



Learners' Perceptions and Participation in Digital-Based Learning: A Review of the Effectiveness of Teaching Materials and Worksheets

Nur Hakima Akhirani Nasution^{1*}, Silfa Hafizah Pulungan², Yusniar Harahap³

¹ Islamic Family Law Study Program, STAI Barumun Raya, Sibuhuan, Indonesia.

² Early childhood Islamic Education Study Program, STAI Barumun Raya, Sibuhuan, Indonesia.

³ Government Science Study Program, Universitas Graha Nusantara, Padang Sidumpuan, Indonesia.

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Corresponding Author:

Nur Hakima Akhirani Nasution

nurhakima1992@gmail.com

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Abstract: Technological developments and global changes that occur very quickly require academic practitioners to be adaptive and innovative in the learning process. Digital-based teaching materials are one answer that is expected to help teachers carry out the learning process in the classroom. This research aims to measure students' perceptions and participation in digital-based learning where researchers want to see the effectiveness of the teaching materials and worksheets used. This research uses a descriptive quantitative approach by collecting data through questionnaires which will be distributed to respondents consisting of 18 students in class IX of SMP N 1 Barumun Baru Padang Sidumpuan. The research results obtained show that student perceptions are in a very high category and student participation in digital-based learning is also in the high category. Therefore, according to students, the use of digital teaching materials, especially Powton teaching materials and live worksheets, is effective in classroom learning.

Keywords: Digital-based learning; Student perceptions; Student participation; teaching materials; Worksheet

Introduction

Teaching has undergone significant changes in recent decades, largely due to advances in information and communications technology (Bray et al., 2023). One of the most striking aspects of this change is the shift from traditional learning to digital-based learning (Zandonella Callegher & Altoè, 2020). Digital-based learning includes the use of software, hardware, and internet networks to deliver learning material, interaction, and collaboration between students and teachers (Haleem et al., 2022). These changes have influenced not only the way students access information, but also the way they participate in the learning process (Li & Bus, 2023). The main challenges for teachers today include promoting critical thinking skills, and dealing

with variations in students' learning styles and most importantly how to construct learning by utilizing technology such as using digital-based learning (Aditya, 2021).

According to Liu (2023) Digital-based learning is a learning method or approach that relies on digital technology, such as computers, mobile devices, software, and the internet, to deliver, manage, and support the learning process. It includes various forms of learning. Digital-based learning must become a new trend that is the main reference for today's teachers so as not to be left behind by the rapid changes in technology (Falloon, 2020). With the variety of digital teaching materials used, it is hoped that students will be increasingly motivated to learn and will improve their learning outcomes.

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According to Rice & Ortiz (2021) one example of digital-based learning is the use of worksheet teaching materials which refers to the use of digital technology to convert conventional worksheets into digital form that can be accessed and used by students via electronic devices, such as tablets, cellphones or PCs which allow them to fill, save, and interact with the material. With this approach, educators can combine the benefits of digital technology, such as flexibility and interactivity (Moorhouse & Wong, 2022), with the content of existing teaching materials to enhance the learning experience. It is hoped that this digital-based learning will increase student participation and can also be measured through their level of perception after learning assisted by the use of digital teaching materials (Zen et al., 2022).

Students' perceptions and participation in digital-based learning are becoming increasingly relevant and important topics in the current educational context. According to Eriksson (2023) perception refers to the way students recognize and understand their learning environment, including the tools and technology used in the learning process. Perception is a mental process in which individuals receive, interpret, and understand information or stimuli received from their environment (Ta et al., 2023). It involves the way individuals perceive and interpret the world around them, including how they process sensory input such as visual, auditory, and other sensory (Lavi et al., 2021). According to Spence (2020), perception is the result of complex interactions between human senses, previous experience, knowledge, and assumptions. In other words, perception is an individual's subjective way of understanding and giving meaning to the information they receive (Ham et al., 2015). This can differ between individuals due to differences in their background, experience, and knowledge.

On the other hand, according to (Bergdahl et al., 2020) Participation is a key indicator of learning effectiveness, which reflects the level of student involvement in learning activities, both actively and passively. Participation is the action or process of being actively involved in an activity, process, or situation. It involves a person's contribution, involvement, or participation in a particular activity (Purbawati et al., 2020). Participation can be individual or collective and often reflects a person's level of engagement or involvement in social, political, educational, or other environmental activities (Park et al., 2019).

In an era where digital technology must be integrated into classroom learning, understanding how students participate in learning becomes essential in designing effective learning strategies (Rafi'y, 2022). Various factors, such as motivation, level of comfort with technology, learning styles, and individual

preferences will influence students' perceptions and participation in the learning environment, which is also the main requirement in the latest curriculum launched by the government (Badri et al., 2016). Previous studies have tried to explore students' perceptions and participation in learning, but there is still a lack of in-depth understanding of how students should perceive and participate in digital-based learning (Smith & Storrs, 2023). These studies include those conducted by (Hafizah et al., 2022) which measure students' perceptions regarding the use of the Prezi application in science learning, apart from (Praheto & Sayekti, 2019) also measure student perceptions on online-based learning. Another research was conducted Sivakumar et al. (2023) with the title Description of Students' Interests and Perceptions of Learning Media which suggests a close relationship regarding the use of learning media which has implications for good learning outcomes according to students' perceptions, as well as research conducted by Harahap et al. (2021) which states that the use of interactive multimedia collisions in the learning process improves student learning outcomes and can also be observed through their perceptions.

Apart from research related to perception, there is also other research related to student participation, such as that carried out by Wihartanti (2022) where the title of the research carried out was observing student participation in learning English using the blended learning method which also had good effectiveness in terms of the participation found. the same thing Rohmah et al. (2023), also stated that students participate actively in learning by using the blended learning method. Whereas Tong et al. (2022) obtained research results in the form of increasing student participation in learning by applying the blended learning method. The research above has similarities with this research, especially in the context of the discussion and issues raised, namely the perceptions and participation of students regarding learning using a variety of interactive teaching materials and learning methods, but this research has striking differences with the studies above, namely in the research variables. What is raised is the perception and participation of students in terms of the effectiveness of digital teaching materials in learning. Therefore, the main aim of this research is to fill the knowledge gap by investigating students' perceptions and participation in digital-based learning contexts.

Method

The research carried out was descriptive quantitative research. Quantitative descriptive is used to measure the value of independent variables, either one or more, without making comparisons between the two

or making a binding relationship between the variables. The data collection technique used is by using questionnaires. This research was carried out at SMP N 1 Barumun Baru Padang Sidumpuan. The research period is July to August 2023. The research object is students in class IX of SMP N 1 Barumun Baru Padang Sidumpuan for the new academic year for the 2023/2024 period, totaling 87 students. Determination of the research sample selected using a proportional random sampling technique. To determine the number of samples, 20% of the total population was taken. The research sample used was 18 people as respondents.

Descriptive analysis is used to identify patterns and characteristics of data collected with the aim of explaining the phenomenon under study from a statistical perspective (Aspers & Corte, 2019). not in relation to testing hypotheses or drawing conclusions. This approach was chosen based on the consideration that the data to be collected used questionnaires. The questionnaire used in this research has four answer choices, namely Strongly Agree (SS), Agree (S), Disagree (TS), and Strongly Disagree (STS). Later the calculation results will be implemented into a perception scale percentage score categorization table which can be seen as follows:

Table 1. Percentage Categorization of Perception and Participation Scales

Score Categorization Range	Score Categorization Range
≤ 40	Very low
40.01 < X ≤ 53	Low
53.01 < X ≤ 66	Currently
66.01 < X ≤ 79	Tall
79.01 < X	Very high

The student perception questionnaire towards digital teaching materials has three variables which are the main elements in tracking and measuring the extent to which they perceive the digital teaching materials they have used in learning which can be seen as follows. Furthermore, in measuring student participation, researchers used two main elements which were used as research benchmarks which can be seen as follows:

Table 2. Perception Questionnaire Grid.

Variable	Variable Indicator	Sub Indicator
Content quality	Relevance of Material	I feel the material presented is relevant to the learning objectives
	Interrelation ship of concepts	The concepts I study are connected to each other

Variable	Variable Indicator	Sub Indicator
Motivation	Legibility	I easily understand the content of the material provided
	Feedback	Powtoon teaching materials and live worksheets have a comment feature that helps me interact with the teacher
	Interest	I am very interested in learning through powtoon and live worksheets
	Enthusiasm	I am enthusiastic about studying material that is integrated with digital teaching materials
	Independence	I am able to manage my learning through this live worksheet and powtoon
	Problem-solving skills	The problems presented in this digital teaching material trigger my problem-solving creativity
	Increased knowledge	My insight has further developed after learning through this digital teaching material
Learning Performance	Information retention	I remember previous lessons because I studied using these digital teaching materials
	Analytical capabilities	This lesson material is easy to analyze
	Self-evaluation	I overcome my weaknesses in learning

Table 3. Participation Questionnaire Grid.

Variable	Variable Indicator	Sub Indicator
Comments and feedback	Number of Feedback	I diligently provide reviews of learning materials
	Comment quality	I diligently provide related comments and my thoughts on the material
Questions and discussion	Questions asked	The questions I ask are descriptive, analytical, and evaluative
	Activity in discussion forums	I often comment on my friends' critical posts on digital teaching materials
	Questions to the instructor	I often ask instructors (teachers) about

Variable	Variable Indicator	Sub Indicator
		learning in digital teaching materials
	Reflective questions	I like to ask questions related to material that has been studied in the previous week

Result and Discussion

The results obtained by researchers in the field regarding the level of student perception in digital-based learning can be seen in the image below:

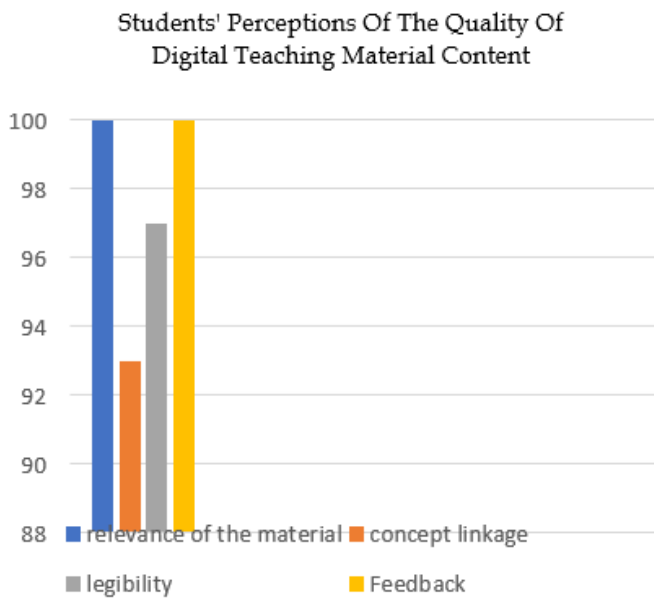


Figure 1. Students' Perceptions of Content Quality.

Based on Figure 1, it is known that students' perceptions of the content quality variable have four variable indicators, namely the relevance of the material which gets a score of 100, in terms of conceptual relevance it gets a score of 93, readability according to students gets a score of 97, and feedback gets a score of 100 which when added up then averaged to get a value of 97.5. This means that students' perceptions regarding the quality of content integrated into digital teaching materials are in the very high category.

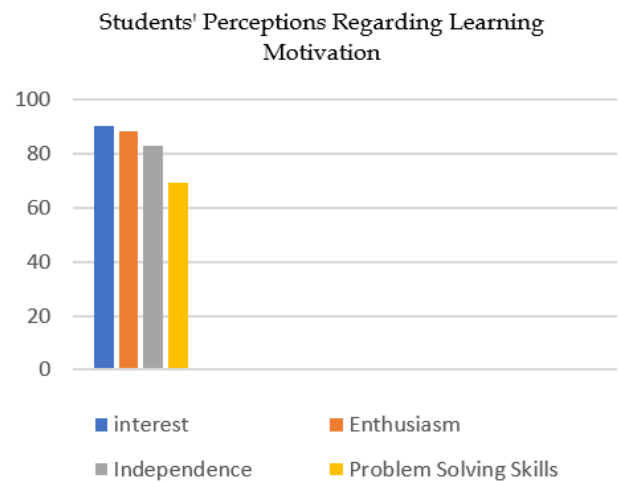


Figure 2. Students' Perceptions Regarding Learning Motivation.

Based on Figure 2, it can be seen that students' perceptions of the second variable, namely the motivation aspect, have four variable indicators which are important aspects in measuring students' perceptions. These aspects are interest which gets a score of 84, enthusiasm gets a score of 83, independence gets a score of 81, and problem-solving skills get a score of 67. If totaled and then divided, the motivation aspect gets an average score of 78.5. This can mean that the value of the motivational aspect of digital teaching materials based on student perceptions is high.

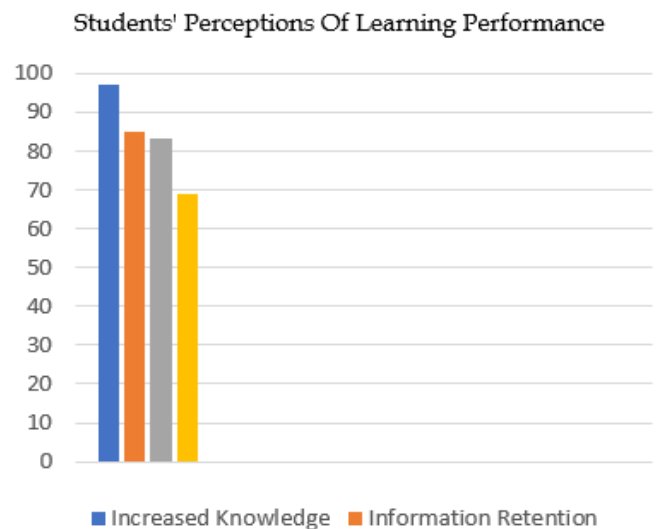


Figure 3. Students' Perceptions of Learning Performance.

Based on Figure 3, the learning performance aspect also has four variable indicators, namely the knowledge enhancement aspect which gets a value of 88, information retention with a value of 83, analytical ability with a value of 81 and the self-evaluation aspect which gets a value of 69 which, if added together and

then divided by four, means got an average of 79.75. This means that in the learning performance aspect, students' perceptions of getting very high results.

Based on the results of a questionnaire distributed to students regarding students' perceptions of digital teaching materials, researchers conducted a review of the effectiveness of Powton teaching materials and live worksheets integrated into learning to obtain satisfactory results. Students gave a fairly good assessment because they were in the very high category regarding the three main variable aspects which are the basic reference for implementing digital teaching materials in class IX of SMP N 1 Barumun Baru Padang Sidumpuan. Furthermore, the results obtained by researchers in the field regarding the level of student participation in digital-based learning can be seen in the picture below:

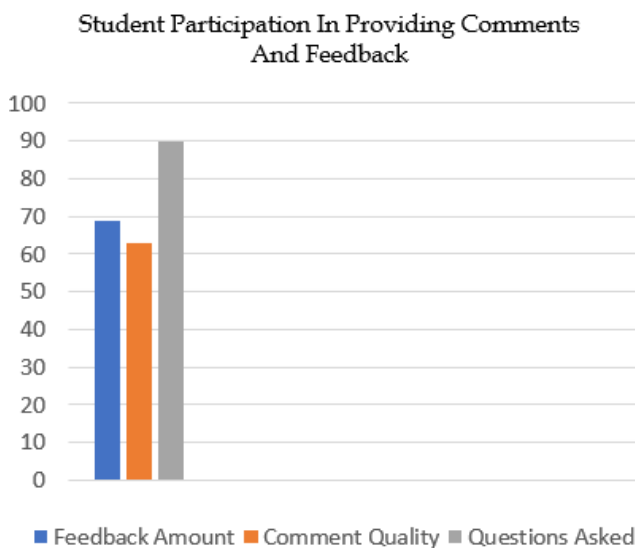


Figure 4. Student Participation Regarding Comments and Feedback.

In Figure 4, it can be seen that student participation in the first variable is related to comments and feedback which has three variable indicators, namely the aspect of the amount of feedback which gets a score of 68, the quality aspect of comments with a score of 63 and the aspect of questions asked with a score of 89. Total The average number of these three indicators is 73. This indicates that student participation in learning using Powton digital teaching materials and live worksheets is in the high category.

Student Participation In Questions And Discussions

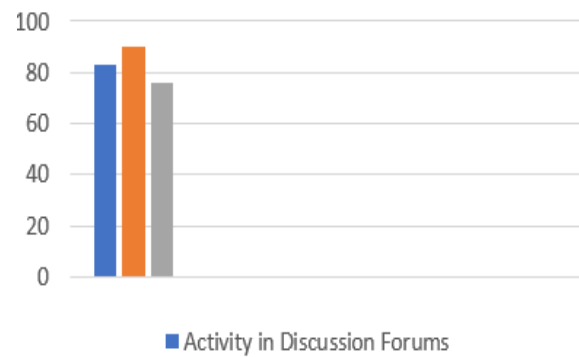


Figure 5. Student participation in asking questions and discussions.

In Figure 5, the results of student participation in the questions and discussion variables are obtained with three variable indicators, namely student activity in discussion forums with a score of 82, the question aspect to the instructor gets a score of 89 and the reflective question aspect gets a score of 75. This means that if you total it up then average it. averaged, the score obtained is 82, which means that students' participation when learning using digital teaching materials is categorized as very high.

The findings obtained in this research are that using digital teaching materials, especially the use of Powton teaching materials and live worksheets, in terms of student perception, has very high results and of course very high perception results will be in line with the implementation of learning objectives. This is in accordance with research conducted by Abdulrahman et al. (2020) which states that by using teaching materials in the form of good media it will increase students' interest in learning and positive perceptions. In terms of student participation, quite good results were also obtained, this was indicated by obtaining scores in the high and very high categories. so with the value obtained, the use of digital-based teaching materials can trigger student participation in the learning process. This means that the use of appropriate techniques, methods or teaching materials will be able to trigger student participation as per research conducted by Prasetyanto et al. (2022) regarding student participation in online learning, the results obtained were that the level of student participation was also in the high category.

Conclusion

Based on the results of research conducted regarding students' perceptions and participation in

digital teaching materials to see the effectiveness of teaching materials in the form of PowerPoint and live worksheets, we got very good results. This means that learning in the classroom must be supported by the use of teaching materials, especially digital teaching materials, Powton teaching materials, and live worksheets. Teachers must try to adapt and innovate to rapid global changes. Using digital teaching materials that are neatly conceptualized and adapted to student's needs, is effective in helping teachers to achieve predetermined learning goals.

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Author Contributions

Conceptualization, N. H. A. N, S. H. P, Y. H.; methodology, N. H. A. N.; validation, S. H. P and Y. H.; formal analysis, N. H. A. N.; investigation, S. H. P and Y. H.; formal analysis, N. H. A. N.; investigation, S. H. P and Y. H.; resources, N. H. A. N and S. H. P.; data curation, Y. H: writing-original draft preparation, N. H. A. N and S. H. P.; writing—review and editing, Y. H.: visualization, N. H. A. N and S. H. P.; supervision, Y. H; project administration, N. H. A. N.; funding acquisition, S. H. P and Y. H. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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