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IDENTIFYING OPPORTUNITIES TO INNOVATE PROJECT MANAGEMENT EDUCATION IN THE DIGITAL AGE[3]

ABSTRACT

This paper focuses on innovative learning methods (serious games, simulation games, virtual and augmented reality, the learning-by-doing concept, and Massive Online Open Courses) used in project management education. The use of these learning methods in project management education is crucial, as this subject needs to be practiced in real life.

This paper aims to examine the current state of research in this area to determine which learning methods are most commonly used in project management education, what impact they have on the ability to learn, and whether these methods are beginning to transfer to the online environment.

To this end, a systematic literature review was conducted in the Web of Science database, which resulted in 53 papers. The results show that game-based learning is the most frequently researched method (43 times). The impact of the analysed methods on the ability to learn was found to have been confirmed 23 times, especially in game-based learning research (18 times). On the other hand, the online environment is not predominant, and these methods are mostly taught on-site (28 times).

KEYWORDS: *Education, Innovation, Teaching methods, Project management, Serious games*

1. INTRODUCTION

Project Management (PM) encompasses a set of complex activities required to successfully manage a project. The commonly taught topics in PM are: "project selection, project initiation, defining the project scope, time management, planning resources and activities, planning the budget and how to control it, planning the procurement and risk management" (Gonen & Israeli, 2016, p. 292). Learning such a comprehensive subject is not easy. Some of the phases can be learned from books, while others cannot and must be trained in practice (e.g., the execution phase of the project). As Saenz & Cano (2009) pointed out that the best way of learning PM is by managing some projects. The problem is that it is very difficult to gain professional practice in the classroom (Calderón et al., 2015).

This issue can be solved by using modern and innovative teaching methods. First, there is a general trend to include games in the learning process (Tews

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et al., 2020). Educational games can inspire and influence students, make learning more engaging, and thus improve the teaching-learning process (Lino et al., 2015). The use of games in education has been shown to be effective several times, for example, by Calderón et al. (2017), Jääskä et al. (2021), Miettinen et al. (2016), and Saenz & Cano (2009). Second, the development of these games is nowadays influenced by technology. Technology accompanies us in our daily lives. So, it is not surprising that students and their motivation have changed (Fogel et al., 2021), and it is logical that teaching methods adapt to this. As a result, for example, online simulation games or virtual reality games are being developed.

In the case of PM education, the use of these new learning methods could solve the problem of the need to practice the learned topics in real life. In this way, students can acquire skills in "cost management, informed decision making, stakeholder engagement, uncertainty management, and project control" (Jääskä et al., 2021, p. 2) and also improve their teamwork and soft skills (Geithner & Menzel, 2016) or their general theoretical knowledge (Hassan et al., 2021). However, as noted by Tews et al. (2020), while serious games are commonly used in higher education, they are not used as much in PM education.

Two problems accompany the new modern and innovative teaching methods of PM today. First, there are too many of them, each aimed at acquiring different skills, and it is complicated for educators to choose the right one. For the purposes of this paper, the new learning methods are categorised as follows: serious games (on-site, such as board games or online games), simulations or learning-by-doing (also on-site or online), or virtual or augmented reality.

Second, despite the Covid-19 situation, when the forced lockdown accelerated the implementation of technologies enabling online communication and management in the real corporate world (Cervinka & Novak, 2022), this did not happen in the case of PM education. Times were evolving rapidly, but neither project methodologies nor project management courses were sufficiently responsive.

As leaders in PM education, universities want and need to equip their graduates with up-to-date knowledge to ensure the competitiveness of the entire economy – the practical field needs graduates who will bring modern and innovative tools and methods to businesses. Thus, the universities are the ones that could change the situation of PM education and want to implement these innovative learning methods. However, before implementation, they need to know the current state of the art in order to decide what type of education best fits the educators´ needs. Since there is no systematic literature review (SLR) on this topic (the SLR on the use of serious games in software PM is made by Calderon and Ruiz (2015)), a research gap was identified. This paper aims to review the current literature on innovative teaching methods in PM and find out what type of them are most frequently the subject of research (and therefore, may be most often used), what impact they have on the ability to learn PM, and whether there is some movement of these methods into the online environment (to confirm the observation in practice that this is insufficient).

The paper deals with serious games, simulation games, virtual and augmented reality, the learning-by-doing concept, and Massive Online Open Courses (MOOC) in PM teaching.

The remainder of the paper is organised as follows: the research methodology is presented with the research question and keywords. Then, the articles are analysed and described with the main findings, followed by a discussion and conclusion.

2. RESEARCH METODOLOGY

In order to determine the current state of knowledge, an SLR was conducted. SLR is "a review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review" (Moher et al., 2009, p. 1). Compared to SLR, traditional types of literature reviews can be biased, lack rigour (Tranfield et al., 2003), or be subjective because they do not specify criteria for paper selection and include only a limited number of studies (Ahmad et al., 2020). These shortcomings are addressed by the use of SLR.

The SLR procedure was applied according to Baltazar et al. (2023) and Tomašević et al. (2021, p. 1005), who were inspired by Tranfield et al. (2003), and it follows four steps: 1) question formulation; 2) keyword search and article sourcing; 3) screening articles for quality and relevance; and 4) full-text analysis. First, the research questions were formulated, then the keywords were determined, and the database was selected. Sources and areas of interest were also selected, and other limitations were determined. Next, the articles were reviewed for quality and relevance and then classified and analysed. In the last step, a synthesis of the results was performed, allowing conclusions to be drawn about the state of knowledge in the field of innovative learning in PM.

2.1. Research question formulation

The first step of the SLR is to formulate specific research questions to be answered during the review. The following questions were posed to explore the innovative trends in PM teaching and to help those who want to implement some of them choose the right method:

- *What types of innovative methods used in PM teaching are most often the subject of research?*
- *What impact do they have on the ability to learn PM?*
- *Are these methods beginning to be used in the online environment?*

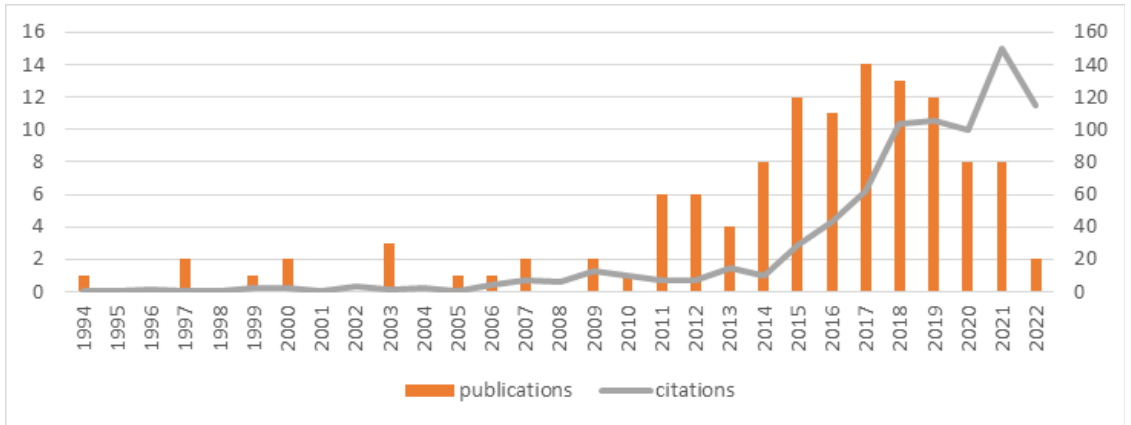## 2.2. Keywords and article sourcing

Within SLR, resources available in the Web of Science (WoS) database were used. The use of a single database prevents duplication of the papers found, and WoS represents a quality database frequently used in SLR (e.g., by Baltazar et al., 2023; Tomašević et al., 2021). The time horizon is unlimited, as innovative methods do not necessarily have to be a new topic; thus, there is no point in limiting the beginning. The search was limited to the resource title, abstract, keywords, and keywords plus. The combinations of terms searched are listed in Table 1. The search was limited to papers in English. No use was made of the option to limit the selection of journals, as the goal was to achieve complete coverage of the topic (conference proceedings were also allowed).

3. RESULTS AND DISCUSSION

Using a combination of keywords, 120 research papers in the English language were found in the Web of Science database on November 25, 2022. Of these, 44 were journal articles and 76 were proceedings papers. An overview of the evolution of the number of papers in each year is shown in Figure 1 (orange column) and cumulatively in Figure 3 (orange area). The first paper dates back to 1994; however, these older papers were later removed due to their inconsistency with the topic. Nonetheless, there has been an increasing trend over the years, and the significant decrease in papers after 2019 is interesting. This could be explained by the ongoing Covid-19 pandemic and the resulting changes in teaching methods (researchers faced unfamiliar situations, e.g., they could not use on-site games as they were used to). In the following years, it would be logical to expect more research on these issues as it becomes possible to assess the impacts of distance learning during the Covid-19 period compared to on-site learning. As for the date of the SLR, it is reasonable to assume that the number of papers on the topic under study will increase slightly in 2022. Figure 1 also shows the number of citations (how many of these existing papers were cited each year).

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TABLE 1. Search Criteria

Database	Web of Science
Year of publication	Without restrictions
Search field	Topic (title, abstract, author keywords, and keywords plus)
Combination of keywords	"game-based learning" AND "project management" OR "simulation game" AND "project management" OR "serious game" AND "project management" OR "virtual reality" AND "project management" AND "education" OR "augmented reality" AND "project management" AND "education" OR "learning by doing" AND "project management" OR "MOOC" AND "project management"
Date of search	November 25, 2022
Criteria for article inclusion	Written in English

SOURCE: Own, 2022

FIGURE 1. Number of articles and their citations over the years (original selection).

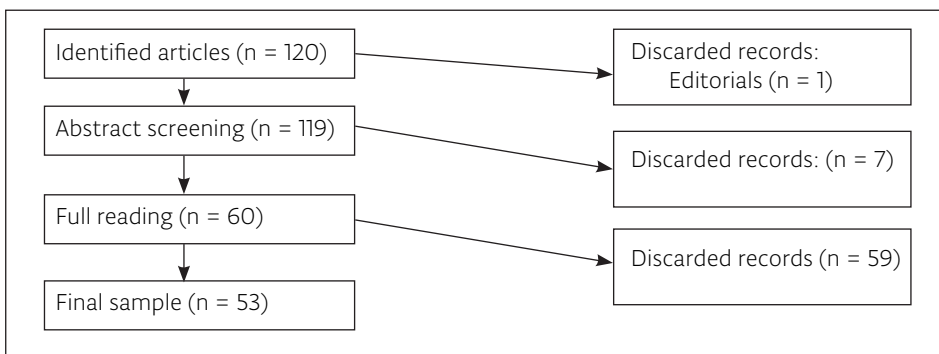**SOURCE:** Own processing of data from the Web of Science (2022)

3.1. Screening articles for quality and relevance

The selection of 120 articles was further reduced by excluding one editorial (too short to contribute to answering the research questions) and after reviewing the abstracts for articles that were irrelevant to the research. It was found that many of the originally selected articles had been included incorrectly, as "project management" is a broad field that occurs in many different areas. The goal of this SLR was to include only papers that addressed PM education using the selected innovative teaching methods. Therefore, papers that had nothing to do with PM (e.g., those that dealt exclusively with software engineering or construction management – without any reference to PM phases) were initially screened out. Although the keywords were very specific, some articles were also found that dealt with PM without any reference to education and were therefore also discarded.

Particular attention was paid to AR and VR where the keywords included the word "education". Otherwise, WoS found many results on topics such as the use of VR/AR in the design of buildings, products, medical simulations, or even in the field of nutrition since PM affects many areas of life and was mentioned in these articles. Nevertheless, some irrelevant articles were found and had to be discarded at this point.

Thus, 59 articles were discarded based on abstract screening, followed by another 7 after the reading of the entire article. The whole process is illustrated in Figure 2.

FIGURE 2. SLR procedure

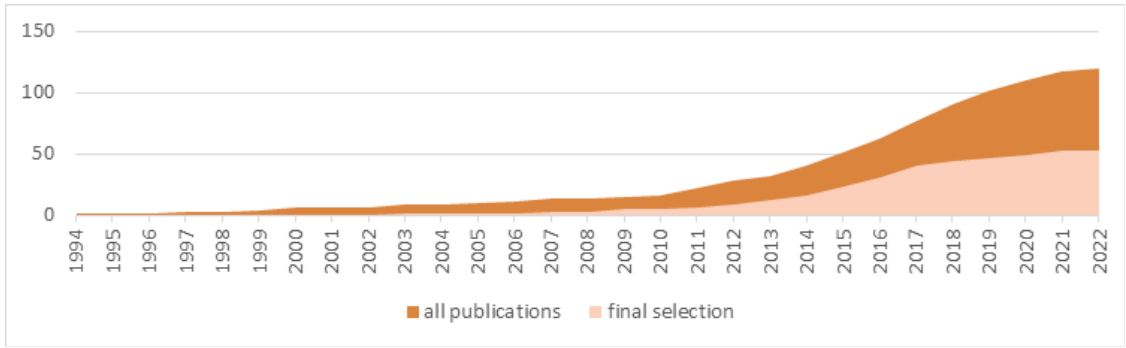**SOURCE:** Own processing of data from the Web of Science (2022)

FIGURE 3. A cumulative number of the analysed articles (original vs. final selection).

SOURCE: Own processing of data from the Web of Science (2022)

3. 2. Characteristics of the selected sample

Finally, 53 research papers were selected for further and more detailed analysis (only 19 were journal articles). Figure 2 shows the cumulative numbers of articles analysed, sorted by year of publication, divided into two categories: original selection and final selection. As mentioned earlier, it can be seen that older papers were irrelevant (the oldest paper in the final selection dates back to 2003).

In addition, the co-occurrence of keywords was determined using VOSviewer. The minimum number of keyword occurrences was set to four, and the full count method was used. In this way, 12 keywords (out of 164 occurrences) were identified. The results are shown in Figure 4. It can be seen that the most frequently used keywords were "project management" (23 times), followed by "game-based learning" (18 times), "serious games" (13 times), "software project management", and "education" (8 times). The colours also show that "game-based learning", "gamification" and "scrum" (in yellow) are the most frequently used keywords in comparison to "risk management" or "serious games" (in blue).
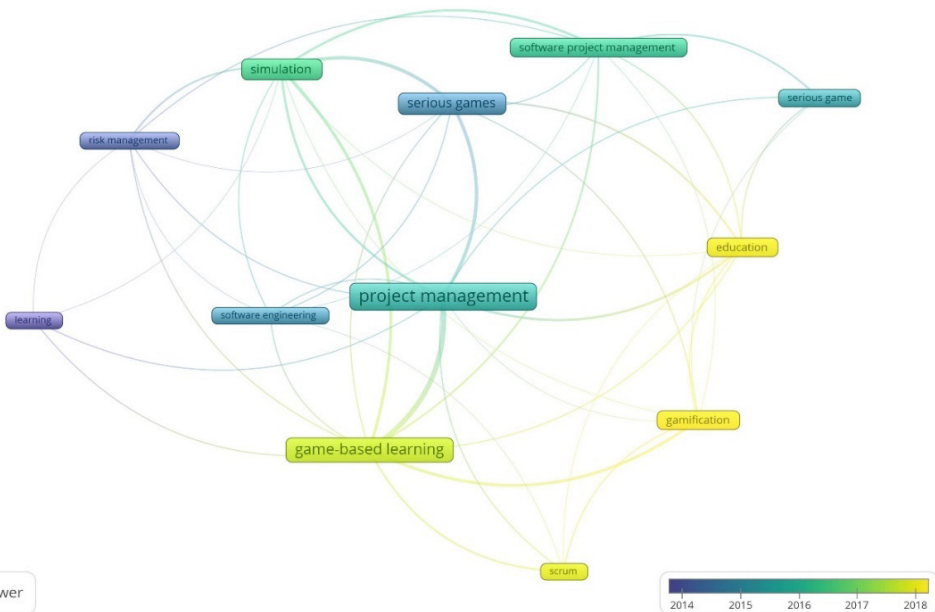

FIGURE 4. Overlay visualisation of keywords

SOURCE: Own elaboration based on Vosviewer (2023)

3.3. Main findings

The impact of innovative forms on PM teaching is being researched worldwide. The selected papers were analysed and classified into several categories according to the types of innovative learning, depending on the area of interest (see the first column in Table 2). To provide a deeper understanding, the specification of the method, its ability to help a student learn, and the possibility of using the method online are also described.

TABLE 2. The main categories of innovative learning methods

Category	Authors	Specification of the method	Effect on the ability to learn/ sample/data source	Online use
Game-based learning	Fogel et al., 2021	Computer-based game	N/A	N/A
	Hassan et al., 2021	Computer-based game	Yes, 18 university students, questionnaires	N/A
	Jääskä et al., 2021	Computer-based game	Yes, 15 students, questionnaires	Yes
	Kodalle et al., 2021	Commercial board game	N/A	No
	Havazik & Pavlickova, 2020	Card-based game	Yes, students, questionnaires	No
	Tews et al., 2020	Comparison of several games	N/A	N/A
	Law, 2019	On-site paper-based game	N/A	No
	Rumeser & Emsley, 2019a	Comparison of two computer-based games	Yes, 285 students, an automatic data collection system embedded in the games	N/A
	Rumeser & Emsley, 2019b	Web-based online game	N/A	Yes
	Calderón et al., 2018	Computer-based game	Yes, 24 students, questionnaires	N/A
	Ramingwong & Ramingwong, 2017	Comparison of 10 games, some computer-based, some board or card-based.	N/A	N/A
	Rich et al., 2018	Several innovative learning methods	N/A	N/A
	Calderón, Ruiz, & Connor, 2017	Computer-based game	N/A	N/A
	Calderón, Ruiz, & Orta, 2017	Computer-based game	Yes, 11 students, questionnaires	N/A
	de Souza et al., 2017	Web-based online game	N/A	Yes
	Rocha et al., 2017	Method for developing a serious game	N/A	Yes
	Rumeser & Emsley, 2017	Computer-based game vs. e-learning	Yes, 126 students, questionnaires	N/A
	Schäfer, 2017	Combination of on-site meetings and modelling in a computer-based game	N/A	N/A
	Denholm & Stewart, 2016	Serious on-site game	Yes, 15 students, questionnaires	N/A
	Geithner & Menzel, 2016	Lego-based serious game	Yes, 47 students, questionnaires	N/A
	Gonen & Israeli, 2016	N/A (the game is described in the author´s previous publication)	Yes, 37 students, questionnaires	N/A

Game-based learning	González-Marcos et al., 2016	Web-based online simulation game	N/A	Yes
	Miettinen et al., 2016	Computer-based game	N/A	N/A
	Sánchez-Gordón et al., 2016a	Card-based game	Yes, 33 students, questionnaires	N/A
	Sánchez-Gordón et al., 2016b	Card-based game	Yes, 46 students, questionnaires	N/A
	Calderón & Ruiz, 2015	SLR (several games)	N/A	N/A
	Hussein, 2015	Comparison of three games (role-playing, physical simulation, computer-based)	Yes, 65 students, questionnaires	N/A
	Hussein & Ravna, 2015	Computer-based game	Yes, N/A, questionnaires	N/A
	Lino et al., 2015	Computer-based game	Yes, 25 students, questionnaires	No
	Misfeldt, 2015	Web-based online game	N/A	Yes
	Sonchan & Ramingwong, 2015	Computer-based game	Yes, 6 students, observations from the game results and questionnaires	Yes
	Misfeldt, 2014	Computer-based game	N/A	No
	Ramingwong & Ramingwong, 2014	Card-based game	N/A	No
	Uskov & Sekar, 2014	Overview of several serious games used by big companies	N/A	N/A
	Lee, 2013	Computer-based simulation	N/A	No
	Vega et al., 2013	Lego-based serious game	N/A	No
	Galvao et al., 2012	Web-based online game	N/A	Yes
	von Wangenheim et al., 2012	Card-based game	Yes, 28 students, questionnaires	No
	von der Heiden et al., 2013	Web-based online simulation game	Yes, N/A	Yes
	Andersen et al., 2009	N/A (Conceptual)	N/A	N/A
	Saenz & Cano, 2009	Computer-based game	Yes, 102 students, questionnaires	No
	Spring & Ito, 2007	N/A (Conceptual)	N/A	N/A
	Cano & Sáenz, 2003	Computer-based game	N/A	No
Learning-by-doing	Pikon & Bogacka, 2018	Preparation of conference step-by-step	N/A	No
	de Medeiros et al., 2017	Description of the course using Learning-by-doing	N/A	No
	Niño et al., 2015	Junior enterprise	Yes, N/A, questionnaires	No
	Sanger & Ziyatdinova, 2014	Description of student projects	N/A	No
	Carvalho et al., 2013	Description of the development project (students involved)	Yes, 22 students, questionnaires	No
	Bofarull et al., 2007	Virtual management of the project	N/A	No
MOOC (SPOC)	Fassbinder et al., 2017	MOOC for Software Engineering Education	Yes, 20 students, questionnaires	Yes
	Lui et al., 2017	Online course with the use of a simulation game	Yes, 37 students, questionnaires	Yes
VR	Maratou et al., 2016	Role-play game in virtual word	Yes, 34 students, questionnaires	Yes
	Sulbaran & Jones, 2012	Collaborative VR	Inconclusive, 7 students, questionnaires	No

SOURCE: Own processing of data from the Web of Science (2022)

As for the form of instruction, game-based learning predominates. According to Rumeser & Emsley (2019a, p. 27), "serious games, or educational games, combine the characteristics of a game and a simulation." A simulation can be characterised as a model of the real system (Gonen & Israeli, 2016) that allows participants to act and react in certain situations. On the other hand, games were developed for entertainment or competition. Gonen & Israeli (2016, p. 292) define a simulation game as "the simulation of a system where the decisions are made by students and the process is advanced according to their decisions". It can be differentiated into computer-based and non-computer-based (Tews et al., 2020).

Game-based learning, i.e., serious games/simulation games, was studied 43 times (see Table 2), most frequently in the form of computer games (21), followed by card or board games (9), while the rest are unspecified. A categorisation of serious games was also done by Calderón & Ruiz (2015), who conducted the only systematic literature review found but focused on software project management. They examined primary sources (102 papers) that dealt with serious games in the context of software project management and identified the frequency of the following types of games: computer games (58%), mobile games (6%), Lego-based games (2 %), virtual worlds (8%), web-based games (10%), board games (5%), videogames (9%), Massively Multiplayer Online Role-playing Games (MMORPG) (2%). Although their focus slightly differed, i.e., software, their findings concerning types of games are consistent with this research: computer games predominate, although not as much as in this paper, i.e., 49 % here compared to their 58%. They also found that nearly 50% of the primary research evaluating serious games, on which they based the SLR, focused on evaluating the ability of the particular serious game to transfer knowledge.

Since it is beyond the scope of this article to present 43 papers in detail, only a general summary is given. In addition, some details of each paper are given in Table 2. Most of these analysed papers present a developed game and the results of its pilot testing with students, as well as the findings on its effects on learning ability. It is not easy to further classify these games, as they differ considerably from each other; nevertheless, some differences can be identified. For example, computer-based (simulation) games predominate, and they are studied 21 times, including six papers on web-based online simulation games. In addition, ten papers describe the use of non-computer-based games, such as card games (6 times), Lego games (2 times), a commercial board game, and a paper-based game.

Learning-by-doing and its use in PM instruction was studied in six research papers, of which only Carvalho et al. (2013) and Niño et al. (2015) demonstrated the impact of this form on learning ability, while the others did not address the topic. The study by Carvalho et al. (2013) described the involvement of university students in the design and development of a small satellite via the learning-by-doing concept. Niño et al. (2015) addressed student learning through a combination of classroom sessions and exploratory work on "get out of the building" tasks and interaction with real-world problems.

MOOCs are not studied at all in relation to PM, and only two similar research papers were found and included in this SLR. Fassbinder et al. (2017) addressed the design and implementation of a MOOC for software engineering education, which they subsequently tested and demonstrated a positive impact on learning ability. In contrast, Lui et al. (2017) studied a Small Private Online Course (SPOC) on PM and demonstrated its effect on learning ability.

In relation to VR and AR, 14 articles were found after entering the selected keywords, but unfortunately, none directly addressed teaching PM using VR/AR. For example, Ahmed (2019) investigated the use of AR and VR to manage construction projects; Couperus et al. (2020) dealt with the use of virtual reality for training in dealing with an extraordinary and traumatic medical event. In the end, only two relevant research papers were found. The first was by Maratou et al. (2016), who tested the use of a virtual world role-playing game to teach PM software and confirmed its positive effect on learning. The use of VR for construction management students was discussed by Sulbaran & Jones (2012), who found that students do not gain real-world experience during their studies and, therefore, end up unprepared for realistic situations. The study aimed to use VR to simulate a construction project with game elements for teaching purposes. The evaluation of the instruction did not determine if the students learned more; however, they had a very positive opinion of the teaching because they received a realistic experience.

Thus, to answer the first research question, game-based learning methods are the most common research subject.

The second question dealt with the impact of the selected learning method on the ability to learn PM. This issue was addressed in 25 papers, while the others dealt with other topics, and in 24 cases, the positive influence of the researched innovative learning method on the ability to learn was proven. This was most frequently demonstrated in research that dealt with game-based learning methods (18 papers in which card games and computer-based games were equally represented). In these 18 cases, a posi-

tive effect of using games on the ability to learn has been demonstrated, most recently, for example, by Hassan et al. (2021), Jääskä et al. (2021), and Havazik & Pavlickova (2020). Serious games have also been shown to improve PM decision-making skills (Saenz & Cano, 2009; Rumeser & Emsley, 2019a). Geithner & Menzel (2016) tested a business simulation game that improved conceptual knowledge of PM, teamwork, and soft skills (measured by pre- and post-game questionnaires). The effects of PM serious games on soft skills improvement was also observed by Denholm and Stewart (2016). Hassan et al. (2021) demonstrated that the tested game improved students' PM knowledge by 158%. Saenz and Cano (2009, p. 305) pointed out an interesting fact by stating that participants who were poorer players were more excellent learners, proving that "mistakes should be part of the learning process". Hussein (2015, p. 107) also considers game-based learning to be risk-free because "it encourages exploration and trial-and-error actions with the possibility of instant feedback and therefore stimulates curiosity and learning". This effect has also been demonstrated in studies of learning-by-doing methods (twice), MOOC (twice), and the VR/AR method (once).

In Table 2, it can be seen that these effects are almost always studied using player self-assessment questionnaires with the exception of two research papers based on in-game data, which is a very questionable method. Therefore, it is difficult to answer the question because not all research addresses this issue and those that do rely only on the subjective opinions of game participants. However, the experiences of the participants are almost exclusively positive and thus indicate the positive influence of these methods on the learning process.

The last question examined the transition of innovative learning methods into the online environment. It was reasonable to assume that this transition occurred due to the Covid-19 pandemic and the advancing digitalization. However, this fact could not be proven. A large proportion of the innovative forms of teaching analysed are implemented offline (18), followed by 12 online; the remainder of the researched papers did not specify this form (22). Out of these 12 papers, the oldest research is from 2011; most of the papers are from 2015-2017 (9 papers), and only one was published in the last three years (Jääskä et al., 2021). Thus, it cannot be seen that these methods have only recently entered the online environment. However, due to the Covid-19 pandemic and associated distance learning, it is expected that research papers dealing with teaching in the online environment will be published more frequently.

4. CONCLUSION

The primary goal of this paper was to conduct an SLR to explore the current state in innovative learning methods in PM to help those interested in implementing them in the education of university students. The scholarly goal of the paper was to determine what types of PM teaching methods are most commonly the subject of research, what impact they have on the ability to learn the subject, and also whether these methods are beginning to move into the online environment.

The SLR conducted did not prove that the innovative learning methods are moving into the online environment. However, it proved that innovative teaching methods are an excellent way to learn and practice PM. Proper application of the presented methods and positive impact on the learning process were documented 24 times, especially in game-based learning, the most frequently used method (43 out of 53 research papers address it). Other methods identified were learning-by-doing (6 times), MOOC (2 times) and VR/AR (2 times).

As Tews et al. (2020, p. 136) discuss, "not all students learn the same way (…) there may be some students who do not like simulations, some who do not like teamwork, some who prefer lectures, some who like hands-on activities". Therefore, teachers should use different teaching methods so that all students can learn effectively.

In general, the topic of innovative learning methods (not only in PM teaching) is very current. It may become more important in the following years, especially due to the ongoing Fourth Industrial Revolution and, thus, the ubiquitous digitalisation. The research comparing on-site games and online games, which were newly developed due to distance learning during the Covid-19 period, and their impact on the learning process could be expected. Thus, future SLR of these methods and their effectiveness on the learning process could be conducted not only in PM but also in other subjects where the practice of the learned material is crucial.

This study also has certain limitations, mainly due to SLR itself. First, even though rules are followed in SLR, the author may still be subjective in analysing the articles. This was addressed by individual assessments of the publications by both authors. In addition, the use of a single database (WoS) or the restriction to the English language may impose further limitations. The use of a single database is a common way to perform the SLR. However, to ensure a comprehensive coverage of the literature it would be better to use other databases (e.g., Scopus or Google Scholar) that contain more scholarly sources.

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IDENTIFICIRANJE PRILIKA ZA INOVIRANJE UPRAVLJANJA PROJEKTIMA U OBRAZOVANJU U DIGITALNOM DOBU

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SAŽETAK

Ovaj rad usredotočuje se na inovativne metode učenja (ozbiljne igre, simulacijske igre, virtualnu i proširenu stvarnost, koncept učenja kroz praksu, i masovne online otvorene tečajeve) korištene u obrazovanju za upravljanje projektima. Upotreba ovih metoda učenja u obrazovanju za upravljanje projektima je ključna, jer se ovaj predmet treba prakticirati u stvarnom životu. Cilj rada je ispitati trenutno stanje istraživanja u ovom području kako bi se utvrdilo koje su metode učenja najčešće istraživane u obrazovanju za upravljanje projektima, kakav utjecaj imaju na sposobnost učenja, i da li se ove metode počinju prenositi u online okolinu. U tu svrhu proveden je sustavni pregled literature u bazi podataka Web of Science, što je rezultiralo s 53 rada. Rezultati pokazuju da je učenje temeljeno na igri najčešće istraživana metoda (43 puta). Utjecaj analiziranih metoda na sposobnost učenja potvrđen je 23 puta, posebno u istraživanju učenja temeljenog na igri (18 puta). S druge strane, online okolina nije prevladavajuća, i ove se metode uglavnom podučavaju na licu mjesta (28 puta).

KLJUČNE RIJEČI: *obrazovanje, inovacija, metode podučavanja, upravljanje projektima, ozbiljne igre*