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	Abstract	<p>As interactive, multimodal, immersive, and extremely popular environments, digital games have received increasing interest from educators in recent years for their potential to enhance the language learning experience, both inside and outside the classroom. Review studies from general education have confirmed that “playing computer games is linked to a range of perceptual, cognitive, behavioral, affective and motivational impacts and outcomes” (Connolly et al. <i>Computers &amp; Education</i> 59(2):661–686, 2012) although this depends on the subject matter (Young et al. <i>Review of Educational Research</i> 82(1):61–89, 2012). Early studies in the area of language acquisition have demonstrated positive effects of game play on motivation, willingness to communicate, language socialization, and a range of other factors involved in the language learning process. As a relatively new field, however, there are significant gaps in the available literature, and many worthwhile areas remain yet to be explored. In this article, I will describe how research into digital games relates to earlier research on game-based learning, primarily with younger learners, before discussing the key areas in which studies have been carried out and their most important findings. The following sections discuss some of the challenges faced by the field and suggest future directions for research and development in this field.</p>		
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# Digital Games and Second Language Learning

AU2

Hayo Reinders

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## Abstract

As interactive, multimodal, immersive, and extremely popular environments, digital games have received increasing interest from educators in recent years for their potential to enhance the language learning experience, both inside and outside the classroom. Review studies from general education have confirmed that “playing computer games is linked to a range of perceptual, cognitive, behavioral, affective and motivational impacts and outcomes” (Connolly et al. *Computers & Education* 59(2):661–686, 2012) although this depends on the subject matter (Young et al. *Review of Educational Research* 82(1):61–89, 2012). Early studies in the area of language acquisition have demonstrated positive effects of game play on motivation, willingness to communicate, language socialization, and a range of other factors involved in the language learning process. As a relatively new field, however, there are significant gaps in the available literature, and many worthwhile areas remain yet to be explored. In this article, I will describe how research into digital games relates to earlier research on game-based learning, primarily with younger learners, before discussing the key areas in which studies have been carried out and their most important findings. The following sections discuss some of the challenges faced by the field and suggest future directions for research and development in this field.

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## Keywords

Digital gaming • Game-based language learning

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38 **Introduction**

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 40 games have received increasing interest from educators in recent years for their  
 41 potential to enhance the language learning experience, both inside and outside the  
 42 classroom. Review studies from general education have confirmed that “playing  
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 44 and motivational impacts and outcomes” (Connolly et al. 2012: 661), although this  
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 51 to earlier research on game-based learning, primarily with younger learners, before  
 52 discussing the key areas in which studies have been carried out and their most  
 53 important findings. The following sections discuss some of the challenges faced by  
 54 the field and suggest future directions for research and development in this field.

55 **Early Developments**

56 **Game-Based Learning**

57 Research in digital game-based language learning and teaching (DGBLLT) is linked  
 58 to a much older interest in the role of play in language learning and in education in  
 59 general. Before describing research on DGBLLT then, it is important to understand  
 60 what is meant by “play” and how game play impacts development and language  
 61 learning.

62 Play is a natural process of learning whereby children develop physically, cog-  
 63 nitively, emotionally, and socially through problem-solving and perseverance. In an  
 64 influential early study, Bruner (1972) showed that children who had opportunities to

65 play with objects achieved similar to higher problem-solving skills than children  
66 who had not but also that they developed greater tolerance in trying to solve  
67 problems and, in dealing with difficulties in doing so, were more creative and had  
68 more positive attitudes. In addition to helping children's general cognitive and social  
69 development, play also has an important role in the development of L1 language  
70 skills. Vygotsky's work has been particularly important in recognizing how play  
71 allows children to make meaning based on resources (real or imagined) in their  
72 immediate context to express feelings and to share intentions and ideas with other  
73 children, even in the absence of fully developed language ability. For example,  
74 where a gap in children's interlanguage exists, the use of physical objects or  
75 movement can make up for this. This not only allows for meaning to be expressed  
76 but for collaborative construction and scaffolding of language to occur (Weininger  
77 and Daniel 1992). As Widdowson (2001, p. 137) notes, "the playground culture is  
78 almost exclusively oral," and this oral aspect requires children to seek ways to  
79 express themselves verbally. A good example of an oral play activity is a narrative,  
80 which, Seach (2007) argues, provides two key elements in children's language  
81 development: context and meaningful communication. Play partners facilitate chil-  
82 dren to share their play experience with each other and implicitly acquire vital  
83 pragmalinguistic knowledge. Play activities allow children to transfer skills and  
84 knowledge to solve problems, discover, and analyze ongoing processes to develop  
85 language skills and strategies. Frost et al. (2001) show how children use metalin-  
86 guistic ability when talking about their play. Language assists children in structuring  
87 and understanding the meaning of their experiences and emotions and recognizing  
88 and making sense of their sensory faculties; in other words, play, language use,  
89 language development, and children's wider cognitive and social development are  
90 closely linked.

91 The use of games in foreign language teaching goes back many decades (Lee  
92 1979; Rixon 1981), both for younger learners as well as adults, with some going so  
93 far as to see a vital role for games in the language classroom: "If it is accepted that  
94 games can provide intense and meaningful practice of language, then they must be  
95 regarded as central to a teacher's repertoire. They are thus not for use solely on wet  
96 days and at the end of term!" (Wright et al. 1984, p. 1). The fact that non-digital  
97 games are still popular can be seen from the fact that the latter book is now in its third  
98 edition (2005) and from the many websites dedicated to ideas for language games for  
99 teachers. The role of physical games in second language acquisition also continues  
100 to be explored (Tomlinson and Masuhara 2009).

101 The advent of gaming consoles and games designed for personal computers  
102 certainly increased interest in game play by people of all ages and hence by  
103 educators in general. As a result, games are now no longer seen as only appropriate  
104 for children or in private settings but incorporate the wide range of genres found in  
105 adult forms of communication, including ones unique to the gaming environment.  
106 However, despite vast differences between games, they share a number of charac-  
107 teristics. Prensky (2001) argues that most games involve the following:

- 108 1. Rules
- 109 2. Goals and objectives
- 110 3. Outcome and feedback
- 111 4. Conflict, competition, challenge, and opposition
- 112 5. Interaction
- 113 6. The representation of a story.

114 These are also characteristics of many successful language teaching environments  
115 and indeed (perhaps with the exception of the “representation of a story”) of task-  
116 based language teaching, in particular as related to the use of technology (see  
117 Thomas and Reinders 2010, for a collection of papers on technology in task-based  
118 language teaching).

119 Another characteristic of many commercially produced recreational digital games is  
120 their complexity, with many games including extremely elaborate story lines, multiple  
121 characters, complex problems to solve, and plot twists. This complexity was initially  
122 not found in games designed for use in education (sometimes referred to as “edutain-  
123 ment”). Often limited to simple vocabulary exercises with the addition of a points  
124 system, many such games do not meet the criteria proposed by Prensky and others.

125 As for the theoretical underpinnings of DGBLLT, sociocultural theory has played  
126 a particularly important role in the implementation of games in education (Ma et al.  
127 2011) and specifically in the area of language education (Lantolf and Thorne 2006;  
128 Thorne 2008). In particular, collaborative games such as massively multiplayer  
129 online role-playing games (MMORPGs), in which people play with and against  
130 others online, and simulation games, in which players create and communicate in  
131 virtual worlds, create many opportunities for collaboration and competition and rich  
132 opportunities for exposure to L2 input as well as opportunities for L2 output and  
133 interaction, all of which have rich theoretical bases in second language acquisition  
134 research (e.g., Krashen on L2 input, 1982; Swain on output, 1985; Long 1981).  
135 Another aspect of games in education is the additional control they give learners over  
136 the learning process (Butler et al. 2014), for example, by allowing players to choose  
137 different levels, avatars, scenes, and so on. Such control has been linked to (the  
138 development of) learner autonomy, which in turn has been linked to language  
139 acquisition (Benson 2013). A final theoretical basis comes from the fields of  
140 embodied and grounded cognition (Clark 2001; Gibbs 2006), which highlight the  
141 importance of our body, either virtual or real, in cognition. New developments in  
142 virtual reality are likely to increase interest in this area in the future.

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## 143 Major Contributions and Work in Progress

### 144 The Affordances of Digital Games

145 In order to understand the benefits of digital games in language learning and  
146 teaching, it is helpful to consider existing research in terms of the ways in which it  
147 attempts to draw on the affordances (or: context-dependent potential benefits (Van

148 Lier 2004) that digital games offer. In Gee's view, digital games are "problem  
149 solving spaces that use continual learning and provide pathways to mastery through  
150 entertainment and pleasure" (Gee 2009, p. 65). Gee (2003) argues that good digital  
151 games incorporate learning principles and have a variety of design features that "are  
152 particularly relevant to language learning" (Gee 2012, p. xiii). In his 2003 book, the  
153 list of 36 of these principles, including, to name a few, "the active, critical learning  
154 principle," which argues that all aspects of the learning environment are set up to  
155 encourage active and critical, not passive, learning, and the "psychosocial morato-  
156 rium," which describes an environment in which learners can take risk and where  
157 real-world consequences are lowered. The "practice principle" holds that learners get  
158 a great deal of practice in a context where that practice is not boring. Gee found these  
159 and other principles to be common in most of the digital games he looked at, and  
160 they provide a helpful lens to investigate the potential benefits of games.

161 Reinhardt and Sykes (Reinhardt and Sykes 2012; Sykes and Reinhardt 2012)  
162 propose a framework for understanding the different roles that games can play in  
163 language research and practice, as game-enhanced, game-based, or game-informed,  
164 where the former uses games designed for entertainment purposes, game-based  
165 involves the use of educational games, and game-informed uses game play princi-  
166 ples only. Each of these may raise different learning and teaching questions, such as  
167 how game-enhanced learning happens in informal language learning or how certain  
168 game designs afford particular learning behaviors (see also Reinhardt and Thorne  
169 2016).

170 Whitton distinguishes between eight roles for games, i.e., learning with enter-  
171 tainment games, learning with educational games, learning inspired by games,  
172 learning within games, learning about games, learning from games, learning through  
173 game creation, and learning within game communities (2014, p.4–5). Another  
174 distinction can be made between studies that investigate primarily the effects of  
175 game (-enhanced, -based, -informed) learning on either L2 acquisition or on affec-  
176 tive factors involved in L2 learning. We use this broad distinction below to report on  
177 some of the key studies in the field.

## 178 **Research on the Effects of DGBLLT: Language Acquisition**

179 Studies on the effects of game play on language acquisition are somewhat limited.  
180 One of the reasons is that the use of digital games is usually a complement to existing  
181 courses, and as such, it is difficult to control for all the variables that can have an  
182 effect on learning outcomes. Most studies attempting to investigate acquisition have  
183 instead (at least in part) focused on opportunities that games afford for exposure to  
184 and interaction in the target language, on the assumption that these underlie language  
185 acquisition. For example, a pilot study by Rankin et al. (2006) investigated interac-  
186 tion between four ESL students in the MMORPG "EverQuest II" in an attempt to  
187 determine if participation in the game could foster students' English language  
188 proficiency and knowledge of new vocabulary. In this study, students participated  
189 in eight gaming sessions held over a period of 4 weeks. The findings demonstrated

190 that students increased target language vocabulary output by 40% as a result of  
191 interaction with non-player characters and produced a remarkable 100% increase in  
192 target language chat messages during social interaction between players. The social  
193 interaction among players in EverQuest II was further examined by Rankin et al.  
194 (2009). The authors took a closer look at the in-game dialogues between eight native  
195 and 18 non-native speakers and language socialization in MMORPGs. The findings  
196 revealed that ESL students significantly increased their target language output by  
197 interacting with their native speaker interlocutors. The findings also suggested that  
198 EverQuest II, and possibly MMORPGs in general, encouraged L2 interaction as the  
199 players must be active learners and engage with other learners within the  
200 environment.

201 These findings were partly borne out by a recent study by Scholz (2016), who  
202 used the popular MMORPG “World of Warcraft” in an extramural setting with  
203 14 learners of German as a foreign language in Canada, to determine the impact of  
204 game play on language development. Data was derived from both in-game experi-  
205 ences and out-of-game conversations over a period of 4 months, without any  
206 instruction or intervention on the part of the researcher other than three focus-  
207 group meetings with other learners over this period, held in German. This is  
208 therefore one of the few studies that were carried out in an informal setting and  
209 that took place over a (relatively) long period of time. It was found that the game  
210 environment was beneficial to the participants’ language development and that in  
211 particular the process of transferring linguistics constructions encountered in the  
212 game environment to a non-game environment (during the focus-group sessions)  
213 played an important role in this.

214 Whether active engagement associated with gaming activity has downsides was  
215 one of the concerns of de Haan et al. (2010), who investigated the effect of using a  
216 music video game on vocabulary recall. In their study, 80 Japanese university  
217 undergraduates were paired with one student playing a music game for 20 min  
218 while the other simply observed. A vocabulary recall test and a measure of cognitive  
219 load, followed by a delayed vocabulary recall test 2 weeks later, showed that all  
220 participants had learned some of the targeted vocabulary but the players significantly  
221 less so than the observers. The authors attribute this to the greater cognitive load  
222 imposed on the players. A similar study by Mohsen (2016), however, found the  
223 opposite: players outperformed observers.

224 A feature of much game-based learning is that it takes place in out-of-class  
225 settings. Sundqvist and Sylvén have produced multiple studies describing the  
226 ways in which Swedish learners make use of various media and games in  
227 non-formal extramural settings and how this impacts on their acquisition of English  
228 vocabulary. The first of these studies (Sylvén 2004) was a longitudinal study into the  
229 effects of content and language integrated learning on vocabulary development  
230 among upper secondary school learners. One of the main factors found to affect  
231 acquisition was the use by students of digital texts and environments outside of  
232 school. To investigate what types of texts were most beneficial, a second study was  
233 conducted among secondary school learners (Sundqvist 2009, 2011). In this study, it  
234 was found that out of school activities were positively correlated with L2 acquisition

235 and that in particular, more “active” types of activities such as use of the internet and  
236 playing video games were more strongly correlated than more passive activities such  
237 as watching TV or listening to music. Boys were found to engage more in the former,  
238 girls more in the latter. A jointly authored third study focusing on 12-year-olds  
239 (Sylvén and Sundqvist 2012) confirmed these findings, and a fourth study with  
240 10-year-olds showed broadly similar findings (Sundqvist and Sylvén 2014).

241 One way of enhancing participation is to involve the learners in the design of  
242 game-based activities. In this vein, Butler (2015) reports on a study that investigated  
243 the use of games with young learners. In her study, 82 learners of 11–12 years of age  
244 were asked first to identify vocabulary-learning elements in existing instructional  
245 games they found attractive and to then design story boards for computer games that  
246 could be used to teach vocabulary to their younger peers. Although this study did not  
247 investigate language acquisition per se, it does give insight into the process by which  
248 (young) learners identify useful features of games and the way they can incorporate  
249 them into building their own learning environments.

## 250 **Research on the Effects of DGBLLT: Affective Factors**

251 A meta-analysis of the effects of digital games in educational (but not language-  
252 learning-specific) contexts by Vogel et al. (2006) showed that its main benefits were  
253 in the affective realm. It is perhaps not surprising then that most studies in DGBLLT  
254 have investigated features such as student engagement, motivation, and anxiety. A  
255 further role has been identified in games helping to facilitate learners’ language  
256 socialization (e.g., Duff, 2007; Tarone 2007) and the development of their social  
257 identity in and through games (Thorne and Reinhardt 2008).

258 Anyaegbu et al. (2012) tested the above assumptions by investigating the effect of  
259 the game “Mingoville” on the motivation, engagement, and interest of young  
260 Chinese learners of English. The qualitative findings of the study indicated that the  
261 majority of the students were motivated to learn English with Mingoville because the  
262 game was fun for them and made them feel relaxed and avoided making them lose  
263 face. This was shown in the amount of collaboration the learners engaged  
264 in. However, there were some students who reported that the experience was  
265 demotivating because they either found playing the game boring or generally did  
266 not like games. This supports Whitton’s (2007, 2011) view that employing games for  
267 motivational purposes alone is not sufficient justification for their use because they  
268 might not be motivational for all students, particularly students in higher education.

269 Dalton and Devitt (2016) found a similarly positive attitude towards games in  
270 education with a group of 25 primary school learners of Irish. In their study, they  
271 developed a 3D game using the Open Sim platform that incorporated a number of  
272 collaborative storytelling tasks. An interesting finding from their study is that for  
273 these younger learners, goal orientation was one of the most important aspects of the  
274 experience, whereas many games (and in particular virtual worlds) give players a  
275 great deal of choice, the 9–11-year-old learners said they preferred more structure.



276 Taking a slightly different approach, and focusing on interaction in the L2,  
277 Peterson (2010, 2011) showed that the highly learner-centered nature of the inter-  
278 action provided by network-based games, the anonymity and the reduced inhibition  
279 provided by personal avatars, and the reduction of paralinguistic cues in real-time  
280 chat are characteristics that may reduce anxiety and improve self-confidence. Sub-  
281 sequent studies by Peterson (2012a, b) focused specifically on learner interaction and  
282 attitudes in MMORPGs. In his qualitative study (Peterson 2012a) of the use of the  
283 MMORPG “NineRift,” six Japanese EFL university students participated in two  
284 gaming sessions, lasting approximately 90 min each, which were held 1 week apart.  
285 Peterson obtained data from learners’ chat messages exchanged during game play,  
286 researcher observations, filed notes, learner responses to pre- and post-study ques-  
287 tionnaires, and interviews. The findings indicated that learners actively participated  
288 in the game, utilized different types of strategy to manage their interaction, under-  
289 took collaborative dialogues exclusively in the L2, and had positive attitudes,  
290 claiming that interaction in MMORPGs was engaging, motivating, and enjoyable  
291 and improved their fluency and discourse management practice. In a later study,  
292 Peterson (2012b) investigated the linguistic and social interaction and attitudes of  
293 four intermediate Japanese EFL university students in the MMORPG “Wonderland.”  
294 Participants were engaged in four sessions, lasting approximately 70 min each and  
295 held once a week over a period of 1 month. Similar to the findings from the earlier  
296 study, participants used a range of strategies and conducted their interaction exclu-  
297 sively in the target language. Moreover, participants provided largely positive  
298 feedback, claiming that interaction in MMORPGs, in combination with the anony-  
299 mity provided by the use of pseudonyms and avatars, helped to reduce anxiety  
300 levels and encouraged opportunities for taking risks in using the target language and,  
301 thus, creative and extensive use of the language.

302 Zheng et al. (2009) investigated the role of the virtual environment “Quest  
303 Atlantis” in English language learning. The authors examined the interaction and  
304 collaborative construction of cultural and discourse practices between two native  
305 speakers and two non-native speakers of English. They were paired and were  
306 requested to work collaboratively over a 10-week period. Data was collected through  
307 participant observation, post-quest interviews, and an analysis of chat logs and  
308 emails. It was found that participation in the game allowed learners to engage in  
309 authentic and meaningful interaction with the native speakers while closely  
310 cooperating with each other to complete the quests, enabling them to gain knowl-  
311 edge from a more knowledgeable/experienced game player through action. That is,  
312 native speakers were able to share their linguistic knowledge with language learners,  
313 and language learners were able to share cultural information regarding the quests  
314 while chatting with the native speakers in the game. This interaction was conceptu-  
315 alized as negotiation for action and perceived as an extension of the concept of  
316 negotiation for meaning. The findings suggested that negotiation for action could  
317 contribute to the potential for greater cultural awareness as well as increased mutual  
318 collaboration and cultural identity as a means to successful quest completion. The  
319 learners who participated in this study recognized that negotiation of action was a

320 type of interaction that was unavailable in their learning experiences in the language  
321 classroom.

322 Willingness to communicate (WTC), or individuals' "readiness to enter into  
323 discourse at a particular time with a specific person or persons, using a L2"  
324 (MacIntyre et al. 1998, p. 547) has received a great deal of attention in L2 research  
325 in recent years, and the effects of digital games on WTC have also been investigated.  
326 In a study of 30 Thai learners of English as a foreign language enrolled in a  
327 university language course, Reinders and Wattana (2016) took the "game-enhanced"  
328 approach one step by further by adopting a commercially available and very popular  
329 online role playing game called Ragnarok. The game was completed during six  
330 90-min lessons playing Ragnarok. The game had been installed on a private server  
331 and was thus only available to participants in the study and modified to include  
332 special instructions or quests (missions that players are assigned to accomplish in  
333 order to get items and progress in the game) designed to encourage collaboration and  
334 communication. To gauge participants' WTC, a series of questionnaires was  
335 designed, adapted from MacIntyre et al.'s (2001) WTC scale and previous studies  
336 on language and communication anxiety (Horwitz et al. 1986; McCroskey and  
337 Richmond 1982) and perceived competence (Compton 2004; MacIntyre and Charos  
338 1996). These asked respondents about their (own perceptions of their) willingness to  
339 use English, as well as their confidence, anxiety, and perceived communicative  
340 competence in communicating in English. The questionnaires were administered at  
341 the start of the course and again after six gaming sessions. Results on the first set of  
342 questionnaires showed that students had low confidence, high anxiety, low perceived  
343 competence, and low WTC. The second set of results showed a marked and  
344 significant improvement, with participants feeling more confident, less anxious,  
345 more competent, and more willing to communicate. The authors argue on the basis  
346 of these results that the careful construction of tasks that draw on the affordances of  
347 games can have a positive effect on the language learning process.

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## 348 **Problems and Difficulties**

349 The research on DGBLLT faces a number of challenges, which can broadly be  
350 categorized as operational, pedagogical, and methodological. In the first category  
351 fall issues related to privacy, safety, and security, as well as concerns by parents and  
352 other stakeholders about the appropriateness of games in educational settings. These  
353 concerns are not to be underestimated as they have a major impact on how, or if,  
354 games are used.

355 Also in the category of operational challenges fall technical issues. Many teachers  
356 may not be familiar with game play and as such lack the skills and interest to play  
357 games, let alone coach others. A number of the studies described above involved  
358 some sort of manipulation of the game environment, which requires a level of  
359 technical skill that many teachers will not have. At a practical level, games can be  
360 expensive, either because they need to be purchased or licensed and also because some

361 types of games (such as MMORPGs, or massively multiplayer online role playing  
362 game) require fast processors and graphics cards, headphones and microphones, etc.

363 In the second category fall pedagogical challenges. In most of the studies reported  
364 above, the researchers were also the teachers delivering the game-based instruction.  
365 For most teachers, who may not be as interested in DGBLLT, the use of games would  
366 be a significant learning experience and the integration of games into an existing  
367 curriculum a considerable challenge. Advocates of “gamification,” or the use of  
368 gaming principles in education, argue that many examples of the use of games are  
369 merely add-ons to existing classes that do not challenge current practice. The impact  
370 of these issues on the effects of DGBLLT has not yet been carefully documented.

371 Methodological challenges include ways in which researchers can control for the  
372 novelty factor of introducing games in the classroom. Although it could be argued  
373 that for most learners, games are not new, their use in an educational setting often is,  
374 and this in itself may give rise to a (temporary) excitement, which may translate in  
375 higher motivation and even greater learning outcomes.

376 Partly because of the operational and pedagogical issues described above, most  
377 studies on game play are relatively short. Although this is an argument that could be  
378 made against most of the research in language learning and teaching, in DGBLLT  
379 research, it is all the more important to conduct longitudinal studies that can  
380 minimize the novelty effect. In studies that look at game play in out-of-class settings,  
381 it is important to monitor the amount of time learners interact in the target language,  
382 as otherwise any benefits could be attributed simply to greater time-on-task rather  
383 than game play itself (although it could be argued that if game play causes learners to  
384 spend more time interacting in the target language, for example, because they enjoy  
385 such language use more than other forms, then this is a worthwhile benefit in and of  
386 itself).

387 A challenge with much research on DGBLLT is that it takes place (either entirely,  
388 or in part) outside of formal settings. This can make data collection difficult (both for  
389 practical as well as privacy reasons). At the same time, this challenge is one that  
390 needs to be taken up if language researchers are to get a full understanding of the  
391 entirety of the language learning process.

392 Finally, relatively little research has been carried out on the effects of DGBLLT on  
393 language acquisition. Most studies look at affective factors, such as motivation,  
394 engagement, and willingness to communicate. Although these are fruitful and  
395 important areas of inquiry, it is important ultimately to link these to better learning  
396 outcomes. Many studies are able to make tentative predictions at best. For example,  
397 Reinders and Wattana (2015) make the reasonable assumption, based on existing  
398 literature, that an increase in WTC will be beneficial to language acquisition and that  
399 because they were able to establish an impact of game play on an increase in  
400 participants WTC, games are likely to have a positive role in language acquisition;  
401 however, they did not prove this link. Similarly Turgut and İrgin (2009) showed  
402 increased strategy use from game play, and again, although there may well be a  
403 positive link between strategy use and language acquisition, this is not certain, and  
404 no direct benefit to learning could thus be established. A final example is offered by  
405 Lee and Gerber (2013), who conducted a digital ethnographic study in which

406 interactions between one of the researchers and a Korean ESL learner on a study  
407 abroad program in the United States in the online role-playing game World of  
408 Warcraft were recorded over a period of 1 year, using transcripts of in-game chat  
409 and screencast software. The researchers documented changes in the learners' use of  
410 language over this period. It was evident from the transcripts that many of the  
411 in-game situations prompted interest in and a need for developing certain types of  
412 language in order to successfully compete in the game. In this sense, the game  
413 provided an environment for genuine communication, and this motivated the learner  
414 to develop his language. However, it is difficult to attribute such changes to game  
415 play per se, in particular in a second language situation. Clearly, significant chal-  
416 lenges lie ahead for the field.

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### 417 **Critical Appraisal and Future Directions for Research**

418 The current state of the field allows us to draw some early, tentative conclusions  
419 about the possible role of DGBLLT in language education and – to a lesser extent –  
420 its impact on language acquisition. It is clear from the above selection of studies that  
421 games play a role in affective aspects of language learning that have, in turn, been  
422 shown to be related to language acquisition. Games have been demonstrated to  
423 increase motivation, lower anxiety, and to increase engagement and willingness to  
424 communicate.

425 However, the learning experience through digital games is not yet fully under-  
426 stood. A key challenge for future studies is to make strong links with what we  
427 already know about (language) learning and teaching and the (potential) role of  
428 digital games in this. Reichle (2012), for example, advocates building on studies of  
429 memory processes, Jackson et al. (2012) on research into strategy instruction, and  
430 Reinders and Wattana (2012) on studies of interaction and willingness to communi-  
431 cate. Other potentially fruitful areas include the role of teacher and peer feedback, the  
432 occurrence of focus on form in informal settings, and the quality and quantity of  
433 input and opportunities for extended output in game settings. As Scholz (2016,  
434 p.268) argues, research that goes beyond learners' reflections and that instead looks  
435 directly at learners' experiences (including their linguistics experiences) is vital for a  
436 better understanding of the relationship between DGBLLT and acquisition.

437 Another challenge for the field is to better identify those aspects of games that  
438 influence the language learning process. As Garris et al. (2002) summarize: “there is  
439 little consensus on game features that support learning, the process by which games  
440 engage learners or the types of learning outcomes that can be achieved through game  
441 play” (p. 442). Wilson et al. (2009) argue:

442 Yet it is still under debate as to which particular aspects of a game lead to learning of any  
443 kind. Do the motivating aspects lead to active participation or does the active participation  
444 increase motivation? And what specific learning outcomes can be achieved? Without  
445 evaluation of the impact of games on specific learning outcomes, games will continue to  
446 be categorized largely as motivating and fun, but instructionally useless (p. 221).

447 Their call for a better understanding of the relationship between game attributes  
 448 and learning outcomes has not yet been comprehensively taken up, at least not in the  
 449 area of language education. Similarly, for such an effort to be successful, multiple  
 450 research approaches are likely to be necessary.

451 Despite these concerns, digital games offer a promising environment for language  
 452 acquisition and deserve greater attention from researchers in the years to come. As  
 453 games become more embedded in our lives, including those of teachers, their  
 454 presence in the educational process is likely to grow. The challenge for teachers  
 455 and researchers is to identify and build on the affordances they offer to best support  
 456 the language learning process.

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## 457 Cross-References

- 458 ▶ [Dialogicality, Ecology, and Learning in Online Game Worlds](#)
- 459 ▶ [Educationally Designed Game Environments and Feedback](#)
- 460 ▶ [Virtual Worlds and Language Education](#)

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