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Game Method Based on Genre Game as Higher Educational Learning: Systematic Literature Review with VOSviewer

Soni Adiyono[1*], Sendi Novianto[2]

[1]Master Information System, Diponegoro University, Jl Imam Bardjo SH No 5, Pleburan, Semarang Selatan, Kota Semarang, Jawa Tengah 50241, Indonesia
[2]Informatics Engineering, Dian Nuswantoro University, Jl Imam Bonjol No 207, Pendrikan Kidul, Kec Semarang Tengah, Kota Semarang, Jawa Tengah 50131, Indonesia
*Corresponding author e-mail: sonisisu@gmail.com

Abstract

Game methods today have often been applied in several functions in the presentation in the realm of learning in multi-disciplines. The application of gaming methods is very varied to provide a different presentation for students to obtain a goal in the organization. In this case, the purpose of an organization is to increase the productivity and quality of a student. This paper discusses the methods and domains that are often used in the realm of education to achieve a goal. Systematic Literature Review is used in the application of research methods by finding selected articles with selected themes. In sorting the selected journals, inclusion and exclusion were also applied to obtain better article search results, and some 1,256 articles were found in the process, the application of filtering with exclusion and inclusion in this phase will result in 265 articles that fall into the category of candidate study discussion. The journal articles conclude that there are only 20 articles that can answer the questions in this paper. The results in this paper state that the Gaming Method in the realm of education is varied and the familiar game genre grouping used in the selected article is Simulation Game. The entire database in this research paper was obtained directly from the largest international journal alert database, namely Scopus. This is done by the database under the auspices of Elsevier as an organization or company publishing international scientific publications based in Amsterdam, the Netherlands since 1880.

Keywords: Game method, Student, Higher education, Systematic literature review

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1. Introduction

The massive development of information technology is very rapid and sophisticated. This is evidenced by the proliferation of innovations that are emerging now, which indirectly greatly affects the realm of education and so does the learning system in it. Regarding the national education system which has been stated in law number 20 of 2003. Education works to develop capabilities and shape the character and civilization of a dignified nation in the context of the intellectual life of the nation. Based on the law, education aims to develop the potential of students to become human beings who believe and are devoted to God Almighty, have a noble character, are healthy, knowledgeable, capable, creative, independent and become democratic and responsible citizens (Schlickum, Hedman, & Felländer-Tsai, 2016).

The design that has been implemented by the UNESCO International Agency for Indonesia has 4 pillars of education, including: (Harjali, 2011; Schlickum et al., 2016)

1. Learn how to know
2. Learn how to do it
3. Learn how to be
4. Learn how to live together

The general space of a broad field of education, as well as its implementation, can be applied to all disciplines, and the methods used to achieve goals in

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a particular organization also vary. Educational games for health are designed to motivate individuals to improve their health through the implementation of changes and habits (Ferebee, 2010; Guo et al., 2021).

During the current COVID-19 pandemic, many teachers have developed effective learning plans for their students (Abouhashem et al., 2021). Referring to this, it is very necessary to have a new method to be able to provide motivation and a renewable treat, besides that there are quite a lot of methods applied in learning to obtain more optimal results in the goals of the organization. If we know more in this regard, it is in line with the research of Vusić et al. who adopted a game for the needs of cognitive interest and motivation to learn (Vusić, Bernik, & Geček, 2018; Winatha & Setiawan, 2020), it is also in the opinion of Stiller & Schworm who applies game-based learning in an educational context to achieve learning outcomes. educational goals for their students (Stiller & Schworm, 2019; Winatha & Setiawan, 2020).

The use of games as a learning tool requires pedagogical considerations for effective learning. Choosing the right game genre for learning is another important issue to consider when designing games for effective learning. Because the game genre gives its sensation to the game (Hidayat, 2018; Novayani, 2019).

This article is structured systematically to explain several things related to the game method applied in previous research and the grouping of game genres in each research according to journals that meet certain criteria. Therefore, this article was written to explain in more detail the related topics. which has been the focus of research on the application of developing methods and genres, and to add new information and links to readers related to the research carried out by the author.

2. Material and Methods

The method used in the preparation of this paper uses a systematic literature review approach. The database used in this paper was obtained from a reputable international journal from the publisher Scopus which was published in the 2015-2021 reference.

A systematic literature review also aims to search, find, and carry out a synthesis of journals or literature that has been systematically reviewed related to previous research, this method will go through several processes in it such as identification, evaluation, and interpretation of all available and relevant research that can answer questions related to topic areas or phenomena of interest than previous research (Ismail, Ramli, & Aziz, 2021; Jingga, Kosala, Ranti, & Supangkat, 2019). The stages in this systematic literature review method are as follows: (Jingga et al., 2019)

2.1 Literature review planning

2.1.1 Database selection

In this initial step, researchers tracked International Journals published by Scopus publishers with the domain of game methods applied in education with all scientific aspects in it.

2.1.2 Define keywords

After opening the official website portal for the Scopus publisher, the author selects the appropriate keywords in the search for related journals. Then the keywords that have been determined and used are

"game method" + "student" + "higher education"

2.1.3 Determine inclusion and exclusion criteria

In the previous step, when the keywords were determined and applied in the database search, the final results of the entire article were 1,256 documents. Subsequently, the following exclusion criteria were applied:

1. All Open Access
2. Vulnerable years of publication of the paper in the period 2016 – 2021 (last 5 years) Publication Stage = Final
3. Source Type = Journal
   Language = English

TITLE-ABS

KEY (*game* AND *method,* AND *student,* AND *higher* AND *education*) AND (LIMIT-

TO（PUBSTAGE , *"final"*））AND（LIMIT-
TO（OA , *"all"*））AND（LIMIT-
TO（PUBYEAR , *2021*）OR LIMIT-
TO（PUBYEAR , *2020*）OR LIMIT-
TO（PUBYEAR , *2019*）OR LIMIT-
TO（PUBYEAR , *2018*）OR LIMIT-
TO（PUBYEAR , *2017*）OR LIMIT-
TO（PUBYEAR , *2016*））AND（LIMIT-
TO（LANGUAGE , *"English"*））AND（LIMIT-
TO（SRCTYPE , *"j"*））

From the inclusion that has been applied at this stage, 265 documents have been produced that match the search criteria for that stage.

2.2 Featured article review

In the next stage, 265 documents have been obtained from the Scopus database which can be categorized as research that has been carried out by previous researchers. Researchers review each document to find appropriate journal documents regarding the game method applied in the scope of learning and cannot be separated from all disciplines in its application, then after the database on Scopus is displayed the initial screening of paper selection that meets the criteria, the screening results initially the author chose some 23 journals were selected to be reviewed in a more systematic detailed mapping of journals because of this journals contain the biggest keyword in VOSviewer, after doing some research about that 23 journals, we found that 3 journals did not meet the criteria for several reasons, including the following:

1. The publisher in the journal has discontinued status at Scopus.
2. There are publishers with newly discovered Scopus indexed status (E-ISSN:2664-9837) that have not been assigned a quartile.
3. Issuers with a not assigned quartile status.

So that by conducting initial screening and conducting exclusions at this stage, from the initial number of 23 journals selected to 20 journals that meet the criteria of authors who are included in the selected research category.

3. Results and Discussion

When going through several stages in this literature study, the author determines that there are 20 selected published journals from Scopus which will later be able to answer the Question Points (PP) set out in Table 1. Where the selected journals will discuss in more detail the method in the game itself, and also the classification in the game itself. genres applied in previous research.

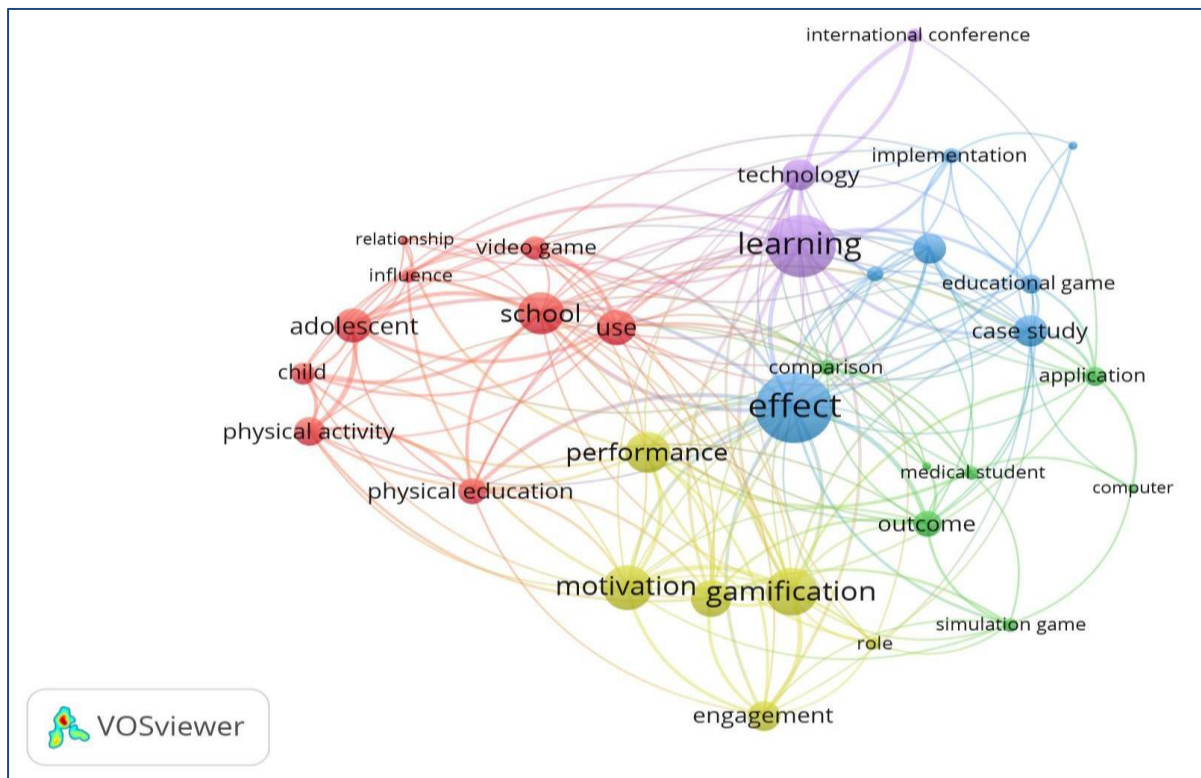**Table 1.** The arrangement of the parameters of the questions systematic literature review.

PP	Detail
PP1	What game method was applied in previous research?
PP2	What game genres have been applied in previous research?

The summary of selected journals will consist of selections that are formed into a detailed list in each selected journal, the variables include Author, Journal Title, Year of publication, Publisher (Publisher indexing Scopus), and Journal Ranking.

From the variable criteria that have been determined, the author in addition to looking for reputable International Journal data from Scopus as one of the reputable indexed publishers for scientific publications and a reputable scientific library database in the academic community around the world. The next step taken by the author is how to find out the ranking index for each of the selected journals, which have found as many as 20 selected journals?

Then, assisted by the portal page https://www.scimagojr.com/ (SJR Scimago) is a portal that can be accessed by the public which includes all journals and scientific indicators contained in the Scopus database. On this page, the author can apply indicators for each selected journal to obtain a ranking index for that journal which can be summarized in Table 2.

In this discussion, the keywords that have been determined will be searched for correlations with previous studies contained in the Scopus database as shown in Figure 1 below:

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Figure 1. Visualization of the keyword network with search results in the Scopus database.

Table 2. Summary of selected Scopus journals.

Author	Title	Year	Publisher	Rank Journal
Jong-Long Guo, Hsiao-Pei Hsu, Tzu-Ming Lai, Mei-Ling Lin, Chih-Ming Chung and Chiu-Mieh Huang	Acceptability evaluation of the use of virtual reality games in smoking-prevention education for high school students: Prospective observational study	2021	Journal of Medical Internet Research	Q1
Azza Abouhashem, Rana Magdy Abdou, Jolly Bhadra, Malavika Santhosh, Zubair Ahmad and Noora Jabor Al-Thani	A distinctive method of online interactive learning in STEM education	2021	MDPI AG	Q1
Frederick K. Ho, Keith T. S. Tung, Rosa S. Wong, Ko Ling Chan, Wilfred H. S. Wong, Sai Yin Ho, Tai Hing Lam, Sheena Mirpuri, Benjamin Van Voorhees, King Wa Fu, Chun Bong Chow, Gilbert Chua, Winnie Tso, Fan Jiang, Michael Rich, Patrick Ip	An internet quiz game intervention for adolescent alcohol drinking: A clustered RCT	2021	American Academy of Pediatrics	Q1
Miroslav Popović, Klemo Vladimir and Marin Šilić	Application of social game context to teaching mutual exclusion	2018	Taylor and Francis Ltd	Q2
Tài Pham, François Beloncle, Lise Piquilloud, Stephan Ehrmann, Damien Roux, Armand Mekontso-Dessap and Guillaume Carteaux	Assessment of a massive open online course (MOOC) incorporating interactive simulation videos on residents' knowledge retention regarding mechanical ventilation	2021	BioMed Central Ltd	Q1

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Friday Joseph Agbo, Solomon Sunday Oyelere, Jarkko Suhonen, and Teemu H. Laine	Co-design of mini games for learning computational thinking in an online environment	2021	Springer Nature Switzerland AG. Part of Springer Nature	Q1
Mary E. W. Dankbaar, Olivier Richters, Cor J. Kalkman, Gerrie Prins, Olle T. J. ten Cate, Jeroen J. G. van Merrienboer and Stephanie C. E. Schuit	Comparative effectiveness of a serious game and an e-module to support patient safety knowledge and awareness	2017	BioMed Central Ltd.	Q1
Meysam Siyah Mansoory, Mohammad Rasool Khazaei, Seyyed Mohsen Azizi and Elham Niromand	Comparison of the effectiveness of lecture instruction and virtual reality-based serious gaming instruction on the medical students' learning outcome about an approach to coma	2021	BioMed Central Ltd.	Q1
Audrey S. Pereira and Monika M. Wahi	Development and testing of a roleplaying gamification module to enhance deeper learning of case studies in an accelerated online management theory course	2021	The Online Learning Consortium	Q1
Heidi N. Eukel, Jeanne E. Frenzel and Dan Cernusca,	Educational gaming for pharmacy students – Design and evaluation of a diabetes-themed escape room	2017	American Association of Colleges of Pharmacy	Q1
Almudena Macías-Guillén, Raquel Montes Díez, Lucía Serrano-Luján and Oriol Borrás-Gené	Educational Hall Escape: Increasing motivation and raising emotions in higher education students	2021	MDPI AG	Q2
Viscione Ilaria and Romano Emanuela,	Elements and methods of organization, design and management of extracurricular sports activities	2019	Editura Universitatea din Pitesti	Q3
Guadalupe Molina-Torres, Irene Sandoval-Hernández, Carmen Ropero-Padilla, Miguel Rodriguez-Arrastia, Jesús Martínez-Cal and Manuel Gonzalez-Sanchez	Escape Room vs. traditional assessment in physiotherapy students' anxiety, stress and gaming experience: A comparative study	2021	MDPI Multidisciplinary Digital Publishing Institute	Q2
Juan Pimentel, Anne Cockcroft and Neil Andersson	Impact of game jam learning about cultural safety in Colombian medical education: A randomised controlled trial	2021	BioMed Central Ltd	Q1
Yanqiu Yu, Phoenix Kit-Han Mo, Jianxin Zhang, Jibin Li and Joseph Tak-Fai Lau	Impulsivity, self-control, interpersonal influences, and maladaptive cognitions as factors of internet gaming disorder among adolescents in China: Cross-sectional mediation study	2021	Journal of Medical Internet Research	Q1
María G. Gamero, Juan M. García-Ceberino, Sergio J. Ibáñez and Sebastián Feu	Influence of the pedagogical model and experience on the internal and external task load in school basketball	2021	MDPI Multidisciplinary Digital Publishing Institute	Q2
Dimitar Tomov, Daniela Tomova and Dimitar Atanasov	Tennis ball as a factor in the initial tennis training of junior high school (12-year old) students	2021	Editura Universitatea din Pitesti	Q3

Hendra Saputra, Achmad Sofyan Hanif, Iman Sulaiman and Desy Tya Maya Ningrum	The effect of traditional games and drill with motor ability on skills (running, jumping, overhand throw and catching) at elementary school	2021	Horizon Research Publishing	Q4
María Consuelo Sáiz-Manzanares, Caroline Françoise Martin, Laura Alonso-Martínez and Leandro S. Almeida	The usefulness of digital game-based learning in nursing and occupational therapy degrees: A comparative study at the University of Burgos	2021	International Journal of Environmental Research and Public Health	Q1
Marcus Schlickum, Leif Hedman and Li Felländer-Tsai	Visual-spatial ability is more important than motivation for novices in surgical simulator training: A preliminary study	2016	International journal of Medical Education	Q2

From the summary of the 20 selected journals above, it was found for the index of journals with a Q1 rating of 12, a Q2 ranking of 5, a Q3 rating of 2 and in Q4 there was 1 selected journal. Thus, to answer questions about this research and provide a more detailed understanding of the selected journals, the researchers found a game method that was applied to previous research and the game genres in this study.

A genre can be defined as the characteristics of a game, where these characteristics are characterized by several similarities, including content, style, and gameplay (Novayani, 2019) or more familiarly, this genre itself can be interpreted as grouping games or games and in it, there are no standard rules that bind to the grouping itself (Novayani, 2019). For details on game methods and game genre groupings in the selected journals, see Table 3.

Table 3. Details of selected journal game methods & genres.

References	Journals Detail		Gaming Method	Game Genre
	Title	Publisher		
Guo et al. (2021)	Acceptability evaluation of the use of virtual reality games in smoking-prevention education for high school students: Prospective observational study	Journal of Medical Internet Research	Game VR (Virtual Reality)	RPG (Role-Playing Game)
Abouhashem et al. (2021)	A distinctive method of online interactive learning in STEM education	MDPI AG	Online Interactive Learning	Simulation Game
Ho et al. (2021)	An internet quiz game intervention for adolescent alcohol drinking: A clustered RCT	American Academy of Pediatrics	Internet Quiz Game	Puzzle Game
Popović, Vladimir and Šilić (2018)	Application of social game context to teaching mutual exclusion	Taylor and Francis Ltd	Social Game Learning	RPG (Role-Playing Game)
Pham et al. (2021)	Assessment of a massive open online course (MOOC) incorporating interactive simulation videos on residents' knowledge retention regarding mechanical ventilation	BioMed Central Ltd	Interactive Simulation	Simulation Game
Agbo, Oyelere, Suhonen and Laine (2021)	Co-design of mini games for learning computational thinking in an online environment	Springer Nature Switzerland AG. Part of Springer Nature	Prototype Mini Game Online	Strategy Game

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Dankbaar et al. (2017)	Comparative effectiveness of a serious game and an e-module to support patient safety knowledge and awareness	BioMed Central Ltd.	Serious Game	Puzzle Game
Mansoory, Khazaei, Azizi and Niromand (2021)	Comparison of the effectiveness of lecture instruction and virtual reality-based serious gaming instruction on the medical students' learning outcome about an approach to coma	BioMed Central Ltd.	Virtual Reality (VR)-Based Serious Gaming	RPG (Role-Playing Game)
Pereira and Wahi (2021)	Development and testing of a roleplaying gamification module to enhance deeper learning of case studies in an accelerated online management theory course	The Online Learning Consortium	Game Based-Learning	Simulation Game
Eukel, Frenzel and Cernusca (2017)	Educational gaming for pharmacy students – Design and evaluation of a diabetes-themed escape room	American Association of Colleges of Pharmacy	Innovative educational game	Puzzle Game
Macías-Guillén, Díez, Serrano-Luján and Borrás-Gené (2021)	Educational Hall Escape: Increasing motivation and raising emotions in higher education students	MDPI AG	Game Based-Learning	Simulation Game
Ilaria and Emanuela (2019)	Elements and methods of organization, design and management of extracurricular sports activities	Editura Universitatea din Pitesti	Teaching games for understanding	Action Game
Molina-Torres et al. (2021)	Escape Room vs. traditional assessment in physiotherapy students' anxiety, stress and gaming experience: A comparative study	MDPI Multidisciplinary Digital Publishing Institute	Gaming Experience	RPG (Role-Playing Game)
Pimentel, Cockcroft and Andersson (2021)	Impact of game jam learning about cultural safety in Colombian medical education: a randomised controlled trial	BioMed Central Ltd	Game Jam Learning	Simulation Game
Yu, Mo, Zhang, Li and Lau (2021)	Impulsivity, self-control, interpersonal influences, and maladaptive cognitions as factors of internet gaming disorder among adolescents in China: Cross-sectional mediation study	Journal of Medical Internet Research	Internet Gaming	Simulation Game
Gamero, García-Ceberino, Ibáñez and Feu (2021)	Influence of the pedagogical model and experience on the internal and external task load in school basketball	MDPI Multidisciplinary Digital Publishing Institute	Tactical Games Approach (TGA)	Strategy Game
Tomov, Tomova and Atanasov (2021)	Tennis ball as a factor in the initial tennis training of junior high school (12-year old) students	Editura Universitatea din Pitesti	Sports Game	Action Game

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Saputra, Hanif, Sulaiman and Ningrum (2021)	The effect of traditional games and drill with motor ability on skills (running, jumping, overhand throw and catching) at elementary school	Horizon Research Publishing	Traditional Games	RPG (Role-Playing Game)
Sáiz-Manzanares, Martin, Alonso-Martínez and Almeida (2021)	The usefulness of digital game-based learning in nursing and occupational therapy degrees: A comparative study at the University of Burgos	International Journal of Environmental Research and Public Health	Game Based-Learning	Simulation Game
Schlickum et al. (2016)	Visual-spatial ability is more important than motivation for novices in surgical simulator training: A preliminary study	International Journal of Medical Education	laparoscopic surgical simulator	Simulation Game

Table 3 shows that for game genres that have been grouped according to the genre applied in the gaming method from previous research, there are 5 different classification groups (Novayani, 2019), which in this genre are also reviewed from the aspect of the gaming method used in previous studies.

The results of the analysis in Table 3 can be visualized in Table 4 and Figure 2, where after being integrated into the visualization it will appear that in the 20 selected journals the methods used to achieve research objectives are very varied, but in grouping this genre is dominant. entered into the Simulation Game genre, which proved to be 8 out of 20 or 0.40 (Abouhashem et al., 2021; Ismail et al., 2021; Jingga et al., 2019) per cent, then the RPG (Role-Playing Game) genre dominated in second place with a total of 5 or 0.25 per cent, while the Puzzle Game genre contained 3 out of 20 selected journals which reached 0.15 per cent, while in the Strategy and Action Game genres, the number was relatively the same, namely 2 of the 20 selected journals which achieved 0.10 per cent.
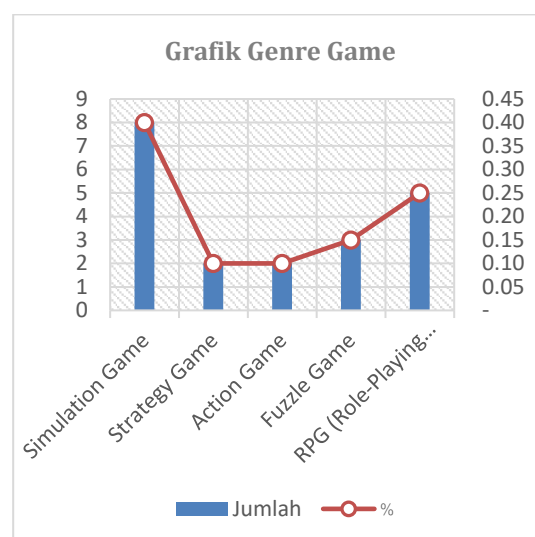
Figure 2. Graph of selected journal game genre grouping results.

Table 4. Detailed results of selected journals.

Genre	Total	%
Simulation Game	8	0.40
Strategy Game	2	0.10
Action Game	2	0.10
Puzzle Game	3	0.15
RPG (Role-Playing Game)	5	0.25

4. Conclusions

The results of the search with keywords that have been carried out by the author are a total of

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1,256 documents in the Scopus database, then after the inclusion and exclusion criteria, it decreases significantly and results in 265 documents.

From these results, a more detailed screening was carried out and found 20 articles were selected for research discussions. Then from the results of the selection of the 20 journals, they analyzed the game method applied in each previous research, and there are variations in the application of the game method. Moreover, in grouping the genre, Simulation games dominate more in a study based on the Scopus database in the last 5 years. This can be because the Simulation game genre is easier to use. After all, it provides knowledge to simulate things from different dimensions and scales.

From the research author assumes that the application of the game method in the realm of learning will provide a different stimulus and achievement, this is because students will enjoy and feel they are not experiencing the learning process which is actually in the packaging of certain game methods will realize goals rather than what will be individual goals as well as the organization, namely achieving superior (Stiller & Schworm, 2019).

ORCID

Author
Soni Adiyono, S.Kom
Education and Qualification
Bachelor (Computer Science) Education,
Dian Nuswantoro University, Indonesia
Student at master information system,
Diponegoro University, Indonesia

Dr Sendi Novianto, S.Kom MT
Education and Qualification
Bachelor (Computer Science),
Dian Nuswantoro University, Indonesia
Master of Game Technology, Institut Teknologi Sepuluh November, Indoensia
Doctor of Philosophy – PhD Control Theory & Control Engineering, South China University of Technology, China
https://orcid.org/0000-0002-3462-7958
ResearcherID: H-3920-2016
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Lecture at Informatics engineering,
Dian Nuswantoro University, Indonesia

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