The Meta of Video Game Research in Finland: A Registered Report

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1. Introduction

Game research is a relatively young field of enquiry (Mäyrä, 2008, pp. 5-11). One that has witnessed significant growth and diversification in recent years. It is fairly multidisciplinary, converging with major research fields such as, but not limited to, storytelling, user experience research, audio research, psychology, sociology, physics, history, education, management, and linguistics. Game research is not limited to just exploring gaming in and of itself, but the societal effects of gaming, and the instrumental use of it in different fields and for different purposes.

Hence, it can become challenging to understand how game research or game studies have developed over the years. What are the most significant issues it has explored? What specific disciplines and theory has it utilized? Where was it published? Who are influencing its research directions the most? Or what social game research networks exist? Developing such a meta understanding of game studies can help us see how it is developing and where attention is needed or useful. It could also help us further quantify and communicate the field's development to "outsiders" from other fields, as well as in establishing the need for dedicated funding to be directed its way.

There exist various publications mapping out the global reach of game research, namely by Martin (2018) and Karhulahti and Koskimaa (2019), to show the explosive effect of video games and digitalization of society in the early 2000s when personal computers, gaming consoles and the internet started to break the barrier and stigma of being a gamer. However, while they give good insight and important overview on the development of the game research in terms of number of authors and the volume of publications, meta-analyses, and literature reviews are in constant need of updates as the time passes. Furthermore, these publications have directed less attention given to examining the game research field in any specific country, let alone in Finland.

Some definitions still need to be given as to steer the study to be more feasible to carry through, and to better argue for the inclusion and exclusion criteria of certain publications in the data set. These criteria will be laid out in the methods section. Game research in this study will be almost interchangeable with game studies, and the former will be used throughout. Game research in this study refers to any publication type and topic that directly relates to video, or digital games, in some form. It can be about the players, modifications, developments, marketing, types of play, types of monetization, theoretical, empirical and practical looks on multiplayer games, single player games, methods of story telling, typologies, ethnographies, or any other type of publication regardless of method or stimulus used. As long as it is very clear to the reader that the publication is about video games and is researching them in some way. This undoubtedly is not a definitive line as there are not only games, but also research perspectives and methods which when combined in myriad ways will dance on either side of this line depending on the perspective of the author and the reader.

While research and studies into analogue games and centring around the word "play" as in activity in physical space by one or more entities offer additional, and just as equally important,

insight into how different types of games, plays and related activities have played a role in forming cultures and stories, this study focuses solely on digital video games to keep the process feasible without increasing manual labour needed too much.

One of the countries with significant contributions to the video game industry and research alike is Finland. Finnish researchers and/or researchers based in Finland have been instrumental in driving and formalizing game research. For example, through the establishment of Digital Game Research Association (DiGRA) and by contributing a high volume of quality game research and game research groups. In Finland itself, the game research scene has also significantly changed from its early days, following, for example increased national funding being directed to game research, the recognition of game research by key funders as a research area, the establishment of many new game research groups and the funding of the first Centre of Excellence in Game Culture Studies (CoE-GameCult).

The literature reviews mapping the game research field are in need of an update and mapping the Finnish game research is important due to how it has significantly developed in recent years as outlined. Furthermore, as a Finnish researcher, there exists a personal interest in understanding the research scene one immediately interacts with. Hence, this study presents a literature review which utilizes both exploratory and systematic approaches to offer and render a holistic overview of the game research scene and its development over the past 20 years in Finland. This study will mainly focus on a period of two decades of game research in Finland, from 2003 to 2023 because the DiGRA was founded in 2003 in Finland (Crawford, 2011). The foundation of DiGRA marks a convenient departure point for this study's timeframe and allows for a more focused display of results over a manageable number of years rather than decades. Further, choosing 2003 as starting point is a convenient starting for another reason. Starting from 2003, more and more Finnish Higher Education Institutes started to offer video game studies as part of their curriculum which would directly, and indirectly, be seen in the quantity, quality and variance of topics in the output of the game research in the following years. In many ways, it could just as easily be argued the starting point to be the year 1998, or 2000, or 2005, for that matter. Attaching the foundation of DiGRA to the start is in a way nod for the game research to start to stand on its own both at international and national level.

This is not to dismiss any related research before DiGRA was founded, but merely to create a manageable analysis scope. This focus on the game research will be open to consider any research connected to video games, e.g., that uses "game", "gaming", "gamer", or "player" and their immediate derivates as part of their title, abstract or keywords. The scope will, hence, be inclusive of more canon game research, as well as research of applied gaming in the form of gamification, serious games, gamefulness. The purpose is to map the overall meta status of the field, rather than impose a definition on what is or is not game research as such.

Thus, the overarching research aims are as follows:

1. To map the development of game research in Finland during the last two decades starting from the year DiGRA was founded in 2003 to 2023. Specifically, this study will map sub-disciplines, publication venues, disciplines of publication venues, publication formats, authors, co-authors, co-authors geographical distribution, co-citation, amongst other variables.
2. Explore, to a limited degree, how, if at all, key developments in the game research field in Finland could be connected or explained by key international developments in game research or in the game industry, with regards to e.g., technological development, or societal changes.

2. Background

Finland has a history of game research spanning over a century. Arguably, the first significant research publications on games and play were in 1904 by Anni Collan *(Suomen kansan leikkejä*), Yrjö Hirn in 1916 (*Barnlek*) and in 1932 by Elsa Enäjärvi-Haavio (*The Game of Rich and Poor*) for her doctoral thesis (Sotamaa, 2009). The country's game culture has an even longer history, with the first commercial game, *Huvimatka Aavasaksaan*, released in 1862. Among the first major international successes was the game *Fortuna* in 1926. Games from this era continue to be studied today, such as the *Petsamo* board game, which Koskinen and Suominen (2023) examined within a larger cultural historical context. The culture of play in Finland has been studied over the decades as well and one of the prime examples is Kalevala Society's yearbook from 1981 titled "*Pelit ja Leikit*" and Suominen's 2023 book "*Pajatsosta pöytätennikseen*" which covers the culture of play between the World Wars. Ari Saastamoinen's book from 2022 "*Lautapelien Historia*" is one of the first publications regarding the history of board games at global scale. Finland also has a long history with gambling arcade games and for more information about the topic, see Pauliina Raento's book in Finnish from 2012 (*Rahapelaaminen Suomessa – Aiheet ja aineistot*). *Pajatso*, or *Payazzo* in English, arrived in the 1920s and remained in active use until 2015 (Luoto & Wickström, 2008, p. 12). This history of analogue games and related research has laid a strong foundation for ongoing play and digital game research that this study builds upon in earnest.

An indicator of the recognition of the impact of games, game studies, and game research in Finland occurred in the early 2000s. Specifically, Tampere University began offering game research courses in 2002. Perhaps the biggest validation for the status especially video games held in contemporary international society was the foundation of the international DiGRA in 2003 in Finland following the Computer Games and Digital Cultural conference that was held in Tampere in 2002 (Kuorikoski, 2014, p. 104). To date, DiGRA continues to provide a significant and integral platform for the discussion and advancement of game research.

Since the founding of DiGRA, Finland has experienced steady growth in the number of researchers and funding for game research covering all aspects of games and play across various publication formats. Simultaneously, the popularity of gaming has increased as both a pastime and a professional activity (e.g., game development, esports), with nearly every citizen either familiar with games or actively gaming (Kinnunen, Tuomela, & Mäyrä, 2022). At present, 21 Finnish higher education institutes (HEI) offer game research courses and degree programmes (Neogames, 2024). One of the most impactful recent developments in the game research field in Finland was the establishment of the CoE-GameCult in 2018, funded by the Academy of Finland. CoE-GameCult has, arguably, provided a substantial boost to Finnish game research in terms of quality, quantity withboth national and international impact which is evident in the results section. Despite being a relatively young discipline, game research has established a solid foothold in the Finnish academic sphere and is expected to continue to grow its hold.

There have been numerous commendable efforts over the years aimed at documenting the historical progression and development of games, the nature of play, and the evolution of game development within the context of Finland. Some notable publications include Nylund's Doctoral Dissertation from 2020 titled "*Game Heritage: Digital Games in Museum Collections and Exhibitions*", an article from Nylund, Prax and Sotamaa titled "*Rethinking game heritage – towards reflexivity in game preservation*" from 2021, Saarikoski and Suominen's article "*Computer Hobbyists and the Gaming Industry in Finland*" from 2009, Sotamaa's two articles "*Studying Game Development cultures*" and "*Suomalaisissa yliopistoissa julkaistut peliaiheiset väitöskirjat*" (in Finnish) from 2021 and 2023 respectively, and Suominen's 2009 article from 2009 titled "*The Past as the Future? Nostalgia and Retrogaming in Digital Culture*". Despite these efforts, it is noteworthy to point out that, until now, there has been a

glaring absence of a comprehensive, in-depth review specifically focused on the game research field in Finland. Such a review would ideally delve into the intricate details of its development, explore its current status, and project potential future directions. Recognizing this gap in the literature, this study was designed to fill this void. As a result, this study provides the first-ever detailed overview of contemporary game research conducted in Finland, spanning a period of two decades from 2003 to 2023. This overview is timely and significant as it offers a milestone review of the progress and advancements in game research within Finland's context.

3. Research objectives

In this section, the areas of analysis investigated in this study are presented to get an overall understanding of the game research scene in Finland. Such an understanding is intended to be useful for funding policymakers in Finland, establishment of further educational programs related to games, and for researchers and scholars interested in the Finnish game research field. Furthermore, in determining these areas of analysis, a previous study by Martin (2018) has operated a rough guideline which aimed to reveal the intellectual structure of game research internationally. The expectation is that the intellectual structure of game research in Finland will align with international trends, and could be revealed with similar analyses, but it is recognised that limiting the analysis to a specific geographical area affords a unique opportunity and challenges to examine the specific nuances and contributions of Finland's game research field.

Considering the scope of the study, the large scale of it within a rather specific domain, it is most beneficial not to approach the topic at hand via hypotheses or research questions, but more open-ended research aims and research objectives that serve to steer the process within sustainable levels of labour. There are pros and cons for having hypotheses and research questions, and similar can be said about research aims and objectives. In this case, having hypotheses could lead to a situation where the hypothesized situations are all either true or false because of underlying variables, such as indirect bias, or the sought answers to the hypotheses might feel forced. Similarly, research question that is not any vaguer than the objective of this study already is, can be extremely limiting and could take the attention to only a specific area of game research in Finland, such as too much focus on humanities. Then again, having research aims and objectives can give an impression of lack of confidence and data gathering happening in very out of comfort zone. However, considering the topic and already outlined scope of the study combined with the following research objectives and the methods to satisfy them, it is best to leave more specific hypothesis testing and research questions for future studies and publication regarding game research at a large scale. Henceforth, the area of the analysis and the research objectives are as follows:

Uncovering scholars with high impact on directing game research in Finland: given the relative newness of game research as a field nationally and internationally, it is currently being actively established and shaped by a few key scholars, who would have a far-reaching and significant impact on how it is developing theoretically, socially and empirically. In the game research field in general, and in Finland specifically, these figures could be revealed through an analysis of the most cited or authoring scholars. These two indicators could potentially reveal those who have been active in the field the longest and who are considered pivotal to cite. Hence, the objectives are:

Objective 1: Reveal the key prolific scholars who potentially have a significant impact on the development of game research in Finland.

Objective 2: Reveal the key cited scholars who potentially have a significant impact on the development of game research in Finland.

Disclaimer regarding the above objectives: It must be noted that different scientific fields, scientific disciplines, university departments, research groups, research projects and supervisors employ different citation and authorship cultures. Additionally, different journals and publishers have their own layers on this topic. These combined makes any definitive, and ultimately fair, in-depth authorship and citedness analysis a complicated matter. Acknowledging these nuances and differences, this study will not attempt to touch on this topic further and will analyse the data regarding authorship and citedness as is when it is gathered.

Uncovering popular thematic research areas in game research in Finland: Examining frequently used keywords in publications can clue in on the popular thematic areas of game research in Finland. I also recognise that a challenge lies in the swift evolution of games and the related technologies, research areas, and research terminology. Researchers often strive to update their used terminology, adopt new ones, or enter new research directions. The inconsistent and evolving use of terminology by different scholars presents a problem in identifying popular thematic game research areas in Finland. Hence, the analysis of keywords is complemented with the logical bridge that once the central research figures in Finnish are revealed (citedness score and authorship volume), that would also indicate some of the popular research directions in Finland. Central scholars in a field can often have a clear line of thought (e.g., a philosophical school) or grow to be considered a part of a popular line of thought or research direction. It is expected to find that the citation of and co-authorship with the revealed central scholars would reflect thematic clusters within Finnish research.

Objective 3: Reveal thematic clusters within Finnish game research.

Uncovering collaboration structures in game research in Finland: To further reveal thematic structures in Finnish game research, previous analyses will be augmented with a coauthorship cluster analysis. There is a growing list of doctoral programmes focusing on the intersection of games with other thematic areas, such as history, game production, player studies, game-based applications and so on. It is natural that scholars working within the boundaries of these programs in different forms would co-author with their immediate colleagues and supervisors. Outside of these programs, it is anticipated that there may be collaborations between researchers working on similar themes or research topics, leading to the formation of thematic clusters outside of formal game programs, e.g., on women in gaming, esports, and accessibility. Therefore, conducting a co-authorship cluster analysis will shed light on the collaborative networks and research communities within Finnish game research, further enhancing the general understanding.

It is also important to acknowledge that clusters in Finland exist not only based on thematic proximity but also based on geographical proximity and co-location within the same research groups or communities even if scholars within the location or research community are working on different research topics. Especially intra-group members often highly co-author with and cite each as they are often more aware of each other's work. Similarly, geographical proximity can foster collaboration and knowledge sharing among researchers more easily through formal and informal meetings. Hence, co-authorship and co-citation clusters will exist based on established research groups and based on geographical proximity in Finland. While it is logical to think as such, in this study there is great interest to see how clearly defined these groups have been from the perspective of co-authorship and co-citation and less so on the number of members, volume of publications or topics covered.

Objective 4: Reveal collaborative networks and clusters within Finnish game research, whether within formal game programs (departments, research groups, or based on geographical proximity).

Uncovering popular publication disciplines in game research in Finland: It is said that there is a lack of established avenues for publishing game research, both nationally and internationally. This poses a significant challenge to publishing game research. At the same time, a considerable amount of game research is being conducted in Finland on various topics. These topics often overlap with other established research fields such as psychology, business, history, humanities, and human-computer interaction (HCI). As a result, game research often appears in venues that publish research in these established fields. Hence, in terms of where Finnish game research (defined in the methodology section) has appeared and the disciplines it has pollinated the most, the last objective of the study is:

Objective 5: Reveal publication venues of Finnish game research and their respective disciplines through a frequency analysis.

4. Methodology

4.1. Research approach

This study builds upon the previous scoping and scientometric analyses of game research by Bragge, Thavikulwat, & Töyli from 2010 titled "*Profiling 40 Years of Research in Simulation & Gaming*", Coavoux, Boutet, & Zabban's work from 2017 titled "*What we know about games: A scientometric approach to game studies in the 2000s*", Deterding's 2017 article about "*The Pyrrhic victory of game studies: Assessing the past, present, and future of interdisciplinary game research*", Martin's article "*The Intellectual Structure of Game Research*" from 2018, and Melcer et al. studyfrom 2015 with the title of "*Games Research Today: Analyzing the Academic Landscape 2000-2014*". These studies are used as reference points and this study continues their work by both widening the topics searched and analysed but also limiting the output the scope of analysis to a singular country. This study utilizes a meta level approach where the foundation for the understanding of the history, the development, current status and the future of game research in Finland can be laid out into a presentable form. The overarching aim of this research is to reveal invisible thematic, authorship, and geographic clusters within the larger game research field in Finland.

As the aims and objectives of the study are simultaneously vague and specific, it is best to treat this study as something between systematic and exploratory literature review. This approach intentionally takes different approach than a strict systematic literature review utilizing the PRISMA guidelines (Page et al., 2021) would allow, but at the same time has more defined goals than an exploratory study requires. Thus, it is most feasible to approach this study more akin to a scoping review at a massive scale with complementing methods, such as frequency count, to manage gathered data in a sensible way.

Accordingly, the "invisible college" approach utilized by Martin (2018) has been chosen for this literature review. An invisible college can be thought of as a community of researchers focused on a specific field that may not be visibly recognised within a larger field but can be recognised through a large-scale analysis (De Solla Price, 1965). The purpose of employing the invisible college approach in specific is to minimize the bias of the data selection, gathering, analysis and interpretation stages of this study that the authors might have while attempting to reveal these invisible colleges.

Regarding the main target of the research output and the Finnish Higher Education Institutes as the prime criteria to be satisfied for the data gathering phase of the study. This is done for couple of reasons. Game research output originating from Finland often comes from the Finnish HEIs, they surely are not the only sources, as Nokia Research Center has acted as the nexus for game research in the past, just like various conferences aimed for game developers acted as such for game research before more dedicated conferences and seminars were founded in the 2000s. It is not assumed that only these HEIs are outputting what could be considered game research. For the sake of feasibility and comparability in the future with other similar studies, the output is limited to the listing of Finnish HEIs offering game studies as part of the curriculum, as per the listing by Neogames (2024).

As an additional note, it must be made clear that the data gatherable from various sources will be different in their output. This means that certain variables found in one database (say, abstracts) are missing in another, meaning that if a publication fitting all the inclusion criteria listed below, is found in only one database, not all possibly relevant information is guaranteed to be present. Further, if the publication is found in two or more databases, the listed variables can also differ. This makes the data compiling and analysis complicated to a degree but not impossible or granulated enough to make the analysis too skewed or limited in scope due factors that can change in the future. By default, any publication fitting the criteria will be screened twice to have as complete set of data as possible. First screening will be to satisfy the inclusion criteria, and the second screening for which analyses the publication is fit for. Any single author publications will be excluded from co-author analyses, for example. Further details on inclusion criteria for the first screening is below, and for the rest of the data analysis in the section 4.3 “Data Analysis”.

Instead of focusing on analysing, for example, the most studied area of research (Couvaux et al., 2017), or a specific intersection of a certain discipline (such as history or psychology) with game research, or examining research only from a specific research paradigm (such as quantitative or qualitative method), this literature review aims to cover as much grounds as possible within the following parameters:

1. The scope is research in Finland. By that it is meant research that is authored or co-authored by a scholar affiliated with a Finnish Higher Education Institutes (HEI). Research in Finland often comes from HEIs, which include 13 universities, and 22 universities of applied sciences as well as from numerous science agencies and public research institutes (Ministry of Education and Culture, 2024). Only affiliations with the 13 universities and 22 universities of applied sciences will be considered in this analysis to allow for clear sources for data collection for this analysis.

2. The research is to cover any topic within the field of game research, regardless of discipline or methodology. This study will not impose a definition for "game" or "play" and cover all variations of the words. Hence, the word “game” or “play”, or their immediate variations, must be included in the title or abstract. However, if games are not the central focus of the research but are only mentioned in passing or as a minor aspect, those studies will not be included in the analysis.

3. Publication formats covered will include peer-reviewed articles, conference papers, doctoral theses, academic books and book chapters.

4. Publications must have appeared between January 2003 and December 2023, i.e., the last twenty years of game research in Finland. This time limit is to ensure that the amount of data to be analysed is manageable, with a focus on the most recent research trends that are most relevant to understanding the current state and future development of the game research scene in Finland.

5. The publications must be in Finnish or English, which would further allow for comparison of the volume of publishing in each language and ensure a wide array of research foci is covered. Swedish is a national language in Finland, however, given the limited proficiency of the author in Swedish, the language of publications in the data is limited to Finnish or English. This ensures a rigorous analysis of the included publication without reliance on translation tools.

Regarding the exclusion of Swedish, and by association other languages. There are publications authored in other languages than Finnish or English by scholars affiliated with Finnish HEIs. For example, see Aska Mayer's book chapter in German about the "Fallout" game series titled "Baroque... baroque never changes: Die Fallout-Serie als neobarockes Medium" from 2024. While these examples are by all accounts game research and by an author affiliated with a Finnish HEI, these results will be excluded. The reasoning is that confirming every such publication requires manual labour and with over 30 institutes to gather data from this could exponentially increase the workload with an unknown return in satisfactory analysis. All the publications found in search results fitting other criteria will be mentioned via frequency count in the analysis section of this study.

4.2. Data collection

Data, i.e., PDFs of research publications fulfilling the selection criteria mentioned in the previous section, will be collected in the following ways:

1. The libraries of the 35 HEIs mentioned in the previous section will be searched (using keywords game and play and their Finnish counterpart *peli*) to access the publications authored or co-authored by scholars affiliated with these HEIs. Available publications that meet the criteria previously outlined will be downloaded and included in the initial data set for analysis. The libraries will also be contacted for support with said process when needed. The libraries will be utilized as the first source of data collection as they can provide quick access to scholarly publications by authors associated with the Finnish HEIs.

2. The national databases (journal.fi and research.fi) will be searched (using aforementioned keywords). Additional results that meet the previously mentioned selection criteria will be added to the initial data set for analysis.

3. Known national game research publication venues in Finland will be searched using the same keywords and criteria to identify further results. These venues include "*Pelitutkimuksen Vuosikirja*", "*WiderScreen*", "*Fafnir*" and "*Lähikuva*". Should other local publication venues appear during the search process, they will be added to this list and searched for further publications.

4. International databases Scopus, ScienceDirect, SAGE, EBSCOhost, Web of Science, and Wiley will be searched to further identify English publications from Finnish HEIs by limiting the search results to publications with affiliation to a Finnish HEI. These sources are added to ensure international publications are included as much as national ones are from national databases.

5. Meta data about these publications will also be collected when the publications are downloaded. This data will include publication year, authors' names, affiliations, keywords, publishing venue, publishing venue type, discipline of publishing venue. Should this meta data be missing, it will be manually extracted from the publications themselves. Should the primary discipline of a publishing venue be missing, it will be obtained from the official websites of said venues, or the author's personal websites should one exist.

After the initial data set has been identified, it will be cleaned and organized for the analysis. Any duplicates will be removed and carefully examine each article to determine if it meets the selection criteria. Any extract relevant information will be extracted from each article, such as publication year, author affiliation, and keywords. Once all cleaned dataset has been finalized, the study will proceed with the analysis. The data cleaning process will be as follows. Each searched website and database will have the used search queries, search results, information about the search results and accessed publication recorded separately. This ensures that the data gathered is comparable, will not be mixed where different or overlapping information is recorded. Such as keywords not listed in database A, but they are present in database B. This will result in duplicate entries of publications which will be then removed for the final list of analysed publications. This is assuming the entries in two or more databases are exactly the same. If not, they will be combined to have as perfect meta data about a publication as possible. The publications will be analysed on numerous ways which will be explained in the following section. Finally, if no full text is not available via aforementioned methods, it will be discarded and the record of it will be left in the data set but will not be analysed further.

4.3. Data Analysis

This study utilizes a combination of bibliometric analyses, including co-authorship and cocitation cluster analysis, as well as frequency analysis of publication venues and their respective disciplines. After the cleaned data set and its accompanying metadata have been finalized, the study will proceed with the following analysis to attain the research objectives outlined in the section 3.

The following programs will be used to attain the analysis quality required to satisfy the study's five objectives. Microsoft *Excel* will be used for the original data gathering and listing. Each database will have their own sheet with the final list of publications selected for the further analysis in its own sheet. This allows for clean recording of the data gathered and to keep it organized for the myriads of analyses conducted. Utilizing Excel in this fashion enables easy frequency count to be conducted, and any ad-hoc fast and simple analysis required should the need arise. Any such analyses conducted will be recorded as needed. *Sci2* and *Gephi* programs will be used to visualize the data in the similar fashion as other review studies have done in the past (see e.g., Martin, 2018). Visualization is needed for the analysis to be presentable to its fullest and to concatenate information in as small space as possible without sacrificing the quality.

To attain objective 1 and 5: a frequency analysis will be conducted to identify the most common publication venues, disciplines, and authors within the dataset. Author names with the highest frequency will reflect the most prolific authors either because of their increased activity or because of a lengthier career, or a combination of both. Similarly, disciplines with the highest number of associated manuscripts in the dataset will reveal the most popular publication disciplines for Finnish game research. A frequency count will be performed of the variables in the meta data to identify potentially interesting general patterns and trends within the dataset.

To attain objective 2: a citation (citedness) analysis will be conducted to identify the most cited authors. The citation analysis will follow the recommendations of Zhao and Strotmann (2015, p. 27) and Backhaus, Lügger, and Koch (2011), as well as examples from a variety of fields (Chen and Lien, 2011; Ferreira, Fernandez, & Ratten, 2016; Small, 1973) as outlined by Martin (2018). In this analysis model, each cited author is a node in a network with links, or edges, between authors who are cited together in at least one document in the data.

These edges are weighted by the number of times the authors are cited together. The cited authors were disambiguated following the technique outlined in Zhao and Strotmann (2015,

pp. 109-112). Citation level was determined by absolute number of citations, where selfcitation counts and where multiple citations in a single document only count once. This is in line with recommendations from Zhao and Strotmann (2015) and Chen and Lien (2011). (Martin, 2018).

To attain objective 3: a keyword frequency and co-occurrence analyses will be conducted to identify common themes and topics in the publications through the co-occurrence of keywords and the frequency of their occurrence. Specifically, a burst analysis (Kleinberg, 2003) as used by Martin (2018) is utilized to identify any significant increase, or decrease, in the use of a particular keyword within the selected time-period. It is aimed to recognize new and rising topics at certain points in the development of game research.

To attain objective 4: a co-authorship analysis will be conducted, and the previously outlined co-citation cluster analyses will be utilized to reveal collaborative networks and thematic clusters within Finnish game research. The co-authorship analysis will identify authors who tend to publish together, forming a network, while the co-citation cluster analysis will reveal thematically connected authors. notably, to reveal these collaboration and citation networks. Publications with a single author will be excluded from the co-authorship analysis.

Accordingly, the analysed variables will include publication titles, keywords, abstracts, methods used, interdisciplinary and multidisciplinary studies (e.g. history and game research), names of the authors, HEIs, language used to write the publication, publication venues, year of publication, and publication year.

4.4. Ethical considerations

The conducted analyses are intended to summarize the data and reveal patterns in it, however, interpreting these summaries and patterns requires human cognition. The results of the analyses mean little on their own without the author's interpretation and contextual understanding of them within knowledge of the field of game research on Finland, national and international political and technological events, HEI degree programmes, presumed geographical clusters, research groups, and significant research projects that have been funded over the years by notable funders such as the Academy of Finland.

Hence, interpreting some analyses will involve more human involvement than others. Specifically, burst, citation, co-occurrence, and co-authorship analyses. There is a need to carefully interpret the results of these analyses, considering the knowledge regarding the field and the broader context in order to accurately identify emerging topics, collaborative networks, and thematic clusters within Finnish game research. Here, to control for potential bias as much as possible, the Registered Report process will be heavily relied on where the author pre-registers their research plans and analysis methods before conducting the study and findings are re-examined to ensure that the process of data collection and analysis has proceeded as outlined. Furthermore, the first stage Registered Report was presented at Tampere University's 2024 Spring Seminar for initial peer feedback. It is planned to also present the second stage registered report at a similar venue to ensure transparency and accountability in the analysis process.

Furthermore, outliers are expected, or results that are unfeasible to be interpreted by just one pair of eyes. In such cases, collaboration and consultation with local colleagues and scholars are contacted to gain a deeper understanding of these outliers. These scholars will be informally consulted until theoretical saturation is obtained, meaning no additional possible interpretations of the data is possible. All the collected interpretations will be communicated in the registered report, allowing the reader to draw their own conclusions.

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