# What We Know About Games: A Scientometric Approach to Game Studies in the 2000s

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## Abstract

This article proposes a reflexive approach on the scientific production in the field of game studies in recent years. It relies on a sociology of science perspective to answer the question: What are game studies really about? Relying on scientometric and lexicometric tools, we analyze the metadata and content of a corpus of articles from the journals *Games Studies* and *Games & Culture* and of Digital Games Research Association (*DiGRA*) proceedings. We show that published researches have been studying only a limited set of game genres and that they especially focus on online games. We then expose the different ways game studies are talking about games through a topic model analysis of our corpus. We test two hypotheses to explain the concentration of research on singular objects: path dependence and trading zone. We describe integrative properties of the focus on common objects but stress also the scientific limits met by this tendency.

## Keywords

topic modeling, lexicometric analysis, multidisciplinarity, sociology of science, epistemic culture, game studies, path dependence, trading zone, *World of Warcraft* (*WoW*), interdisciplinarity

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In the first issue of *Games & Culture*, in 2006, Henry Lowood compares the current development of game studies as a research field to the emergence of the history of science as a discipline during the 20th century (Lowood, 2006). Both fields took shape *via externalization*. Today, their objects are no longer studied from an internal perspective alone; rather, scholars emphasize their connections with various research fields and dimensions of life. The focus on context-oriented perspectives on games and the interest in connections between games and "real life" seem to have played a significant role in constituting game studies as a field of research. These perspectives have strongly contributed to a widespread perception of games as relevant objects and of the study of games as a legitimate and relevant research orientation: If games matter in our contemporary society, then game studies should and indeed must be developed.

However, an observer may find it curious that the development of this "external" approach to the study of games, which focuses on the games' social and cultural dimensions (and is complementary to an "internal" approach to games as texts), is essentially about a small set of games and game practices, among all those that have been developed in industrial societies. Specific genres (first-person shooters [FPS], massively multiplayer online game [MMOG]) and titles (*WoW*, *GTA*, *Second Life*, *League of Legend*, etc.) have—much more than others—attracted the attention of scholars, media, and politicians. The tendency to focus on a few kinds of games and on a few titles in particular has often been the subject of debate; it has, however, received little empirical attention. Previous critical analyses of the game studies literature warned against the danger of developing an essentialist theory of games. Our study primarily draws on Adrienne Shaw's critical arguments in a cultural studies perspective. Shaw argued that "video game culture" is often detached from popular culture at large: "in an effort to make video games visible and have them taken seriously as cultural products, video game culture has to be defined as something specific" (2010, p. 415). She observed that scholars contributed to the "othering" of video games. The predominance of a few game genres in the literature published in the core game studies journals strongly echoes this shortcoming, especially since the genres concerned are not the most widespread: Their audience is more limited and socially exclusive than other genres. This issue is the starting point of our study: Does the research in game studies concentrate on a small selection of games? What games are concerned? We will first measure this phenomenon and then discuss its dynamics in relation to the construction of game studies.

As game scholars ourselves, we are largely involved in the processes described in this article. Our objective is to provide the game studies community with research tools it can use to critically evaluate its own production. We need to develop a reflexive understanding of the effects of scientific strategies on the production of knowledge in order to make our work relevant to society.

This article thus applies a sociology of science approach to game studies. A number of researchers have used similar approaches to investigate both the "disciplines" and the "communities" of this field (Melcer et al., 2015; Quandt et al.,

2015; Williams, 2005) and the different viewpoints held by actors from different fields of study. However, these works have overlooked the object of game research. Indeed, few authors have described what game studies are actually about. While it is often described as a multidisciplinary field built around a common object, it is worth questioning what this "object" really is. By grounding our analysis on an ad hoc data set, we aim to understand how three of the most visible scientific publishing locations in the field of game studies have produced a singular knowledge about games in general by studying certain digital games in particular. The first issue of *Games & Culture* in 2001 asked "why game studies now?" We, in turn, wonder "what have game studies been about until now?"

## Data set and Method

Citation or covenue networks are a common way of studying scientific literature. Bibliometrics has tools with which to understand the relationship among citations; to identify scientific networks; and to measure the impact of papers, concepts, or authors on a research field. In this article, we have decided against adopting this approach. Indeed, we seek to take an emic view of the game studies community. In other words, we are more concerned with the manner in which this community defines itself than with the research about games in general. The citation network approach usually applies to a corpus gathered through key word queries of scientific literature databases. A citation analysis of game studies would have meant retrieving all papers in these databases using key words such as "video/digital/computer games," and so on. However, while many researchers work on video games, not all of them consider themselves part of the game studies community. For instance, behavioral psychology has long studied digital gameplayers, but it has its own separate journals, conferences, and frames of reference; moreover, it does not have close ties with the "game studies" community. We would thus have been unable to discriminate between such studies within a corpus obtained from key word queries. Melcer et al. (2015) identified a broad range of venues where game research is published, which led to the delineation of several research communities. Our study focuses on a narrower group: the scientific community self-labeled as game studies rather than all researches on digital games. We aim to analyze the practices and beliefs that constitute a cultural group's attitude to knowledge and the way it justifies knowledge claims (Knorr-Cetina, 1999).

We built a corpus of publications from journals and conferences within the game studies community.[1] These publications can be considered central not only with regard to their life span but also in the sense that they have played a major role in the establishment of this community, are widely acknowledged as representative, and are interconnected by a network of collaborations and citations. Sociological studies of specific disciplines often focus on their core journals because these journals are considered both representative and influential. For instance, two recent studies on American sociology analyzed the top two journals in the field because

**Table 1.** Composition of the Data Set.

| Source/Journal | n | Frequency (%) | Period |
|---|---|---|---|
| DiGRA | 603 | 67.4 | 2002–2012 |
| *Games & Culture* | 184 | 20.6 | 2006–2014 |
| *Game Studies* | 107 | 12.0 | 2001–2013 |

they provided an overview of the mainstream perspective (Abend et al., 2013; Ollion, 2011). Our content analysis methodology is labor intensive; moreover, analyzing core journals is considered more appropriate than analyzing peripheral journals. Consequently, we focused on three publication venues of game studies. The first two are *Game Studies* and *Game and Culture*, whose legitimacy is uncontested and whose names literally indicate their ambitions to be defining. *Game Studies* was launched in 2001 by Northern European researchers as a free and independent (i.e., independent from the publishing industry) online journal (Aarseth, 2001). *Games & Culture* is a commercial, quarterly Sage publication that was launched in 2006. We also included in our corpus the proceedings of the main conference in this field, the *DiGRA*.

## Data set

We produced a relational database of articles published in *Games & Culture* (hereafter *GAC*) and *Game Studies* (hereafter *GS*), and of conference proceedings of DiGRA, published on the organization's website (Table 1). The data were collected from the journal's websites by means of web-scraping tools in Spring 2014. The completeness of the journals' data set was checked by comparing our scraped data with the results of queries to a commercial publication database, *Scopus*. Editorial articles, book reviews, and interviews with game designers were removed from the data sets.

## Method

The raw data set contained, for each paper, its title, the journal in which it appeared, the year of publication, the list of its authors and their affiliations (institution and department, when available), and an abstract (except for a dozen Game Studies articles and DiGRA papers where abstracts were not provided). To prepare the data set for analysis, we performed a series of data manipulations on information about authors and articles.

First, when the paper abstract was missing, we extracted the first two paragraphs of the paper and considered them as its abstract. We extracted mentions of game titles and game genres from the titles and abstracts. We recorded all game titles, irrespective of whether they were single games or series; we considered any

categorization based on the contents of the game as a genre. To code these data, we read every title and abstract: There was no consistent typographic style, no systematic ludography at the end of the papers, and no exhaustive game title dictionary to help us programmatically find which games were being referred to. This is one of the reasons why we focused on just three publication venues. Moreover, we only coded games and genres cited in the abstracts because this allowed us to control for the article length disparities between journals. When ''cites a game'' appears in this article, we mean that a game title or a game genre explicitly appeared in the abstract or title of the paper analyzed.

Once the titles and genres had been extracted, we inductively categorized them into game genres. There is no agreed-upon classification of game genres in the game studies literature (Apperley, 2006; Arsenault, 2009; Clearwater, 2011). Most genre classifications appear to be based on industry standards. Thus, they mix game design and market concerns. However, as they establish ''conventions,'' genres are important for industrials, independent producers, journalists, and audiences (Becker, 1982). As such, an empirical study of discourses about games cannot ignore folk genre classifications: They are the categories people use to make sense of games and to choose from among them. We adopted a grounded perspective, starting with the genres that were used by researchers and aggregating games in those genres inductively. We relied on our own knowledge of the game production scene and on game databases to assign genres to game titles, and we discussed ambiguous cases. Ultimately, our classification contains 36 different genres. They enable a cartography of the games that are discussed in this literature as well as a comparison with audience research.

Authors' affiliations were also incomplete. *GS* and DiGRA authors' affiliations were not always specified, and some affiliations did not specify the department. We completed these data through inference (for authors with multiple publications and coauthored papers) and through Internet searches.[2] Institutions were used to situate the authors geographically (country and larger areas). Departments (or laboratories or research centers) were used as a proxy for discipline and coded inductively based on department names and on self-descriptions on the departments' websites in cases of ambiguity. Rare categories were aggregated; consequently, ''other social sciences'' include psychology (27 authors), general social science departments (22), anthropology (19), political science (5), law (5), and geography (1); and ''other humanities'' include unspecified humanities or human sciences departments (24), philosophy (8), history (7), and linguistics (1). See Table 3 for a full list of department categories.

The variable ''game genre,'' although simple, proved to be informative. However, our secondary goal was to grasp the different kinds of arguments about games that are constructed within the field of game studies. This was made possible through a topic model analysis which allowed us to extend the analysis on the articles' abstracts (Blei & Lafferty, 2009). A topic model analysis consists in a bottom-up classification of textual material into categories called ''topics'' based on the

**Table 2.** Geographic Distribution of Authors by Journal.

| Geographic Area | DiGRA (%) | Games & Culture (%) | Game Studies (%) |
|---|---|---|---|
| Asia | 5 | 2 | 6 |
| Australia, New Zealand | 8 | 7 | 9 |
| Canada | 7 | 8 | 7 |
| Europe | 45 | 13 | 30 |
| Coauthors from different areas | 4 | 3 | 2 |
| United Kingdom | 13 | 14 | 11 |
| United States | 19 | 53 | 36 |
| Total | 100 | 100 | 100 |

*Note.* DiGRA = Digital Games Research Association.

co-occurrences of words. The more words that two abstracts use in common, the more likely they are to belong to the same class or topic. The criteria for log-likelihood maximization pointed to 20 as the optimal number of topics. The algorithm (latent Dirichlet allocation) thus computed the probability of each text belonging to those topics. We assigned each abstract to its most probable topic and analyzed the resulting classification of articles. We interpreted each topic's signification based on the most frequent words found in its articles, on the most strongly associated abstracts, and by reading whole articles from each topic. We used the topics as indexes of the different "ways of writing" about the games that we confronted to the choices of games studied to further our previous analysis.

Our analysis was developed as follows:

- First, we produced a map of this community in terms of disciplines and location. The data showed that the greatest contrasts were between a North American school and a North European school and between social sciences (anthropology, sociology, communication) and humanities (literary theory, cultural studies, media studies).
- Second, we unveiled the "game citation paradox." We showed that a majority of papers are focused on a minority of games: MMOGs, especially *WoW* (*GAC*), online worlds such as *Second Life*, and "FPS" (*GS*). Our first hypothesis explored why these games enjoyed a dominant position in the scientific production: We thus posited that there exists a "path dependence" (Pierson, 2000), orienting scholars toward this choice for their work, due to positive feedback mechanisms.
- Third, to further the analysis of the game citation paradox, we examined a second hypothesis: The focus on a minority of games is a means of building a "trading zone" (Galison, 1997) between various disciplines within the interdisciplinary field of game studies. To this end, we described what kind of knowledge of "game" is produced by game studies: using a topic model analysis we pointed out 20 different ways of studying games.

**Table 3.** Distribution of Departments by Journal.

| Department | DiGRA (%) | Games & Culture (%) | Game Studies (%) |
|---|---|---|---|
| Art | 6 | 10 | 5 |
| Communication | 11 | 20 | 15 |
| Computer science | 10 | 2 | 7 |
| Cultural studies | 2 | 3 | 6 |
| Design | 9 | 1 | 5 |
| Economics | 4 | 2 | 1 |
| Education | 9 | 12 | 6 |
| Game studies | 6 | 5 | 8 |
| Industry | 4 | 1 | 2 |
| Interdisciplinary | 21 | 16 | 9 |
| Literature | 2 | 2 | 11 |
| Media studies | 10 | 9 | 13 |
| Other humanities | 2 | 3 | 7 |
| Other social sciences | 3 | 8 | 4 |
| Sociology | 2 | 6 | 4 |
| Total | 100 | 100 | 100 |

*Note.* DiGRA = Digital Games Research Association.

## The Morphology of an Interdisciplinary Field

Our data set allows us to provide an overview of the morphology of game studies. This field is a highly interdisciplinary space, bringing together scholars from literary disciplines, cultural studies, social sciences, and computer sciences. It thus appears different from earlier scholarly works on games, such as the philosophical and anthropological endeavors of Huizinga, Caillois, or Henriot. It also differs from the more technical works that were published in, for instance, the older journal *Simulation and Gaming*, and from research on games that were conducted within other fields (e.g., within childhood studies). In recent years, new game studies journals have emerged, but *GS* and *GAC* remain the most referenced ones. Furthermore, given that they are among the most long-standing scientific publications in this new field, they offer a midterm perspective on the analysis.

### Geography

The journals differ by their authorship (Table 2). Globally, North American, especially the United States, authors dominate the field.[3] However, *GS* appears to be more diverse than *GAC* in terms of nationalities: U.S. authors make up 52% of *GAC* authors and only 36% of *GS* authors. The difference almost exclusively benefits European scholars, whose proportions range respectively from 12.5% to 28.9%. DiGRA proceedings' authors are heavily concentrated in Europe, but this is largely a consequence of the locations of conference venues. Except for two editions in Vancouver, Canada (2005) and Tokyo, Japan (2007), all conferences took place in

Northern Europe (Stockholm, Sweden in 2010; Tampere, Finland in 2002 and 2012; Utrecht, the Netherlands in 2003 and 2011) or nearby (Brunel University, United Kingdom in 2009). Continental Europe approximately equates to Northern Europe: Denmark, Finland, Germany, Sweden, Norway, and the Netherlands account for almost 90% of European authors.

## Academic Repartition

Authors are members of various academic departments, that is, computer sciences, the humanities, and social sciences. Game studies is a broad denomination for a very diverse field.

Department affiliations vary slightly from one journal to another (Table 3). *GAC* tends to value the social sciences more (including education and communication studies), while *GS* pays more attention to literature (i.e., English departments, Japanese departments, etc.), other humanities, and computer sciences. *GAC* and, especially, DiGRA also have more interdisciplinary papers (i.e., coauthors from departments focused on different disciplines), but this may be a consequence of the slightly higher mean number of authors (about 1.9 authors per paper for DiGRA, 1.7 for *GAC*, 1.4 for *GS*).

Communication and media studies departments somewhat differ as they cite games very differently. DiGRA also has a significantly higher number of computer science authors than *GAC*, which might be traced back to the fact that computer scientists favor conference proceedings and field-specific journals but are willing to participate in game studies conferences (in contrast to behavioral psychologists who are almost entirely absent from both the conferences and the journals[4]).

Game studies have long been described as shaped by an opposition between the "ludologic" and "narratologic" perspectives on games. This opposition, however, has been challenged (Frasca, 2003). The study of the two main journals actually shows another opposition between social sciences and humanities approaches. This opposition is reminiscent of the analysis provided by Williams (2005) regarding a "methodological divide" between approaches based in social sciences and in humanities. The "European" journal, *GS*, seems to have closer links to cultural studies, media studies, and humanities (philosophy, history, etc.) departments. The "American" journal, *GAC*, is closer to the social sciences, sociology, and anthropology as well as to educational research and communication.[5]

Arguably, these differences between European and American journals appear to be related to epistemological and methodological traditions. We assume that *GS* developed first in Northern Europe, succeeding an anterior utilitarian tradition of the study of games. It developed as the product of an "epistemic culture" marked by an ontological perspective on games and somewhat oriented toward design and production issues, including an interest in computer sciences. *GAC*, in contrast, appeared in North America, along with a growing concern for the social effects of games, particularly online games.

**Table 4.** Game Citation by Department (GS, GAC, DiGRA).

| Department | Does Not Cite any Game (%) | Cites a Game (%) |
|---|---|---|
| Art | 55 | 45 |
| Communication | 38 | 62 |
| Computer science | 57 | 43 |
| Cultural studies | 38 | 62 |
| Design | 50 | 50 |
| Economics | 54 | 46 |
| Education | 43 | 57 |
| Game studies | 54 | 46 |
| Industry | 59 | 41 |
| Interdisciplinary | 47 | 53 |
| Literature | 47 | 53 |
| Media studies | 56 | 44 |
| Other humanities | 56 | 44 |
| Other social sciences | 37 | 63 |
| Sociology | 46 | 54 |
| Total | 48 | 52 |

Note. GS = Games Studies; GAC = Games & Culture; DiGRA = Digital Games Research Association.

## The Game Citation Paradox

An initial investigation into the corpus shows that 61.6% of all articles in the two journals cited at least one game in their title or abstract—and that figure dropped to 51.8% when we included DiGRA. Game studies papers developed arguments mostly on the basis of specific games or game genres. GS articles appeared much more likely to cite specific games (69%) than GAC (58%) or DiGRA (47%).

Secondly, we found that researchers affiliated with certain departments seemed more likely than others to base their demonstrations on specific games or game genres (Table 4). Scholars from art, media studies, and other humanities, as well as economics, industry, and computer science departments, seemed less disposed than others to citing specific games or game genres. On the other hand, scholars in literature departments (53%) tended to cite specific games—perhaps to specify the content to which their analysis was applied. In addition, there appeared to be a positive link between the tendency to cite games and the use of empirical methods as was the case with communication, cultural studies, education, sociology, and other social sciences.

What games were cited in this period? Our analysis showed that one game genre by itself represented more than one third of the core game studies literature. This is remarkable if we consider the precedent mapping of an international and multidisciplinary field. In total, 462 articles in our database cited 679 games, and among these, online games were "massively" overrepresented. Massively multiplayer role-playing games—"MMORPGs"—alone accounted for 18% of all games cited. If we

**Table 5.** Game Series Cited in at Least Three Articles.

| Game Series | DiGRA | *Games & Culture* | *Game Studies* | Total |
|---|---|---|---|---|
| Total number of game titles cited | 244 | 78 | 70 | 392 |
| *World of Warcraft* | 23 | 16 | 7 | 46 |
| *Everquest* | 9 | 4 | 5 | 18 |
| *The Sims* | 9 | 2 | 4 | 15 |
| *GTA* | 7 | 3 | 3 | 13 |
| *Whyville* | 6 | 7 | 0 | 13 |
| *Counterstrike* | 2 | 2 | 2 | 6 |
| *Resident Evil* | 4 | 2 | 0 | 6 |
| *Dance Dance Revolution* | 4 | 1 | 0 | 5 |
| *America's Army* | 1 | 3 | 0 | 4 |
| *Fallout* | 0 | 0 | 4 | 4 |
| *Final Fantasy* | 2 | 0 | 2 | 4 |
| *Myst* | 1 | 2 | 1 | 4 |
| *Silent Hill* | 2 | 1 | 1 | 4 |
| *Super Monkey Ball* | 4 | 0 | 0 | 4 |

*Note.* DiGRA = Digital Games Research Association.

consider them to be part of a broader category including ''MMOGs'' and virtual worlds, this figure rises to 38%.[6] Together with FPS (8%) and role-playing games—''RPG'' (5.7%), five genres of 36 accounted for 50% of all games studied in the corpus. The distribution of genres in the corpus can be seen as approximately Pareto distributed: A few genres receive most of the attention while a long tail of varied genres is rarely studied. This has been proven by a linear model predicting the log number of articles per genre by the log genre rank ($R^2 = .83$). The model's fit increases if we omit DiGRA ($R^2 = .90$), showing that the conference is less focused on a handful of games than the two journals.

When we turn to game series[7] rather than genre, online games still occupy first position. *WoW* is by far the most studied game (46 articles, 11.7% of the total; this figure rises to 20% in *GAC*); then comes *Everquest*, with 18 articles (4.6%; many of which appeared in a 2009 special issue of *GS*), and *Whyville*, with 13 occurrences (for the same reason: a special issue in *GAC*). *The Sims* and *GTA* are the only other games with at least 10 citations. Game series and game genres appeared to share the same type of distribution: a strongly overrepresented leaderboard and a long tail of rare titles.

The most cited games and genres (Table 5) share a number of features. Most of them are played online. They have also enjoyed great commercial success (*WoW* was once the most successful MMORPG; *The Sims* is a long-running franchise, as is *GTA*, whose last episode had a long-awaited, widely mediatized release; *Counterstrike* was once the preferred FPS for the e-sport community). They have a devoted and creative fan base, expressing and communicating both within and outside the game community. They demand active, long-term involvement and require the

development of specific, situated skills (grinding in *WoW*, skills and conforming to community norms in *Counterstrike*, mansion building in *The Sims*, etc.). In other words, various noticeable and measurable forms of sociability are generated around these games.

Breaking results down by journal shows that *GAC* largely contributes to an over-representation of online games. MMORPGs, together with MMOGs and virtual worlds, accounted for 55% of all games cited in *GAC*, 34% in DiGRA, and only 22.5% in *GS*. Except for FPS, no other game genre had more than 5% of articles in *GAC*; DiGRA had FPS at 7% and RPG at 5%; *GS* had FPS, action, RPG, strategy, and arcade games in more than 5% of the articles. While *GS* was the journal most open to variety, *DiGRA* made up for in volume what it lacked in proportion, with a very long tail of rarely cited genres accumulated across its 603 articles.

## What Games Could be Cited More Often?

The games field often claims that its key objective is to study games or at least video games in general. We believe that the selective focus on a few particular games may not be the best way to achieve it.

*WoW* and online games are only a small proportion of the broader social phenomenon that is the practice of video games. The results of a national, representative survey of video practices in France sheds light on the marginality of online games. The Ludespace survey was carried out by phone in 2011 on a representative sample (obtained through quota sampling) of the French population aged 11 and above[8] (Rufat, Ter Minassian, & Coavoux, 2015). People were asked whether they had played any video game from a series of game genres during the past 12 months. We have no reason to believe that the global trend of video game consumption in Northern Europe differs from that in North America, although the actual figures may vary. Table 6 presents the distribution of genres played by the overall population.

Clearly, the data show that a number of video game genres overlooked by researchers are widely played in industrial societies. These underrepresented genres include mobile, "casual" and browser games, party games, platform games, and sports games. Moreover, some genres are almost entirely absent from the core game studies publications we studied: adaptations of board games, preinstalled games (such as minesweeper), card games, letter games, and racing games (only one DiGRA paper). Obviously, there have been a few studies on these games. Indeed, some books and articles have focused on these genres. However, the fact that these studies exist yet are not published in the core game studies publication venues is very revealing; all things considered, these studies are also far less frequent.

While forgotten genres are quite popular, there is a discrepancy between how widely they are played and how often they are studied. This contradicts the idea that "[game scholars] have collectively tended to play, think about, and write about the games that are popular in the mass culture sense of the term" (Simon, 2013, p. 2). We argue that the genres underrepresented in the literature are either

**Table 6.** Proportion of the French Population That Has Played a Video Game From Various Genres at Least Once in the Past 12 Months.

| Game Genre | Has Played in the Past 12 Months (%) | Game Genre | Has Played in the Past 12 Months (%) |
|---|---|---|---|
| Preinstalled games | 40.7 | Board | 15.6 |
| Agility | 24.4 | FPS | 12.8 |
| Card | 26.6 | RPG | 12.0 |
| Platform | 23.0 | Life simulation | 10.3 |
| Letter | 22.6 | Puzzle | 12.2 |
| Racing | 18.7 | Tycoon | 9.8 |
| Educational | 20.0 | Fighting | 9.3 |
| Sport | 17.1 | MMOG | 7.8 |
| Strategy board | 18.1 | Wargame | 7.0 |
| Music dance | 15.6 | | |

*Note.* Adapted from Ludespace Survey, Base: all respondents aged 11+, n = 2,542. FPS = first-person shooters; RPG = role-playing game; MMOG = massively multiplayer online game.

low-involvement, so-called casual games, which are favored by older, less engaged players, or are high-involvement games favored by the working classes, such as sports and racing games (Rufat et al., 2015).

For instance, sports games and dance games represent neither controversial contents nor niche markets—the *Ludespace* survey shows that these two genres are equally popular, at least in France, amongst the most played video game genres (Table 6). They are also especially popular among populations that are, socially speaking, most removed from scholars: people from the working classes and young girls. As in any field of research, especially research on culture or arts, the personal tastes of researchers in game studies matter in the choice of research objects. However, these personal tastes are not only a matter of individual preferences but are also socially distributed (Bourdieu, 1984). The choices made by game studies researchers to focus on some genres rather than others may be partly linked to the fact that the young, highly qualified, upper middle-class population of game researchers favors MMORPGs and FPS over card games and sports game in their own practices.

There is nothing intrinsically wrong with focusing on certain genres. However, inferring knowledge about games in general from results from limited areas of scholarship is problematic. The most often played games are the least studied, which means that the researchers have tended to marginalize the study of games as common leisure activities. The blind spots cover the ordinary practices of video games that do not entail online guilds or fan-based groups or competitions of some sort, including the game practices of today's older adults, who are prodigious consumers of puzzles, browser games, and digital versions of board and card games. These forgotten genres may suggest new leads for innovative inquiries: They may afford ways of studying otherness, ecologies of practice, daily sociability (Coavoux & Gerber,

2016), and games that support a broad range of different playing styles (Boutet, Coavoux, Rufat, & Ter Minassian, 2013). These empirical fields may turn out to be as valuable as online games have proved to be.

## Path Dependence

Personal tastes are closely linked to researchers' social origins and positions. While these may partly explain things, we believe they insufficiently explain why online games dominate the game studies publication venues. The game-citing paradox is nowadays a tendency firmly anchored in the internal dynamics of the field. The citations of online games increased during the 2000s, up until 2011. We found no sign of their decline in recent years. This can clearly be interpreted as a phenomenon of path dependence. Once a particular vocabulary has been built and a body of references established around a common object, it becomes easier to study that object: Methods of inquiry become stabilized and each new study meets with a public of interested colleagues. While we observed that the number of citations of online games has decreased in recent years, we have been unable to spot any new, alternative trend. The only comparable trend of mentions concerns FPS, which is actually an anterior trend, emerging in the first years of the field, especially in *GS*, and maintained ever since.

DiGRA has a comparatively wider range of game genres studied compared to the two journals. Given that many journal papers were first presented as conference papers, one might wonder why the diversity of DiGRA proceedings has not extended to the journals. Part of the observed path dependence could be explained by considering the journals as institutional gatekeepers (Crane, 1967) in a two-step selection system. While some diversity of research exists as evidenced by the conferences, the nature of the contributions that are ultimately published in the journals tends to remain unchanged. This may be an effect of the journals' selection process, but it could also be a matter of self-selection—this may be the case when authors studying marginal game genres seek publication venues beyond the circle of core game studies journals. The publishing processes of the games studies field thus require further research. Whatever the case, only a few game genres play a central role in the constitution of knowledge about games.

We may formulate another hypothesis regarding the explanation of the game citation paradox. The centrality of online games may be something more than just an arbitrary restriction of the empirical scope of games research; it may also serve as a valuable cornerstone to the construction of the field of game studies. This would be the case if a common focal empirical object was like a trading zone, allowing different traditions to compare their languages and even to build some bridges (Gorman, 2010). We will now develop this hypothesis here.

## Convergences and Divergences in the Study of Video Games

Game studies' focus on online games may be a response to the internal problems of the field from the need to confront approaches to the expectations of a common scientific language. In order to test this hypothesis, we must examine whether the ways of writing about online games are more diverse than those for any other game genre.

*The many ways to write about games.* The different ways of studying games needs further analysis. Resorting to authors' departments and disciplines in order to map the diversity of the field yielded interesting results. However, there are reasons to believe that these variables provide insufficient indications of the research strategies deployed in the papers. The first reason is that research strategies of individual researchers are not necessarily defined by the academic inscription of the department where they work. Based on the career trajectories of game scholars, Frans Mäyrä (2015) showed that cross-disciplinary exchanges exist: For example, researchers might be recruited from departments of a discipline different from the one in which they conducted their doctor of philosophy studies. Indeed, departments developing research about games tend to recruit scholars from other disciplines to strengthen their teams. The second reason is that games can be successfully studied far beyond the reach of the departments and even the disciplines where they were first elaborated.

In order to further develop the analysis of the different ways of studying games, this last section provides a categorization of the "ways of writing about games." Topic model analysis proved very effective here: It provided an exhaustive analysis of the corpus, and the categorization it built makes sense to anyone familiar with the field.[9]

We identified the following 20 topics (we indicate here how many papers in the data set are most strongly associated with each topic): "Social Interaction Online" (86), "Education" (69), "Design Methods" (66), "Narratology" (58), "Systems & Devices" (49), "Cultural Industries" (47), "Media Effects & Representations" (45), "Player Experience/Agency" (45), "Situated Play" (44), "Game Studies Theory" (44), "Media Consumption" (42), "Virtual Worlds" (40), "Conceptual Framework & Theory" (40), "Rules Elements" (38), "Gender" (36), "Everyday Life (Simulation)" (33), "War Simulation" (32), "Mechanics" (32), "Play Motivations" (25), and "Music/Atmosphere/Aesthetics" (23).

This distribution of topics underlines the presence of a diversity of objects of study, and of theories, as well as various relationships between the two. We can broadly distinguish between:

- Descriptions of the specificities of games: War Simulation, Everyday Life (Simulation), Virtual Worlds, Rules Elements, Mechanics;
- Descriptions of the specificities of players and play: Play Motivations, Gender, Media Consumption, Situated Play, Experience/Agency, Social Interaction Online;

**Table 7.** Authors' Department Disciplines of Papers Associated With the Six Most Common Topics. (In numbers)

| Department | Social Interaction Online | Education | Design Methods | Narratology | Systems & Devices | Cultural Industries |
|---|---|---|---|---|---|---|
| Art | 1 | 0 | 2 | 3 | 1 | 2 |
| Communication | 15 | 5 | 4 | 5 | 2 | 15 |
| Computer science | 7 | 8 | 11 | 4 | 4 | 1 |
| Cultural studies | 1 | 0 | 0 | 1 | 1 | 4 |
| Design | 1 | 3 | 14 | 5 | 5 | 2 |
| Education | 14 | 27 | 6 | 0 | 2 | 1 |
| Game studies | 2 | 0 | 2 | 5 | 1 | 2 |
| Humanities | 2 | 2 | 1 | 5 | 0 | 5 |
| Industry | 3 | 0 | 2 | 2 | 5 | 0 |
| Interdisciplinary | 25 | 16 | 17 | 6 | 14 | 4 |
| Literature | 1 | 0 | 0 | 3 | 1 | 1 |
| Media studies | 4 | 2 | 6 | 12 | 9 | 4 |
| Social sciences | 9 | 5 | 1 | 6 | 3 | 1 |

- Descriptions of the specificities of devices: Systems & Devices, Music/Ambient/Aesthetics;
- Theoretical languages of game studies: Framework & Theory, Game Studies Theory;
- Theoretical imports from other fields: Media Effects & Representations, Cultural Industries, Narratology;
- Applied research fields: Education, Design Methods.

Considering these topics as ways in which games are studied enables us to shed light on the resources for cooperation available within our interdisciplinary field. For example, game studies may also be perceived as a subfield of more established fields—communication, media studies, or education, as Quandt et al. (2015) have noted. On a more general level, it also appears that targeted analyses of games, players, and devices are more developed than theories, even if we take into account the theories imported from other fields. This might be explained by the central position occupied by applied research—Education and Design—which seems to bring all the fields together. Among the six most common topics, four appear to be used frequently in papers by researchers of different disciplines (Table 7): Social Interaction Online, Education, Design Methods, and Systems & Devices. The other two are Narratology, mostly used in media studies departments, and Cultural Industries, mostly used in communication departments.

*Framing the field.* This brief presentation of the ways we write about games describes a research field with more specialized vocabularies than theoretical ones and where

**Table 8.** Topics, Ranked by the Number of Papers Where They Are Associated as the First Topic in All the Papers, Only in Papers Citing Games, or Only in Papers Not Citing Games.

| Topic | All Papers | | Cite Game Variation of Rank | Don't Cite Game Variation of Rank |
| --- | --- | --- | --- | --- |
| | Number | Rank | | |
| Social interaction online | 86 | 1 | = | +15 |
| Education | 69 | 2 | +2 | −1 |
| Design methods | 66 | 3 | +1 | −1 |
| Narratology | 58 | 4 | +2 | −1 |
| Systems and devices | 49 | 5 | −2 | +6 |
| Cultural industries | 47 | 6 | +3 | = |
| Experience/agency | 45 | 7 | +9 | −2 |
| Media effects and representations | 45 | 7 | +7 | = |
| Game studies theory | 44 | 9 | +10 | −5 |
| Situated play | 44 | 9 | −2 | = |
| Media consumption | 42 | 11 | −1 | −3 |
| Framework/theory | 40 | 12 | −2 | −2 |
| Virtual worlds | 40 | 12 | −10 | +7 |
| Rules elements | 38 | 14 | −2 | −2 |
| Gender | 36 | 15 | −3 | −2 |
| Everyday life | 33 | 16 | +1 | −3 |
| War simulation | 32 | 17 | −2 | −2 |
| Mechanics | 32 | 17 | −9 | = |
| Play motivations | 25 | 19 | +1 | −2 |
| Music/ambient | 23 | 20 | −2 | = |

applied research plays a fundamental role. Social Interaction Online appears particularly specific to the field and tends to be used in interdisciplinary works. Tabulating topics with cited games or game genres allows further analysis of these topics and of the singularity of the most used topic (Table 7). If we interpret citing game genres as an indication of an empirical use of the vocabulary, and not citing any particular game genre as an indication of a theoretical use of the vocabulary, we can distinguish between the topics that are empirically oriented and those that are theoretical or a balance between the two (Table 8):

- On the one hand, some topics are underrepresented among the papers *citing games*, which points to a more theoretical use. These topics are Experience/ Agency, "Media Representations," and Game Studies Theory.
- On the other hand, some topics are underrepresented among the papers that *do not cite any game*, which points to a more empirical use. This is the case for Social Interaction Online, Systems & Devices, and Virtual Worlds.
- Finally, Education, Design Methods, and Narratology appear to owe their prominent positions to a balance between empirical and theoretical purposes.

For example, Narratology, an early import in the field, is now perfectly acclimated to the field of game studies and its objects, and it could thus be considered one of the most important theories in the field. The most common situation is a balance between empirical and theoretical uses of the vocabularies; however, this is not the case with the most used topic, Social Interaction Online.

*Trading languages or promoting one?* Finally, how are topics related to game genres? If we interpret topics as ways of producing knowledge about games, do some games favor certain perspectives and, reciprocally, are some perspectives more closely related to certain games? An analysis of the cross tabulation of game genres and topics shows two processes: a general tendency for genres to be strongly associated with one topic (polarization) and an increase in the diversity of perspectives when we look at the most represented game genres (diversification). This confirms that the choice of games does have an impact on the kind of knowledge produced by game studies, but also that some games, especially when they are often studied, may act as trading zones, allowing different perspectives and contributing to the coherence of the field.

The measure of polarization attempts to identify the dominant approach in the study of a game genre. We assume that the more a game genre is associated with one topic, the lower the likelihood of the study of this game genre calling for a new language, since this topic will tend to appear as the ''right'' way of describing this game genre. In fact, among the papers citing games associated with the topic Social Interaction Online, 45% cite MMORPGs. In addition, it is a reciprocal relationship as 40% of the papers citing MMORPGs are associated with Social Interaction Online (Table 9). Unsurprisingly, MMOG and virtual worlds are also strongly associated with this topic.

Second, we were interested in whether there would also be any observable diversification of approaches in the field: Are game genres studied using a diversity of approaches? How many different topics are significantly associated with the papers citing a game genre? We assume that the more topics that are used in its study, the greater the likelihood of a game genre functioning as a point of intersection between approaches in the ''interdisciplinary'' field. Here, however, our analysis is limited by the great dispersion of the data. Indeed, most genres with few articles are associated with only one topic; we thus chose not to represent them in Table 9.

However, the measure of ''diversification'' allows the testing of a necessary, albeit insufficient condition for a game genre to act as a trading zone between intellectual traditions, that is, the object must be studied from various angles. An immediate result is that online games are studied using the most varied approaches. For instance, there are at least three papers citing MMORPG in 8 of the 20 topics. The game citing paradox thus points to the quest for a common language, one that is grounded in the specificities of the object of study and, as such, contrasting with theoretical imports from other fields. It is also worth noting that even if Social

**Table 9.** Diversification and Polarization of the Ways of Studying Games, by Game Genre With at Least 20 Papers.

| Game Genre | Number of Papers | Number of Topics With at Least Three Papers | Proportion of Papers in the Main Topic (%) | Main Topic |
|---|---|---|---|---|
| MMORPG | 123 | 8 | 40 | "Social interaction Online" |
| FPS | 54 | 5 | | |
| MMOG | 81 | 9 | 31 | "Social Interaction Online" |
| RPG | 37 | 4 | | |
| Strategy | 27 | 1 | 22 | "Game Studies Theory" |
| Action | 34 | 3 | 24 | "Media Representations" |
| Arcade | 20 | 1 | 20 | "Systems & Devices" |
| Virtual world | 39 | 2 | 41 | "Social Interaction Online" |
| Adventure | 25 | 2 | 24 | "Narratology" and "Gender" |
| Mobile | 20 | 1 | 40 | "Systems & Devices" |

*Note.* MMORPG = massively multiplayer role-playing game; FPS = first-person shooters; MMOG = massively multiplayer online game; RPG = role-playing game.

Interaction Online could be associated with social sciences, these departments constitute a minority in the field, allowing others to appropriate the language (Table 7).

Given these measures, some other genres appear as possible occasions of interdisciplinary exchange, as they show both broad diversification and little polarization: FPS (five topics with at least three articles), RPGs (four topics), action (three topics). These genres are also close to online games: FPS games are early examples of 3-D environments, and RPGs can be considered as ancestors of MMORPGs.

With the hypothesis of trading zone, we introduced the idea that the focalization on one game genre may have been instrumental in the development of the field as a point of intersection between disciplines, making it possible to confront various perspectives and languages in order to build a shared epistemic culture. However, we found no evidence of such a dynamic. Indeed, the field now mostly presents itself as a large collection of sets between one empirical object and one way of studying. In this regard, the focalization on the online games genre tends to privilege one language. There may be some marginal diversification as each language is tested at least (and often only) once against the online games genre. However, only the most specific languages are further cultivated. This entails the risk of obfuscating a series of avenues for research; for example, it is today far easier for a young sociologist to

study online games than to even consider studying some of the most frequently played games. In other words, the paradox of game citations now appears far from beneficial for the production of general knowledge on games and game practices.

## Conclusion

In this article, we presented exploratory data and analysis with the aim of contributing to the paucity of empirical knowledge on the research field of game studies. We offered information to game researchers seeking to take a reflexive look at more than 10 years of scientific production. To this end, we focused upon the epistemology-in-the-making inherent in the collective practice of researchers. The analysis of the geographical and disciplinary composition of the field shows the heterogeneity of perspectives involved. Our results also reinforce the hypothesis of different contexts for the development of the field, indicating a specific culture of knowledge for each journal.

Analyzing the content of the scientific production in the two core journals and the proceedings of the most important conference of game studies produced two main results. First, and this is puzzling, only a few kinds of games are dominant in the literature. This undoubtedly calls for further reflection. We assume here that the strong presence of research on online games, especially *WoW*, that characterizes the past 10 years of the field is the product of internal dynamics in the field. Second, besides the spectacular impact of these kinds of games on media and politics, the search for shared ground to build a common knowledge has certainly played a crucial role in this concentration of scholarly attentions and efforts. We argue, however, that today, this tendency toward a very specialized area of study is also reinforced by a path-dependence effect.

Beyond a simple description of the game studies field, this article wishes to draw the attention of game scholars to the limitations of the field's current dynamics as shown here. Our analysis contributes to the debate by questioning the focus on a very limited scope of games and game practices. Furthermore, the diversity of games today is largely ignored, with entire genres the object of no more than one paper. More importantly, the wide scope of intellectual resources of the field appears to have been barely put to work: Entire approaches have often been used only once.

As this is the first inquiry of its kind into quantitative content analysis of the game studies literature, we focused on the core journals of the disciplines. Further research extending the corpus to other journals and conference proceedings would make it possible to test whether the concentration on a few game genres is specific to the central venues.

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## Notes

1. According to the work of Melcer et al. (2015), this game research community can be defined as comprising the following venues: Digital Games Research Association, Simulation and Gaming, Journal of Virtual World Research, Games & Culture, International Digital Media and Arts Association, The Philosophy of Computer Games, Journal of Gaming and Virtual Worlds, Game Studies, Eludamos, Under the Mask, International Simulation And Gaming Association, G|A|M|E, International Journal of Role-Playing.
2. When an author without an affiliation had published at least one other paper in our data set, we assigned them the affiliation they provided in their most recent paper. If they had no other paper, we assigned them the institution and department of their coauthors (if those coauthors were all from the same institution or from similar departments). Finally, we conducted a web search on the remaining authors and attempted to identify their affiliations based on the date of publication or on the nearest available date.
3. The nationality of an author is defined by the country where their institution is located. The figures presented here are at the article level. An article's location is that of its authors, if they are all from the same area, or "international," if they are from different areas (about 3% of all articles).
4. Only seven papers in the database have authors who are affiliated with psychology departments. Yet, psychologists are responsible for a large number of research studies on video games, as the debates over violence and addiction show. Those papers are simply not published in core game studies journals: They belong to a different field of research.
5. That this opposition can help structure the field derives from the fact that what we call here "game studies" is a diverse but limited research field. It is geographically limited to the Western world, more specifically to the United States and Canada, Northern Europe, the United Kingdom, and Australia. Our focus here on English-speaking journals may partially explain this phenomenon.
6. Since we initially relied on folk classifications to create our genre categories, we distinguished between massively multiplayer role-playing games (MMORPGs) and massively multiplayer online games (MMOGs), which both appeared very frequently in the data set. However, the differences between those two categories are minimal (the "role-playing" property of MMORPG is not always strong either in the game design or in actual audience

practices, and many MMOG may have role-playing components). We use the phrase "online game" to refer to both genres.

7. To facilitate the comparison between titles, we aggregated all games from a series under the same name in this analysis. Thus, The Sims 1, 2, and 3 are just *The Sims*, and *Morrowind*, *Oblivion*, and titles from the *Elder Scrolls* series fall under *Elder Scrolls*.

8. All three authors were part of the research team who designed the survey.

9. We all read the topics separately and then compared our interpretations (providing titles for topics) with no notable deviation.

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