

Influence Android-Based Learning to Self-Regulated Learning, Entrepreneurship, and Mathematical Literacy

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Abstract

The Covid-19 pandemic requires students to study online and at home. Online learning has its challenges because educators must choose suitable media in delivering material. This study aims to find a comparison of learning independence, entrepreneurial spirit and mathematical literacy before and after using Android media. This research method uses quantitative methods with pre and post group design. This research was conducted in one of the junior high schools in Serang on social arithmetic material. The instrument used is a learning independence questionnaire and an entrepreneurship spirit questionnaire. Another instrument is a mathematical literacy test. Data analysis used paired sample t-test. The conclusion from the results of this study is that there are differences in learning independence, entrepreneurial spirit and mathematical literacy before and after using android media.

Abstrak

Pandemik Covid-19 mengharuskan siswa untuk belajar secara daring dan dilaksanakan di rumah. Pembelajaran daring memiliki tantangan tersendiri karena pendidik harus mampu memilih media yang tepat dalam menyampaikan materi. Penelitian ini bertujuan untuk mencari perbandingan kemandirian belajar, jiwa entrepreneurship dan literasi matematis sebelum dan sesudah menggunakan media Android. Metode penelitian ini menggunakan metode kuantitatif dengan desain pre and post group design. Penelitian ini dilaksanakan di salah satu Sekolah Menengah Pertama di Serang pada materi aritmetika sosial. Instrumen yang digunakan berupa angket kemandirian belajar beserta angket jiwa entrepreneurship, instrumen lainnya adalah tes literasi matematis. Analisis data menggunakan *paired sample t test*. Kesimpulan dari hasil penelitian ini adalah bahwa terdapat perbedaan kemandirian belajar, jiwa enterpreneurship dan literasi matematis sebelum dan sesudah menggunakan media android.

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INTRODUCTION

The covid-19 pandemic has changed almost all the fabric of human life because it spreads almost worldwide. The impact is felt in the world of education. Practically all schools in Indonesia carry out an online learning system, namely learning at home (Daulay, 2021; Siahaan, 2020). This is due to the new clusters of Covid-19, especially students who are still vulnerable if someone in the classroom is exposed to COVID-19. The government's efforts through the ministry of education are to provide subsidized quotas for students to study well even though studying is done at home (Setiati & Azwar, 2020). However, problems that often arise are problems with the internet network owned by students so that students find it challenging to learn and improve their understanding of the material.

One of the problems often encountered is low student enthusiasm for learning because they are too saturated in carrying out online education. Several teachers in Serang provided information that no more than 65% of students did the exercises given by the teacher through the platform chosen by the teacher either through Edmodo, Google Class Room, etc. Even some teachers reported that some classes were below 50% in doing the assignments given by the teacher. This situation makes learning ineffective because not all students carry out online learning carried out by teachers (Results of interviews with Mathematics Teachers at Serang). Then it was found that the mathematical ability was still low seen from the teacher's tests.

The main problem that often arises is student self-regulated learning when online learning is still low. Independence is an essential attitude that a student must possess. It is intended that students are not dependent on others (Granberg et al., 2021; Hong et al., 2021; Wong et al., 2019; Yıldızlı & Saban, 2016). This attitude of self-regulated learning needs to be instilled in students from an early age so that they will have an independent perspective and responsibility for what they are doing in the future. Autonomous learning in the context of learning for students can be disciplined in carrying out their duties (Nurhayati, 2017; Sun et al., 2018). Independence is also one of the goals of national education. It is apparent in the national education goals that one form to educate the nation's life and develop a whole person is to have an excellent independent attitude.

Independent learning becomes an essential need for students because independent learning makes students know and understand learning needs in achieving a promising future. One of the characteristics of successful people from some of the attitudes they must-have is their independence (Nurhayati, 2017; Nurjanah et al., 2020; Sulisworo et al., 2020). People with good freedom will act and think of ideas to solve their life problems. Likewise, students with good self-regulated learning will find the best way to solve the issues they are facing. Independence is a person's ability to direct, control themselves in thinking and acting, and have the self-confidence to not depend on others. Students with good self-regulated learning can be seen from the encouragement to learn independently, their own choice of understanding, and responsibility for their work. If we look at the reality in this online learning, the independence of students' knowledge on their responsibilities still needs to be improved because the environment in their home may not necessarily encourage them to learn. There needs to be learning that can facilitate a pandemic situation like this so that students can easily understand the material presented by the teacher.

Some of the characteristics that can be found if students have good self-regulated learning are having an awareness of their obligations (Saihu & Umar, 2021; Sun et al., 2018). This can be seen if students ask questions about the assignments given by the teacher, then, in fact, he has self-regulated learning to be able to do his job well. In contrast to people who do not have good learning independence, they tend to be indifferent to the tasks given by the teacher so that when there are announcements of material and assignments from them, they tend not to comment and ignore the contents of the notifications provided by the teacher. There are self-regulated learning that students must possess. Another attitude that is required to be included by students is the spirit of entrepreneurship. The entrepreneurial spirit is often associated with someone who owns a business and trades, even though if we dig deeper, the entrepreneurial spirit does not only lead to that.

Someone who gives more value to an object, in fact, already has an entrepreneurial spirit (Lindner, 2018; Olokundun et al., 2018; Wardana et al., 2020).

We can find the form of the entrepreneurial spirit if someone has a disciplined attitude, has different ideas than others, and does not forget to have good learning independence. Creative and innovative nature is necessary for building an entrepreneurial spirit because these two things make a difference for someone in carrying out and implementing the entrepreneurial spirit in various life situations. The fundamental question is, why does the spirit of entrepreneurship need to be given to students through learning carried out by teachers? This is because students can train themselves in innovative and creative thinking. The teacher's learning needs to facilitate these two things so that they can compete with other people who have relatively the same abilities in the future. We cannot imagine that the Indonesian people do not have a good entrepreneurial spirit with this ASEAN Economic competition. Creative ideas will emerge when students get used to the problems they face. Innovative in the sense that they can complete the work given by the teacher by choosing the right different way and can be faster in the usual way (Boldureanu et al., 2018). For example, a student is studying material that usually uses the formula taught by his teacher. He does another way to solve it and is considered faster and more correct. This student has gotten used to thinking creatively and can find other alternative methods.

Learning in the online era like now needs to be made the suitable media to know well. Media has a meaning as an intermediary between the transmitter of information and the one who is given the information. Media in learning has the purpose of means that can be done by teachers in conveying material to their students. Media that the teacher well designs will be able to help students understand the material well. One of the benefits of the media created by the teacher is that it provides motivation and makes the material more interesting and fun (Kularbphettong et al., 2015; Sulistyawati et al., 2018). They are engaging because the teacher has well designed the material to be taught to students. It's fun because students can learn anytime and anywhere about the material.

In addition to self-regulated learning and entrepreneurial spirit, one of the problems that arise is a mathematical ability, in this case, is mathematical literacy. Arithmetic material, which is mainly presented in the real world, is very close to mathematical literacy. Literacy means the ability to read and write. The ability to read, write and count is an essential ability of a person who needs to be possessed and taught early. This critical ability is also a foundation in developing higher-order thinking skills—mathematical literacy is one of the domains measured in The Program for International Student Assessment (PISA). In PISA's view, mathematical literacy aims to assess mathematical knowledge and skills and apply them in everyday life (Pradana et al., 2020; She et al., 2018). PISA defines mathematical literacy as a person's ability to formulate, use and interpret mathematics in various contexts, which involves reasoning and communication skills intending to help students understand the use of mathematics in different contexts (Martin, 2019; She et al., 2018). This becomes the basis for solving everyday problems and determining considerations, and making decisions on an issue.

The data presented regarding smartphone users in Indonesia, which is the highest among other countries, is a potential that teachers and lecturers can develop in providing the material to be delivered. Smartphone user data can be a target in developing technology and information-based media. Android is the largest user among students in Indonesia. Media developed by teachers can refer to platforms that students in Indonesia widely use. Teachers can create android to make learning more exciting and fun. Learning media using the android platform can be easily used by students because this media can be arranged systematically and efficiently used by students. Android media can be used whenever and wherever according to student needs (Indiati et al., 2021; Saputra et al., 2018; Wahid et al., 2020). This is an essential factor in online learning situations that teachers can use in the learning process in the classroom. Some of the advantages of media with the android

platform compared to others are that it is easy to use and can be developed according to student needs.

Mathematical material at the junior high school level, including social arithmetic, needs to be developed based on android media. Social arithmetic material is often found in everyday life and is very closely related to entrepreneurship activities. Activities such as sales and purchases and discounts or discounts are part of this material. Media needs to be developed to have a good entrepreneurial spirit and independence. Students are equipped with two critical attitudes in the current era of competition. Android-based learning for independent learning and entrepreneurial spirit has been widely studied. The results show that android media can be a suitable means in developing independent understanding and entrepreneurial spirit.

Arithmetic material is strongly related to mathematical literacy because it can provide mathematical functions in solving everyday problems. This becomes a fundamental understanding that mathematics can solve problems related to everyday life. This research is to see the effect of android media on independent learning and entrepreneurial spirit. This research also improves students' mathematical literacy skills during education using android media. This research implies that in learning mathematics using an android press, students are able to increase their learning independence, entrepreneurial spirit and mathematical literacy skills. The urgency of this research is that it is essential to create media that can improve learning independence, entrepreneurial spirit and mathematical literacy.

METHOD

The research method used is a quantitative method with a pre-experimental approach. Pre-experiment is used to compare mathematical literacy before and after learning using android media. The test used is the paired sample t-test. The design used is pre and post-test group design. This research was conducted on State Junior High School 1 Serang Class VII students. The population of this study is class VII SMPN 1 Serang, amounting to 439 people. Sampling was done randomly, and one class was chosen to be the research sample, namely class VII C SMPN 1 Serang. The material given is social arithmetic in the odd semester of the 2020-2021 school year. The research was carried out from August to September 2020. This research is a follow-up study of the development of android media that the research team has developed. The research instrument consisted of a self-regulated learning questionnaire, entrepreneurial spirit in students and then a set of tests on mathematical literacy.

The questions were developed to refer to the mathematical literacy developed by PISA. Then the comparison is analyzed before and after learning on social arithmetic material after using android media. The statistical test used is an inferential statistical test with parametric statistics that meet the normal distribution. If it does not meet the normality of the data, a non-parametric test is used instead.

FINDINGS AND DISCUSSION

This study aims to compare learning independence, entrepreneurial spirit, and mathematical literacy before and after using android media. This research is a continuation of a study developed on the previous press made. The media display is as follows:



Figure 1. Screenshot of the initial login of the application

The initial appearance of the media made was adjusted to the character of the seventh-grade students of SMP. This is to attract students; the pictures are illustrated to make it easier for students to understand the applications' commands.



Figure 2. Display of Early Learning

It is the initial appearance of learning in which it consists of the material being taught and then the steps in learning



Figure 3. Observing in the Learning Process

Observing in the learning process has been linked to the entrepreneurial spirit; at the end of the observation, process questions are asked about the entrepreneurial spirit possessed by someone in a natural case. The problems presented are real problems so that students feel like experiencing the real world



Gambar 4. Reasoning in the Learning Process

The students' reasoning process is presented in the form of questions to think of answers to the problem situations that have been displayed.



Display if students experience errors in answering the questions given through the application made

Figure 5. Responses to Answers

The learning process carried out through android media is easy to use, and students can learn anytime and anywhere. This is one of the advantages of android media, namely the flexibility in its use (Indiati et al., 2021; Pramuditya et al., 2018). Through well-organized and systematic applications, students are facilitated in their learning. After the implementation of education is carried out, the next step is analyzing the data obtained in the field. The first data is about the effect of independent learning on entrepreneurial spirit and mathematical literacy. Analysis using simple linear regression, with the following results:

Table 1. Comparison of Independent Learning, Entrepreneurial Spirit, Mathematical Literacy Before and After Using Android Media

Variable	Significance Score
Self-regulated learning	0,001
Entrepreneurship	0,004
Mathematics literacy	0,002

Based on the data from the table, it can be seen that there are significant differences in learning independence, entrepreneurial spirit, and mathematical literacy before and after using android media. This shows that the android press has a considerable influence on all three. Self-regulated learning is an attitude in which a person has responsibility for what he is learning. Students who have high self-regulated learning tend to respond directly to the tasks given by the teacher in contrast to students whose freedom is less likely to be slow in responding to teachers (Nurhayati, 2017; Wong et al., 2019). Self-regulated learning is also one of the most important characters among other characters. Independent learning has a role in being disciplined in doing their assignments. Independent learning accustoms students to discipline and always has confidence that they can do the tasks given by the teacher well without asking others for help first.

Independent learning is also not interpreted as students who do not need the help of others. But the meaning is that independent learning has a confident attitude and tries hard to do it independently. These results also provide information that independence is one of the essential attitudes possessed by students in building an entrepreneurial spirit (Haddad et al., 2021). The entrepreneurial spirit also gives a role to someone to constantly innovate and add value to an object. Through interviews, some students were asked that the entrepreneurial spirit will be awakened because they have good habits from within the students. The unique thing about android media connected to the entrepreneurial spirit is that students can provide innovative ideas when the problems are presented, as shown in Figure 3. Some students responded to being able to sell goods during this pandemic by innovating existing batik motifs that can be adapted to suit the needs of the people—the peculiarities of the area.

Another thing is that they respond that online sales can be an alternative in the current pandemic and technological advances. These results illustrate that the problems presented well in

daily life can be used as an alternative for students to familiarize themselves and improve their entrepreneurial spirit. Another research result revealed in this study compares mathematical literacy before and after using Android media. The results are as follows:

Table 1 provides an understanding that android media can improve mathematical literacy. Android is presented well, and the system can be used to enhance students' abilities in mathematics. Android is easy to use, and we can design attractive designs and animations. Stunning designs and animations can attract students to improve their mathematical literacy skills. The results of this study are also supported by research results (Kularbphetong et al., 2015) that android media can improve students' mathematical literacy skills. Seeing the results of this research becomes a means for teachers to develop media that can be used in the mathematics learning process. The dynamic learning process through the suitable press can allow students to enjoy mathematics. It should be emphasized that inappropriate media can hinder students in learning mathematics. Media that is not systematic and not made carefully can make it difficult for students to learn the material provided by the teacher.

CONCLUSION

The conclusion from the results of this study is that there are differences in learning independence, entrepreneurial spirit and mathematical literacy before and after using android media. The results of this study can be a means for teachers and lecturers to improve their students' understanding skills by applying appropriate media in the learning process in the classroom, especially during online learning.

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