THE USE OF MATHEMATICS APPLICATION IN MULTIPLICATION LEARNING: A *SYSTEMATIC LITERATURE REVIEW*

Disusun sebagai salah satu syarat menyelesaikan Program Studi Strata I pada Jurusan Pendidikan Guru Sekolah Dasar Fakultas Keguruan dan Ilmu Pendidikan

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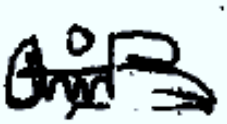

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Abstrak

Tujuan: Tujuan dari penelitian ini adalah untuk meninjau kembali pemahaman siswa tentang penggunaan Aplikasi Matematika (Maths App) pada materi perkalian untuk siswa sekolah dasar. Metodologi: Penelitian ini menggunakan metode Systematic Literature Review (SLR). Data dalam penelitian ini menggunakan artikel dari Google Scholar dengan rentang waktu lima tahun terakhir yang membahas tentang aplikasi perkalian sekolah dasar. Teknik pengumpulan data menggunakan data sekunder. Hasil: Hasil penelitian ini menunjukkan bahwa penggunaan Maths App memberikan pemahaman siswa terhadap materi perkalian. Selain itu, siswa merasakan pengalaman yang lebih baik dalam penyampaian materi ketika menggunakan media aplikasi perkalian. Aplikasi/Originalitas/Nilai: Penggunaan Aplikasi Matematika khususnya pada materi perkalian sangat dianjurkan karena pemahaman siswa meningkat dengan sangat baik. Penelitian ini memberikan pemahaman guru menggunakan Maths App pada materi perkalian yang berpengaruh terhadap hasil belajar siswa.

Kata Kunci : Media Aplikasi, Matematika, Perkalian

Abstract

Purpose: The purpose of this study was to review the students' understanding of the use of Mathematics Application (Maths App) in multiplication material for elementary school students. Methodology: This study used the Systematic Literature Review (SLR) method. The data in this study used articles from Google Scholar with a span of the last five years that discussed elementary school multiplication applications. Data collection techniques used secondary data. Results: The results of this study indicated that the use of Maths App provides students' understanding of multiplication material. In addition, students felt better experience in the delivery of material when using multiplication application media. Applications/Originality/Value: Using Maths App especially in multiplication material are recomended because students' understanding improve excellently. This study provided an understanding of teachers using Maths App in multiplication material, which influences students' learning.

Keyword : Application Media, Mathematics, Multiplication

1. INTRODUCTION

Learning requires dynamics that can follow every development of students. One of them is using application-based interactive learning media. Application is a learning media that is designed like a game but can be used as a learning medium. Advanced technology will impact learning media that is more interesting and not monotonous. According to Febriyanto et al. (2018), designing the learning process is an element that must be considered by the teacher in making learning media.

Learning application is a medium used to help students and teachers make it easier to obtain information quickly and precisely according to the material. According to D'angelo & Iliev (2012), digital learning media is a web-based interactive media that represents dynamic

objects and can be used to build Mathematical understanding. The development of learning media raises several kinds of application features, especially in multiplication learning media. The many parts of this application will determine which device the Maths App media runs on. Whether on android based devices or personal computer. The process of selecting the multiplication application is essential because the availability of the multiplication application is measured by the machine running the application. Given the importance of using application-based learning media, this study collected data from previous studies on using Maths App in multiplication material.

The data collected were articles that discussed multiplication application from 2018 to 2022. These data are identified using the Systematic Literature Review (SLR) method. According to Kitchenham et al. (2009), the use of the SLR method can be carried out by reviewing and identifying articles systematically with each process and following the steps that have been set.

Basically, all teachers in Indonesia can use learning media. In learning multiplication teacher's lack of knowledge in using various learning media results in monotonous teaching methods for students. According to Idris & Narayana (2011), the problem teachers face in learning Maths is understanding the basic concepts of the material correctly. While according to Paridjo (2008), the problems faced by teachers were not being able to choose teaching methods, lack of students motivation, lack of variations in conveying material, and also the limitations of visualization aids. Advanced technology will impact learning media that is more interesting and not monotonous. The average student already has a smartphone, so the use of this smartphone does not have a negative impact. The teacher must guide his students to take advantage of existing facilities to make changes for the better by creating Maths App for interactive learning media.

Various studies related to multiplication application in elementary schools have been carried out. Afrizal (2018) found that the multimedia-based interactive Jarimatika app using Adobe Flash CS6 software, and the MDLC (Multimedia Development Life Cycle) can make it easier for students to learn Mathematical calculations. Furthermore, Anggraini et al. (2020) created an android-based multiplication and division arithmetic operation media application to make students understand lessons easier. The value obtained using this application is 75.4% with 34 respondents. (Muslimah & Rahmawati, 2020) developed educational game media for android-based multiplication material. The validation obtained 94% so this game was very feasible to use.

Furthermore, another study by Jayanti et al. (2021) about the LOH application (Counting Operations). They explained that the LOH application could help students improve students understanding of arithmetic operations. Fitriyani et al. (2022) developed the android-based Mathematical comics media. Students' responses were very diverse to android-based comics media, and students became less bored and more active in learning. Ceria & Sutopo (2020) found that the multimedia-based Mathematics operations education game application makes students interested in learning Mathematics. This application is in the form of an interactive CD.

This study synthesized the evidence of existing studies systematically in the search for articles. Based on this explanation, multiplication application media needs to be used during learning. There are only a few studies that apply learning application media, especially in Mathematics lessons in multiplication material. Based on this background, this study aimed to determine how much application media is used in elementary schools. This study be necessary for teachers to use application in learning Mathematics, especially multiplication material.

2. METHOD

This study was a qualitative using the SLR method. According to Agusta (2007) SLR is a critical analysis of the current study with a specific topic in the form of questions from a scientific section. In using the SLR method, each method process must use predetermined steps. According to Andani et al. (2021), the actions of the SLR, namely formulating study questions, looking for articles that match the theme of the study, applying inclusion criteria to select articles, evaluating and analyzing data, and reporting study findings. Based on the steps of the SLR, it can be described as follows:

2.1 Research Question

Made in this study based on the needs of the chosen theme. The questions in this study were as follows:

RQ1. Is application media needed when learning Mathematics, especially in multiplication material?

RQ2. What are the most frequently used devices in media applications in 2018-2022?

2.2 Search Questions

To obtain relevant sources to answer the Research Question. The search process was carried out using the site address https://scholar.google.com/

2.3 Inclusion and Exclusion

This stage was to decide whether the data found are feasible or not to be used in SLR study.

1. Data used in the period 2018-2022
2. Data obtained through the site https://scholar.google.com/
3. The data used is only related to the multiplication application media.

2.4 Quality Assessment

SLR be evaluated based on quality questions as follows:

QA1. Was the article published in 2018-2022?

QA2. Does the article write down the devices used for learning application media?

Each journal will be rated below for answers to each of the questions above:

1. Y (Yes) : for articles in the 2018-2022 range
2. T (No): for themes that do not list the device used for application media.

The data in this study was an article that discusses the media for elementary school multiplication applications. The data source in this study only used articles from Google Scholar with a range of the last 5 years (2018 to 2022).

Data collection techniques carried out in this study used primary data and secondary data as follows:

2.5 Primary data

Primary data is information collected through observation and surveys tailored to the needs. In this study, preliminary data were taken from https://scholar.google.com/. The reason to use Google Scholar is that:

a. *Google Scholar* provides complete facilities.
b. The data was easy to find because it has a range of years that can be adjusted based on the needs.

2.6 Secondary Data

Secondary data was needed to complete the primary data. Data collection was obtained from several stages as follows:

a. Observation, observed directly to the source, namely: https://scholar.google.com/
b. Documentation, data were collected and concluded.

This study used triangulation. In this study, one type of triangulation was used, namely source triangulation. Source triangulation is used to collect data from articles via Google Scholar sources.

Qualitative data analysis is a process of searching and editing data systematically obtained from interviews, field notes, and materials that are easy to understand and communicate to others about the results. The data analysis process in this study according to Miles & Huberman (1992:20) includes data reduction, data presentation, and concluding.

3. RESULT AND DISCUSSION

This result display a table grouped by journal name to facilitate the data type or journal name obtained through the search process.

Table 1. Grouping by Journal

No.	Journal Name	Amount
1.	JPGSD	4
2.	e-Proceeding of Applied Science	1
3.	Jurnal Tadris Matematika	1
4.	SNISTEK	1
5.	Jurnal TEKNOINFO	1
6.	E-Prosiding TEKNIK Informatika	1
7.	Jurnal Esensi Infokom	1
8.	Jurnal Pendidikan dan Pembelajaran Dasar	1
9.	Seminar Nasional Hasil Pelaksanaan PLP	1
10.	Jppd	1
11.	Jurnal TIPS: Jurnal Teknologi Informasi dan Komputer Politeknik Sekayu	1
12.	Repositor	1
13.	Prosiding Webinar Nasional Pekan Ilmiah Pelajar	1
14.	Jurnal Ilmiah Mahasisswa Pendidikan Matematika	1
15.	Kalbiscentia, Jurnal Sains dan Teknoogi	1
16.	e-Proceeding of Art & Design	1
17.	Jurnal IT	1
Amount		20

The searching results were selected based on the inclusion and limitation criteria. Next, the data were scanned. The following table show whether or not the data will be used in this study.

Table 2. Quality Assessment Results

No.	Author(s)	Year	QA1	QA2	Results
1.	(Amalia & Zuhdi)	2019	Y	Y	✓
2.	(Al Maududi et al)	2021	Y	Y	✓
3.	(Galandaru Swalaganata)	2018	Y	Y	✓
4.	(Marlina et al)	2019	Y	Y	✓
5.	(Sulistyowati et al)	2022	Y	Y	✓
6.	(Komara et al)	2022	Y	Y	✓
7.	(Janiati)	2021	Y	Y	✓
8.	(Rusdiansyah & Leonard)	2021	Y	Y	✓
9.	(Aragarini)	2020	Y	Y	✓
10.	(Salsabila & Siswantari)	2021	Y	Y	✓
11.	(Rifa et al)	2018	Y	Y	✓
12.	(Djamaluddin & Wardana)	2019	Y	Y	✓
13.	(Kartikasari & Rahmawati)	2018	Y	Y	✓
14.	(Lestari et al)	2020	Y	X	x
15.	(Afrizal)	2018	Y	Y	✓
16.	(M. Anggraini et al)	2020	Y	Y	✓
17.	(Muslimah & Rahmawati)	2020	Y	Y	✓
18.	(Jayanti, Ni Putu S., Dewi, I Dewa A. N. P. S., Yundari)	2021	Y	Y	✓
19.	(Fitriyani et al)	2022	Y	Y	✓
20.	(Ceria & Sutopo)	2020	Y	Y	✓

Symbol description:

✓ : article used for this study. The data was chosen because it has answers that match the Quality Assessment in data selection.

X : The article was not used in this study because the data did not have answers that matched the Quality Assessment.

In the discussion section, the authors explain by answering the Research Question (RQ) as follows:

RQ1 Is application media needed when learning Mathematics, especially in multiplication material?

Based on the articles selected in Table 1, 20 articles with results show that the use of application has succeeded in learning media for elementary school Mathematics. According to (Amalia & Zuhdi, 2019) the effects of application had a score of 85% with a relatively high feasibility level. This application greatly influences students' mastery of multiplication and division material. Using applications, students better understand the delivery of material during learning. According to finding of Pratondo et al. (2021) 87.5% of students understand the delivery of multiplication material using the SD multiplication application media that has been developed.

RQ2 What are the most frequently used devices in applications in 2018-2022?

From the results of the Quality Assessment, there were 19 relevant articles to be grouped based on the device used to answer the research question. These results answer RQ2 which will be shown in Table 3. Table 3 shows that the dominant devices used in multiplication application are as follows:

Table 3. Grouping of devices used by application media

No.	Device	Amount
1.	Android	16
2.	PC	3

In this grouping of devices, Android is used more for learning media than PCs. Android with its technology field has ease of use and is open source so there are many enthusiasts among the general public, ranging from the development of applications that are easy to download to the development of various systems (Sitanggang et al., 2016). At the same time, a PC is an electronic device consisting of several components that can work together between parts with one in order to produce information based on existing data.

From the results of the literature review that has been carried out, the use of application in Mathematics lessons has a good influence on students in mastering multiplication material, and students' understanding in receiving multiplication material using application media using both Android devices and PCs.

4. CLOSING

Several applications have been selected in this study in the form of PIKABI, LOH application, GAMETIKA, and MoMM. Although in this application there are still many who develop their own applications, the use of this application is very influential for students in understanding multiplication material. Therefore, the findings of this study provide an understanding of teachers in the use of Mathematics application media in multiplication material which greatly influences students' understanding. The limitation in this study is that the authors only used one source on Google Scholar. So it is hoped that further studies can examine several articles through different sources. After conducting this study, there are suggestions for teachers to use application when learning Mathematics, especially in multiplication material because students' understanding when using application media is very good .

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