# A systematic literature review of Teachers' Role in using Game-based Learning

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## ABSTRACT

One of the developing trends in education is the integration of digital game-based learning into teaching and learning in schools. This trend has been gaining momentum in many countries in Europe, Asia, the United States, and Israel (Hayak & Avidov-Unger, 2020; Hsu et al., 2017; Boyle et al., 2016). Despite the growing interest in integrating digital games into teaching and learning, and the substantial resources and efforts invested by education systems worldwide, the results are slow to emerge, and only partial (Baek, 2008; Joyce et al., 2009; Koh et al., 2012). The literature mainly focuses on two aspects of the phenomenon – the games' characteristics and the implementation processes – in which teachers are given a limited place.

This review seeks to present the existing research on teachers' role in integrating digital game-based learning into teaching and learning in schools, and proposes future research directions for professional development. Digital game-based learning (DGBL). In 2003, Prensky (2001) coined the term digital game-based learning, enabling students to acquire knowledge and learn through games, rather than games designed for entertainment and leisure purposes (Klopfer et al., 2009; Prensky, 2003). Digital game-based learning (referred to here as "digital games") was designed to promote learning, acquire knowledge, and develop cognitive skills among students (Backlund & Hendrix, 2013; Girard et al., 2013).

A review of articles published in leading journals in the education field from 2009 to 2020. The journals were selected according to the Q1 rating in SCImago Journal & Country Rank (SJR). A total of 2908 articles were found in 18 journals (see Table 1), of which 308 articles referred to teachers in very general terms (e.g., teachers who appeared in the literature review, or were part of the research population). Only 16 articles were about teachers integrating digital games, which is the main focus of this analysis.

| # | **Journal Name** |
|---|---|
| 1 | Computers & Education |
| 2 | British Journal of Educational Technology |
| 3 | Education and Information Technologies |

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| 4 | Educational Technology Research and Development |
| 5 | Journal of Computer Assisted Learning |
| 6 | Technology, Pedagogy and Education |
| 7 | Australasian Journal of Educational Technology |
| 8 | International Journal of Child-Computer Interaction |
| **9** | Journal of Research on Technology in Education |
| 10 | International Journal of Technology and Design Education |
| 11 | Journal of Educational Technology & Society |
| 12 | International Journal of Computer-Supported Collaborative Learning |
| 13 | Education and Information Technologies |
| 14 | IEEE Transactions on Learning Technologies |
| 16 | Learning, Media and Technology |
| 17 | International Journal of Human Computer Studies |
| 18 | Journal of Educational Computing Research |

**Table 1**: Journals ranked Q1 in education associated with technology and computers.

Content analysis of the 16 articles (see Table 2) presents three main categories that the articles relate to, as indicated by their title and abstract: (1) the perceptions and experiences of teachers in the integration of digital games (n=7); (2) Practices for integrating digital games – how teachers integrate digital games in practice into their instruction (n=7); and (3) the professional development of teachers integrating digital games (n=4). Two articles were found to suit two categories, namely 1 and 2. Only 5% address teachers' roles. Analysis of these issues by means of the professional skills of diagnosis, intervention, and inference (Abbott, 2014).

| # | **Articles reviewed** |
|---|---|
| 1 | An, Y. (2018). The effects of an online professional development course on teachers' perceptions, attitudes, self-efficacy, and behavioral intentions regarding digital game-based learning. *Educational Technology Research and Development*, 66(6), 1505-1527. |

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| 2 | Bourgonjon, J., De Grove, F., De Smet, C., Van Looy, J., Soetaert, R., & Valcke, M. (2013). Acceptance of game-based learning by secondary school teachers. *Computers & Education*, 67, 21-35. |
| 3 | Callaghan, M. N., Long, J. J., Van Es, E. A., Reich, S. M., & Rutherford, T. (2018). How teachers integrate a math computer game: Professional development use, teaching practices, and student achievement. *Journal of Computer Assisted Learning*, 34(1), 10-19. |
| 4 | Chee, Y. S., Mehrotra, S., & Ong, J. C. (2015). Authentic game-based learning and teachers' dilemmas in reconstructing professional practice. *Learning, Media and Technology*, 40(4), 514-535. |
| 5 | Deng, L., Wu, S., Chen, Y., & Peng, Z. (2020). Digital game-based learning in a Shanghai primary-school mathematics class: A case study. *Journal of Computer Assisted Learning*, 36(5), 709-717. |
| 6 | Denham, A. R. (2019). Using the PCaRD digital game-based learning model of instruction in the middle school mathematics classroom: A case study. *British Journal of Educational Technology*, 50(1), 415-427. |
| 7 | Eastwood, J. L., & Sadler, T. D. (2013). Teachers' implementation of a game-based biotechnology curriculum. *Computers & Education*, 66, 11-24. |
| 8 | Hämäläinen, R., & Oksanen, K. (2014). Collaborative 3D learning games for future learning: Teachers' instructional practices to enhance shared knowledge construction among students. *Technology, Pedagogy and Education*, 23(1), 81-101. |
| 9 | Hsu, C. Y., Liang, J. C., & Tsai, M. J. (2020). Probing the structural relationships between teachers' beliefs about game-based teaching and their perceptions of technological pedagogical and content knowledge of games. *Technology, Pedagogy and Education*, 1-13. |
| 10 | Huizenga, J. C., Ten Dam, G. T. M., Voogt, J. M., & Admiraal, W. F. (2017). Teacher perceptions of the value of game-based learning in secondary education. *Computers & Education*, 110, 105-115. |
| 11 | Ketelhut, D. J., & Schifter, C. C. (2011). Teachers and game-based learning: Improving understanding of how to increase efficacy of adoption. *Computers & Education*, 56(2), 539-546. |
| 12 | Li, Q. (2012). Understanding enactivism: A study of affordances and constraints of engaging practicing teachers as digital game designers. *Educational Technology Research and Development*, 60(5), 785-806. |
| 13 | Li, Q. (2018). Enactivism and teacher instructional game building: An inquiry of theory adoption and design consideration. *Educational Technology Research and Development*, 66(6), 1339-1358. |
| 14 | Proctor, M. D., & Marks, Y. (2013). A survey of exemplar teachers' perceptions, use, and access of computer-based games and technology for classroom instruction. *Computers & Education*, 62, 171-180. |

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| 16 | Rowan, L. (2017). Teachers' beliefs about the impact of games on the academic and social experiences of diverse and at-risk children in schools: a Deleuzian perspective. *Learning, Media and Technology*, 42(3), 295-307. |

**Table 2.** The 16 articles that were reviewed

Analysis of these issues through the professional skills of diagnosis, intervention, and inference suggests future research directions focused on combining the three skills to combine digital games and teachers' professional development.


## Keywords

Digital game-based learning, teachers' role, professional skills, teachers' professional development.



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