# Faraway, So Close! Co-citation analysis of sources cited by Gaming & Simulation journal

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## EXTENDED ABSTRACT
Game Studies is a field dedicated to play and games research but games are multidisciplinary objects by nature and, in that sense, demand the combination of different perspectives to build up its analysis. Given the multidisciplinarity of games and games studies, this extended abstract aims to investigate connections between different clusters in this field, based on the journals in the cited literature on articles from Simulation & Gaming.

Several studies have been investigating the disciplinary dynamics of the field. Mäyrä, Looy and Quandt (2013) researched the disciplinary identity of game scholars, finding a strong representation of respondents with Communication Studies and Humanities background and finding that their research is highly multidisciplinary and highly dynamic. Martin (2018) mapped the 300 most-cited authors whose co-citation analysis identifies communities of Education, Humanities/Social Science, Computer Science, Communications, and Health. Karhulahti and Koskimaa (2019) investigated the most cited studies within the field that reflected the emergence of "game studies" research. They find that cultural, sociological, psychological, and computer science publications remain relevant, and education/learning and gamification emerged after 2000. It emerged more recently and is primarily focused on the analysis of digital games, the study of game players, gameplay experience and the study of game design. Its

researchers originally came from fields such as literary, film or media studies, communication research, sociology, psychology, computer science etc.

It is possible to say that the main interinstitutional representations of the field of Game Studies are the peer-reviewed journal "Game Studies" established in 2001 and the series of conferences, followed by the establishment of the Digital Games Research Association (DiGRA) in 2003. Mäyrä (2008) includes the formation of the ISAGA conference and of the Simulation & Gaming journal as part of the history of Game Studies.

Gaming and Simulation is one of the names of the field that began to be structured in the 1960s and 1970s. Its conceptual roots lie in the new perspectives of the 1930's organised systems and the 1950's business management. Considering sectors and environments as organised systems, simulations and games were increasingly applied to several areas such as management, urban planning, environmental issues and healthcare (Klabbers 2009). It resulted in a movement by a diverse set of groups and initiatives increasing the complexity of previous mechanistic models of society and learning. Instead, the Gaming and Simulation models incorporated aspects coming from social sciences into the political debate, aimed at producing systems focused on emancipation and participation (Klabbers 2009). The International Simulation and Gaming Association (ISAGA) was just one of the associations that emerged in the early 1970s and were largely responsible for establishing and developing Gaming and Simulation as a research and development field. Similarly, Simulation & Gaming: An Interdisciplinary Journal has been a means of communication and debate for field members for fifty years (Duke 2011).

Many of its research and development approaches are typical of what Klabbers (2009) calls Design Sciences, focused on issues that address human needs, organisational problems, and functional enhancements through the use of artefacts for data collection and evaluation, models, methodologies and processes. Design science "is fundamentally a problem-solving paradigm. It seeks to create innovations that define the ideas, practices, technical capabilities, and products" (Hevner et al. 2004, 2). In a way, the field of Gaming and Simulation could be understood as containing aspects of the Game Design field (in the sense of creating rules, evaluation, and gameplay systems) and sharing many characteristics with Game Studies (for its consideration of experiential aspects of the games, learning, and communication). In this respect, Gaming and Simulation bears little relation to the field of game-applied computing, even because most of its projects involve analogue games.

Despite the overlap of themes, these academic traditions that address the same empirical object (games) have developed in parallel and autonomously over the years, with (apparently) few crossings. Each field seems to have its own theorists, methods, conferences, and journals. Even academic associations such as the Digital Game Research Association - DiGRA, Network of Excellence for Serious Games - GALA and Serious Games Association - SGA among others recognize and have tried to overcome what they classify as a "fragmentation" in the field (Mayer, Warmelink, and Zhou 2016).

It is relevant to emphasise that, although the independent development of different areas with games as a research object is not intrinsically problematic, the lack of communication between them may hinder the opportunity for a broader exchange of ideas and concepts that could contribute to new perspectives of research and development in both groups. Thus, we consider that revealing the connections and dynamics of such different fields could be an initial step to better comprehend their points of contact and perhaps foster new opportunities for the enrichment of said fields.

As a starting point in this work, we seek to observe which other fields the journal Simulation & Gaming interacts with. To this end, we collected data from the Dimensions Database (www.dimensions.ai) of all indexed articles of Simulation & Gaming (ISSN 1046-8781 and 1552-826X) to perform bibliometrics analysis by running the data on the VOSviewer software version 1.6.18 (www.vosviewer.com). We used co-citation analysis of sources cited by indexed articles from this journal which resulted in a science map that can help understand the different resources and dialogues on the field in this journal.

As a result, we obtained a bibliometric visualisation (Figure 1) which revealed thematic clusters, which we will name here as the major areas of Politics, Education, Administration, Medicine and Psychology. In the list of cited journals revealed by the analysis (Figure 2), Computers & Education appeared most frequently (with 303 connections) followed by Computers in Human Behavior (257) and Journal of Personality and Social Psychology (252).
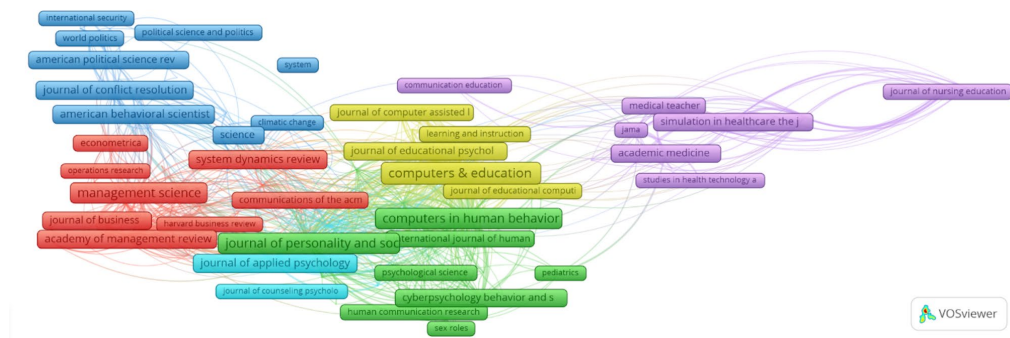


**Figure 1:** Co-citation graph of references cited by Simulation & Gaming papers indexed in Dimensions Database.

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|---|---|---|
| ☑ | computers & education | 303 |
| ☑ | computers in human behavior | 257 |
| ☑ | journal of personality and social psychology | 252 |
| ☑ | management science | 232 |
| ☑ | journal of applied psychology | 163 |
| ☑ | lecture notes in computer science | 159 |
| ☑ | journal of conflict resolution | 158 |
| ☑ | academy of management review | 156 |
| ☑ | american psychologist | 151 |
| ☑ | academy of management journal | 136 |
| ☑ | american behavioral scientist | 136 |
| ☑ | psychological bulletin | 132 |
| ☑ | system dynamics review | 123 |
| ☑ | simulation in healthcare the journal of the society fo... | 116 |
| ☑ | journal of educational psychology | 114 |
| ☑ | american political science review | 114 |
| ☑ | clinical simulation in nursing | 112 |
| ☑ | decision sciences | 111 |
| ☑ | review of educational research | 109 |

**Figure 2:** List of the 19 mostly cited journals by Simulation & Gaming papers indexed in Dimensions.

This initial exploratory study showed the complex and diverse ways in which the works published in Simulation & Gaming originate from a number of sources, confirming the multidisciplinary quality of the field. However, it is noteworthy that other Game Studies journals don't show up in these clusters. The next step of the research is comparing Simulation & Gaming with other game studies journals like Game Studies and Games and Culture aiming to reveal the connections among the works on those journals.

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