Analysis of Students' Self Regulated Learning Using Augmented Reality Media on Solar System Material at Class VII SMP

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Abstract

With the implementation of some limited face-to-face learning, the effects of the COVID-19 epidemic have now started to significantly fade from education. This forces instructors to be creative so that children can still learn independently. Students who get inadequate online instruction generally behave passively when receiving offline instruction. To deal with the issues of 21st-century learning, technological use, the selection of interesting learning models, and media that are in line with the characteristics of the material, especially abstract material, are still necessary. To prepare students for real life and improve learning, technological application and the growth of student learning independently are important. The purpose of this study was to examine how media augmented with augmented reality helped students learn independently. There are up to 27 students in the seventh grade at SMPN 3 Rantau Bayur in this qualitative descriptive study. A student learning independence questionnaire was designed to collect data, and it was triangulated using learning observation sheets and teacher interviews. The three stages of the data analysis technique are data reduction, data presentation, and summary. The percentage technique was used to examine the learning independence data collected. As according statistics from the learning independence questionnaire, the average percentage in the medium category is 61 percent.

Keywords: Augmented Reality, Self Regulated Learning, Solar System, SMPN 3 Rantau Bayur

INTRODUCTION

The World Health Organization (WHO) has dealt with cases like pneumonia in Wuhan, China, coronavirus, or Covid-19 since December 31, 2019. (coronavirus disease 2019) (A Lee, 2020). WHO classified Covid-19 a global health emergency on March 12, 2020. Advantages of fast dissemination, this virus spreads quickly over almost the entire world, including Indonesia. To try to stop the growth in COVID-19 instances, the Indonesian government has published a number of policies. These regulations restrict some community groups' access to education. A variety of policies have been released by the Ministry of Education and Culture as Circulars, including instructions for cooperative distance learning activities for education professionals (Sun et al., 2020). Practically the entire world performs distance learning activities immediately during the COVID-19 epidemic (Goldschmidt, 2020).

Online learning generally has a number of issues, such as limited internet network connectivity, teacher preparation, and student adaptation strategies (Lie et al., 2020). One of them is the teachers' still-poor ability to use information and technology in learning activities. (Cábyová et al., 2020). In order to generate limited face-to-face learning (PTMT), which differs from traditional face-to-face learning, the government issued regulations, one of which is limited meeting time between teachers and students. Because the use of good and appropriate learning techniques can increase learning outcomes, learning must be carefully prepared by applying appropriate learning methods to ensure that limited face-to-face learning can be performed out optimally so that learning goals can be reached (Dewi Indah Pratiwi, 2019). Additionally, e-learning-based education is a possibility for knowledge construction as predicted by constructivism. Information technology will also make a variety of learning tools easily accessible to students so they can increase their knowledge (Syuhendri, 2009).

Based on observations and interviews with class VII students and a teacher named Mrs. Purnama Sari that were done on December 3, 2021 at SMP Negeri 3 Rantau Bayur, S.Pd. According to observations and interviews, there are still issues with teaching, such as the solar system lesson in science, where the teacher continue to utilize abstract concepts to describe the topic and students continue learning in class by memorizing and reading text. Additionally, at the very least the learning resources used during the learning process. When a teacher employs lessons and homework as a teaching strategy, learning becomes monotonous, the students become bored, and they pay less attention to the lessons that are being presented. So that students become passive learners and learning becomes teacher centered (Eka, Devi, 2015). Some students are less excited to engage in class, as shown by their loss of participation in the learning process. The lack of attentive media selection by instructors is the primary cause of the poor quality of science education. Of course, it will be challenging for students to understand the meaning of the material presented without the supply of effective learning media by teachers (Badiro et al., 2019).

Practically everyone in this millennial era uses a mobile phone or smartphone. Many people, including teachers and students, may easily access and use augmented reality that is linked to a mobile phone or smartphone. In the area of education, augmented reality that is attractively packaged and simple to use will be advantageous. A technology known as augmented reality (AR) projects virtual things into real time while combining two- and possibly three-dimensional virtual objects into a real three-dimensional environment. A visualization technology called augmented reality (AR) is currently being developed for use in video games, entertainment, and even medical (Dedynggego et al., 2015). The application of AR is really quite interesting and improves user activity. Because it uses a marker to display specified three-dimensional (3D) items that are targeted to the Smartphone), augmented reality also has benefits from an interactive perspective. Augmented reality and educational material come together to develop a new kind of application that is utilized to improve the efficiency and attractiveness of teaching and learning for students in the real world.

To make that these activities function smoothly, students must actively engage in the learning process. In order for the learning process to function well, students must be responsive to the limitations of the current learning process by staying productive and changing attitudes and behavior. Self regulated learning combined with the activeness of students to support the learning process is very dependent on current conditions (Huda et al., 2018). The requirement for self-directed learning that must be satisfied during the current pandemic is the situation at present. The demands on students in the field of education are increasing along with the progress of the times, one of which is that they be able and willing to manage their learning activities independently. In general, every

student participates in independent learning, which gives them the chance of learning more and become more aware of their surroundings so they can solve problems that arise.

Using research that was done by (Rosa et al., 2019) claims that using Augmented Reality technology, interactive learning applications have a positive effect on students. Due to the fact that teachers and students are learning together while utilizing unknown technologies, this application also makes it simpler for teachers to explain concepts to students and creates a closer relationship between them. Teachers may produce interesting, interactive, and simple-to-use learning materials by using augmented reality. Learning modules that do not currently exist in schools in virtual or virtual form can also be replaced by augmented reality. Additionally, augmented reality (AR) technology can be utilized to extend content from print promotional materials to promotional materials that take the shape of videos. Students stimulate their interest and learn more about the subject as a result. Based on the information that has been provided, the study's purpose is to evaluate how effectively children learn when utilizing Augmented Reality media to study the Solar System for class VII SMP.

METHODS

This research uses a method of descriptive qualitative analysis. Students in class VII.2 even semester for the school year 2021–2022 served as the research participants. The researcher employed a variety of methods to gather data, including observation, interviews, questionnaires, documents, and experiments using instruments built by the researcher with class VII.2 students and all science teachers. As soon as the data is received, it is processed and studied to identify whether or not the study's goals have been met.

Direct interviews, learning observations, and student learning independence questionnaires were used to collect data on learning independence. The Hidayati & Listyani (2013) instrument, which already has good content validity and construct validity, was used to design the student learning independence questionnaire. The fact that the confirmatory method's factor analysis produced an index of 127.398 with 85 degrees of freedom and a p value of 0.002—indicating that the data is normally distributed multivariate—is proof of this. The used learning independence test has a reliability rating of 0.880, which suggests high reliability (Hidayati & Listyani, 2013).

Six variables are included in the student learning independence questionnaire: independent from others, self-confidence, self-control, discipline, sense of responsibility, and behave on your own initiative. Twenty statement items make up the questionnaire (13 positive statements and 7 negative statements). A Likert scale with five options is used in this test. Researchers created and had validated by professionals' other tools, such as student learning independence observations conducted and science teacher interview sheets. These two tools will be utilized to support the data from the student learning independence survey results.

After performing learning with augmented reality media, these three data will be carefully investigated using the Miles & Huberman (1992) technique and the percentage calculation in order to determine the profile of the learning independence of students. Data on learning independence from student surveys were examined using descriptive statistics (percentages). Each indicator's percentage is computed by multiplying the total score by the maximum score, then dividing that result by 100. The qualitative values from the percentage findings are then converted into categories in Table 1.

Table 1. Category of Self-Regulated Learning

Self-Regulated Learning Score (%)	Category
80-100	High
60-79,99	Medium
50-59,99	Low
30-49,99	Very Low

Source : (Linda et al., 2020)

The Miles & Huberman (1992) analysis method was then used to perform a descriptive, in-depth analysis on the percentage of each indicator. The Miles & Huberman (1992) analytical technique consists of three steps: data reduction (eliminating irrelevant data), data showing (understanding and preparing the following action), and conclusion drawing/verification (answering problem formulation). In order to collect reliable data and depict the actual circumstances, triangulation techniques were also used in this study, specifically referring to additional data in the form of observations and instructor interviews.

RESULTS & DISCUSSION

Six indications of student learning independence are included in the independence questionnaire, including independence from others, self-confidence, being disciplined, having a feeling of responsibility, acting on their own initiative, and practicing self-control. Figure 1's graph displays the percentage of each indication.
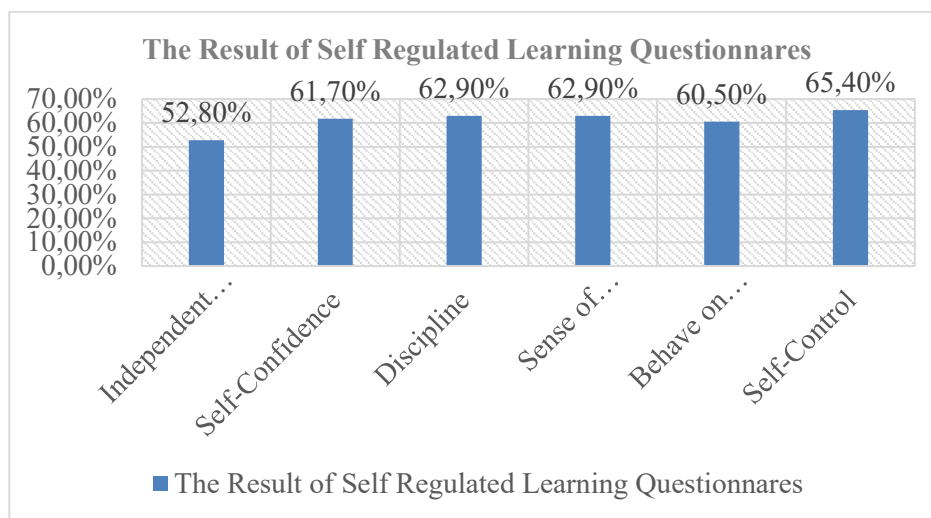

Figure 1. Profile of Student Self-Regulated Learning for Each Indicator

The indicator of self-control received the highest percentage, or 65.4 percent, according to the graph of each indicator in Figure 1, while the indicator of independence from others had the lowest score, or 52.8 percent. The scores for each indication that are shown in table 2 are as follows.

Table 2. Results of Student Self-Regulated Learning Questionnaire for Each Indicator

No	Indicator	Score (%)	Category
1	Independent from Others	52,8	Low
2	Self-Confidence	61,7	Medium
3	Discipline	62,9	Medium
4	Sense of Responsibility	62,9	Medium
5	Behave on Your Own Initiative	60,5	Medium
6	Self-Control	65,4	Medium

Independent from others

Based on survey results, the indicator of independent from others have received a percentage of 52.8 percent in the low group. These findings indicate that the majority of students' learning is still in the hands of adults like teachers and parents. Students have not been able to increase their academic performance on their alone, but rather thanks to the support of others. In order to achieve class assignments in accordance with their skills, students have not been able to choose their own learning strategies. Nearly all students are still unfamiliar with using augmented applications during the learning process supported by augmented reality. Students have technical problems, especially with their smartphone capabilities. Because of this, at this point, students still depend on the instructions and guidance of the teacher.

It is also known that students still gain the support of others, such as parents, teachers, or friends, in order to learn and achieve better results, according to the findings of interviews with science teachers. Develop learning independence beginning with teacher guidance and collaborative learning, but if learning is too led, it may have negative effects on students' ability to self-regulate (Dee Fink, 2009). This description demands for the continued development of indicators of independence from others.

Self-Confidence

According to data from the student learning independence questionnaire, the indicator of self-confidence comes into the medium category with a score of 62.9 percent. These results demonstrated that the majority of students now feel confident in themselves after learning the Solar System using augmented reality media. Self-assured students are known for having confidence to be able to overcome the problems experienced during learning. This is also compatible with observational data showing that over 50% of students asked questions about learning and the accuracy of the information they had received. Another indicator that students are confident is when they dare to advocate for positions that differ from others. 15 of the 27 students dared to express their opinions when the teacher asked them about the material they were studying during the class. By utilizing the discovery learning approach, which stimulates inquiry and develops a sense of pleasure in the process of independently discovering knowledge or an idea, students' self-confidence is improved (Dahliana et al., 2018). The research result from (Azzajjad et al., 2021) shows that using animation to teach can improve learning independence, with a significance level of 0.05 for the t-test results. This result is also a result of the fact that animated media allows students to discover their own facts about the subject material by seeing it in a real setting. Additionally, 3D items are easier to visualize with AR, and even students can engage with them on their own (Goleman, daniel; boyatzis, Richard; Mckee, 2019)

Discipline

The score for disciplined behaviour in the medium group was the highest at 62.9 percent. These results shows that students make an effort to arrive on time for class. All students arrive on time when learning takes place, which has also been verified through observations and discussions with scientific professors. Additionally, disciplined students arrange their learning activities and turn in their homework on time, according to behavioural indicators. Additionally, observations reveal that students submit their assignments on time.

They have made an effort to finish assignments on time, even though not all assignments have the correct answer. This takes place during in the data processing and verification step, which is a part of the knowledge construction process. Meaningful learning can take place when students ask questions, look for answers through careful observation, and then contribute their own answers. This is attributable to the fact that after completing these steps, misconceptions will be discovered and corrected or verified with the aid of the teacher's assessment of the students' responses, allowing the students to understand the limits of their understanding and establish future problem-solving strategies (Honomichl & Chen, 2012).

Sense of Responsibility

In the medium group, the indicator of having a sense of responsibility has a rate of 62.9 percent. This demonstrates how motivated students continue to be about their studies. The implementation of technology in the classroom has an impact on these students' enthusiasm. Self - regulated learners take ownership of determining learning requirements and choose the most effective approach to achieving objectives. It may be concluded that Augmented Reality media can help students in understanding the concepts of the Solar System because all participants turned in their assignments on time. Students believe that studying is substantially more interesting by the presentation of 3D models through the use of augmented reality on their smartphones in the classroom. This is compatible with the totality of research that shows how quickly people can access information and communicate with one another using smartphones as mobile devices. Using mobile devices in the classroom as a consulting tool and a method to access current events (Jan et al., 2014). Additionally, using augmented reality (AR) to teach science has advantages. It can help students understand the material, support independent learning, improve concentration, and foster students' imagination and creativity (Maulana et al., 2019). Additionally, augmented reality can help students become more independent learners.

Behave on Your Own Initiative

The students' initiative in learning is a sign of their learning freedom (Sugandi, 2013). Based on the results of the questionnaire, individuals who behave independently scored 60.5 percent in the medium category. These findings suggest that students are good at thinking carefully about their own goals. But it is nonetheless challenging, according to the findings of teacher interviews, to determine if students are aware of having an opinion. However, eight students tried to stand up and voiced their opinions despite teacher direction during augmented reality learning, according to observers.

The motivation of students has an impact on their ability to learn independently. For learning activities to be completed, motivation is important (Geng et al., 2019), Memory, cognition, intelligence, and reasoning function normally if motivation is not affected with. Even when the assignment has not been assigned by the teacher, good cognition causes students to act consciously of their own own will, design their own

educational activities, and work on practice questions. This demonstrates the value of cultivating an independent learning mindset, or taking initiative during the learning process.

Self-Control

A score of 65.4 percent for practicing self-control shows that students think their learning activities will have an effect on themselves. These improvements also suggest that the majority of students have assessed the learning outcomes by determining whether they have improved or deteriorated. As stated by (Zimmerman, 2008), Students who have control over the learning process through task understanding, the use of suitable techniques, acquisition of motivation, and development of decision-making skills participate in self-regulated learning. Students' motivation for studying is closely related to independent learning. Students have the chance to go on and be interested in the following learning when they are inspired by their lessons (Saeid & Eslaminejad, 2016). A key factor in developing independent learning practices is the motivation for learning that develops (Huang & Hew, 2016), so that students will continue their education both inside and outside of the classroom (in society) (Zumbrunn et al., 2017).

Utilizing interactive media can enhance learning independence and encourage students to be highly motivated students since they feel engaged and appreciate what they are learning (Lalitha & Sreeja, 2020). Students who learn independently are also better able to manage and control themselves as they acquire and verify their knowledge. Students may become more independent learners due to increased motivation and convenience. Interesting augmented reality media have an impact on the percentage of learning independence that is acquired in the medium category. This accords with the research of (Arista & Kuswanto, 2018) showed a 0.46 gain in learning independence in the medium category after consuming android-based media helped by augmented reality. Consequently, it is important to keep developing up with innovative ways to teach so that students' independence grows and influences learning outcomes in the cognitive and psychomotor domains. For further research, the authors suggest conducting research on science subject matter other than the solar system, so that the differences in student learning independence can be seen.

Based on a questionnaire, the outcomes of the students' independent learning after utilizing Augmented Reality media to study about the Solar System indicated a percentage of 61 percent and included in the medium category. This is because students still depend on teacher instructions in learning do their study assignments. Overall, most of the students already have independent learning, but this attitude needs to continue to developed through appropriate, interesting and interesting learning models and media make it easier for students to find their knowledge. teen who independence is in being independent, not only aware of the various alternatives that can be chosen carefully and experienced by themselves, but also able to realistically and objectively resolve internal conflicts while remaining mutually dependence on others (Asrori, 2005).

CONCLUSION

After learning about the Solar System using augmented reality media, students at SMPN 3 Rantau Bayur were independent, achieving a percentage of 61 percent in the medium category. This is due to the fact that students still follow the teacher's instructions when completing their assignments. The majority of children learn independently overall, but this attitude needs to be encouraged through appropriate learning models and media that are engaging and facilitate students' discovery of knowledge.

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