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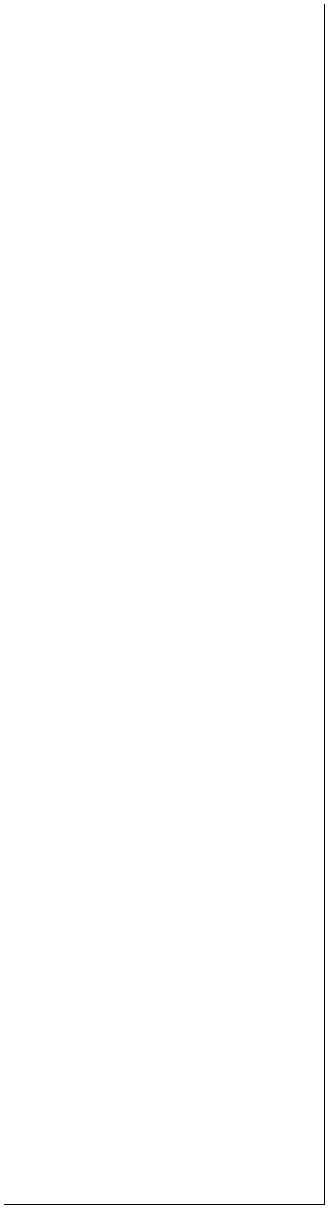

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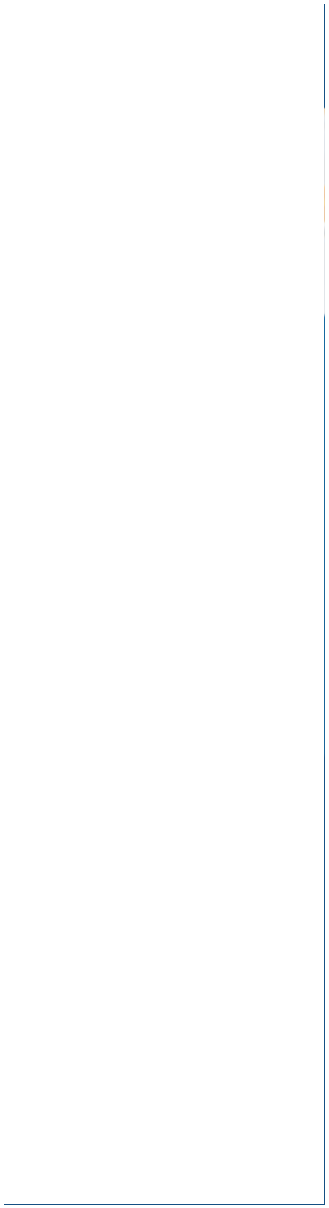

Meta-analysis: google classroom on mathematics learning in Indonesia as an alternative online media during the COVID-19 pandemic

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Meta-analysis: google classroom on mathematics learning in Indonesia as an alternative online media during the COVID-19 pandemic

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Abstract. The purpose of this study was to determine the research profile consisting of articles related to Google Classroom on mathematics learning in Indonesia. This research is meta-analysis research by conducting research journal studies. The research journals were chosen purposively based on the latest and suitability of the research theme, namely the use of Google Classroom in mathematics learning in Indonesia. This study examines 17 research journals in the last 5 years (2016 - 2020) originating from the Google Scholar database. The instrument in this study was the human instrument, which was the researcher himself who acted as the research instrument. The data collected is a research profile, research objectives, research designs, research instruments, and analysis techniques in research related to Google Classroom on mathematics learning in Indonesia. Analysis of the data used is descriptive qualitative. The results of this meta-analysis show that Google Classroom has a positive impact on mathematics learning in Indonesia.

1. Introduction

The COVID-19 pandemic has impacted and brought various changes to all aspects of life. The development of COVID-19 spread very quickly throughout the world. Every day, data in all cities reports the increasing impact of co-19. Indonesia is a country that is entering a national emergency. The virus that attacks the human respiratory system has resulted in policy changes in various fields. One area affected by this pandemic is education. The Ministry of Education and Culture has issued guidelines for organizing learning during the COVID-19 pandemic, where most of the teaching and learning process was carried out online that students or university students learned from home.

This situation requires students to study at home, making teachers and lecturers required to be able to carry out online learning. The rapid development of technology makes the online learning process easy. Many choices of web products that offer digital learning, including those issued by companies that are oriented to education, such as Ruangguru, Moodle, Zenius, Kelase, Quipper, Google Classroom, HarukaEdu, Classroom, Squiline, Mejaguru, AsDos, 7 Pagi, and others. Even now, cell phone companies are starting to make educational products, for example, Samsung. Based on this, the researchers also conducted interviews with peers, teachers, university students, and students where the results were almost 80% comfortable and found it easy to use Google Classroom for the learning process. This is in line with research by Mardhiyana [1], showing that 94% of respondents already know the terms of e-learning and e-learning that they often use is Google Classroom.

Google Classroom is a product of a large web company, Google. It has access to more than 45 countries. It is an internet-based e-learning system. This system provides services such as paperless assignments to students [2]. It is one of the best platforms for improving teacher work. It provides a powerful feature that makes it an ideal tool for teachers to use with students. Classes in it helps teachers save time, organize classes and improve communication with students. Some of the benefits offered by Google Classroom are: 1) Very easy to use: Its design is very simple to use to send and track tasks; communication with all participants or individuals, there are announcements, e-mail and notification features [3]; 2) Save time: Its software engineers say that it was created to save time. It has several features such as transferring values to Google Sheets, updating the class scale, keyboard navigation to grade and sort by name [4]; 3) Cloud-Based: It is a professional technology because it can store various data in the cloud [5]; 4) Flexible: This application can be accessed by teachers and students both in a face-to-face learning environment or a fully online environment. This allows the teacher to explore learning methods and more easily organize the distribution and collection of assignments [5]; 5) Free: It can be accessed by anyone and anywhere for free by only having a Google account; 6) Easy cellular access: It is designed to be responsive. Easy to use on any mobile device. Cellular access to interesting and easy-to-interact learning material is very important in learning connected to current websites [3].

Some research that has been done shows that the use of Google Classroom in mathematics learning is effective. Gunawan [6] concludes that Google Classroom runs optimally in vector learning and can develop students' problem-solving skills. The application of Google Classroom-assisted problem solving is more effective than conventional google classroom-assisted because there are no time and space limits [7][8][9]. The learning process of mathematics with Google Classroom-assisted blended learning is of excellent value [10]. Zurimi's research [11] concludes that the use of Google Classroom media as a medium in mathematics learning can increase student motivation and activity. Google Classroom can improve student learning outcomes, learning interesting, effective, fosters motivation, fosters independent, active, and creative learning attitudes [12][13].

Research on Google Classroom has been done by quite a number of researchers and academics in Indonesia. Various research articles and journals attempt to explore the readiness or use of Google Classroom and provide information related to Google Classroom. Based on this, researchers are interested in determining the research profile consisting of articles related to Google Classroom on mathematics learning in Indonesia from the Google Scholar database in the last 5 years (2016-2020).

2. Methods

This research uses a meta-analysis method that examines a number of research results in a similar problem with this research that is about Google Classroom in the mathematics learning process. The instrument in this study was the human instrument, which was the researcher himself who acted as the research instrument. The data in this study are journals obtained online from Google Scholar regarding Google Classroom in learning mathematics in Indonesia in the range of the last five years (2016-2020). The study population was determined using a purposive technique with the following conditions: 1) the study was taken in accordance with the research theme, namely the use of Google Classroom in mathematics learning; 2) Conducting research in Indonesia; 3) The year of the research was 2016 to 2020 and 4) The study population came from junior high school students, high school students, and university students. Analysis of the data used in this research is descriptive qualitative. Data collection techniques using documentation techniques, the researchers document research data in Google Form.

The data processing and analysis process is carried out in four stages, namely: 1) coding the input data to Google Form; 2) tabulating data to make it look class, type, nature, and frequency of data so that it is easy to read, categorize, and analyze; 3) qualitative data analysis by describing and linking data and information relating to the focus of the study; 4) make interpretation of the results of the analysis according to the problems and research questions and make conclusions.

3. Results and discussion

The research on Google Classroom on mathematics learning in Indonesia is obtained from 17 studies in the last five years (2016 to 2020). These studies were obtained from the Google Scholar database and in general the data were obtained by downloading on the internet.

3.1. Profile of publication year

Based on an analysis of 17 Google Classroom-themed articles on mathematics learning in Indonesia published, there were 24% of research published in 2020, 52% of research published in 2019, 18% of research published in 2018, and 6% of research published in 2016. As seen in figure 1, there is a significant increase in 2018 and 2019. The increase in the number of Google Classroom-themed studies in 2018 and 2019 was related to the era of the industrial revolution 4.0, where one of the challenges in facing the era of the industrial revolution 4.0 was with online learning [1]. This was obtained based on the analysis of researchers on the background of these studies, 70% revealed that the challenges of the industrial revolution era were the background in research, while 24% revealed that Google Classroom was an alternative media during the pandemic COVID, and 6% had the background that the media online is needed because of technological advances. In 2020 there was not as much research in Google Classroom as in 2019 due to the emergence of various online learning media that began to be known by teachers and lecturers.

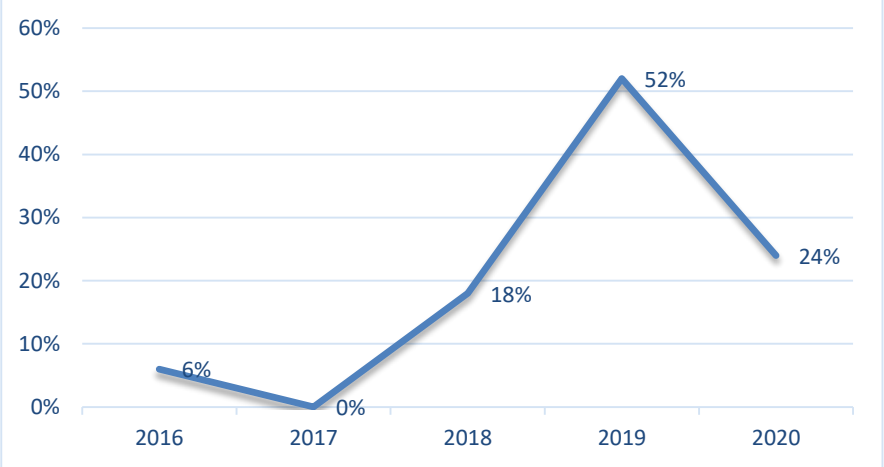

Figure 1. Publication year.

3.2. Profile of research population

This part will elaborate on the profile of the research population of articles related to Google Classroom on mathematics learning in Indonesia, which is represented through the diagram as follows.

Based on figure 2, it is known that the population of the research with the theme of Google Classroom is 47% of students, 35% high school students, and 18% junior high students. Online learning is more widely applied to university students compared to junior and senior high school students. This is related to the approach to adult learning in contrast to children's learning. Learning in university students includes learning in adults while learning in junior high, and high school students include children's learning. In online learning, students are required to study independently. So that students can more easily understand or learn online. This concept is in accordance with the concept of andragogy, namely learning with independent motivation [14].

The lack of Google Classroom-themed research on mathematics learning for high school and junior high school students indicates that the application of online learning in middle and high school students is not optimal. Based on this, it certainly needs to be reviewed because of the government's policy regarding schools at home with online media. This was also stated by Krisna [15] that there are many

obstacles in the implementation of online learning in junior high school students, including students who do not understand about virtual classes or even do not understand about e-mail.

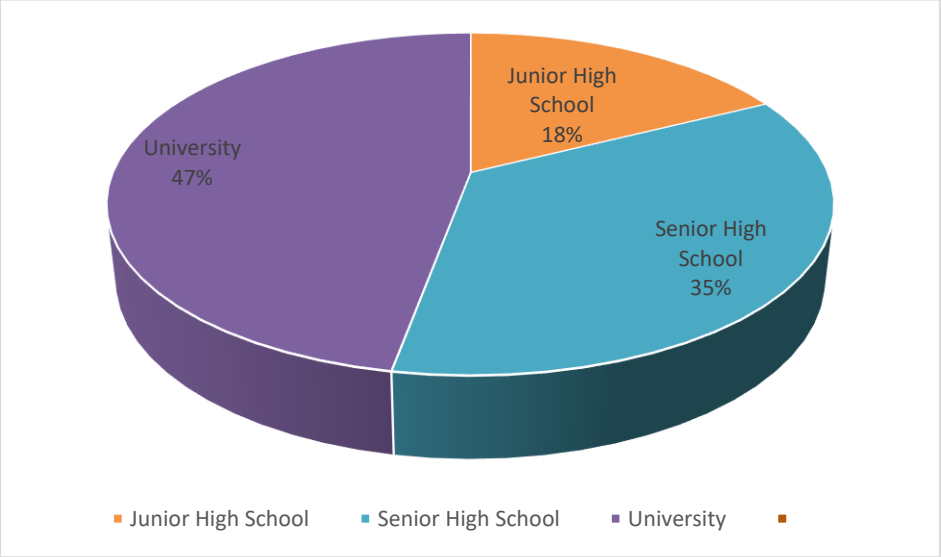

Figure 2. Research population.

3.3. Profile of research objectives and research design

This part will elaborate on the profile of research objectives and research design of articles related to Google Classroom on mathematics learning in Indonesia, which is represented through in figure 3.

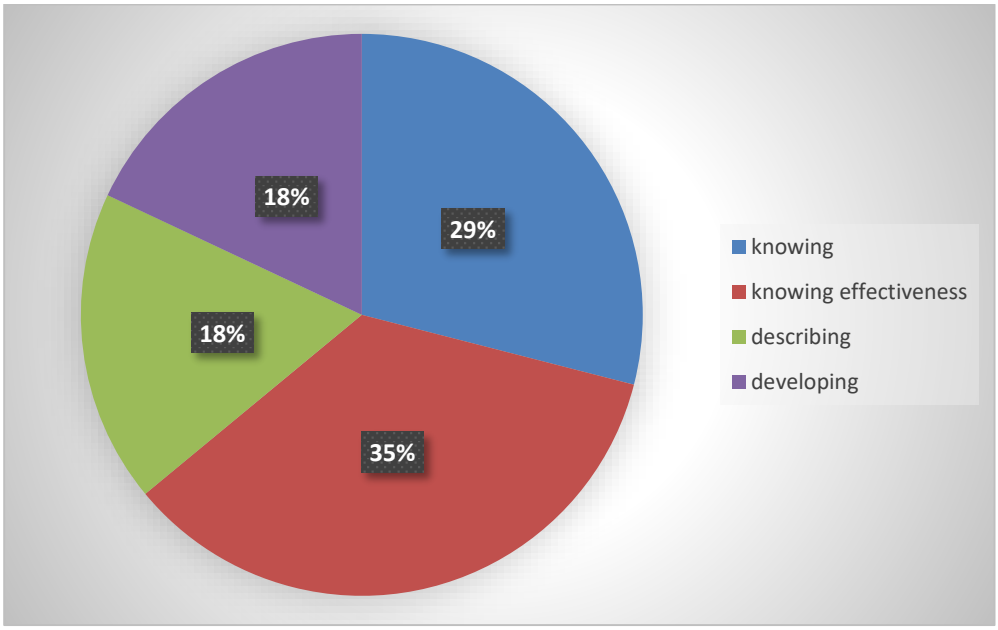

Figure 3. Research objectives.

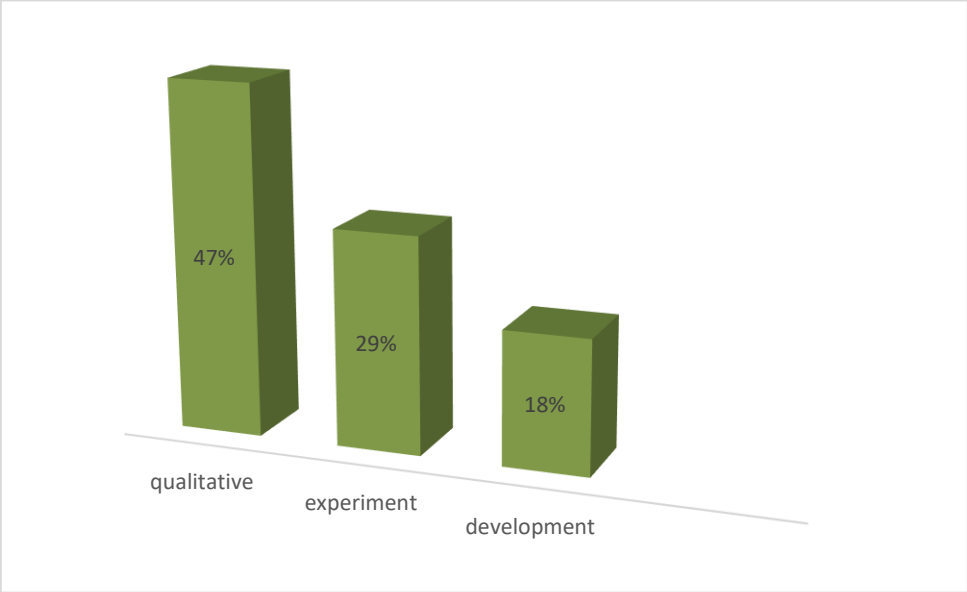

Figure 4. Research design.

Based on figure 3, it appears that from the 17 studies analyzed there were 35% of studies aimed at knowing effectiveness, 29% aimed at knowing, 18% aimed at developing, and 18% aimed at describing. Based on figure 4, it appears that 47% of research uses qualitative design, 29% of research uses experiment and 18% of research uses development design. The lack of effective testing and development research due to online learning is a new thing in the world of Indonesian education. This is in accordance with the opinion of Pujilestari [16] that IT in Indonesia is still entering the stage of studying various possibilities for the development and application of IT in the field of education.

3.4. Profile of instruments and data analysis techniques

Table 1 above is a table of instruments and data analysis techniques used in Google classroom themed studies in mathematics learning in Indonesia. There are four instruments most commonly used, namely written tests, questionnaires, observation sheets, and interview guidelines. Whereas the analysis technique used is 59% using descriptive, 29% using t-test, 6% using F-test, and 6% using Anova. This is following the research design used in each study.

Table 1. Instruments and Data Analysis Techniques.

No	Research code	Instrument				Analysis Techniques
		Test	Questionnaires	Interview guidelines	Observation sheets	
1	P1		√			Descriptive
2	P2	√		√		Descriptive
3	P3	√		√		Descriptive
4	P4		√			Descriptive
5	P5	√	√	√	√	t-test
6	P6	√	√		√	Descriptive
7	P7		√		√	Descriptive
8	P8	√				t-test
9	P9		√			Descriptive
10	P10	√				Descriptive
11	P11	√				Anova

No	Research code	Instrument				Analysis Techniques
		Test	Questionnaires	Interview guidelines	Observation sheets	
12	P12	√		√	√	t-test
13	P13	√	√			t-test
14	P14	√				F-test
15	P15	√	√			t-test
16	P16	√			√	Descriptive
17	P17	√	√		√	Descriptive

3.5. Discussion

Based on a review of the results of the study, in general, it is obtained some data that Google Classroom has a positive impact on mathematics learning in Indonesia. Some of the impacts include the following: 1) Google Classroom is the most widely known e-learning platform by students; 2) Positive student responses to the use of Google Classroom as a learning medium; 3) Learning mathematics using Google Classroom results in better critical thinking skills; 4) Students feel the learning process using Google Classroom makes learning interesting, effective, fosters motivation, fosters independent, active, and creative learning attitudes; 5) Mathematics learning using google classroom has a significant influence on student motivation; 6) Learning to use Google Classroom video help is very effective to use; 7) There is a positive influence on Google Classroom-assisted blended learning on the ability to think creatively and learner learning independence. The positive impact of using Google Classroom media on mathematics learning in high school students is not different from the impact on students, including: 1) Learning with Google Classroom has the effectiveness to support problem-solving skills of high school students; 2) The response of high school students to learning mathematics using Google Classroom is quite effective; 3) Learning using Think Pair Share (TPS) aided by Google Classroom can improve student learning outcomes; 4) Learning Google Classroom on students' mathematical reasoning abilities is quite effective; 5) The use of Google Classroom's assisted blended learning has a positive effect on student achievement.

For junior high school students, the use of Google Classroom in mathematics learning also has a positive impact. The results of several studies of junior high school students include: 1) Video utilization is quite effective in using virtual classrooms using Google Classroom; 2) Student learning outcomes using the Google Classroom-assisted blended learning model are in a good category and have a positive influence. All subjects in the google classroom research on mathematics learning were observed to experience the same increase in learning outcomes. However, it should be noted that the implementation of Google classroom at all levels also has constraints including 1) The problem of cellular signals in students' residence varies; 2) Different economic abilities of students; 3) Students' IT abilities are different. Some of these obstacles can be used as a reference for the application of e-learning platforms in mathematics learning.

4. Conclusion

Research with the theme of Google Classroom on mathematics learning in Indonesia has been found. Researchers found 17 studies with publication years between 2016 and 2020. The results of this meta-analysis show that the profile of research on Google Classroom media is 1) 24% of research published in 2020, 53% of research published in 2019, 18% of research published in 2018, and 6% of research published in 2016, 2) The research population used 47.1% were students, 35.3% were high school students/equivalent and 17.6% junior high school students/equivalent, 3) The most research objectives were to test the effectiveness by 35%, to find out by 29%, to develop by 18% and to describe by 18%, 4) the research design that is widely used is qualitative by 47%, the rest is experimental by 29% and development by 24%, 5) The instrument used was a test of 47%, a questionnaire of 35%, an interview guide of 18% and an observation sheet of 12%, 6) Data analysis technique used descriptive statistics of 59%, t-test of 29%, F-test of 6% and anova of 6%. The benefit of this research is to provide an overview

of the use of google classroom in mathematics learning in Indonesia so that It can be used as alternative online media during the COVID-19 pandemic with consideration of the constraints and benefits that have been analyzed in this study. Researchers' suggestions for further research include: 1) develop a virtual classroom using google classroom; 2) conducting research related to other online learning media; 3) conducting research in the form of developing teaching materials with online media.

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