

## Gamifikasi Digital dalam Pembelajaran Pendidikan: Penelitian Pemetaan Peta Melalui Studi Bibliometrik Menggunakan Vosviewer

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### Abstrak.

Tulisan ini bertujuan untuk mengetahui perkembangan penelitian mengenai penggunaan gamifikasi dalam proses pembelajaran dengan pendekatan studi bibliometrik menggunakan vosviewer. Gamifikasi adalah suatu pendekatan pembelajaran dengan menggunakan unsur-unsur dalam permainan atau video game dengan tujuan untuk memotivasi siswa dalam proses pembelajaran dan memaksimalkan perasaan senang dan keterlibatan dengan proses pembelajaran, selain itu media ini dapat digunakan untuk menangkap hal-hal yang menarik minat siswa dan menginspirasi mereka untuk terus melakukannya belajar. Data yang diperoleh dalam penelitian ini berasal dari pencarian jurnal Google Scholar melalui software Harzing's Publish or Perish dan terdapat 980 jurnal yang menjadi fokus data penelitian. Hasil penelitian menunjukkan kajian gamifikasi dalam dunia pembelajaran pertama kali diteliti pada tahun 1970. Juho Hamari menjadi peneliti paling aktif dalam melakukan kerjasama penelitian dengan total 35 dokumen dengan 54 link. Platform, Elemen Desain, dan Niat adalah kata-kata yang paling sering muncul. Topik gamifikasi paling sering muncul dalam penelitian di tahun 2016. Beberapa tema seperti efek motivasi, pendekatan inovatif, simulasi, publikasi merupakan topik yang minim diteliti sehingga hal ini akan membuka celah penelitian bagi peneliti selanjutnya untuk melakukan penelitian pada topik tersebut.

## Digital Gamification in Learning Education: Research Map Mapping Through Bibliometric Studies Using Vosviewer

### Abstract

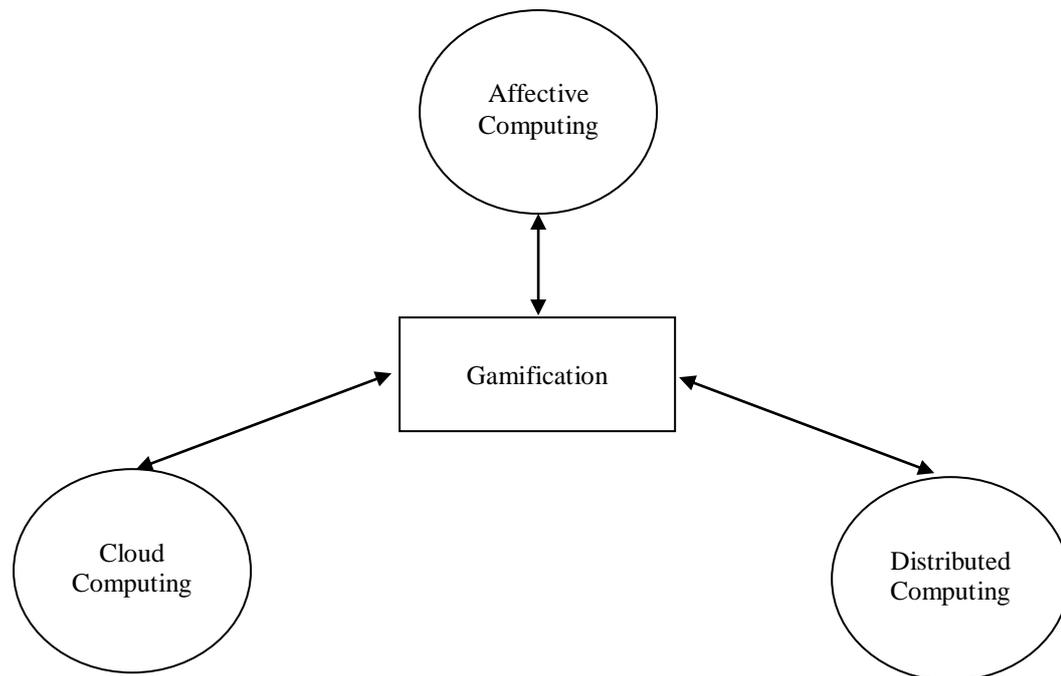
This paper aims to find out the development of research regarding the use of gamification in the learning process with a bibliometric study approach using vosviewer. Gamification is an approach learning using the elements in the game or video games with the aim of motivating the students in the learning process and maximize feelings of enjoyment and engagement with the learning process, besides that, this media can used to capture things of interest students and inspire them to keep doing it learning. The data obtained in this study came from searching Google Scholar journals through Harzing's Publish or Perish software and there were 980 journals that were the focus of the research data. The results show that the study of gamification in the world of learning was examined for the first time in 1970. Juho Hamari became the most active researcher in conducting research collaborations with a total of 35 documents with 54 links. Platform, Design Element, and Intention were the words that appeared most often. The topic of gamification most often appears in research in 2016. Several themes such as motivational effects, innovative approaches, simulations, publications are topics that have been minimally researched so this will open research gaps for future researchers to conduct research on these topics.

**Keywords:** *Bibliometric, Digital, Gamification, Map Mapping, Vosviewer.*

### 1. BACKGROUND

Information and communication technologies have transformed life. This trend is reflected in education, which now emphasizes digital tool proficiency (Almerich et al., 2005; De Diezmas & Graells, 2016). The application of gamification strategies in education can result in higher student motivation and engagement with course content, which are the main arguments supporting their adoption. That is to say; they can make learning more attractive and fun, and thus, ultimately, more effective (Barber, 2018; Barber & Smutzer, 2017). Research into gamification in education has primarily focused on areas such as systematic reviews of the literature (De Sousa Borges, Durelli, Reis, & Isotani, 2014; Dey & Eden, 2016; Hamari, Koivisto, & Sarsa, 2014), the effective elements of gamification (Cheong, Filippou, & Cheong, 2014; Schobel, Sollner, & Leimeister, 2016), the implementation of gamification (Banfield & Wilkerson, 2014; Cheong et al., 2014; Iosup & Epema, 2014) and learning outcomes (De Sousa Borges, Durelli, Reis, & Isotani, 2014). However, in order to successfully apply learning-enhancement technology, it is critical to understand the factors that encourage students to use gamification (Al-Tarawneh & Osam, 2019; Ali, Nair, & Hussain, 2016; Chiao, Chen, & Huang, 2018; Fotiadis & Sigala, 2015).

There are many platforms that can be employed for implementing gamification. The possible potential platforms include cloud computing, affective computing, and distributed computing as shown in Fig. 1.



**Figure 1.** Learning activity in Guided Discovery Learning (Hakak, S, et.all., 23: 2019)

- (i) Promoting gamification through Cloud computing: Cloud computing constitutes a platform that offers three main services of infrastructure as a service (IAAS), platform as a service (PAAS) and software as a service (SAAS) (Hakak, S, 2013). It offers a pool of configurable computing resources to its end users based on the selection of service. Cloud computing can be employed for gamification by exploring all potential configurable resources and utilizing those resources for designing and developing games with learning outcomes. This solves the problem of the cost incurred by educational institutions when upgrading existing computing facilities (Rahman MNA, 2016).
- (ii) Applying affective computing through gamification: Affective computing constitutes one of the promising paradigms that also promote the gamification concept. The main aim of affective computing is the design and development of a computer interface in order to detect and respond automatically to the user's emotion (D'Mello S, 2013). In game designing, emotions play a key role, and detecting user emotions in advance can help game designers in developing more interesting and engaging games. There are numerous applications of affective computing in the area of artificial intelligence and other related sciences, technology, engineering and mathematics (STEM) areas. It can be explored for promoting learning through gamification. The interface can be designed in such a way that can help students to enhance their learning ability and improve concentration.
- (iii) Promoting gamification through distributed computing: Networking is the exchange of data through different types of media between computing devices. The area of networking is quite massive, and there are numerous applications of networking in different areas. This technology can be found in healthcare, wireless communication, the education sector and other various fields. In distributed computing, several computing resources are used for processing particular applications, which may consist of data, multiplayer games or other related features. Gamification can be employed by designing multi-user games in a distributed environment. In this manner, the gamified learning environment can promote learning among multiple end users connected through different personal computers

In addition, the researcher in this instance used the method of bibliometric study to conduct research on the growth of research on the subject of gamification in the context of the field of education. The examination of bibliometric studies is helpful for classifying many facets of science, such as the authors, journals, institutions, universities, and nations that have made significant contributions. We are able to

comprehend the significance of bibliographic research when it comes to the investigation of literary movements and the current state of knowledge in all areas (Said, 2020: 165-184). In this particular instance, the author uses the Vosviewer software to perform an analysis of bibliometric studies and performs research mapping using subjects that have been specified in advance.

## 2. METODE

### Data collection technique

This study uses a bibliometric method with a qualitative approach. Bibliometrics is analyzing literature or books using a mathematical and static approach (Sidiq, 2019). The qualitative approach in question is to produce descriptive data in the form of written words based on the results obtained. Descriptive research is used to describe the condition of the object as it is (Yuberti, Y. and Saregar, A, 2017). This research method adopts a five-step method (Hudha et al, 2020) as shown in Figure 3.1. The five steps include defining search keywords, initial search results, narrowing search results, compiling initial data statistics, and data analysis.

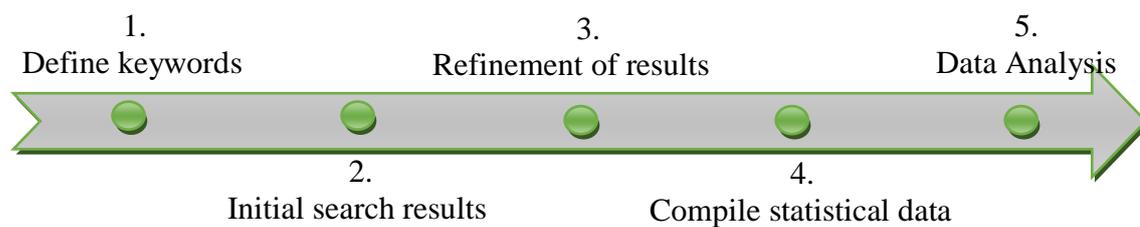


Figure 2. Bibliometric Analysis Steps.

1. Define keywords  
A literature search was carried out on September 24, 2022 using 1 keyword 'gamification' which was compiled using the Harzing's Publish or Perish (PoP) software.
2. Initial search results  
This search is specifically for 'journals', 'conference proceedings' 'words of title'. Found 980 journals from the Google Scholar database in the initial search using the Publish or Perish (PoP) software.
3. Refinement of results  
Narrowing down the search results was done by limiting them to 'journals', and editorials were removed from the data set so that 47 journals were collected to become metadata for author analysis and 498 47 journals were collected to become metadata for word analysis in this bibliometric research. Search results are saved in RIS (Research Information Systems) format to include all article information important such as article title, author name and affiliation, abstract, keywords and references.
4. Compile statistical data  
Metadata is input into the VOSviewer software. VOSviewer analyzes and maps gamification research data sets.
5. Data analysis  
VOSviewer is used to analyze and visualize a bibliometric network with the topic of research on gamification. In this analysis the node size represents the number of publications in the data set. The strength of the collaboration between the two items is represented by the proximity of the items on the map and thickness.

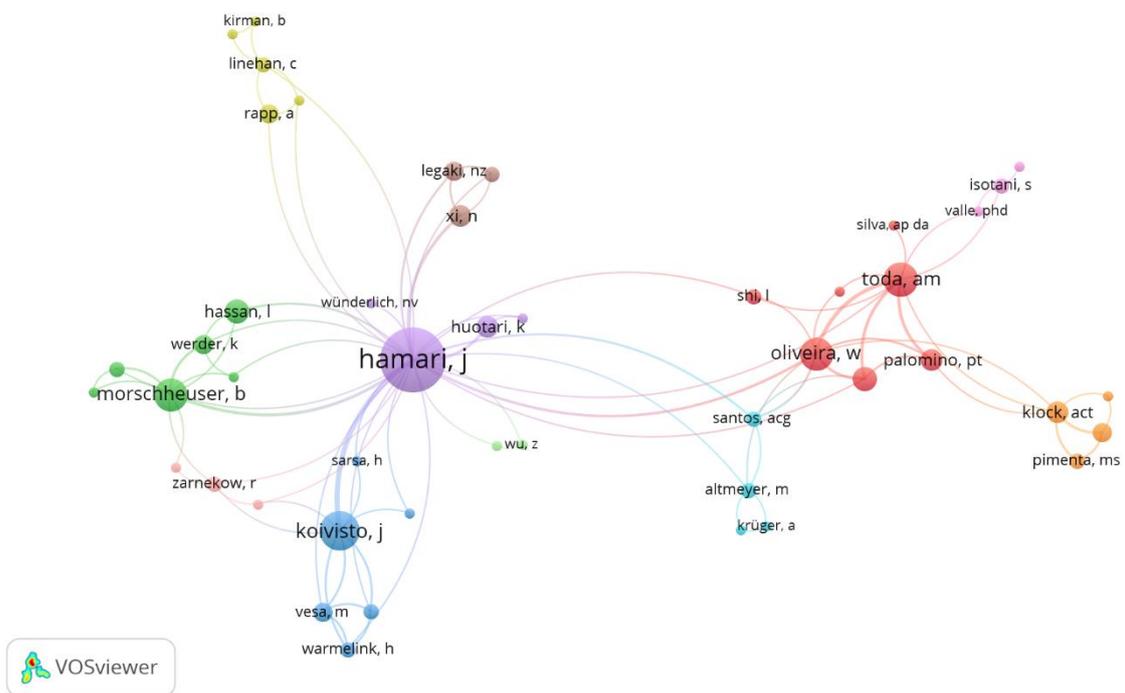
## 3. PEMBAHASAN dan HASIL

### Results

#### Bibliometric Study of Research on Gamification In Education

##### 1. Author Collaboration Networks

VOSviewer was used to do bibliometric study of co-authorship based on author's name. Co-authorship analysis has become one of the most common methods for assessing author collaboration in research. Figure 3 shows the findings of the co-authorship analysis depending on the author.

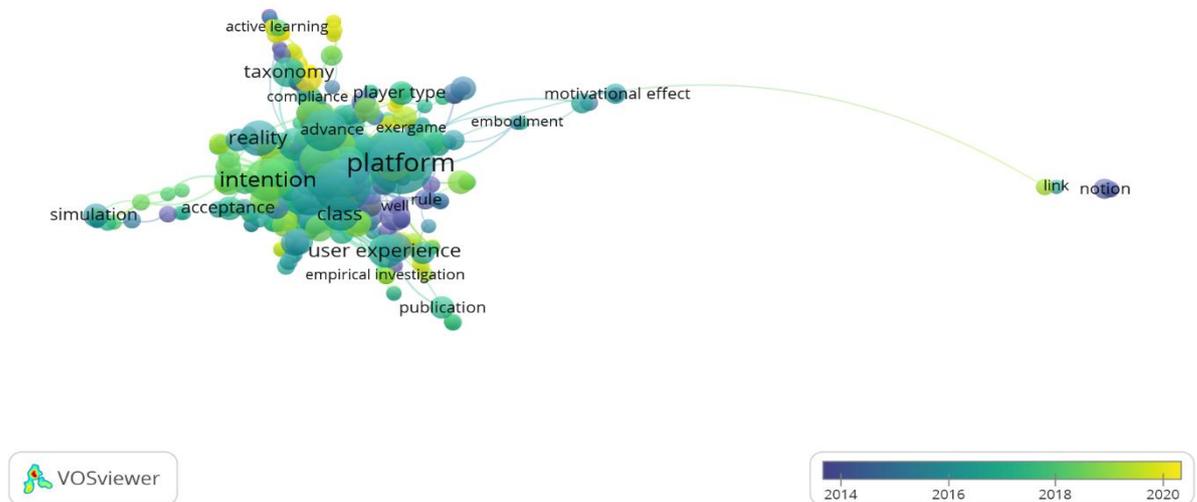


**Figure 3.** Co-author analysis

This study focuses on the 47 authors who collaborated with other authors after doing a co-author analysis search on a total of 1842 authors and using an automated shrinking process to reduce the number of authors to 1000. Figure 3 shows that Juho Hamari, with a total of 35 documents and a link strength of 54, led the most collaboration groups. Jonna Koivisto comes in second place with a total of 13 documents and a link strength of 21. Armando Maciel Toda follows with a total of 10 documents and a link strength of 21.

**2. An Educational Gamification Mind Map Visualization**

Data visualization is the process of creating a visual representation of data. Data visualization is a powerful tool for exploring large and complex data sets. Visualizing data helps users to understand patterns, trends, relationships and outliers hidden in large and complex data. Data visualization or data visualization can also be defined as a graphical or visual form of data and information. The results of the visualization of the co-word network map on the development of research on gamification were carried out by tracing 3532 terms and reducing them automatically to 538 terms. The results show that there are 498 items with a total of 30 cluster divisions and it is found that the word "platform" is the word with the highest accuracy totaling 36 with a total relevance of 0.33. Followed by the word "design element" with a total accuracy of 29 and a total relevance of 0,42. Then the word "gamification feature" has a total accuracy of 19 and a relevance of 0.67. The results can be seen in the following figure.



**Figure 3. Map Visualization**

Then based on the results of the overlay visualization it was found that 2016 was the year the word gamification was most often used as a research topic. Furthermore, the results of the density visualization show that the words motivational effects, innovative approaches, simulations, publications are the topics that are the least discussed, thus opening research gaps for advanced researchers to conduct research on the topic.

**Discussion**

Based on the results of the research map mapping on the topic of gamification in the world of education, we can see that the effect of gamification makes a promising contribution to improving learning outcomes so that topics regarding gamification are often scrutinized. Of course the implementation of gamification in the world of education also has procedures that can be done so that the resulting output runs optimally.

The existence of a normative influence among the students of a digital community is crucial to the success of any gamified application aimed at encouraging positive behavioral change. So, when a student starts making useful contributions, they can adjust to the positive learning attitudes of their peers and feel more included (Hamari & Koivisto, 2015). The gamified practices, which are not actually games themselves but are designed to utilize human psychology in a manner comparable to that of games, are known as "gamification." It demonstrates that gamification is a more rewarding option, and therefore effective than conventional techniques of motivation and loyalty, because motivation is implicit in the game. This demonstrates that gamification is superior to conventional techniques of motivation and loyalty (Werbach & Hunter, 2012).

Through gamification, learning is more fun, interesting, and appealing. As a result, learning processes are getting better and people are better able to gain knowledge and skills. In the same way, games encourage students to take part in class by making them more motivated and helping them get over their fear of making mistakes, which could make them not want to participate. (Zarzycka-Piskorz, 2016).

**4. CONCLUSION**

The development of research on the topic of gamification in learning education is experiencing a very good trend. Through bibliometric analysis using Vosviewer software and searching through Harzing's Publish or Perish software, the authors found that Juho Hamari, with a total of 35 documents and a link strength of 54, led the most collaboration groups. The results of the visualization of the co-word network map that the word "platform" is the word with the highest accuracy totaling 36 with a total relevance of 0.33. The overlay visualization was found that 2016 was the year the word gamification was

most often used as a research topic. Then density visualization shows a few words that are minimally researched such as motivational effects, innovative approaches, simulations, publications on the topics that are the least discussed. Through this analysis, it will open a research gap for advanced researchers to conduct research on the topic of gamification in education.

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