mastered the basic skills, they also needed to obtain tips on how to advance in the game. To overcome these difficulties, the instructors provided them with videos and articles and recommended some gaming websites. Upon the request of two participants who found gaming especially difficult, the instructor joined them in the game to teach them how to play. One of them stated: "At first, I was not familiar with this game, and I felt disappointed that I lose every time. I was very frustrated."

However, this participant went on to state that “Things got better after I got the hang of it. It’s not that difficult.” The other said that after the instructor showed her how to play and she read the articles online, she was able to play the game and even come up with solutions on her own later on.

Language-related Contradiction. In the early stage of the project, learners had difficulty in employing appropriate vocabulary and expressions during the gameplay. This finding is illustrated in the learner feedback reproduced below:

Some things in the game are very common, like 斧头 (ax), but I just don’t know their English names.

I know many academic words, but this game made me realize I don’t know many every day words. I don’t even know how to say 开关 (switch).

It can be inferred that playing this game drew learner attention to issues in their language learning. Data show that they resorted to different strategies to resolve these contradictions. To enrich their vocabulary, participants read and watched walkthroughs and took notes of the useful words and expressions (see Appendix M for an example). An excerpt from a game play transcript is reproduced below:

A: Can you turn on the...the...?

B: What?

A: I forgot the word! Wait! Let me check! ... Oh, it’s thermometer!

Turn on the thermometer!

This excerpt shows that when the player did not know the necessary vocabulary, she would look up the word. This interpretation of the data was confirmed

in the interview when the learner stated that she kept an electronic dictionary at hand during the game play. Other learners also reported that they would refer to their notes or smartphone when they were at a loss for words, which is evidenced by the following remark:

If I don't speak, I'll die, so I put my smartphone nearby. When I don't know how to say something, I can look up the words immediately.

Some participants also used Chinese, or Chinese followed by some English for paraphrasing. For example:

C: I find the ghost! Come here!

A: Where are you?

C: I'm in 地下室, underground.

Noting this, the instructor offered the English versions in the feedback and it was observed that in most cases, participants would use the correct word the next time when they wanted to express the same meaning, indicating that they read the feedback very carefully. Thanks to these efforts, this type of contradiction was greatly reduced after three weeks.

However, after mastering the basics, learners started to have higher requirements for themselves, with some not satisfied with the quality of their language output. They expressed this in the interview:

After I mastered the basics, I want my language to be more native-like.

When I watch native speakers play the game, they can use different expressions, but I can only use the same word over and over again.

From this feedback, it is clear that as the project progressed, the learners' focus shifted from accuracy to quality and this language-related contradiction also took on a new meaning. In response, the instructor provided some alternatives that they could use in similar contexts when giving feedback and it was observed that they were able to utilize these words and expressions in later similar situations. This was confirmed by the learner who stated that:

I try to force myself to use different words every time. To use the words I newly learned to replace the words I'm already familiar with.

As an example, one learner said "I don't have other choices" during gameplay in week two, but she used "I have limited options" in week three and "we are running out of options now" in week five.

6.3.1.2 Contradiction B: Subject versus Rule. Teamwork was needed to play the game, but the interaction between this game rule and subjects brought forth a contradiction as subjects struggled to find teammates. They found it challenging to coordinate each other's schedules for gameplay. However, learners managed to work out solutions on their own either by inviting their friends to join or by joining random groups online. Moreover, it is noteworthy that this scheduling issue served as a trigger to encourage innovation. Two learners overcame this obstacle by playing the game alone. They played the game as if they were livestreaming, talking about what they saw, what they did and how they felt during gameplay, as shown in the following excerpt:

What a sunny day! How about something meaningful? I got an excellent idea.

I'll play a very interesting game, Phasmophobia. Absolutely, I need more

brave (bravery) and courage. Ok. I'll get started. Here I go. I'm too excited.

The game is loading. Ok. I'm in. Wow, look, I level up and my money is 90.

I'm a big boss now.

The learner demonstrated that she talked as if there was an audience watching her play. She explained this in the interview:

Sometimes when I want to play the game, my friends are not available, so I play it alone. I've seen some youtubers did that. I think it's interesting, so I give it a try.

The instructor shared this innovative practice in the group chat and another two learners followed suit in the coming weeks. However, three participants expressed their dissatisfaction with these solutions as they believed that pairing and frequency of gameplay should be covered and made explicit in the project requirements.

6.3.1.3 Contradiction C: Subject versus Community. Engeström (2001) pointed out that when a contradiction is the source of change, this change can lead to another contradiction that again is the source for further change. In the case of this study, as a result of handling the scheduling issue, the community expanded from consisting of only the participants and the instructor to include participants' friends and online gaming community. Within this expanded community, subjects had more opportunities to play the game. However, due to the introduction of new members,

they had to deal with new contradictions. When learners tried to join others online, they were sometimes ejected from the game. They were also upset by strangers who were not that friendly or talkative. They expressed their frustration in the interviews:

I had hoped to talk with native speakers, but they didn't talk much. I speak much more when I play with friends.

I thought playing with native speakers can help me improve, but I was wrong because they only talk with each other, not with me.

However, it was observed that instead of discouraging them, the unpleasant encounters with online gamers motivated learners to work for higher levels in the game.

6.3.1.4 Contradiction D: Community versus Division of labor. Before the study commenced, all the participants were aware of the autonomous nature of this out-of-school project and expressed their wish for interdependence and freedom. However, as the project progressed, several participants expressed their desire for more instructor guidance. As some learners commented:

I am used to being told what to do.

I think the tasks should be mandatory. For example, everyone should summarize at least 5 words each week.

I think the feedback each week is very useful for me, but I think more teaching will be better.

In this contradiction, learners had different expectations for the instructor, with some enjoying the autonomy given to them while some others yearning for more and

direct scaffolding. Therefore, the instructor, torn between her role as a facilitator and learners' wish for more scaffolding, faced a dilemma with regard to whether to set more mandatory requirements. In response, the instructor conducted regular checks with each individual and provided support accordingly, which partially resolved the contradiction that was present throughout the project.

6.3.2 Research Question 2: What are the Outcomes of the Activity System?

6.3.2.1 Development and Exercise of Autonomy. The scores of the items concerning autonomy in the pre and post questionnaire were used to detect the possible development of learner autonomy from two dimensions. The descriptive statistics showed that learners obtained higher scores in the post test, indicating possible improvement of autonomy level. Due to the small sample size and thus the lack of normal data distribution, non-parametric test was employed to determine whether there were statistically significant differences in participants' pre and post autonomy level. As illustrated in Table 9, the Wilcoxon signed rank test found a significant difference both in terms of the technical dimension ($Z = -3.2, p = 0.01$) and psychology dimension ($Z = -3.352, p = 0.01$). This finding is also in line with learner responses to the item that they believed they gained confidence as an autonomous learner ($M = 4.125, SD = 0.6$) and obtained the ability to make use of game-related resources for the purpose of language learning ($M = 4.125, SD = 0.64$).

Table 9

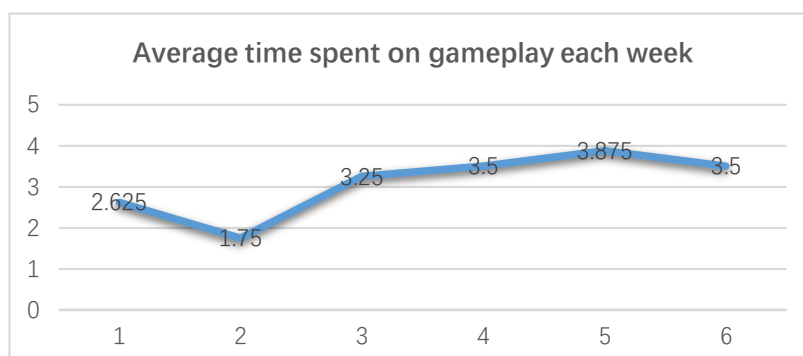
Wilcoxon signed Rank Test Results on Two Dimensions of Autonomy (n = 8)

Tests	<i>M</i>	<i>SD</i>	<i>Z</i>	<i>Sig.</i>
Psychological				
Pre	3.89	1.03	-3.352	0.001
Post	4.15	0.91		
Technical				
Pre	3.2	1.09	-3.2	0.001
Post	3.55	0.93		

In terms of assessing their autonomous learning practices, weekly journal entries were analyzed. In total, the eight learners invested 148 hours in gameplay throughout the project ($M = 18.5$, $SD = 3.937$). As demonstrated in Figure 19, the average time spent on gameplay per week dropped in week 2, but went up gradually in the following weeks. At the end of the project, their in-game levels reached 19.25 ($SD = 3.73$) on average.

Figure 19

Average Time Spent on Gameplay Each Week



Besides gameplay, the participants also exercised autonomy in terms of their learning activities which fell into two categories: one was directly related to the gameplay itself such as watching walkthroughs, reading game review and browsing game-related websites, while the other included activities that were more oriented to language learning such as practicing pronunciation skills and summarizing useful language points. In their journals participants wrote:

In addition to playing the game, I would also watch walkthrough videos to learn some expressions. I note down the words and expressions so that I can use them when I play the game with my friends.

The instructor pointed out several mistakes I made in my pronunciation and taught me some useful pronunciation skills such as linking. So I found some more materials to practice.

Speaking in the game is not enough. I also did some practice myself, for example, to repeat BBC news.

These remarks demonstrate that the learners did not only rely upon the game itself for learning, but also extended learning outside the game.

6.3.2.2 Perceptions towards DGBLL. Data show that the participants were overwhelmingly satisfied with the learning experience ($M = 4.38$, $SD = 0.52$), stating that they were willing to recommend it to others ($M = 4.63$, $SD = 0.52$) and would choose to participate in similar projects in the future ($M = 4.25$, $SD = 0.46$). Learners used the word “exciting”, “novel” and “worthwhile” to describe the experience.

Several participants expressed their willingness to continue to play the game even

after the project ended, indicating their enjoyment with the game itself. Data indicated that compared to conventional speaking classes, learners in general preferred to speak English in the game ($M = 4.25, SD = 0.7$).

Additionally, the instructor's role was well-received in terms of providing feedback ($M = 4.875, SD = 0.353$), materials ($M = 4.625, SD = 0.517$), and gaming support and guidance ($M = 4.625, SD = 0.517$). Learner comments in the interview and game journal highlighted the importance of instructor feedback. As noted earlier, learners benefited from the feedback in terms of language variety. It was also observed that they were able to correct pronunciation mistakes pointed out in the feedback. It can be argued that feedback drew learner attention to their mistakes and helped them perform better in the future. Unexpectedly, two participants even said that they were moved by the instructor's detailed feedback and attitude. Three participants said that they valued this opportunity because they "don't get feedback like this in class". The three participants who struggled with gameplay at the outset stated that it was the detailed and individualized feedback that motivated them to continue. However, it should be noted that in spite of their favorable attitude to and positive comments on this novel way of learning, learners also expressed the concern that the learning "may not be systematic enough" and considered it as only a good "supplement" to formal learning.

6.3.2.3 Perceived Benefits. Participants agreed that they learned a lot ($M = 4, SD = 0.534$) and they believed that their listening ($M = 4.25, SD = 0.462$) and speaking ($M = 4.375, SD = 0.517$) improved as a result of participating in this project.

From their perspective, learning stemmed more from peer interaction ($M = 4.375$, $SD = 0.517$) and supplementary materials ($M = 4.125$, $SD = 0.64$) than from the game itself ($M = 3.75$, $SD = 0.462$). Moreover, all the participants reported that they felt more confident ($M = 4.625$, $SD = 0.52$) and less anxious ($M = 4$, $SD = 0.53$) when speaking English. Learners stated that they “*do not worry too much about grammar any more*” and “*are not that afraid of making mistakes*”. The following remarks further illustrate these observations:

This project has left a huge impact on me. I didn't like to speak English because I was worried. But now I realize I can do it. I'm not that bad. I can speak and I can even speak a lot. Now I feel confident.

I can feel a change in my psychology. Now I'm more willing to use English in my daily life. I even added some English words when talking with my friends in Chinese. I can feel I can take more initiative to practice oral English.

In addition to confidence, participants also felt that they had stronger desire to speak English and their English has improved in terms of vocabulary and fluency, with some stating:

At the beginning, I needed to use some Chinese, but later, I can speak English the entire time because I am more fluent and I know many more words.

I learned many words and expressions which are not taught in English classes. I don't need to write down the sentences before I speak. This is my improvement.

6.4 Discussion

In this research, Activity theory was employed to systematically describe and analyze the experiences of eight non-gamers who utilized an MMOG for language learning in an out-of-school context. The findings of this study highlight that throughout the process, the subjects worked through contradictions and as a result of their efforts to handle these contradictions, the activity system evolved, with tools, rules, community members, division of labor and objects taking on new forms (Blin, 2004). In turn, the interplay of these components transformed the object into actual outcomes.

In this case, the game affords players opportunities to speak English outside the classroom. However, to fully leverage the affordances of the game, learners had to address various contradictions that emerged as the activities unfolded. The solutions resulted in the changed dynamics of the activity system. On the one hand, some of these contradictions only temporarily disrupted the system and were easily resolved such as poor Internet connection, inadequate PC performance, schedule clashes, and unfamiliarity with the gaming mechanics. On the other hand, some other contradictions were more inherent and remained unresolved. One such tension came from learners' inadequate language competence. At the beginning, the initial objective was to play the game and participants' efforts focused on learning the necessary words and expressions. Later, when they no longer had difficulty playing the game using English, their focus shifted to the quality of their language output, indicating the activities transitioned from being gaming-oriented to learning-oriented. This

contradiction compelled learners to constantly improve their English. Another major unresolved contradiction manifested itself in the division of labor within the community. This was rooted in learners' different expectations of the instructor, which required the instructor to offer individualized scaffolding to suit varying degrees of competence, echoing Zhao's (2016) call for taking learner variation into account when utilizing MMOG for L2 learning. It is worth noting that instead of causing the system to collapse, these contradictions, although not fully addressed, resulted in adoption of solutions that brought improvements to the activity system. In sum, the early phase of the project was dominated by the temporary contradictions and once these were resolved, the more inherent contradictions became more pronounced. This was accompanied by the shift of attention from playing the game to achieving higher levels in the game and language learning through the game.

According to Vygotsky (1978), the development path of a particular phenomenon is best understood through the analysis of the instances that are disrupted. It is demonstrated in this study that sometimes the solution of one contradiction may lead to a new one. As noted earlier, confronted with the scheduling issue (in Contradiction B), learners engaged with online gamers. This brought forth contradiction D (between community and subject), which in turn motivated learners to work for higher levels in the game. In other words, the solution of contradiction B gave rise to contradiction D, the solution of which resulted in more elements in the object. Moreover, sometimes contradictions and their solutions are interconnected or

overlapped. For example, for the purpose of improving gaming skills, learners read and watched walkthroughs, which is also conducive to language learning.

As for the outcomes of the activity system, findings were overwhelmingly positive, especially in terms of affective factors, suggesting that even for non-gamers, DGBLL is feasible. In particular, both quantitative and qualitative data demonstrate the exercise and development of autonomy. Similar to the gamers reported in previous studies (Chik, 2014; Zhao, 2016), non-gamers in this study also managed to make use of materials around the game. Besides that, they also made deliberate efforts to improve their oral English through intentional learning such as pronunciation practice, note-taking, review and reflection. This intentional learning is a step further compared with the incidental learning reported in the literature, suggesting that learners have developed the awareness and ability to harness this game for language learning. Moreover, the DGBLL literature has long stressed that it is crucial to balance gaming and learning as it was found that gamers may prioritize gaming over learning and learning may be only a by-product of gaming (Chik, 2014; deHaan et al., 2010). However, for non-gamers in this study, they deemed digital learning as an enjoyable way to learn English and their priority was to improve their language ability through it. In this sense, it is plausible to argue that in an out-of-school setting, digital gaming may be more effective for non-gamers than for gamers, highlighting a need for more studies into the differences and similarities between these two groups in the context of out-of-school DGBLL.

It is worth noting that despite the autonomous nature of the study, the instructor was found to have played a critical role in helping participants manage contradictions through actions ranging from recommending software to providing scaffolding both in terms of gameplay and language. The findings suggest that, in out-of-school gaming projects like this one, instructors should remain alert to learners' needs and issues so as to strike a balance between autonomy and scaffolding. In particular, the instructor feedback was the most well-received. As noted previously, timely and individualized feedback enabled learners to correct mistakes, improve their output and even served as a source of motivation. However, as the study focused on participants' experiences and AT is descriptive rather than prescriptive in nature (Nardi, 1996), the learning achievements were not quantified, indicating more quantitative studies are needed in this regard. Moreover, future research may benefit from the "multi-voicedness of activity system" (Engeström, 2001, p.136) by incorporating the activity system from the perspective of the instructor into the investigation.

Another issue meriting attention is that despite their favorable attitude towards DGBLL, participants reported unpleasant encounter with other gamers, which is contrary to the claim that digital games frequently afford an affinity space (Gee & Hayes, 2012) where players socialize through shared interest. One possible reason for this finding may be the subjects' unfamiliarity with the gaming culture and conventions. As a result, the non-gamers may have failed to follow certain unwritten rules without knowing. The above finding may also be explained by their low level in

the game as it was observed that it was easier to establish a bond with other players after reaching a high level in the game (Chen, 2009; Ducheneaut, et al., 2006). This suggests that MMOG's affordance of providing a venue for communication with native speakers may be over-estimated in the literature, or at least, this affordance cannot be equally leveraged by all the players. This finding serves as a caution that non-gamers, if propelled into gaming unprepared or too early, may be confronted with setbacks which may dampen their enthusiasm.

6.5 Conclusion

This chapter presents an analysis of out-of-school language learning through digital gaming from the perspective of activity theory, which constitutes the third cycle of the AR. As with most DGBLL research, the study is subject to the limitations common in the field such as a small sample size, limited duration and a lack of control group, all of which may make it challenging to generalize the result. In addition, the self-reporting data may be subjective. However, the findings can shed some light upon the complex process of out-of-school DGBLL, which is especially important for exploratory studies. Despite these limitations, the study contributes to the expanding research in three ways. First, it applied AT to depict out-of-school language learning through digital gaming, with a focus on the contradictions that arose throughout the process. This research demonstrates that AT can provide a useful lens to frame such investigation. Second, to the best of the researchers' knowledge, this is one of the first DGBLL studies that targets non-gamers and it provides empirical evidence that even for this learner group, it is feasible to use MMOG for L2

learning. The findings highlight the need for more longitudinal and large-scale studies along this line to produce more quantitative data regarding the learning outcomes of out-of-school digital gaming and the differences between gamers and non-gamers in this context. Third, this study presents the first attempt to measure the development of autonomy after digital gaming in an informal setting. However, more research is needed to investigate how instructors can facilitate autonomy in such a context.

Chapter 7. Conclusions

7.1 Introduction

This chapter brings together some of the most salient findings and conclusions that can be drawn from the three studies (Li et al., 2021; Li et al., 2022a; Li et al., 2022b) that were the focus of this thesis. The discussion in this chapter begins by examining the issues of pedagogical practices and then turns to identifying the benefits of digital gaming on language learning highlighted by the findings of the research. The discussion then moves on to discuss the limitations of the research and its implications. Finally, the chapter concludes with suggestions for further research.

7.2 Discussions

As noted previously, this action research consists of three cycles/studies, the overview of which is presented in table 10. This section synthesizes and critically examines the findings of these three studies from the dimensions of pedagogical mediation and the positive effects of digital gaming.

Table 10

The Overview of the Three Studies

Research Details	Study 1 (Li et al., 2021)	Study 2 (Li et al., 2022a)	Study 3 (Li et al., 2022b)
Participants	Eleven English learners of intermediate level (Chinese, 3	Six English learners of intermediate level (Japanese, 3	Eight English learners of intermediate

	gamers and 9 non-gamers)	gamers and 3 non-gamers)	level (Chinese, non-gamers)
Context	Out-of-school	Classroom-based	Out-of-school
Game Used	<i>Life is Strange</i>	<i>Life is Strange</i>	<i>Phasmophobia</i>
Pedagogical Mediation	Online orientation prior to gameplay; Supplementary materials	Orientation prior to gameplay; Tracking tasks; Classroom debriefing and discussion; Gameplay guidance; After-class feedback	Online orientation prior to gameplay; Supplementary materials; Feedback
Areas Investigated	Vocabulary retention; Perceived benefit Participation levels and patterns; Learner perception	Vocabulary retention and reproduction; Writing; Engagement; Learner perception	Autonomy level; Autonomous practices; Perceived benefit; Learner perception
Findings	Vocabulary acquisition; Perceived improvement in listening, reading and autonomy; Positive perception	Vocabulary acquisition; Vocabulary reproduction; Improvement in writing game reviews; Perceived improvement in critical thinking, reading and listening;	Higher autonomous level; Demonstrate the ability to use digital gaming for language learning and to overcome most of the contradictions that arose;

Positive perception

Perceived

improvement in
speaking,
autonomy and
confidence;

Positive perception

Findings of the three studies point to the importance of pedagogical mediation, lending credence to the claim that instructors are needed to secure learning outcomes (Peterson, 2013; Wang, 2019). Specifically, in out-of-school contexts, teachers mainly support learners by providing them with supplementary materials, which were recommended by the prior studies (Miller & Hegelheimer, 2006; Ranalli, 2008). However, as demonstrated in study one, due to the non-mandatory nature of out-of-school projects, there is a possibility that learners may not actually use the supplementary materials, so the issue remains as to how to make sure that learners do capitalize upon those materials. As shown in study three, the key is to develop learner autonomy and to achieve that goal, the instructor asked learners to keep a game journal and provide them with timely feedback, which proved to be effective. This finding indicates that even in out-of-school contexts where instructors may not be present all the time, they still have a pivotal role to play so as to strike a balance between playing and learning (deHaan et al., 2010). In other words, instructors should create assignments with a view to drawing players' attention to language usage and provide individualized and timely feedback accordingly.

The findings of this research further suggests that when implementing digital games in language classrooms, there is more room for instructors to provide scaffolds, however, they also have to take into account many factors ranging from the alignment with the curriculum, time allocation, to institutional requirements. As detailed in study two, apart from providing the supplementary materials, the instructor followed the advice of Reinhardt (2019) that activities should be designed as logical extensions of the game world and created classroom activities around the gameplay through tracking tasks, debriefing and presentation, which highlight the language points and help sustain the focus on language. Moreover, as demonstrated in study two, instructors can also assign after-class activities and this indicates the possibility of adopting a blended (eg. Singh, 2021) and flipped mode (eg. Mehring & Leis, 2018) for DGBLL. A further potential barrier to the adoption of digital technologies into formal English education may be the presence of institutional constraints. As shown in study two, it is highly possible that access to computers may be limited. As an alternative, the instructor may assign learners into different groups to play the game together or adopt a hot seat mode which means learners can take turns to play the game with the rest observing.

The literature has suggested that gamers participate in game-based community (Zheng et al., 2012) where more experienced players act as more competent peers and learners are exposed to linguistically rich environments. However, the findings reported in the three studies in this thesis have demonstrated that this practice is not universal and may be limited to very experienced gamers. Non-gamers who are not

familiar with the gaming culture may find it hard for them to be immediately accepted into an existing gaming community. Therefore, there appears a need for additional scaffolding which may direct them to useful resources. For moderate gamers, they may be aware that there are game-related resources available online, but they are not motivated enough to take the initiative to utilize those materials, therefore, additional scaffolding is also necessary. With this in mind, instead of pushing learners into the “digital wild”, instructors would be well advised to make efforts to construct a game-based community for the participants. In terms of evidence, there were numerous instances of learners relying upon such a community for sharing information and exchanging opinions.

A final point to note regarding pedagogical mediation is that the appropriateness of the game should be evaluated in the first place. As different games have different affordances for language learning, instructors should select those suitable for their classroom, this is especially true for COTS games. In addition, the scaffolds should serve two goals: one is to make the full use of the affordances of the game by highlighting the language points for learners and the other is to make up for the limitations in game’s affordances. For example, the adventure game used in this thesis did not elicit linguistic output, so the instructor complimented gameplay with online and in-class discussions. In a similar vein, the MMOG used did not expose players to enough linguistic input, so the instructor provided learners with playthrough videos and online threads.

In terms of the learning gains of digital gaming, the thesis has for the first time demonstrated that digital gaming was, in some way, conducive to facilitating all of four skills, i.e., reading, listening, speaking and writing. Studies one and two have produced further evidence which confirmed the benefit of digital gaming on vocabulary retention. Study two also demonstrated that learners were able to apply the words learned as a result of playing the game in non-gaming environments. This evidence of knowledge transfer represents a step forward from prior studies. Quantitative data from study two also suggests that learners improved their writing. Moreover, the qualitative data from the three studies further indicates that learners believe they made progress in reading, speaking and listening. These findings suggest that coupled with proper design and learning tasks, digital games can be utilized to develop language in an all-round manner. However, more research is needed to generate more evidence to establish the benefits of digital gaming on the language skills other than vocabulary and more efforts are needed to explore the optimal practices that maximize the learning effects of digital gaming on each language skill.

Another noteworthy benefit of digital gaming highlighted in this research is a higher level of autonomy, which is reflected through scale responses, learner practices and learner opinions. The enhanced autonomy may be attributable to the enjoyment and motivation brought about by digital gaming. Driven by the interest in the game, learners started seeking game-related resources and overcoming difficulties on their own, thus engaging in the autonomous gameplay. As shown in the studies, the process of developing autonomy in DGBLL contexts is one in which players develop

language awareness of game-related paratext and then take the initiative to capitalize upon those affordances. Therefore, pedagogical mediation should be carried out with these two goals in mind.

To sum up, this action research project contributes to the literature with new empirical evidence regarding the learning benefits, learner perception and learning process of DGBLL. By triangulating and synthesizing the findings of the three studies, this discussion reveals insights that may go unnoticed in the original studies and highlights the finding which is consistent across the research: learning outcomes are enhanced by both indirect and direct teacher intervention during game play in both formal and informal learning contexts.

7.3 Limitations

This thesis is subject to some limitations that should be acknowledged in any evaluation of the findings. One pertains to the generalizability of the research due to its small sample size and limited duration. Language learning through digital gaming was a novel method for all participants, so given the limited duration of the research, the benefits, especially the positive feedback and active engagement, may be attributed to the influence of novelty. In addition, it would have been better if the three studies had the same participants. However, this cannot be easily realized as it is challenging to recruit participants for longitudinal and unconventional projects. Moreover, as the two games selected for this thesis are of the COTS genre, the findings may not apply to contexts where other types of educational games are

utilized. A further limitation lies in the data collection and analysis. The heavy reliance upon self-reported data and the dual role of researcher and instructor may place objectivity in question. Rich qualitative data of the types collected in this research may provide detailed insights into the issues under investigation, thus, they are particularly valuable for exploratory studies. However, once the issues that deserve further attention are identified, more quantitative data are needed in order to generate more definitive conclusions.

7.4 Future Research

The fundamental aim of this action research was to explore how to best support learners when utilizing digital games for language learning so as to clarify the connection between research, theory, and teaching practice. As the three cycles of this action research have documented the detailed pedagogical practices in the context of DGBLL, they hold pedagogical implications for future cycles where instructors can draw from them useful information regarding game selection, material preparation and activity design. The findings of this research suggests that it would be worthwhile replicating this research with more students who possess different language proficiency levels. Research into these differences and insights into how to support learners with various backgrounds and in diverse contexts would appear to be of great value.

This research has reported on several pedagogical practices in the context of DGBLL, but future studies may consider adopting more interventions such as student projects including making podcasts, videos, webpages and even mini games.

Furthermore, as noted by Pivec (2009), researchers should leverage the meta-game contents surrounding the game itself so as to implement games for education more effectively. In this sense, future practice-oriented studies could incorporate more game-related materials such as gaming forums, livestreaming videos and vlogs. Researchers may also expand the research by combining DGBLL with other CALL research areas such as tandem learning, blogging, blended learning and flipped classroom. As learner comments in the three studies highlighted the role of instructor feedback, it would also be beneficial to conduct further research into this area.

Games of different genres were employed in this thesis, but exploring this in depth was not a focal point. Future work in this area would certainly be worthwhile. Researchers could consider using games of different genres with the same group of participants so as to compare and contrast their impact on language learning.

One of the original contributions of this thesis was its demonstration of the insights that can be gained by viewing non-gamers' autonomous practices through the lens of activity theory. In future studies, researchers could expand upon this approach by making further use of activity system analysis to examine the dynamism of DGBLL from the perspectives of not only learners, but also the instructors and institutions so as to expound upon the complexities of the intertwining elements of multiple activity systems.

Finally, meaningful contributions could also be made to the research base by conducting longitudinal qualitative or mixed method studies as well as large-scale quantitative work so as to provide new insights into the field.

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Appendix A. Consent Form

Title of study

Game based language learning

Principal investigator

Mark Peterson and Li Ke; Department of Human Coexistence; Kyoto University

Purpose of study

The purpose of this study is to explore students' perceptions of using games to facilitate language learning and examine the development of their writing performance.

Confidentiality

Your test scores and responses to the survey will be anonymous. Every effort will be made by the researcher to preserve your confidentiality including the following:

- Assigning code names/numbers for participants that will be used on all research notes and documents
- Keeping score sheets, notes, and any other identifying participant information in a locked file cabinet in the personal possession of the researcher.

Participant data will be kept confidential except in cases where the researcher is legally obligated to report specific incidents.

Consent

I have read and I understand the provided information and have had the opportunity to ask questions. I understand and give permission that my relevant data will be used for study. I understand that I will be given a copy of this consent form.

Participant's signature _____ Date _____

Appendix B. Examples of the Interfaces of the Tools

Figure B1

Word sets on Quizlet (used in study one and two)

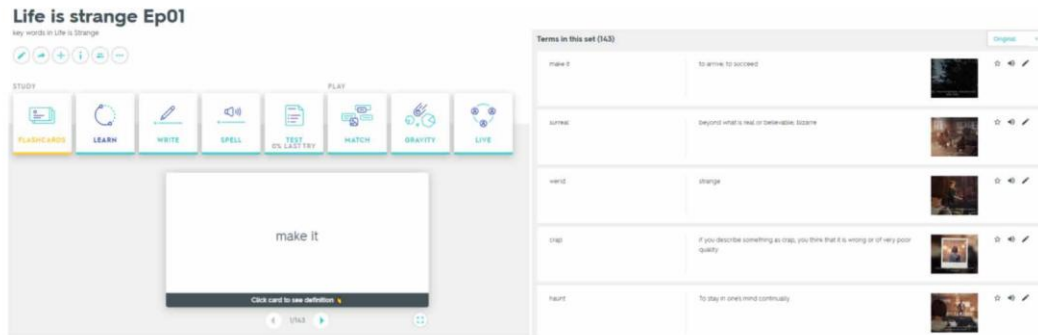


Figure B2

Edmodo Interfaces (study one)

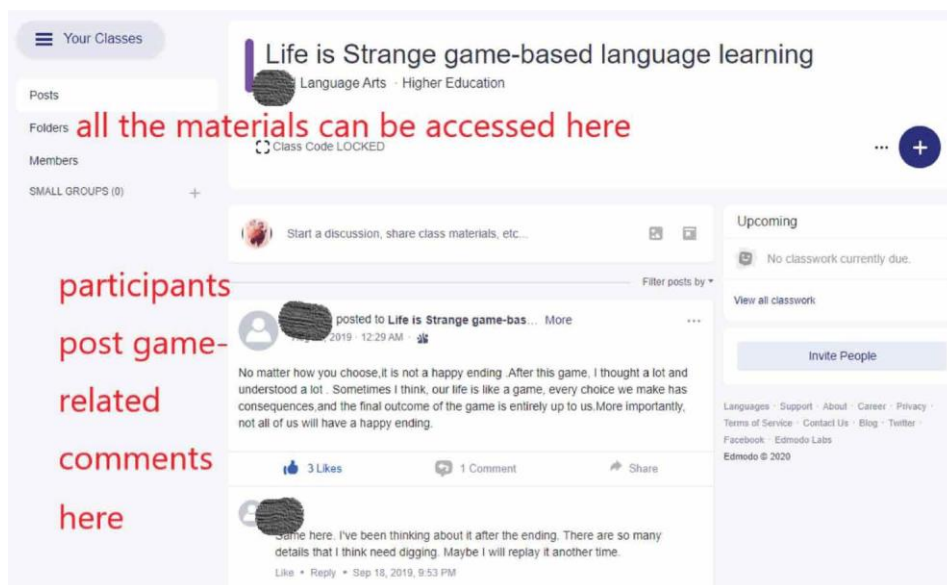


Figure B3

Edmodo Interfaces (study two)

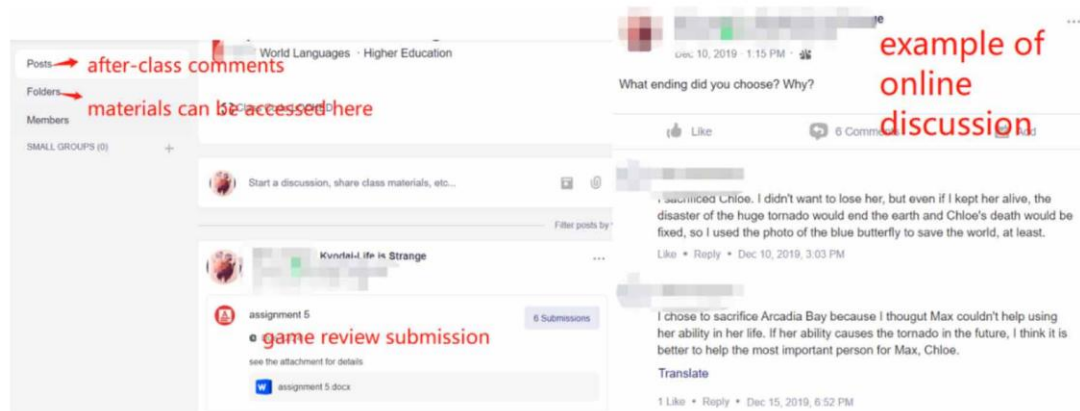
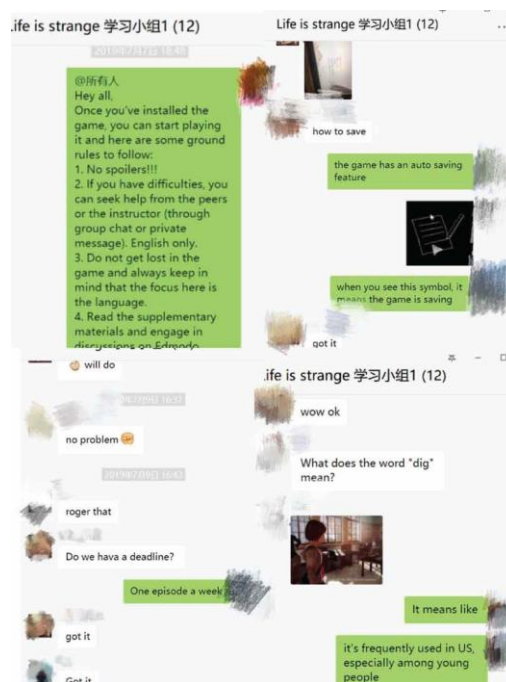


Figure B4.

Group chats on Wechat (study one)



Appendix C Words for Vocabulary Tests in Study One

50 words for immediate and delayed post tests

prank	syringe	kickstart	dystopia	bureaucrat
aura	pun	maze	crate	inhale
multifaceted	surplus	mumble	karma	millionaire
dickhead	vent	monograph	highlight	graffiti
paralyse	pussycat	gossip	audible	holocaust
graphic	cereal	tearful	balcony	sarcastic
stall	slam	dilemma	jackpot	envision
hood	initiate	handicap	fete	paranoid
surreal	mellow	apocalypse	wholehearted	deduct
muse	verge	essence	vial	grill

50 words for pre test

ominous	eclipse	lame	disciple	sneak
jukebox	dystopia	clutter	karma	bust
personify	slap	snooze	doe	rewind
drone	elusive	cockroach	gimmick	boast
syringe	snap	scoff	Armageddon	hassle
pimp	hectic	grill	cardboard	chef
paranoia	vibe	psychotic	hideout	stance
tearful	hypocrite	blackmail	detect	manipulate
stationery	mortgage	vanish	wreck	revenge
whine	sane	aura	prescription	infamous

Appendix D. Overview of the Supplementary Materials Used in Study Two

Types of supplementary materials	Intended usage
Quizlet wordlists	Vocabulary preview and review
Tracking tasks (see Appendix I)	Sustain a language focus during in-class gameplay
	Guide in-class discussion and debriefing
Walkthrough videos	Review the gameplay and find out other alternative storylines
One themed reading article for each session	Enhance the understanding of the gaming content
	The respective themes for the five articles are choice-making in life, bullying, childhood friendship, mercy killing and alternative ending of the game.
Sample game review (provided after they submitted their game journal each week)	Review and improve their writing

Appendix E. Student's Writing Sample with Feedback

<p>In episode two, there were two <u>storylines</u>: Kate <u>being bullied</u> and Max and Chloe <u>searching for Rachel</u>. As for the bullying, Kate seemed to be bullied by Victoria and her friends because of her <u>viral video</u>, <u>where</u> Kate <u>got excited by drug</u> at the party held by Vortex club. When Max saw Kate in the shower room, <u>she</u> was so depressed, and while Max was having a shower, Victoria and her friend <u>teased</u> Kate. After taking shower, Max went to Kate's room to bring her book <u>back</u>. Kate talked about the party. According to <u>her</u>, she took only one <u>hip</u> of red wine, but after that she felt <u>dizzy</u> and Nathan took her to a place like hospital <u>where</u> <u>Max</u> seemed to feel a sharp <u>sting</u> in her neck. She was probably <u>dosed</u>. Hearing about the party, Max reasoned that Kate should go to police. Kate looked so <u>depressed</u>. <u>The bullying, the viral video, guilt for her own family, bad conscience as a pious Christian, and harassment from Nathan ... all of these</u> seemed to cause her stress. In the circumstances, Max would have been a support for Kate.</p>	<p>nicole Deleted: the ... episode two, there were</p>
	<p>nicole In which</p>
	<p>nicole Inappropriate Get excited by drug?</p>
	<p>nicole Unclear, could be Max and Kate</p>
	<p>nicole Return the book</p>
	<p>nicole sip</p>
	<p>nicole Deleted: In her room, ... ate talked</p>
	<p>nicole Kate?</p>
	<p>nicole Deleted: There might not be hospital</p>
	<p>nicole Upset, frustrated</p>
	<p>nicole Deleted: by Victoria and her friends</p>
	<p>nicole ...overwhelmed by the whole</p>
	<p>nicole Deleted: become ...came noisy and all</p>
	<p>nicole , but time was frozen.</p>
	<p>nicole No one except for Max</p>
	<p>nicole Deleted: but ...cept for Max could</p>
	<p>nicole Kate</p>
	<p>nicole Seeing Max..., Kate seemed to feel</p>
	<p>nicole logic</p>
	<p>nicole It is ...that...</p>
	<p>nicole Taken down</p>
	<p>nicole Deleted: like this... "Kate, this is oup</p>
	<p>nicole you mean find out?</p>
	<p>nicole believed</p>
	<p>nicole It is possible that ...</p>
	<p>nicole Deleted: among them</p>
	<p>nicole Deleted: and... change in climate</p>

Appendix F Questionnaire Used in Study Two

Table D1

Likert-scale Items of the Questionnaire

Statements	Mean	SD
1. I am generally satisfied with the course.	4.333	0.516
2. I am willing to recommend the course to others.	4.667	0.616
3. The game is immersive and interactive.	4.833	0.428
4. The game is easy to play.	2.833	0.408
5. I can improve my English by playing this game.	4.167	0.428
6. My writing has improved as a result of the project.	4.167	0.763
7. Compared to regular writing classes, I am more willing to write the game journal.	4.333	0.816
8. The instructor's interactions with me in class were useful.	4.833	0.408
9. The instructor's help with gameplay and use of the computer was useful.	4.833	0.408
10. The instructor's instructions and debriefing in class were useful.	4.667	0.516
11. The instructor's feedback on my writing was useful.	4.667	0.516
12. The wordlists on Quizlet were useful.	4.5	0.837
13. The Edmodo discussions were useful.	4.333	0.516
14. The supplementary materials were useful.	4.5	0.837

Open questions (You can answer in Japanese)

1. What do you like and/or dislike most about the course?
2. Are there skills this project has helped you to improve and why?
3. What are the challenges you encountered in the course?
4. What are your suggestions for improvement?

5. Is there anything else you would like to tell the instructor about your experience participating in this project? (Optional)

Appendix G Observation Scheme for the DGBLL Classroom

Target behaviors	Score				
	Very active (5)	Active (4)	Neutral (3)	Not so active (2)	Inactive (1)
Engagement with the content					
Showing interest and curiosity	Proactive and constantly engaged in gameplay; advance very fast and willing to try several times when in difficulties	Proactive and engaged in gameplay most of the time; seek help when in difficulties	Engaged in gameplay; waiting for the instructor's guidance when in difficulties	Not so engaged in gameplay; slow in advancement	Not engaged and not willing to play
Showing emotional responses	Strong emotional expressions such as crying and laughing in class, excitement after completing an objective	Mild expressions such as smiling and frowning at the screen	No obvious emotional expressions	Not focused, frequently looking around	No response and not willing to play
Note-taking	Frequent note-taking during gameplay	Note-taking from time to time during gameplay	Little note-taking during gameplay	Very little note-taking	No note-taking
Engagement with the instructor					
Asking questions	Constantly asking questions	Frequently asking questions	Occasionally asking questions	Rarely asking questions	No questions
Responding to questions	Actively raise hands and volunteer to answer questions	No hand-raising, but volunteer to give answers	No one volunteered to answer, but willing and able to answer when called upon	Not able and willing to speak when called upon	No response even when called upon
Following instructions	Willing and quick to follow instructions	Willing to follow instructions	Able but not quick to follow questions	Not willing and not quick to follow instructions	Ignore instruction
Engagement with the peers					
Discussion initiated by instructor	Willing and quick to engage in discussion	Willing to engage in discussion	Able but not quick to engage in discussions	Not willing and not quick to engage in discussions	No engagement in discussion
Helping others with gameplay	Constant	Frequent	Occasional	Rare	No
Talk with peers before or after the class	Constant peer interaction	Frequent peer interaction	Occasional peer interaction	Rare peer interaction	No peer interaction

Appendix H. Writing Assessment Rubric (Jacobs et al., 1981)

Scale	Level	Criteria
Content	30-27	EXCELLENT TO VERY GOOD <ul style="list-style-type: none"> ● knowledgeable ● substantive ● thorough development of the composition ● relevant to the topic
	26-22	GOOD TO AVERAGE <ul style="list-style-type: none"> ● some knowledge of the subject ● adequate range ● limited development of the composition ● mostly relevant to topic, but lacks details
	21-17	FAIR TO POOR <ul style="list-style-type: none"> ● limited knowledge of the subject ● limited substance ● inadequate development of the composition
	16-13	VERY POOR <ul style="list-style-type: none"> ● does not show some knowledge of the subject ● non-substantive ● not pertinent ● or not enough to evaluate
Organization	20-18	EXCELLENT TO VERY GOOD <ul style="list-style-type: none"> ● fluent expression ● ideas clearly state/supported ● succinct ● well-organized ● logical sequencing ● cohesive
	17-14	GOOD TO AVERAGE <ul style="list-style-type: none"> ● somewhat choppy ● loosely organized but main ideas stand out ● limited support ● logical but incomplete sequencing
	13-10	FAIR TO POOR <ul style="list-style-type: none"> ● non-fluent ● ideas confused or disconnected ● lacks logical sequencing and development
	9-7	VERY POOR <ul style="list-style-type: none"> ● does not communicate ● no organization ● or not enough to evaluate
Vocabulary	20-18	EXCELLENT TO VERY GOOD

- sophisticated range ● effective word/idiom choice and usage ● word form mastery ● appropriate register
- 17-14 GOOD TO AVERAGE
- adequate range ● occasional errors of word/idiom form, choice, usage but meaning not obscured
- 13-10 FAIR TO POOR
- limited range ● frequent errors of word/idiom form, choice, usage ● meaning confused or obscured
- 9-7 VERY POOR
- essentially translation ● little knowledge of English vocabulary, idioms, word form ● or not enough to evaluate
- Language use 25-22 EXCELLENT TO VERY GOOD
- effective complex constructions ● few errors of agreement, tense, number, word order/function, articles, pronouns, prepositions
- 21-18 GOOD TO AVERAGE
- effective but simple constructions ● minor problems in complex constructions ● several errors of agreement, tense, number, word order/function, articles, pronouns, prepositions but meaning seldom obscured
- 17-11 FAIR TO POOR
- major problems in simple/complex constructions ● frequent errors of negotiation, agreement, tense, number, word order/function, articles, pronouns, prepositions and/or fragments, run-ons, deletions ● meaning confused or obscured
- 10-5 VERY POOR

		<ul style="list-style-type: none"> • virtually no mastery of sentence construction rules • dominated by errors • does not communicate • or not enough to evaluate
Mechanics	5	<p>EXCELLENT TO VERY GOOD</p> <ul style="list-style-type: none"> • demonstrates mastery of conventions • few errors of spelling, punctuation, capitalization, paragraphing
	4	<p>GOOD TO AVERAGE</p> <ul style="list-style-type: none"> • occasional errors of spelling, punctuation, capitalization, paragraphing but meaning not obscured
	3	<p>FAIR TO POOR</p> <ul style="list-style-type: none"> • frequent errors of spelling, punctuation, capitalization, paragraphing • meaning confused or obscured <hr/>
	2	<p>VERY POOR</p> <ul style="list-style-type: none"> • no mastery of conventions • dominated by errors of spelling, punctuation, capitalization, paragraphing • or not enough to evaluate <hr/>

Appendix I. Examples of Tracking Tasks and Students' Notes

Chloe's ~~infer~~ respiratory system is showing signs of rapid weakening
 Joyce and William have difficulty in paying money for Chloe.
 David left home
 use camera in PAH Estates (Prescott family) ex, got some photos
 help with Nathan · has a photo Nathan hit Warren at the parking lot

- Note down the major plots and experiences which will serve as the basis of your summary.
 - Rachel and Chloe weren't best friend in the changed timeline
 - Max, Victoria, Nathan are friends
 - Chloe asked Max to ~~take~~ her life → accept → back to the time when William find Key → go back to the main timeline
- What did you learn about Nathan by searching his room?
 - he is going to go to tonight's party → go back to the main timeline
 - his sister works in Peace Corps
use when saying something bad about you
 - Frank
 - Verrex club "Nathan p... is... an
 - "Dark room"
 - talked with Kate
- Words and expressions (figure out the meanings of the underlined words according to the context):
 - I could have ended up vanishing out of the blue like that girl from Blackwell. ^{disappear} vanish into trace
 - -No offense. -None taken. ^{don't mind}
 - My dad would have banished me.
 - So I know I'm just putting off the inevitable. ^{postpone}
 - Thank you for your morning grope. ^{grope for} X grope for: search for
 - One, decipher Frank's logbook. ^{find out what is inside}

- Note down the major plots and experiences which will serve as the basis of your summary.
 - B rewind time ^{talk with} → Mr. Jefferson
 - rewind time ^{if I could} (classroom) · warn David (555-630-8243)
 - comfort Kate, talked to Victoria
 - entry to the contest
 - go to San Francisco
 - Jefferson was arrested, Max got a prize, Chloe was alive
 - felt dizzy, saw a timado → called Chloe → tornado was real
 - rewind time to save her · tear the photo ^{if} DarkRoom^ Jefferson burned Max's diary
 - David came to help Max
 - Tell David Chloe was killed - killed Jefferson · Message from Nathan: He didn't want to hurt anyone, but Jefferson used him
- Words and expressions (figure out the meanings of the underlined words according to the context):
 - If you had, you might have seen all this coming.
 - -You used Nathan. -I prefer the term "manipulated". ^{use, control}
 - Between Mr. Jefferson and the Prescotts, things have been... hectic, to say the least. ^{busy}
 - That's a smart way of telling me to stop whining. ^{complain} have a lot on my plate
 - What words and expressions can be used to mean change (for the better)? ^{complain}
 - ~~water~~ evolve
 - transformation

Appendix J. Learner Autonomy Questionnaire (Murase, 2015)

Technical Dimension

1. I set long-term goals in learning English.
2. I make long-term plans for studying English.
3. I set goals for the day before I start studying English.
4. I make study plans for the day before I start studying English.
5. I set achievable goals in learning English.
6. I make study plans that match my goals in learning English.
7. I make realistic plans for studying English.
8. I revise my English study plans if they don't work well.
9. If I have a limited amount of time available for study, I decide in what order the things need to be done.
10. I reflect upon how I studied after I finish studying English for the day.
11. I reflect upon what I learned after I finish studying English for the day.
12. I try to create opportunities to use English outside the classroom.
13. I try to create the conditions under which I can study English best.
14. I evaluate the improvement in my ability to use English effectively.
15. I assess how much of my goal I have achieved.
16. I assess the effectiveness of my English study plans.
17. I take notes about how much time I spent on my English study.
18. I keep records of what kind of methods I used for my English study.
19. I write down what kinds of materials I used for my English study.

20. I keep records of what I learned from my English study.

21. I take notes of my feelings while I am studying English.

Psychological Dimension

22. All students ought to set their own goals in learning English.

23. Every student ought to set long-term goals in learning English.

24. All students ought to make long-term plans for studying English.

25. Every student ought to set goals for the day before he/she starts studying English.

26. All students ought to choose the materials suitable for their goals in learning English.

27. Every student ought to make study plans that match his/her goals in learning English.

28. All students ought to make realistic plans for studying English.

29. Every student ought to create the conditions under which he/she can study English best.

30. Every student ought to reflect upon how he/she studied after he/she finishes studying English for the day.

31. All students ought to reflect upon what they learned after they finish studying English for the day.

32. Every student ought to write down how he/she studied English.

33. A good learner of English keeps records of what he/she learned from his/her English study. 34. Every student ought to evaluate the improvement in his/her ability

to use English effectively.

35. Every student ought to assess the effectiveness of his/her English study plans.
36. I know what I need to study to improve my English.
37. I know what I am good at in learning English.
38. If I ask my teacher for help in learning English, I know how I want him/ her to help me.
39. I know the conditions under which I can study English best.
40. If I don't feel like studying English, I know the reason.
41. If I don't feel like studying English, I know how I can motivate myself.
42. I want to study overseas in the future.
43. I want to work overseas in the future.
44. I want to get a job where I use my English in the future.
45. I like the English language.
46. I like studying English.
47. I give a higher priority to studying English than studying other academic subjects.
48. The reason that I study English is to pass the exams for English classes.
49. The reason why I study English is that it is an obligatory part of the course.

Appendix K. Exit Questionnaire Used in Study Three

Statements	Mean	SD
1. Overall, I am satisfied with this project.	M = 4.38	SD = 0.52
2. I would recommend this project to other students.	M = 4.63	SD = 0.52
3. I am willing to participate in more projects like this one.	M = 4.25	SD = 0.46
4. I find instructor's feedback useful and necessary.	M = 4.875	SD = 0.353
5. I find instructor's gaming support useful and necessary.	M = 4.625	SD = 0.517
6. I find instructor's materials useful and necessary.	M = 4.625	SD = 0.517
7. My reading improved as a result of this project.	M = 2.375	SD = 0.517
8. My listening improved as a result of this project.	M = 4.25	SD = 0.462
9. My speaking improved as a result of this project.	M = 4.375	SD = 0.517
10. I feel more confident when speaking English	M = 4.625	SD = 0.52
11. I feel less anxious when speaking English.	M = 4	SD = 0.53
12. I am more willing to speaking English with others.	M = 4.375	SD = 0.517
13. Compared to speaking classes, I am more willing to speak English in the game.	M = 4.25	SD = 0.7
14. I learned a lot as a result of this project.	M = 4	SD = 0.534
15. I learned a lot from the game itself.	M = 3.75	SD = 0.462
16. I learned a lot from the peer interactions.	M = 4.375	SD = 0.517
17. I learned a lot from the instructor's supplementary materials, interactions and instructions.	M = 4.125	SD = 0.64
18. I gained confidence as an autonomous learner.	M = 4.125	SD = 0.6
19. I gained confidence in my ability to make use of the games and game-related resources to learn English.	M = 4.125	SD = 0.64

Open questions:

What are the challenges you encountered in the project? (You can answer in Chinese)

What are your suggestions for improvement? (You can answer in Chinese)

Appendix L. Weekly Game Journal

1. How much time did you spend on this game this week?
2. In addition to playing the game, did you engage in other game-related activities? If so, what are they and for how long? Please be specific.
3. What have you learnt as a result of this project this week?
4. What problems and difficulties did you encounter this week?
5. Is there anything else you would like the instructor to know?

Appendix M. Two Examples of Student Notes (in Study Three)

1/18 游戏笔记
thread 帖子
Walkthrough 攻略
Live streaming 直播
The game: phasmophobia 恐鬼症
C 蹲下身子投东西 them thermometer
G 扔掉
T 闪光
F: 放下
E: 拿三脚架
P: 放下三脚架
B: 对话 (使用通风盒)
V: 对话
Q: 切换工具

1/22 看攻略笔记
catch the ghost as quickly as possible:
1. Thermometer 温度计
2. EMF reader
3. crucifix 十字架
4. 斧头ax
5. Fuse box 电闸
6. 大门 entrance
7. Equipment 不可数
8. see的发音注意
9. Corridor 走廊
10. 车: van / trailer / truck

11. Name object:
① Living-room, Dining-room, Kitchen.
② Nursery 儿童.
③ table desk is messy
④ I want to check this room use sensor (声音传感器)
⑤ No, not yet! 还没有.
⑥ EMF3
⑦ I've got nothing detected now.
⑧ Do we get a writing?
⑨ That's weird on oh -
⑩ It's time to go for now 现在该走了

2/1 第一次和第二次反馈总结:
① need, see, again, find/can't evidence/what 末尾不必重读
② salt 没有儿化音
③ Demon 发音错误

④ Go back to the truck, what I should take/what should we do
⑤ White (重音在前面) one
⑥ 点表达:
- enter the room once more: reenter/enter again/entered/I'm in
- It's not looks as in my imagination: it's not what I had in my mind

2/8
The light is strongly flickering

2/7. 第三次反馈总结:
- Add / Aid 发音混淆
- have a look, did we, uv light
- 注意注意语音弱读

① I think I just had upstairs (国外表达常用 had 代替go)
② You sweep(扫一圈) the first floor
③ use the thermometer to locate the ghost
④ Are you on the first floor now?
⑤ Press you flash light on your shoulder
⑥ Nothing detected 说得更完整一点 + 手上工具一起说 + 更加细节化 + 表达地道话
⑦ You lose all your equipment once you die
⑧ Head up to stairs (慢慢转过去)
⑨ 如何解释温度计与手电筒一起使用:
Press T and the flashlight will be instantly placed on your shoulder and turned on, but you have to make sure flashlight is in your inventory
⑩ 表达地道话: equipment disappear

2/8 看视频笔记:
① Grab the key Get emf out(拿出...)
② I don't see it, Nothing over here
③ Do something that sounds like it was close.

crucifix 十字架
living room 客厅
我到楼上: I'll go upstairs.
这个房间我搜过了 I have searched this room.
水声 sound of water flow
我害怕极了 I'm scared.
午觉: afternoon nap
阁楼: loft, garr etc.
如果你找到证据, 你可以告诉我
我迷路了: I have lost my way.
扔掉东西: Throw away the things.
拿东西: take, have, bring, grab.
鬼正在狩猎: The ghost is on the hunt.
灯在闪: Light in a flash.
浴缸: bathtub
洗手池: sink
怎么打开水龙头: How to turn on the tap/faucet.
把声音调低: turn the volume down.
温度低于十度: The temperature is below ten degrees.
我能看到冷空气: I can see the cold air.
太黑了: It's too dark in here.
储藏室: storeroom
杯子从桌上掉下来: The cup fell off the table.