Analysis of Student Learning Independence as the Basis for the Development of Digital Book Creations Integrated by Realistic Mathematics

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Abstract. The aim of this study was to determine the category of independence of SMAN Bukittinggi students in learning mathematics and elaborate a number of thoughts and concepts that believe in the importance of digital book creations integrated by realistic mathematics educations in order to achieve independent learning. The method used is descriptive qualitative through the questionnaires and interviews with the mathematics teacher in Senior High School Bukittinggi and several randomly selected students. The results obtained were the category of independence of SMAN Bukittinggi students in learning mathematics was low. Based on elaborate, a few thoughts and concepts believes in the importance of Digital Book Creations Integrated by Realistics Mathematics Educations in order to achieve independent learning. For this reason, it is necessary to carry out research into the development of a creative digital book integrated with realistic mathematics education to guide self-regulated learning

1. Introduction

Learning independence is one of the important goals in the learning process. This is in line with the Presidential Regulation of the Republic of Indonesia Number 87 of 2017 concerning Strengthening Character Education, which states that in order to create a cultured nation through strengthening religious values, honesty, tolerance, discipline, hard work, creative, independent, democratic, curiosity, the spirit of nationality, love of the country, respect for achievement, communicative, love peace, love to read, care for the environment, care for social, and are responsible, need to strengthen character education [1]. An Independent attitude is a personality trait that has by a person. An Independent attitude is formed gradually starting from yourself, parents, and teachers.

Independence is greatly influenced by the environment, especially the immediate environment, namely the rules and values given by parents. Parents' education patterns also play a big role in fostering independence in children. Children are given the freedom to be responsible in acting so that independence is formed in the child. Teachers in schools are expected to create a conducive learning atmosphere to provide freedom for students independently in school.

The fact that what happens is, students tend to be less independent in learning. Based on the results of observations made at SMAN Bukittinggi on June 19, 2020, students learn from home, so they have difficulty making independent assignments about math exercises. In addition, during the Covid 19 pandemic, many students were not confident in their own abilities, even though there were many sources on the internet. This is also supported by several research results which show that students
tend to have fewer independent attitudes [2]. The lack of good students' independent learning attitudes identifies the lack of good student initiative in learning, student discipline in learning, self-confidence in learning, and student responsibility in learning.

The current phenomenon illustrates that students are closer to smartphones than learning media such as textbooks or the like. However, the benefits of using smartphones have not been maximized in the world of student education. Smartphones are more widely used for social media, offline and online games, perpetuation of student activities or other applications that are just fun applications. The use of smartphones in the learning process is expected to be more useful [3]. This attitude of independent learning of students is expected to develop along with the development of the world of information technology with the needs of modern humans who are demanded creative and innovative. Based on the problems caused by the independent learning of students. Independence is one of the most important factors affecting student academic success [4]. The results of research by Fahinu [5] and Qahar [6] found that students and students who received innovative learning achieved good learning independence. Students' learning independence contributes to creative thinking skills [7]. The ability to think creatively can be seen from the activities carried out by students in learning. Mathematics learning is emphasized on student activities in finding, finding, and building their own necessary knowledge, so that it becomes a learning experience for everyone [8].

Thus, the need for teachers to develop student learning independence because it has long-term benefits for students in the future. So, it is suspected that the problems related to student learning independence above can be solved using Digital Book Creations Integrated by Realistics Mathematics Educations [9] because it is suitable to solve the problem of learning mathematics independence. It is hoped that learning with Digital Book Creations Integrated by Realistics Mathematics Educations can reveal the effect of independent learning. This is very appropriate to be applied in learning in this digital era, especially with the Covid 19 pandemic situation, which demands online learning, like it or not students' study at home (Learning from Home).

Starting with mathematics learning that starts with emphasizing aspects of independence, where students are close to everyday life, the focus of the material selected through this initial research is how the characteristics of students from their independence so that the purpose of this article is to determine the category of independence of SMAN Bukittinggi students in learning mathematics, and elaborate a number of thoughts and concepts believes in the importance of Digital Book Creations Integrated by Realistics Mathematics Educations in order to achieve independent learning.

2. Methods

This study seeks to describe and analyze the problems in Student Learning Independence in the aspects of knowledge and student learning styles in understanding mathematical concepts. In this case, researchers conducted research by descriptive research using a qualitative approach. A qualitative approach is research whose procedures are sourced from data, utilizing existing theories as explanatory material to produce descriptive data in the form of written words from people and actors observed and ending with an theory [10]. The data collection techniques used in this study was qualitative through the questionnaires and interviews with the mathematics teacher in Senior High School Bukittinggi and several randomly selected students.

The study used is a closed questionnaire where answers have been provided so that respondents cannot give answers freely. The questionnaire is arranged in the form of a checklist, which contains a few question items to describe the characteristics of students in learning mathematics. Respondents provide a check (✓) on each question item by selecting one of the four criteria used. The criteria are arranged according to a modified Likert [11], namely, strongly agree, agree, disagree, and disagree.

This research was conducted at SMAN Bukittinggi in June 2020. Students of class XI MIPA at SMAN Bukittinggi in the 2019/2020 school year became the research sample, amounting to 23 people. The sampling was obtained by purposive sampling. The data analysis technique was carried out quantitatively based on the results of the calculation of the questionnaire filled out by the students. The aspects of independence in learning are described in indicators, namely confidence in work results,
initiative in learning, responsibility for tasks, motivation to learn, independence in making decisions, independence in using knowledge and experience in accordance with situations and conditions, and discipline.

Data analysis had begun with determining the highest score for each indicator. Then proceed by calculating the number of scores given by all students who were sampled for each indicator. The next step is to calculate the percentage value of each indicator and data processing is analyzed using the categories proposed by Ministrial Regulation 2013.

3. Results and Discussion
The research results obtained in accordance with the research problems described earlier are to illustrate the independence of students in the aspects of knowledge in understanding mathematical concepts. These results will be taken into consideration in the creation of a creative digital book integrated by ethno mathematics to guide self-regulated learning. The results of student independence data acquisition can be seen in the following categories of student learning independence

3.1. Independent Learning Category for Students of SMAN Bukittinggi
Based on the results of the mathematics learning independence questionnaire which was given online in June 2020 it was concluded that of the seven main indicators in the student learning independence questionnaire were obtained as follows: Confidence in work results, Initiative in learning, Responsibility for assignments, Motivation to learn, Independence in making decisions, Independence in using knowledge and experience in accordance with situations and conditions, Discipline. Of the six indicators, all of them are classified as low, one indicator of discipline that is classified as moderate. This is presumably due to the limited number of students taken, only 23 students who filled in online via Whatsapp, and have not shown the desired results.

Overall processed so that the measured learning independence of students obtained the result is a score of student learning independence has a mean of 82.57 and a standard deviation of 4.18. The questionnaire results data are grouped into three categories, namely the category of high student learning independence with criteria $X > \bar{X} + 1.8$, namely the score above 86.75, the category of student learning independence was the criteria $\bar{X} - 1.8 \leq X \leq \bar{X} + 1.8$, namely the score from 78.39 to 86.75, the category of learning independence is low with the criteria $X < \bar{X} - 1.8$, that is, the score is less than 78.39. With these criteria, there are 4 students who have high learning independence, 17 students who have moderate learning independence and 2 students who have low learning independence. The average score of student learning independence per indicator in Figure 1.
Figure 1 is the result of the description of the level of student independence. The indicator for the level of student independence consists of seven aspects. The seven indicators are: 1) Confidence in the results of work, classified as low, 2) Initiative in learning, classified low 3) Responsibility for tasks, classified low 4) Motivation to learn, classified low 5) Independence in making decisions, classified low 6) Independence in using knowledge and experience in accordance with situations and conditions is low, 7) Discipline, From the data in Figure 1 it can be explained that the six indicators are in the low category, while the student's discipline level is in the moderate category with an average of 82.

Overall, the average level of student independence is a score of less than 78.59 with low criteria. For that it is necessary to follow up with interviews with several students and a teacher. Based on the results of interviews with several students about how independent learning in students, by looking at some of the characteristics of learning independence which are described in the form of several indicators then made in the form of several interview questions. Interview results of student learning independence from Chat Results via Whatsapp.

- Assignments in mathematics are given by the teacher, some are done if you can, if not, let them be, but if the teacher orders them to be collected, just give examples to friends
- The math study schedule was delayed because there was an event, some people just let it go, because there were lots of other work, so I did not think about changing it on another day
- Often do not collect assignments, if the math teacher gives assignments because of the hassle in this pandemic, especially when playing games at the same time
- Students can relate the mathematics they have learned with the knowledge I have acquired, because mathematics in my head is only formula formulas, making me dizzy
- Some are looking for ways to discuss school math subject matter to clarify the concepts I understand by searching the internet
- There are those who do the math themselves, because at home there is the internet, I am free to search until I can
- If there is a sudden daily test while last night I didn't study, someone tried to work alone, let alone study at home, just open the internet or open a math textbook
- At night, the family is asleep and still has unfinished math assignments, continues to work on these assignments, because they don't want to disappoint the teacher
- If it was during mathematics lessons during the Covid 19 period. According to students, if the teacher used online learning, they were very happy because the teacher used a platform that made students interact, but there were also less happy because they were not able to understand on their own
- Have a discussion through discussion with Whatsapp, if you have an opinion that is contrary to the majority of the WA group, ask the teacher to join the chat on WA to give it true or not
- Students are motivated to learn online, there are many ways on the internet that can be used, but also miss the school atmosphere.

While the results of interviews about independent learning with teachers are from Chat Results via Whatsapp.

- Only some students have the initiative in learning for example students do a lot of practice math problems even though the teacher is not told only to like math alone
- So far, student responsibility for the assignments has been good enough, but not all students are aware of their responsibility
- Students' confidence in the results of the work that I assign if they compete in class, but because of this covid, only the punctuality of submitting assignments is seen
- Teacher just provide a clue of steps and ask the digestive students to remember the lesson
- You can say that you are independent and sometimes you search the internet
- Teacher condition the class during the covid period by using google classroom and whatsapp group and sending learning videos
- Students there are motivated to learn but also want to learn face-to-face
Based on the results of the interview with the teacher above, the teacher provides exercises taken from the student's e-book. Due to the condition of Covid 19, teacher use google classroom and whatsapp groups and send learning videos to students in understanding the subject matter and doing exercises. The training activities contained in the e-book have encouraged students to be responsible and disciplined [12].

3.2. Making Digital Book Creations Integrated by RME in mathematics learning can improve student learning independence

Based on the problems of student learning independence, it can be assumed that the solutions offered will be able to solve the problem of learning independence. In accordance with the opinion of Ningsih and Muzanip Alperi [13],[14] who say that independence plays a very important role in improving student achievement. One of the efforts to overcome the low student independence is to create teaching materials that can make students learn independently, namely by providing digital teaching materials that can be accessed by students at anytime, anywhere, and anytime. One of these digital teaching materials is an e-book. The e-book that he developed can foster student independence where all the indicators of independence have been fulfilled [15], [16].

Independence can achieve action completeness criteria because the teacher presents learning with steps in the RME approach assisted by the creation of interesting digital books, and assignments that have varied answers. The following are the stages of RME (Fauzan, 2002) that can improve students' learning independence. First, at the problem-giving stage (this is in accordance with the creations used in digital books), the teacher gives problems in the form of oral and written stories to each group where each two groups get different problems. In addition, students are creative with the given assignments that can be completed in various ways or with various answers, so that activities can be seen because of their creativity. Second, teachers help with digital e-books). Digital book creation can help students’ complete given assignments or find other concepts, so that students are motivated to complete the assigned assignments independently. Furthermore, the teacher facilitates that the assignment that has been independently made is submitted to the group so that each group writes its findings / answers on the group worksheet. Third, the stage of discussing and comparing, students present the results of group work with representatives of two students in each group. For each presentation, two groups are responsible for presenting the results simultaneously. The teacher facilitates that assignments that have been independently made are submitted to the group so that each group writes their findings / answers on the group worksheet. Third, the stage of discussing and comparing, students present the results of group work with representatives of two students in each group.

The teacher is only a student facilitator who never blames students when there is an inaccurate opinion. When there is an inaccurate opinion, the teacher will invite other students to discuss it together. This is done so that students are not afraid or intimidated when expressing their opinions, so that their self-confidence arises after the presentation, the teacher invites groups who are not presenting to compete between groups by giving question cards where the cards will be read by the group presenting. The questions given are flexible, so they can be adjusted according to the group work that is currently presenting. Fourth, the concluding stage, the teacher helps students in concluding activities from the beginning to the end of learning. The teacher helps students by asking questions that can help students conclude the activities that have been carried out. The active process of students in groups allows students to carry out learning according to their knowledge so that students can be independent in their learning [17]. In this case students are expected to learn more meaningfully and can learn independently according to their respective developments.

So it can be concluded that the criteria for student learning independence can be explored through the digital book creations Integrated by RME so that it can increase student learning independence, and is considered effective in increasing students' independent attitudes [18], [19]. Further according to Fauzan and Yerizon, [20] there is an interaction between the learning approach and learning
independence in influencing students' reasoning abilities. In this case, the RME approach has a better effect on improving the reasoning abilities of students with moderate and low learning independence.

Based on the study of several research results above, it can be concluded that independence has an important role in supporting e-book development. The use of digital teaching materials designed in the form of digital book creations integrated by RME can make students interested in learning and play a role in increasing their learning independence. Development of electronic book teaching materials digital book creation in accordance with technological developments, student characteristics and integrated with the real world needs to be done to create independent, meaningful, enjoyable learning and improve student learning outcomes.

4. Conclusion
Based on describing above, obtained were the category of independence of SMAN Bukittinggi students in learning mathematics was low. Based on elaborate a few thoughts and concepts believes in the importance of digital book creations integrated by realistic mathematics educations to achieve independent learning. For this reason, it is necessary to carry out research into the development of a creative digital book integrated by realistic mathematics education to guide self-regulated learning.

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