



Learning Science with TAULISTRİK Media: Increasing Students' Independence

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Abstract. The research objective, in general, is to develop Android-based TAULISTRİK media for science learning in grade 6 elementary school students. This study has two objectives: 1) to describe the process of using TAULISTRİK media in learning science; 2) to test the level of students' independence after using TAULISTRİK media. This study is qualitative with a research and development method. This research was conducted at SDN 6 Karangrayung, Grobogan, Central Java, 2022/2023 for six months. The research subjects in this study were 26 students and teachers of grade 6. Data were collected using interview techniques, observation, and assessment rubrics. Data was validated using source and technique triangulation. Data analysis used an inductive technique. The process of data analysis was data collection, data reduction, data display, verification, and conclusion. The results of this research include 1) The use of TAULISTRİK media consists of the opening, core, and closing stages; 2) There is an increase in students' independence after using TAULISTRİK learning media. The average independence score in the initiative aspect increased from 3.423 to 3.885, the self-confidence aspect increased from 3.585 to 3.838, and the motivation aspect increased from 3.436 to 3.859. The average independence score from the three aspects increased from 3.483 to 3.862.

Keywords: Android · Independence · Science Learning · TAULISTRİK Media

1 Introduction

Natural Science (IPA) is a compulsory subject matter that needs to be taught to students in the 2013 Curriculum. Science teaches things that are around. Science explains various phenomena in every matter in the world, both animate and inanimate objects such as humans, animals, plants, space and earth, seasons and wind, and movement of objects or phenomena why something can work [1]. Science is an essential subject for understanding oneself and the environment. IPA is a way of thinking, investing, and a body of knowledge [2].

Independence is a crucial factor for students. Students' independence can be seen in how students study or work on questions given by the teacher independently. Independent learning is a learning activity independently in knowing sources, formulating

learning objectives, and evaluating learning [3]. Independent students will not easily depend on others [4]. Independent students will not run or avoid problems [5]. Students' independence will allow them to overcome problems at school and when facing life's problems. Learning independence can increase student learning success at school [6]. However, in reality, many students are not independent in learning. Many students work on questions or assignments from the teacher by cheating. Students with high independence will try their best to complete the tasks the teacher gives, whereas students with low independence will easily depend on others for their tasks [7].

Based on the description above, learning media is needed to help students understand the material and support students' independence. Learning media allows teachers to channel knowledge and material to students (Pakpahan, 2020). The development of learning media can be applied via smartphones by developing Android-based learning media applications. Android is a progressive operating system [8]. Android is a software operating system with an open and accessible portable system [9]. Students can independently install learning media based on android applications on a smartphone. Learning media in an android application can be used for student learning anywhere and anytime [10]. Students can explore the features of learning media material installed independently.

Based on previous research on student learning independence in elementary schools, out of 56 elementary school students, there were 37.5% or 21 students in the low category, 46.4% or 26 in the medium category, and 16.07% or 9 in the high category with a medium independence score. Students are at a medium level [11]. Other findings in the study regarding independence show that five students never cheat, 20% sometimes cheat, 20 often cheat, and 60% always cheat [12]. Based on these findings, students' independence in learning is still lacking.

Factors causing the lack of students' independence can be divided into internal and external factors. Internal factors come from within the student, while external factors come from the surrounding environment. Students' independence can be viewed from two things: from social sources in the form of adults such as parents, family, teachers, and coaches and from the opportunity to train oneself to learn independently [13]. The teacher's position in learning shows the lack of students' independence. Students who are not independent are often passive and depend on the teacher as a learning center.

Based on a preliminary study conducted at SDN 6 Karangrayung, Karangrayung District, Grobogan Regency, Central Java Province, in July 2022, it is known that students do not show a sense of independence in the learning process. Students do not take the initiative to study independently. Many students are waiting for the teacher to come and start learning. In addition, when given assignments, it is found that several students are still pacing back and forth, asking their friends for answers. In addition to these findings, students do not read the material in student handbooks or other sources anymore, so there are findings that students do assignments randomly. Their spare time is spent playing and snacking. In addition, there are no learning media that helps them to learn independently. Learning is centered on the teacher. Based on the results of interviews with teachers, it is known that students are often confused about the answers to assignments, so they often ask the teacher for the correct answer. Students also often ask friends about the

answers to assignments. Few students study and do science questions without prompting. Students rarely use their free time to study the material to be taught.

Various research and development of learning media have been carried out to support learning. Previous research states that comic learning media can increase students' independence [14]. In research and development [15], biological media is effectively used for the learning process, with an average score of the experimental class of 84.04% in the control class of 72.69%. Other research shows that *monosa (monopoli bahas)* media can increase students' independence inside or outside of learning [16]. Other research states that instructional media has a difference towards independence with values of 52.22% of never, 65.37% of not intense, and 66.07% of intensely [17]. Another research and development study [18] states that Android-based learning applications are declared valid with an average Aiken value of 0.85. Previous research has not been able to answer the problem of problem-solving optimally.

An alternative solution is "Learning Science with TAULISTRİK Media: Increasing Students' independence." TAULISTRİK is an Android-based learning application that teaches material about electricity in the 2013 Curriculum Natural Science lesson content for 6th-grade elementary school students. Electrical materials are contained in Theme 3, Figures and Inventors. The basic competencies in the media are 3.4 Identifying electrical components and their functions in simple electrical circuits and 4.4 Experimenting with simple electrical circuits in series and parallel. The TAULISTRİK application has various menus to support learning, such as materials, virtual laboratories, educational games, and quizzes.

This research and development aim to develop android-based TAULISTRİK media for learning science in grade 6 elementary school students. There are two research objectives in this article: 1) to utilize TAULISTRİK media for 6th-grade students at SDN 6 Karangrayung; 2) to increase the independence of students in science content for grade 6 students at SDN 6 Karangrayung.

2 Method

This type of research used the research and development (R&D) method with qualitative ethnographic research. The R&D method is a method that is carried out systematically and deliberately used to formulate, discover, improve, produce, develop, and test the effectiveness, validity, and practicality of specific models, products, strategies/means/methods, services, and specific procedures that are better. Ethnographic qualitative research can guide researchers to photograph and explore social life [19].

This research was conducted at SD Negeri 6 Karangrayung, on Jl Raya Karangrayung, Sumberjosari Village, Karangrayung District, Grobogan Regency, Central Java Province. This research was conducted for six months, from July–December.

The subjects of this study were 26 students at SD Negeri 6 Karangrayung, consisting of 18 male students and eight female students, and one grade-six teacher.

The data was validated using source and data collection technique triangulation. Data collection techniques used interviews, observation, and assessment rubrics. The process of giving the assessment rubric was carried out twice, before and after using the TAULISTRİK learning media to measure students' independence. The assessment rubric

Table 1. The Assessment Rubric of Students' independence

No	Mean	Standard Deviation
1	Initiative Aspect	6
2	Self-confidence Aspect	5
3	Motivation Aspect	3

was a questionnaire with a scale of 1 to 5, given to students as research subjects. Description of the scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. The students' independence assessment rubric is presented in Table 1.

Data analysis used the inductive technique. The process of data analysis is data collection, data reduction, data display, verification, and conclusion.

3 Results and Discussion

Based on the results of observations in grade 6 at SDN 6 Karangrayung, there are 26 students in the class consisting of seven female students and 19 male students. The TAULISTRİK media was used in the learning process on September 16, 2022. Each student was asked to bring a smartphone with the android system one day before the test. For students who do not have smartphones, the school provided some smartphones that students could use. The utilization of this media is divided into three stages: introduction, core, and closing. It follows the learning steps arranged systematically with preliminary, core, and closing stages according to the learning method or model [20]. The learning method used is the demonstration method. The demonstration method is a way of teaching by directly demonstrating rules, items, sequences of activities and events, and using learning media appropriate to the material [21]. The time used in learning media is 3 h of lessons.

At the opening stage, students are given an apperception. Apperception links old and new knowledge so students can easily absorb new knowledge [22]. The apperceptions given are in the form of questions linking what students already know, which are then used by students in leading opinions about the material to be taught. The following is an apperception given to students. 1) Is there a light in your house that illuminates the room?; 2) Did you know a lamp must be energized to work?

The core stage begins with the researcher sending files to the teacher via WhatsApp. Then the teacher sends the file to the students via WhatsApp class group. Students are asked to download the teacher's learning media via the WhatsApp group. For students who do not have an internet quota, the researcher and schools provide an internet network that can be connected to each student. After students download and then install the TAULISTRİK application on their smartphones, each student is guided by the teacher and researcher. Some students have difficulty installing the application due to the system's security and must get approval for the item via the phone settings. The researcher helps students who experience difficulties. After the students are all helped, they listen to the researcher's tutorial on how to use it. The researcher gives students information about

the buttons and menus in the application. Students who find it challenging to use the application and are confused about the learning menu are welcome to ask the researcher. After understanding how to use the application, students explore and use TAULISTRİK media independently and enthusiastically. It follows research by [23] that Android media increases students' enthusiasm for learning at school. Students explore various learning menus in the learning media independently monitored by the researcher. It is in line with research and development. Students open a menu of material on electricity, simulations of making simple electrical circuits, educational games, and other menus.

In the closing stage, students convey what material they have learned from the TAULISTRİK learning media, followed by concluding the material guided by the researcher. After that, students are asked to do ten quizzes on the TAULISTRİK learning media. Students are asked to screenshot the results of the quiz work. Students reflect on learning using TAULISTRİK media. Students feel happy because besides learning from each other, students can also play using TAULISTRİK learning media. Students want to use the TAULISTRİK learning media further after learning at school because they have installed the media on their smartphones. Reflection activities help provide input regarding revising the following lesson plan [24].

The researcher tests students' independence through an assessment rubric. The assessment rubric consists of two stages: before and after using the TAULISTRİK learning media. The assessment rubric consists of 14 items with a scale of 1 to 5. Indicators of students' independence are self-confidence, discipline, initiative, responsibility, and motivation [25]. In this research, three indicators of students' independence are taken: initiative, self-confidence, and motivation.

Based on Table 2, the initial average of students' independence in the initiative aspect scored 3.423, and the final average scored 3.885. This value indicates students' independence from the initiative aspect, increasing by 0.462 after using TAULISTRİK learning media. The standard deviation before and after using instructional media is 0.984 and 0.745. It is in line with [26], which states that learning media can increase student self-confidence from the aspect of initiative in learning by 16.67%.

Based on Table 3, the initial average of students' self-confidence aspects scored 3.585, and the final average scored 3.838. This value indicates students' independence from the self-confidence aspect, increasing by 0.254 after using TAULISTRİK learning media. The standard deviation before and after using instructional media is 0.87 and 0.795. It is in line with [27], which states that using instructional media can increase students' independence from the self-confidence aspect in cycle III compared to cycle I and cycle II.

Table 2. The Result of Assessment Rubric on Students' independence by Using TAULISTRİK Media from the Initiative Aspect

Test	Mean	Standard Deviation
Before treatment	3,423	0,984
After treatment	3,885	0,745

Table 3. The Result of Assessment Rubric on Students' independence by Using TAULISTRİK Media in the Self-confidence Aspect

Test	Mean	Standard Deviation
Before treatment	3,585	0,87
After treatment	3,838	0,795

Table 4. The Result of Assessment Rubric on Students' independence by Using TAULISTRİK Media in the Motivation Aspect

Test	Mean	Standard Deviation
Before treatment	3,436	0,815
After treatment	3,859	0,733

Based on Table 4, the initial average of students' independence in the motivation aspect gets a score of 3.436, and the final average gets a score of 3.859. This value indicates students' independence from the motivation aspect, indicating an increase of 0.423 after using the TAULISTRİK learning media. The standard deviation before and after using instructional media is 0.815 and 0.733. It aligns with research [26], which states that 90% of 20 students experience increased learning motivation with the Android-based learning application.

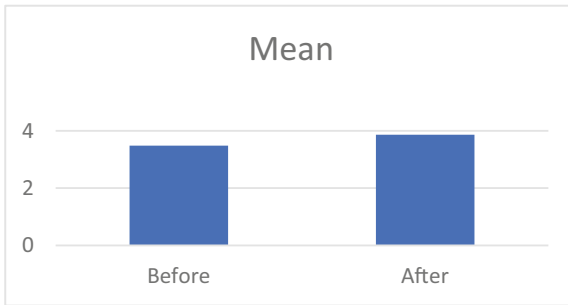


Fig. 1. The Average score of Students' Independence in Using TAULISTRİK Learning Media

Table 5. The Result of Assessment Rubric on Students' independence by Using TAULISTRİK Media in the Initiative, Self-confidence, and Motivation Aspects

Test	Score Total	Percentage	Mean Total
Before	1268	69,67	3,483
After	1406	77,25	3,862

Based on Table 5 and Fig. 1, the average score of the scoring rubric from the aspects of initiative, self-confidence, and motivation before using the TAULISTRİK media is 3.483, and the average score of the final assessment rubric is 3.862. These results indicate that respondents experience an increase of 0.379 in independence after using the TAULISTRİK learning media. Table 5 shows that the total score of students' independence assessment from the aspects of initiative, self-confidence, and motivation before using learning media is 1268, and the total score for evaluating independence after using learning media is 1406, with an increase of 138. The percentage of students' independence assessment before using TAULISTRİK learning media is 69.67%, and after using TAULISTRİK media is 77.25%, with an increase of 7.58% in the percentage of students' independence assessment. It indicates that the total value has increased before and after using TAULISTRİK learning media, aligning with research [28] that using instructional media can increase students' independence. Other research shows the results of students' learning independence before and after applying the media, 75.1 and 101.8 [29]. It aligns with a study that using application media can increase students' independence [30].

4 Conclusion

Using TAULISTRİK learning media in science learning for grade 6 elementary school students is carried out at SDN 6 Karangrayung, including opening, core, and closing activities. The opening contains apperceptions that are used to lead students' opinions on the material to be studied. The core stage includes sending files via WhatsApp Group to students, downloading media, installing media, giving tutorials regarding how to use media, and exploring various menus independently of TAULISTRİK learning media. The closing contains activities for delivering material by students related to the material they are learning, concluding material, doing quizzes, and reflecting on learning.

Students' independence assessment has three aspects: initiative, self-confidence, and motivation. The average initiative aspect before using TAULISTRİK media is 3.423, increasing to 3.885 after using TAULISTRİK media, with an average increase of 0.462. The standard deviation of the initiative aspect before using TAULISTRİK learning media is 0.984. The standard deviation of the initiative aspect after using learning media is 0.745. The average self-confidence aspect before using TAULISTRİK media is 3.585, increasing to 3.838 after using TAULISTRİK media, with an average increase of 0.254. The standard deviation of the self-confidence aspect before using the learning media is 0.87. The standard deviation of the self-confidence aspect after using the learning media is 0.795. The average motivation aspect before using TAULISTRİK media is 3.436, increasing to 3.859 after using TAULISTRİK media, with an average increase of 0.423. The standard deviation of the motivation aspect before using the learning media is 0.815. The standard deviation of the initiative aspect after using the learning media is 0.733. The total score of students' independence from the three aspects before using TAULISTRİK media is 1268, increasing to 1406 after using TAULISTRİK media, with an increase of 138. The total percentage of students' independence from the three aspects of students' independence before using TAULISTRİK media is 69.67%, increasing to 77.25% after using TAULISTRİK media, with an increase of 7.58%. The average score of the assessment rubric of the three aspects of students' independence before using

TAULISTRİK media is 3.483, increasing to 3.862 after using TAULISTRİK media, with an increase of 0.379. These increases indicate that after using the TAULISTRİK learning media, students experience an increase in learning independence.

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