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Digital game-based SLA in the wild: evidence from a qualitative case study

Bio data

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Abstract

A substantial body of research in the field of digital game-based language learning (DGBLL) suggests that games may hold significant potential to facilitate second language acquisition (SLA). Since many CALL researchers are also language teachers, it is common for studies in this field to be carried out in a language classroom context, with a focus on implications for in-class learning and teaching. Scholars such as Sauro and Zourou (2019) have recently pointed out, however, that DGBLL is far more likely to take place outside of the formal educational context than within it. Of the billions of digital game players around the world, many play in languages that are not their L1 and this must surely contribute significantly to their language learning. To better understand how SLA may take place in the context of a cooperative multiplayer digital game, a case study was conducted in which four hours of spoken interactions between three learners playing a game face-to-face over several sessions were recorded, transcribed, and analysed. Other than stipulating the use of English, the researcher did not guide or structure the interaction in any way, so as to simulate play "in the wild". Interaction was analysed using two different qualitative approaches: a cognitive-interactionist analysis and a direct qualitative analysis. The first approach revealed occasional instances of negotiation for meaning and regular use of beneficial interactional strategies during interaction, while the second shed light on how unstructured game-based interaction among learners may facilitate the acquisition of L2 vocabulary and grammatical structures.

Conference paper

Background

A number of recent studies in digital game-based language learning (DGBLL) have emphasised the importance of supplemental classroom activities and materials in optimising learning outcomes (Peterson, 2021). In a classroom or language lab setting, a teacher may prepare worksheets to scaffold learning or to focus the attention of learners on language points relevant to the game-based task. Post-play debriefing sessions may also play a productive role in consolidating the acquisition of new language. Studies by

Miller and Hegelheimer (2006), Ranalli (2008), and Wang (2019), among others, provide empirical support for the use of such activities to supplement game-based learning. In light of these findings, influential voices in the game-based CALL community (York et al., 2021; deHaan, 2022) have begun to advocate for a drastic shift in focus within the field, calling for a move away from research on the potential of games for *learning* and towards the pedagogy and praxis of game-based *teaching*.

It is certainly true that over recent years, many language educators and learners have come to accept digital games as a promising new tool in the teacher's pedagogical arsenal (Bolliger et al., 2015; Mifsud et al., 2013). However, it is also important not to forget that the vast majority of actual DGBLL probably occurs outside of the formal learning environment and thus well outside the control or influence of the language teacher, out in what Sauro and Zourou (2019) refer to as the "digital wilds". The reasoning behind this assumption is simple. Today, active players of digital games across the world are estimated to number well over two billion people (Narula, 2019). Since many popular games are not available in the first languages (L1s) of all players, and since many games require online language-based interaction between players situated across the world who speak a wide range of L1s, it follows that a large number of players, probably many millions, gain considerable exposure to languages other than their mother tongues via their gaming hobby. The engaging nature of digital games provides these players with a strong intrinsic motivation to reach a level of second language (L2) proficiency sufficient to successfully complete the challenges posed by the game and as such, digital gaming that takes place in informal settings is likely to contribute significantly to out-of-school language learning on a global scale. This hypothesis is supported by one survey study (Sundqvist, 2019) conducted in Sweden, which found that L2 English learners who regularly played commercial digital games as a pastime, as well as those who played specific genres of digital games, outperformed their non-gamer peers in various measures of English vocabulary. Apart from this study, however, research on DGBLL in informal learning contexts has been scant (Peterson, 2021).

In order to better understand the processes through which DGBLL occurs in the digital wilds, a case study was carried out to investigate the potential of one digital game belonging to a promising yet under-researched genre to facilitate second language acquisition (SLA).

Case Study: *Keep Talking and Nobody Explodes*

Game, Participants, Data, and Analyses

The game title used for this study was the commercially-produced cooperative puzzle game *Keep Talking and Nobody* Explodes (Steel Crate Games, 2015). The aim of the game is for a small group of players to work together to defuse a time bomb before the countdown timer on the bomb reaches zero. One player, the "defuser", has access to a screen displaying a bomb consisting of a combination of various puzzle modules. The other players, the "experts", have access to the *Bomb Defusal Manual*, which contains instructions on how to solve the game's various puzzles. The defuser may not look at the manual during play time, while the experts may not look at the bomb on screen. This creates an information-gap game mechanic, as players are required to quickly and effectively exchange verbal information in order to disarm the bomb before it detonates.

For this case study, three learner participants working towards a degree in English Studies at a large Japanese university played the game over four one-hour sessions. Two of the participants spoke Japanese as an L1 and the other spoke Mandarin, but this learner was also highly proficient in Japanese at the time. In order to simulate play in the wild and also to identify opportunities for SLA to take place during such game-based interaction, that is interaction not guided by a language teacher, the researcher aimed to

minimise interaction with and support given to the group of learners before, during, and after the play sessions. Learners started the first play session by completing a short in-game tutorial, but no further supporting materials or activities were provided. The participants were asked to use only English and the researcher did not intervene during play, except in cases where technical problems prevented participants from continuing. Audio and video recordings were made of the four entire play sessions, adding up to a total of four hours of recorded interactional data, which were then manually transcribed in full.

Two separate discourse analyses were performed on the data set to investigate whether and how the game facilitated SLA during the play sessions. The first analysis was informed by the cognitive-interactionist model of SLA and was performed in order to identify processes believed to facilitate language learning, such as the negotiation for meaning and associated interactional strategies. The second analysis followed an original analytical approach known as direct qualitative analysis. This approach was developed in order to identify probable acquisition episodes (PAEs) that could not be identified from the first analysis.

Analysis 1 Findings

In this section, the key findings of the cognitive-interactional analysis will be briefly described. A full description of these results can be found in Hofmeyr (2021).

The aim of the first discourse analysis is to investigate whether certain processes that have been hypothesised to facilitate SLA could be identified in the interaction data set. The frequent presence of such processes in learner interaction is taken as evidence that the game-based activity is likely to facilitate SLA. Negotiation for meaning occurs when communication between two or more participants in interaction, or interlocutors, breaks down, after which the interlocutors attempt to repair the breakdown by engaging in further dialogue (Long, 1996, 2015). In the data set, 51 negotiation episodes were identified. Episodes that were triggered by gaps in a learner's lexical knowledge or by vague language use were found to have elicited significant modified output and therefore to have held the most potential for SLA. While negotiation for meaning occurred several times during each one-hour play session, such episodes did not occur very frequently. The presence of negotiation for meaning in the game-based interaction is therefore not enough to justify the use of the game as an efficient means of language learning.

The analysis also identifies occurrences of interactional discourse management strategies, including confirmation checks, clarification requests, and comprehension checks (Ellis, 2008). Interactional strategies sometimes occur during negotiation episodes as attempts to repair a breakdown, or they may occur outside of negotiation episodes in order to improve clarity and avoid breakdowns from arising in the first place. Discourse analysis of the data revealed that confirmation checks, in which one interlocutor checks that they have understood another's utterance correctly, occurred very frequently during the game-based interaction, with more than a thousand instances of this strategy identified. However, the utterances produced as confirmation checks typically involved only the repetition of short phrases and therefore probably did not contribute much to the acquisition of new language. Clarification requests, on the other hand, prompted significant modified output and thus appears to hold greater promise for game-based SLA. However, a total of only 35 such instances were identified in the data set, indicating that the game offers only limited potential to benefit SLA in this way. Comprehension checks occurred only four times over the course of the four play sessions and in none of these cases prompted rich linguistic output, leading to the conclusion that their effect on SLA was negligible during play.

Analysis 2 Findings

In the second analysis, six PAEs were identified in the data set and investigated in detail, three involving the acquisition of L2 vocabulary and three more involving the acquisition of L2 morphosyntactic features. In order to identify interactions beneficial to SLA that did not involve negotiation for meaning or the use of interactional strategies, a new approach to discourse analysis was devised. This approach is referred to as direct qualitative assessment and it attempts to minimise reliance on speculative SLA theory by identifying self-evident instances of SLA during learner interaction. This is done by pinpointing interactions in which one interlocutor clearly lacks knowledge of a given L2 feature, after which another interlocutor correctly models the feature in question, after which the first interlocutor reproduces the feature fully or partially. The following example from the data set illustrates what a PAE might look like in practice. While working to solve a maze puzzle during the first play session, one learner produced the following utterance to indicate the position of a red triangle appearing on an on-screen six-by-six-square grid: "From top one, two, three, four […] and from right, two". A more appropriate syntactic structure to describe the location of the red triangle would be: "Fourth from the top and second from the right". During the second play session, when the learners encounter the same type of puzzle again, a different learner indicates the position of the red triangle with the utterance "Second from the right and third from the bottom", employing the appropriate syntactic structure. The learner who was at first unable to produce this structure repeats the appropriate structure two times after the model provided by his peer. Later during the second play session, this learner again encounters a maze puzzle and this time, he produces the appropriate structure spontaneously, without a peer first modelling the correct form. Tracking the learner's output in this way reveals that over the course of two play sessions, he had progressed from not being able to produce the appropriate structure at first, to then repeating it accurately after an interlocutor, and finally to producing the appropriate form spontaneously. This result demonstrates that even in cases where neither negotiation for meaning nor conventional interactional strategies occur in game-based learner interaction, opportunities exist for rich linguistic exchanges that hold the potential to facilitate SLA.

Hofmeyr (in press) provides a more complete description of the direct qualitative approach to discourse analysis and explains the reasons for its development. Detailed analyses of the six PAEs from the data set are also provided. In addition to improving our understanding of how cooperative puzzle games based on an information-gap mechanic may help learners to acquire and consolidate L2 vocabulary and grammatical structures, the analysis also produced findings to suggest that game-based interaction may improve L2 pronunciation. While the phonological analysis carried out for this study was not sufficiently robust for publication, the potential of game-based spoken interaction to improve L2 pronunciation is a topic ripe for further study.

Conclusion

The findings of the two analyses described here strongly suggest that face-to-face spoken interaction between learners playing an interactive puzzle game without the support of a language teacher or supplementary materials can facilitate SLA in several ways. The game used in the case study elicited negotiation for meaning as well as interactional strategies that sometimes led to the production of modified L2 output. However, it is still uncertain whether these potentially beneficial processes occurred frequently enough to efficiently produce positive learning outcomes. The game-based interaction also enabled learners to notice and to address gaps in their knowledge of vocabulary, morphosyntactic features, and possibly also pronunciation features of the L2. Finally, it should be noted that the conditions under which data was collected for this study did not constitute a perfect simulation of gaming in the wild, as the play sessions took place in a specially reserved classroom on a campus, the researcher was present during the play sessions, and learners were instructed to use only English while playing

the game. In a genuinely informal setting, learners playing a cooperative or other type of multiplayer game would be free to communicate in any language they choose and any given learner would be likely to choose to do so in their second or foreign language only if they did not share a first language with the other players. In online play involving players of different nationalities or cultural backgrounds, communication is likely to take place in English or another regional lingua franca. It therefore follows that DGBLL opportunities in the wild would be most readily available to players whose L1 were not the lingua franca. In the case of face-to-face cooperative games such as *Keep Talking and Nobody Explodes*, friends playing the game together would be more likely to share the same L1 than players from different locations being randomly matched up to play with an international pool of partners or competitors online, as is often he case with popular commercial multiplayer games. However, in self-contained multicultural settings such as a university campus that houses a sizable proportion of international students, learners might play the game in a shared L2 and thus most likely also benefit from the processes of SLA demonstrated in this case study.

This paper calls for a wider awareness among the CALL and DGBLL research community of the impact of digital gaming in the wild on foreign language development on a global scale as well as a recognition that in-class DGBLL must in all likelihood only account for a small fraction of the language learning that happens by means of digital games. This is not to deny, however, the positive potential of in-class DGBLL and that of supplemental activities designed to enhance the learning of specific target L2 structures. Han and Reinhardt (2022) reiterate this point in claiming that investigating DGBLL in the wild can "shed light on the potential role of language educators in leveraging activity in the digital wilds for formal learning purposes". Further research on this topic can help us to better understand what kinds of digital games and gameplay mechanics best facilitate SLA and how to exploit and enhance these games and mechanics for the purposes of in-class learning. It can also help to clarify when it would be most advantageous to integrate digital game-based learning activities into the classroom and when it would instead serve learners best to encourage DGBLL outside of class, whether at home with their friends or in a quasi-formal learning environment such as a self-access learning centre or a language laboratory.

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