

Games for Teaching and Learning History: a Systematic Literature Review

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Abstract: This work shows a systematic literature review carried out within Scopus database to identify educational projects where games have been used to teach geography and history in secondary education. Following most of PRISMA methodology procedures, while adapting some of its protocols, we identified 255 works. After the first data cleaning, we applied our inclusion and exclusion criteria to end up with 125 relevant results which were refined in later stages. Within our final sample, we applied descriptive statistics to confirm that most projects appear in conference proceedings and that they use mainly educational games created *ad hoc* instead of commercial games. Many times, these projects have not been implemented and even in these cases, their educational impact is rarely measured rigorously.

Keywords: video games, history, geography, systematic literature review, COTS

1. Introduction

Video games are a form of convergent media that involve narrative elements and ludic components. Despite the attempts made by several authors to define what a video game is (Juul, 2010; Salen and Zimmerman, 2004), in this work, we understand video games (and also physical games) as artistic products, created with a ludic intention, which provide an artificial system accepted by the players who interact with it in a new complex experience that depends mainly on the emotional dimension (Oceja, 2020).

Furthermore, video games, like other cultural artifacts, represent a diverse media that can take the form of casual games, Commercial Off-the-Shelf Games (COTS), or artistic pieces exploring creative possibilities. This diversity in video games is also becoming diversity in who plays video games. In the United States, 55% of players are men and 45% are women (Entertainment Software Association, 2021) with similar data in Europe, where 53% of players are men and 47% of women. The average age of players is more than 30 years old and the ways and devices where they play (57% mobile, 46% home consoles, and 42% PC) also highlight this diversity.

The increased popularity of video games has been accompanied by some criticism in the mass media which many times has approached games through stereotypes and simplifications. Among them, we find the characterization of players as a homogeneous community, the bias shown when representing events such as esports as competitions destined only to teenage, desensitized boys, or the representation of games only through triple-A and blockbuster games. Furthermore, one of the most common negative stereotypes is the idea of games as problematic media responsible for causing addictions and violence.

Admitting that some best-selling games could confirm partially those clichés, it is important to note that video games offer great educational possibilities. For instance, a meta-analysis carried out by Sitzmann and Ely (2011) with more than 55 studies showed that simulation games could improve self-efficacy by 20%, declarative knowledge by 11%, procedural knowledge by 14%, retention by 9%, and transfer by 5%. Besides their impact on the learning process, other authors mention benefits associated with spatial abilities (Green and Bavelier, 2003) or the ability to solve problems (Ko, 2002). Moreover, video games can also bring benefits in the acquisition of educational content that is part of the official curriculum. This has been studied extensively for several subjects such as math (Ottar and Hanghøjh, 2020), language arts and literature (Beavis, 2014) and foreign languages (Rudis & Poštić, 2017).

Nevertheless, the educational possibilities of games for teaching Geography or History, has not been explored deeply and it is not easy to find scientific works documenting in detail good educational projects. In fact, there is no information about what academic production (academic journals, conference proceedings, etc.) has tried more consistently to do that. Also, within this scientific production, it is not clear what kind of games do these

projects advocate for, what methodological approaches are being used, and to what extent their educational impact has been measured.

Historically, methodological approaches have depended on the prevailing educational theory at each time. For instance, behaviorism has looked at games as an opportunity to promote responses based on rewards. On the contrary, uses from a cognitive perspective underlined the limitations of behaviorism while focusing on the cognitive aspects involved in the process of playing (Malone and Lepper, 1987), which brought richer experiences and the use of more complex games. In turn, constructivist approaches, which remain scarce, highlight the importance of players interacting with the digital environment and with other players to build knowledge as it would happen with games like *Minecraft*. Along the same lines, we find contributions from constructionism, a closely related sub-theory that focuses on the benefits of students/learners designing their own games (Papert, 1993). Finally, we must mention the so-called sociocultural approaches. In this framework the explicit educational content of the game is not the most important element for learning. On the contrary, it advocates for the use of commercial games (COTS), with no explicit educational content, emphasizing the importance of what happens around the game experience: the conversations, the places where they are played, the critical role of the teacher, etc. While acknowledging good practices through educational games such as DragonBox (Gibbs, 2020) or the Global Conflict series (Moreno Cantano, 2020), we agree with Gee (2014) when he highlights the benefits of using COTS dialogically mediated by teachers. However, Hanghøj (2018) has highlighted the historical lack of research focusing on these games in comparison with educational games. Hanghøj also mentions that the most important factor for success (both using educational games and COTS) is the way they are deployed through pre-game and post-game activities. One example could be the educational project *Playing Emotions* (Oceja, 2019) which tries to promote emotional competence through indie games such as *Braid* or *Gris* with activities before, during, and after the game.

However, as we anticipated, there is a lack of knowledge on what kind of academic works have documented these educational projects. We are especially concerned with this issue as we agree with Miller (1999) when he points out the historical distance between real educational practices and academic production.

Thus, we theorize that the most important academic format (academic journals) might not gather all this evidence as well as others that have been traditionally marginalized.

Following this rationale, in this paper we try to answer the following research questions (RQ):

- RQ1. What kind of academic works (conference proceedings, journal articles, etc.) document educational projects aiming to teach Geography and History through games?
- RQ2: What kind of games (educational games, COTS, etc.) are being used in these educational projects?
- RQ3: What are the main methodological approaches (using existing COTS, using educational games, making students design their own games, etc.) are used when working with games?
- RQ4: To what extent is the impact of projects based on COTS measured?

To do all that, carrying a systematic literature review seems to be the most adequate methodology.

2. Methods

Systematic literature reviews are becoming critical when facing any rigorous scientific work. Mapping an academic field to know the most important contributions is important to build new useful knowledge. Jesson et al. (2011) distinguish between traditional and systematic reviews. The first ones have positive features such as the flexibility to explore ideas and, when needed, give authors the chance to express their subjectivity. However, they have problems like including bias, personal opinions, or relying too much on the skills of the researchers.

On the other hand, systematic reviews propose a more rigorous approach based on a specific methodology, with more transparency, and with a degree of replicability that allows researchers to imitate the procedures of a particular work. Jesson et al. (2011) mention the following phases: scope and map, plan and protocol, document, inclusion and exclusion criteria, search and screen, quality appraisal, data extraction, and synthesis.

In the last years, we have seen different initiatives to consolidate these approaches. Probably, the most important ones have been the Quality of Reporting of Meta-analyses (QUORUM) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al, 2009). This model provides a guide to improve the quality of the reviews, providing researchers with a clear and common procedure. Only a few adjustments have been made in this work such as (1) not removing duplicates as we used only one metadata

base (Scopus) and (2) working with two sets of data depending on the RQ we were answering (78 for RQ1, 2 and 3 and 11 for RQ4).

2.1 Search

This review is based on Scopus, an Elsevier's database. Several authors have mentioned that Scopus can outscore other services such as Web of Science (WOS) being more inclusive and comprising more sources (Bosman et al, 2006). Specifically, Scopus covers 36377 sources from 11678 publishers, with 34346 academic journals with peer review.

In this proposal, we have focused on projects using games to teach/learn geography and/or history in secondary education. Both disciplines have been understood as a single unity of analysis following historiographical criteria, as some countries such as Spain or France have tended historically to unite both as a single subject. We ran the search in March 2022 and after several tries, we decided to use a wide query to include as many projects as possible. The boolean operators used were:

(TITLE-ABS-KEY (*game*) AND TITLE-ABS-KEY (history) OR TITLE-ABS-KEY (geography) OR TITLE-ABS-KEY ("social studies")) AND (TITLE-ABS-KEY (secondary) OR TITLE-ABS-KEY ("high school")) AND (TITLE-ABS-KEY (teach*) OR TITLE-ABS-KEY (learn*) OR TITLE-ABS-KEY (student*))

After this first search, we ended up with a significant number of works (n = 255). After applying the first inclusion criteria, we ended up with a more manageable set (n = 125). Those criteria were:

- Works documenting game-based educational projects
- Projects focusing on teaching/learning history
- Projects focusing on secondary education

We then applied some exclusion criteria to end up with the final works assessed for eligibility. Those were:

- Book chapters based on theoretical contributions
- Model's design
- Books based on theoretical contributions
- Not focusing on secondary education
- Not focusing on Geography/History
- Not focusing on games
- Not implemented
- Not in English
- Teachers' perceptions on GBL
- Critical reviews
- Literature reviews

We used the resulting sample (n = 78) to answer the first, second, and third research questions. Those articles are shown in Table 1.

Finally, as the last research question focused only on COTS, we had to add extra inclusion criteria: Projects including the use of COTS for learning/teaching Geography and/or History in Secondary Education (n = 11)

Figure 1 shows the whole procedure with all the inclusion and exclusion criteria.

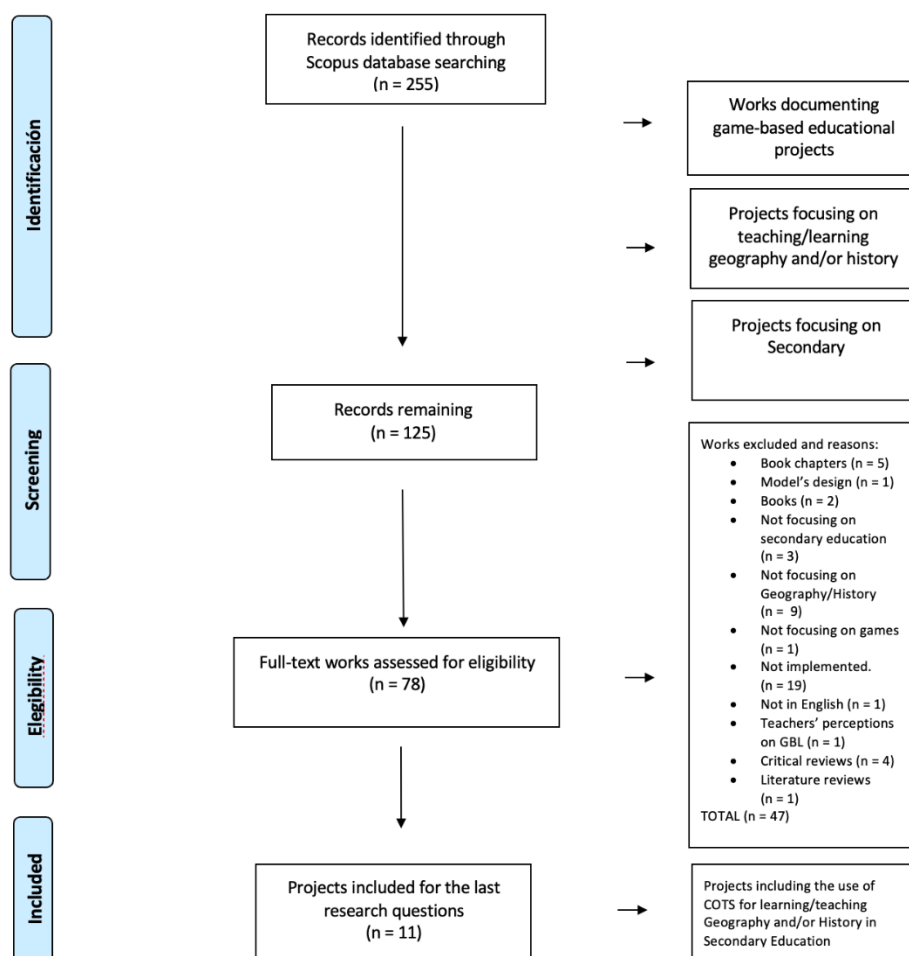


Figure 1: Procedure followed in the review

3. Results

The following table shows the 78 games used for answering questions 1, 2 and 3.

Table 1: Works documenting the use of games for teaching Georgraphy and/or History

Authors	Title
Admiraal, W. Huizenga, J. Akkerman, S. & Dam, G.T.	The concept of flow in collaborative game-based learning
Akkerman, S. Admiraal, W. & Huizenga, J.	Storification in History education: A mobile game in and about medieval Amsterdam
Bachen, C.M., Hernández-Ramos, P.F., Raphael, C. & Waldron, A.	Civic Play and Civic Gaps: Can Life Simulation Games Advance Educational Equity?
Baker, M. Bernard, F.-X. & Dumez-Féroc, I.	Integrating computer-supported collaborative learning into the classroom: The anatomy of a failure
Barkand, J. & Kush, J.	GEARS a 3D virtual learning environment used in online secondary schools
Bedi, K. Hrustek, N.Z. & Ćorić, A.	Teaching vs. 3D gaming in secondary school
Bikar, S.S. Sharif, S. Rathakrishnan, B. & Talin, R.	Students' Perceptions about the Use of Minimalist Robotic Games in Geography Education
Bralia, C. & Catenazzi, N.	Two-fold learning: Learning by developing and learning by playing
Buchtová, M. Šisler, V. & Brom, C.	Educational games and simulations at school: Experimental comparison with classic teaching methods and requirements of successful implementation into school environment and curricula
Charsky, D. & Ressler, W.	"Games are made for fun": Lessons on the effects of concept maps in the classroom use of computer games
Chee, Y.S. Mehrotra, S. & Liu, Q.	Effective game based citizenship education in the age of new media

Authors	Title
Chou, Y.-S. Hou, H.-T., Chang, K.-E. & Su, C.-L.	Designing cognitive-based game mechanisms for mobile educational games to promote cognitive thinking: an analysis of flow state and game-based learning behavioral patterns
Chou, Y.-S., Hou, H.-T., Su, C.-L. & Chang, K.-E.	Designing and evaluating a mobile educational game "Void Broken 2.0" for history instruction
Craft, J.	Rebuilding an empire with minecraft: Bringing the classics into the digital space
Deslis, D. Kosmidis, C.-V. & Tenta, E.	Using a non-educational mobile game for learning in biology, geography and mathematics: Pokémon go as a case study
Di Blas, N. & Poggi, C.	Investigating entertainment and learning in a multi-user 3D virtual environment
Di Blas, N. Paolini, P. & Poggi, C.	Factors influencing chat-based cultural discussions for learning history in a 3D virtual world
Díaz, J. Queiruga, C. Tzancoff, C.B. Fava, L. & Harari, V.	Educational robotics and videogames in the classroom
Dietz, M.	The effects of role-play from a history didactical perspective
Drosos, V. Alexakos, C. Alexandri, A. & Tsolis, D.	Evaluating 3D serious games on cultural education
Earp, J. Catalano, C.E. & Mortara, M.	Investigating the deployment of serious games in secondary education: A pilot study inspired by design-based research
Egunjobi, A.O.	Efficacy of three computer-assisted instructional modes on students' academic performance in secondary school practical geography in Nigeria
Ewen, T. & Seibert, J.	Learning about water resource sharing through game play
Fialova, D.D.	Challenges for student's skills and attitudes within social studies conventional simulation games
Fullerton, T. Malamed, L.M. Sharkas, N. & Vigil, J.	Designing history: The path to participation nation
Galí, C. Remolar, I. & Rebollo, C.	Visiting Ancient Rome with a serious game
Gaydos, M.	Developing a geography game for Singapore classrooms
Gwee, S. & Tan, E.M.	Developing a sense of identity as a governor within a mobile learning community
Gwee, S. Chee, Y.-S. & Tan, E.-M.	Assessment of student outcomes of mobile game-based learning
Hadi, A.A.R. Wan Daud, W.M.F. & Ibrahim, N.H.	The development of history educational game as a revision tool for Malaysia school education
Henriet, J.-M.	On using simulation games in secondary schools: the example of ACIERIX, France).
Hofmann, J.	Can playing an "unfair game" promote ethical decision-making? The use of the "trading game" in secondary-school geography lessons
Holden, J.I., Kupperman, J. Dorfman, A. Saunders, T. Pratt, A. & MacKay, P.	Gameful learning as a way of being
Huizenga, J. Admiraal, W. Akkerman, S. & Ten Dam, G.	Mobile game-based learning in secondary education: engagement, motivation and learning in a mobile city game: Original Academic journal
Huizenga, J. Admiraal, W. Akkerman, S. & Ten Dam, G.	Learning history by playing a mobile city game
Huizenga, J. Admiraal, W. Akkerman, S. & Ten Dam, G.	Cognitive and affective effects of learning history by playing a mobile game
Hwang, G.-J. Chien, S.-Y. & Li, W.-S.	A multidimensional repertory grid as a graphic organizer for implementing digital games to promote students' learning performances and behaviors
Jenson, J. Black, K.R. & De Castell, S.	Designing, tinkering and making: Implementing digital games in classroom contexts
Jong, M.S.Y.	Does online game-based learning work in formal education at school? A case study of VISOLE
Karademir, N.	Secondary School Students' Attitudes toward the Geography Course
Katalinić, E.	Travelling across Euroland [Potovanje po Evrolandiji]
Kesuma, A.T. Harun, Putranta, H. Mailool, J. & Adi Kistoro, H.C.	The effects of MANSA historical board game toward the students' creativity and learning outcomes on historical subjects
KoÅodziejczyk, A.M. Rzepa, A. CieÅak, B. & Harasymczuk, M.	Educational analog missions in Lunares habitat in Poland
Kusuma, G.P. Putera Suryapranata, L.K., Wigati, E.K. & Utomo, Y.	Enhancing Historical Learning Using Role-Playing Game on Mobile Platform

Authors	Title
Lim, K.Y.T. & Wang, J.Y.Z.	Collaborative handheld gaming in education [Jeux collaboratifs sur portables en éducation] [Gemeinschaftliches Spielen auf Handhelds oder Handys als Unterricht]
Lin, K.-C. & Wei, Y.C.	Online Interactive Game-based Learning in high school history education: Impact on educational effectiveness and student motivation
Lin, K.-C., Wei, Y.C., & Hung, J.C.	The effects of online interactive games on high school students' achievement and motivation in history learning
Lin, Y.-H.	Pokémon: Game play as multi-subject learning experience
Mollica, A.	Games and Language Activities in the Italian High School Classroom
Mystakidi, S. Lambropoulos, N. Fardoun, H.M. & Alghazzawi, D.M.	Playful blended digital storytelling in 3D Immersive eLearning Environments: A cost effective early literacy motivation method
Nor Azan, M.Z. & Wong, S.Y.	Game based learning model for history courseware: A preliminary analysis
Nugroho, S.M.S. Rahman, M.D.A. Hariadi, M. & Arief, M.	Development of Educational Game for Indonesian History Lesson Focusing on Indonesia Pre-Literacy Relics 'Prehistoria' for Grade X High School Student
Öztürk, Ç. & Korkmaz, Ö.	The effect of gamification activities on students' academic achievements in social studies course, attitudes towards the course and cooperative learning skills
Pease, M. Pérez-Lapeña, B. & Lant, C.	Energy and water resource simulations for U.S. geography undergraduates
Pee, N.C. Blanchfield, P. & Higgins, C.	Teaching climate change in Year 8!
Pitura, J. & Terlecka-Pacut, E.	Action research on the application of technology assisted urban gaming in language education in a Polish upper-secondary school
Putra, E. Tantular, B.A. & Ruhimat, M.	The Effect of Simcity as Instructional Media in Geography Learning on Learners' Spatial Intelligence
Remolar, I. Rebollo, C. & Fernández-Moyano, J.A.	Learning history using virtual and augmented reality
Repantis, V. & Delidaki, S.	Engaging students in developing a stereoscopic 3D educational history game
Rüth, M. & Kaspar, K	Commercial Video Games in School Teaching: Two Mixed Methods Case Studies on Students' Reflection Processes
Sánchez, M.J.J.-M.	The use of video games for the teaching of ancient history in secondary education: An educational investigation [El uso de los videojuegos para la enseñanza de la historia antigua en educación secundaria: Una investigación educativa]
Schnürer, R. Dind, C., Schalcher, S. Tschudi, P. & Hurni, L.	Augmenting printed school atlases with thematic 3D maps
Selmbacherova, T. Sisler, V. & Brom, C.	The impact of visual realism on the authenticity of educational simulation: A comparative study
Šisler, V. Brom, C., Cuhra, J. Činátl, K. & Gemrot, J.	Stories from the History of Czechoslovakia, A serious game for teaching history of the Czech lands in the 20th century - Notes on design concepts and design process
Šisler, V. Selmbacherová, T., Pinkas, J. & Brom, C.	Teaching contemporary history to high school students: The augmented learning environment of Czechoslovakia
So, H.-J. Gaydos, M. Seo, M. Jung, Y. & Lee, H.	Learning with minecraft and kodu: Examining complex problem-solving strategies
Sorensen, E.K. Poulsen, M., Houmann, R. & Mortensen, P.-E.	Interactive whiteboards and computer games at high school level: Digital resources for enhancing teaching and learning
Teo, C.T. & Chee, Y.S.	The effect of gaming on secondary students' thinking, beliefs, creativity and skills: A preliminary study in social studies lessons
Wang, D.	Gamified learning through unity 3D in visualizing environments
Wang, S.-M. Hsu, H.-Y. Keng, S.-H. & Hou, H.-T.	The development and preliminary evaluation of a street view-based educational game - "guarding Ka-lah-a©"
Watson, W.R. Mong, C.J & Harris, C.A.	A case study of the in-class use of a video game for teaching high school history
Weitze, C.L.	Reflective, creative and computational thinking strategies used when students learn through making games
Wijers, M. Jonker, V. & Kerstens, K.	MobileMath: The phone, the game and the math
Wilms, D.C. & Steinbrink, J.E.	Escalation: A simulation of contemporary GEO-politics
Yu, Z. Yu, W.H. Fan, X. & Wang, X.	An exploration of computer game-based instruction in the "world history" class in secondary education: A comparative study in China

Authors	Title
Yue, W.S. & Ying, C.Y.	The Evaluation Study of Gamification Approach in Malaysian History Learning via Mobile Game Application
Zhu, K. & Huen, M.H.J.	Teaching and learning of Chinese history in minecraft: A pilot case-study in Hong Kong secondary schools
Zin, N.A.M. & Yue, W.S.	Design and evaluation of history Digital Game Based Learning (DGBL) software

Regarding the first research question, as seen in figure 1, we explored how many of the projects appeared in academic journals and how many in conference papers.

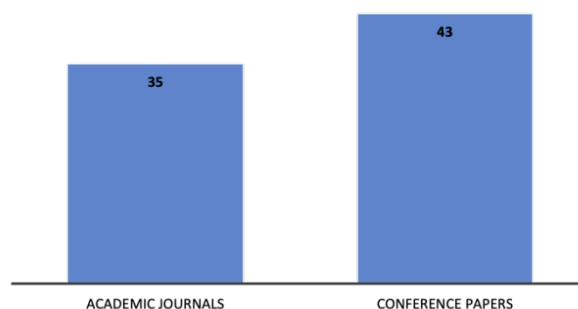


Figure 2: Number of projects appearing in academic journals and those appearing in conference papers
Out of 78 works, conference papers (n = 43) outscored those published as articles in academic journals (n = 35).

Regarding the second and third research questions, the following graphic shows what kind of approaches were used when bringing games to the classroom.

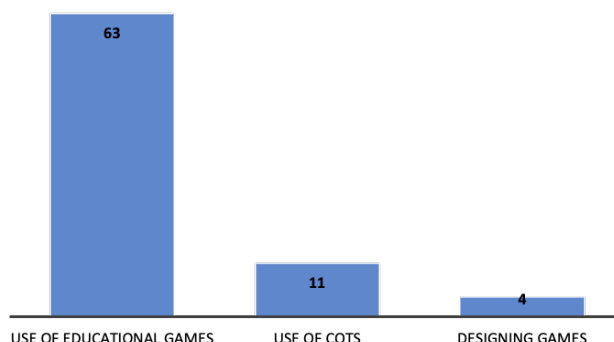


Figure 3: Number of projects that use educational games, COTS, or the methodology of students designing their own games.

Clearly, most projects use educational games to work on content knowledge. Most of those games have been designed *ad hoc* for these studies. It was surprising the shortage of teachers using COTS, as in all 78 works, only a few projects (n = 11) used commercial games. Those games were Sim City, Kodu, Minecraft (in three projects), Age of Empires, Pokemon Go, Civilization, Pokemon, Spore and Valiant Hearts, Dominations, and Second Life.

It also called our attention that other experiences, such as students designing their own games, were particularly scarce (n = 4).

Finally, to answer the fourth research question Table 2 shows all the projects using COTS, indicating if the educational impact was measured and, in that case, what variables were assessed, under what methodology, and with what results.

Table 2: Works documenting the use of COTS including if there is any measurement in the project and, in this case, the main variables, methodology, and results

Title	COTS	Meas	Variables	Methodology	Results
The Effect of Simcity as Instructional Media in Geography Learning on Learners' Spatial Intelligence	Sim City	Yes	Spatial intelligence	Quantitative. Quasi-experimental. Inferential statistics (T-test)	Improves spatial intelligence
Learning with minecraft and kodu: Examining complex problem-solving strategies	Minecraft And Kodu	Yes	Ability to solve complex, ill-defined problems	Qualitative. Open-ended problems that they discussed and solved as groups. Discourse data was transcribed and analyzed.	Minecraft and Kodu, coupled with a PBL curriculum, can help students in tackling complex, ill-defined problems by improving their use of models and planning practices
Teaching and learning of Chinese history in minecraft: A pilot case-study in Hong Kong secondary schools	Minecraft (2)	Yes	Motivation, students, and teachers' perception about the experience	Mixed methods. Questionnaires for motivation (ANOVA), feedback from teachers and students for perception	Motivation increased significantly. Most students enjoyed the experience. Teachers appreciated the experience even though more history knowledge within the game experience is demanded
Rebuilding an empire with minecraft: Bringing the classics into the digital space	Minecraft (3)	Yes	Content knowledge	Quantitative. Pre-and post-written assessments (not advanced statistics)	Improvement in the understanding of Roman architecture
An exploration of computer game-based instruction in the "world history" class in secondary education: A comparative study in China	Age of Empires	Yes	Content knowledge and motivation	Mixed methods Quantitative (pretest/posttest experiment) -content knowledge- and qualitative (feedback questionnaire) - motivation-	(1) Greater learning achievement (2) (3) there were no significant differences in learning achievement between boys and girls; although (4) boys were significantly more motivated
Using a non-educational mobile game for learning in biology, geography and mathematics: Pokémon go as a case study	Pokémon Go	Yes	Attitudes towards the subject	Qualitative. Observation, field notes, and interviews	Effective integration of mobile technologies can enhance learning and students' attitude
"Games are made	Civilizati	Yes	Motivation	Quantitative.	Motivation towards the

Title	COTS	Meas	Variables	Methodology	Results
for fun": Lessons on the effects of concept maps in the classroom use of computer games	on		towards the instructional material (Instructional Materials Motivation Scale (IMMS)	ANOVAs and other advance inferential statistics	activity increases when using games vs. traditional class. Using conceptual maps when using games shows lower motivation
Pokémon: Game play as multi-subject learning experience	Pokemon	NO	N/A	N/A	N/A
Commercial Video Games in School Teaching: Two Mixed Methods Case Studies on Students' Reflection Processes	Spore and Valiant Hearts	Yes	Qualitative: Perception on the experience Quantitative: Topic knowledge, learning motivation and acceptance towards video games	Mixed methods. One-group pre-post mixed methods design collecting data at five-time points.	Qualitative: Discussions provided students opportunities to reflect on their game experiences and the current curricular topic as well as to practice media criticism. Quantitative: They improve perceived topic knowledge, learning motivation, and their acceptance towards video games
The use of video games for the teaching of ancient history in secondary education: An educational investigation	Dominations	Yes	Content knowledge and comprehension of historical time	Qualitative (with the use of rubrics and other tools to assess each domain). Interpretive-type research structured in different phases (search for classroom experiences, preparation, and design of research and didactic instruments, research in the classroom, and evaluation of the results)	Improves general motivation, content knowledge, and co comprehension of historical time
Playful blended digital storytelling in 3D Immersive eLearning Environments: A cost effective early literacy motivation method	Second Life	Yes	Perceptions of the teachers on student learning	Mixed methods. Questionnaires and interviews to explore teachers' perceptions on student learning	Teachers perceive that children acquired new skills, that the experience added to the students' perception of books and reading, and they found 3d worlds useful for facts recall & history understanding.

Besides the small number of projects using COTS (n = 11), most of them tried, to some extent, to measure their educational impact. Only one project (n = 1) was not measured.

The nature of these measurements was diverse, with some quantitative (n = 3), some qualitative (n = 3), and some using mixed methods (n = 4).

4. Conclusion and discussion

In this systematic literature review, we only found references for 78 relevant educational projects using games for teaching and learning geography and/or history in secondary education. The authors of this text have experience as elementary and secondary teachers and they have been involved in the Game Studies and GBL communities for years. This experience allows them to affirm that there are many more projects that are not covered in this kind of publications.

Most projects did not appear in the form of academic articles, but they were published in conference proceedings. Different scientific cultures among disciplines might explain these differences. For instance, Talja & Maula (2003) found that “journals and databases are likely to be used most heavily in fields in which directed searching is the dominant search method” (p. 673). This could explain, for instance, why Computer Science is usually more focused on conference contributions than Social Sciences disciplines, which would be more interested on journal publications.

Results could also mean that, even if academic journals might be considered more prestigious, teachers and researchers prefer to use conferences and social events to share their discoveries with the community. In this context, several authors have reflected on the problems of academic journals (Weiner, 2001) in comparison with other alternative formats such as conference proceedings which might better represent real practices (De Vries & Pieters, 2007). Going further, this should make us reflect on the pressure for publishing in high-impact journals and the competitiveness generated around this pseudo-meritocracy. Moreover, it should be questioned to what extent this is contributing to a real knowledge transfer between research and educational practice. We have historically seen a lack of applicability of most educational research and on some occasions, the impossibility of generalizing results from a specific project to other contexts. This has led some authors to reflect about the “failure of educational research” (Miller, 1999, p. 17) or the “need [to] confront the sterility of past labors and take radical steps to conduct inquiry in more productive ways” (Reeves, 2000, p. 10).

Even though proceedings might better represent the work of teachers, we need to acknowledge the value of other practices that might take us closer to the idea of *design-based research* proposed by Reeves (2000). Authors, for instance have mentioned the importance of training courses and teacher professionalization when implementing game-based learning (Ketelhut & Schifter, 2011). Specifically, variables such as teacher efficacy in using the software, pedagogical issues, and school culture, seem to be critical.

It is surprising the lack of educational projects using COTS, besides all the scientific evidence highlighting its benefits. For instance, research made before this worked proved that using games such as *Europa Universalis* in history class improved students' knowledge about the 16th century (Egenfeldt-Nielsen, 2005) or that game *Civilization III* allowed students to better examine world history from 4000 BC to the present and stimulate problem-solving (Squire, 2004). As stated in the introduction, commercial games (and historical commercial games in particular) have shown to improve content acquisition (Clark et al., 2018) and many authors believe that they should be used more widely (Gee, 2014). However, it is important to remember that the game chosen is only one side of the story, being the role of the teacher and the activities proposed, the most important variables (Hanghøj, 2018).

Teachers interested in GBL have preferred to use educational games that help them to teach content or practice skills. Some authors have referred to this approach as *edutainment* (Egenfeldt-Nielsen, 2016) highlighting that these games are superficial and their quality and design is far from those students normally play (Facer et al, 2003). In fact, many times the explicit content contaminates students' experience and learners tend to perceive these uses as artificial instead of playful (Oceja, 2018).

Besides this lack of sociocultural approaches as mentioned by Gee (2014), some authors (Reng et al, 2016) point out that the most beneficial form of GBL occurs when students design their own games. These contributions, which are aligned with Papert's constructionist approach (1993) seem also very scarce as we only found four projects allowing students to design their own games. We find important to explore this possibility in depth, taking into account the numerous free tools available for working on digital game design (such as Scratch or Unity). Furthermore, making students design their own games physically is also an interesting and easier option for teachers.

Even though we found only a few projects using COTS or allowing students to design their own games, it was interesting that most of them tried to measure their educational impact. However, in future research, the rigor of these studies should be assessed thoroughly by applying a quality scale such as PEDro (Maher et al, 2003). It also would be interesting to expand this review by searching for specific games and finding any potential grey literature that gives us a more detailed picture of what teachers are doing in their classes.

In fact, we hope that this work contributes to a deeper understanding of how teachers are using games. We think that only by understanding games (both physical and digital) as cultural and artistic products with a capacity to move us and generate learning, we would be able to implement high-impact educational practices.

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