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The application of digital technology in teaching physics: A quantitative study in terrain using Sem-moderating

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Abstract: The formulation of the problem that arises from this research is to find out and analyze how the variables of creativity in delivering subject matter and the effective use of digital media affect the improvement of students' learning abilities through the capacity to use technology as an intervening variable. The subjects of this study are high school teachers and students in Medan City, where the variables in this study are independent variables, namely the creativity of delivering subject matter and the effective use of digital media, the dependent variable, namely the variable of improving students' learning abilities and the intervening variable is the variable capacity to use technology. The results of data analysis used using SEM analysis using SMART PLS 4.0 software. The research method uses a descriptive quantitative method of data analysis using the structural equation model (SEM) method, where the results of data processing with the SEM method are carried out with the PLS 4.0 application. From the results of this study, the conclusions are that partially the variables of creativity in the delivery of learning materials and the effective use of digital media affect student learning abilities and affect the capacity to use technology. Simultaneously, the variable delivery of learning materials and the capacity to use technology affect students' learning ability through the variable capacity to use technology as an intervening variable. The more creative the delivery of learning materials, and the more effective the use of digital media through the creation of the right technology use capacity will have an impact on improving student learning abilities and producing students who are creative and able to translate learning materials significantly.

Keywords: *Capacity to use technology, Creativity, Digital technology, Effectiveness, digital media, Learning materials, Student learning ability.*

1. Introduction

The school is a place for the teaching-learning process, where the school will apply methods and learning processes that are tailored to the subjects taught. Schools have something to change about teaching procedures, methods and learning models that are tailored to the understanding and pedagogical abilities of the teachers concerned. (Alyousify, Ahmed L. and Mustafa, 2022)..

There are several pedagogical abilities that must be possessed by teachers, such as the ability to improve understanding of the characteristics of students, the creation of modules according to the curriculum, the ability to develop students' potential, improve the ability to use learning media, and improve the ability to determine objective and subjective assessments. (Papacharalampopoulos, Alexios, Sabatakakis, Kyriakos and Stavropoulos, 2021)..

In the process of improving the ability to use learning media, it is necessary to harmonize between manual learning media and digital-based learning media, where manual learning media makes the learning process uninteresting for students, and makes students bored and bored, thus affecting students' ability to understand learning material well. (Sosa-Reyes, Ana María, Villavicencio-Queijeiro, Alexa and Suzuri-Hernández, 2022).. Digital learning media has its own advantages, where the use of

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digital learning technology in teaching physics has great potential to improve students' understanding of concepts that are often abstract and complex. Digital learning media allows students and teachers to learn and teach anytime and anywhere. This is particularly useful in situations where distance or hybrid learning is required, such as during the COVID-19 pandemic or for students living in remote areas. (Ferdiman, Bayu, 2023).

Digital technology provides access to a variety of learning resources, including e-books, videos, simulations, podcasts, journal articles, and more. This allows students to explore materials from multiple perspectives and deepen their understanding. Access to these learning resources will make it easier for students to access, as well as process the search for learning materials quickly and effectively. (Cárdenas-Sainz, Brandon Antonio, 2023).

Digital media such as interactive simulations, learning videos and *online* quizzes can make learning more interesting and interactive. This increases student engagement and helps to maintain their attention for longer compared to conventional learning methods. This method will make it easier for students to remember, as well as analyze the learning material comprehensively. (Azlan, Che Ahmad, 2020).

With digital media, learning can be tailored to the needs, interests and abilities of individual students. For example, adaptive platforms can offer additional tasks or content for students who need more support or provide additional challenges for students who understand the material quickly. Digital media can make learning more developed, allowing students to improve their critical and creative thinking, thus enabling an interactive and flexible learning process that makes students' understanding of the material better. (Lindner, Claudia, Rienow, Andreas and Jürgens, 2019)

The use of digital technology can be beneficial for the process of creating creativity in the application of learning materials. Through this digital technology, it not only increases creativity in the delivery of material but can also increase effectiveness in the process of delivering material on an ongoing basis comprehensively, where the process of creativity and effectiveness in the use of digital technology will make improvements in student learning abilities through the capacity for maximum use of technology carried out continuously in schools. (Hall, Daniel M., 2022).

Digital learning platforms often include features that support collaboration, such as discussion forums, chat rooms, and document sharing tools. This allows students to communicate and cooperate with classmates or even students from other schools in *real-time*, where the existing features will make students enthusiastic and interested in following the subject because it is able to present real forms of creative application of learning through the inclusion of features that are suitable for learning content and materials. (Lucchi, 2023).

Digital learning is very important for students, where digital learning will allow students to increase their thinking stimulus, so that with good thinking it will increase their creativity, so that teachers will always create creative learning methods through digital media in every learning process that will be carried out in order to improve the quality of the learning process to improve student abilities. (Platz, Constantia and Pontevedra, 2019)..

The use of creative teaching-learning technology through the creation of creativity will have a real impact on applying and incorporating learning materials and materials wisely, where the process of incorporating learning materials through media that is able to explain in detail about the concepts to be brought, so that it will provide an easy understanding of learning materials for students, which in turn will tend to keep students' abilities stable, which makes students able to understand that the learning materials taught can be easily understood well. (Bereczki, Enikő Orsolya and Kárpáti, 2021).. The creative learning process through digital learning media in the learning process also helps students develop important digital skills, such as information literacy, technology-based problem solving, and the use of digital software and tools that can create an interesting and creative learning process, so as to bring effectiveness in the delivery process, so that it requires a courage from the teacher in increasing the effectiveness in providing material, so that the material can be absorbed by students, so that students can increase student understanding through increasing willingness to learn. (Abuselidze,

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George, 2022).

Digital technology allows teachers to track student progress in greater detail. The data collected by the learning platform can be used to analyze the achievement of learning objectives, identify areas that need improvement, and provide timely interventions so that the technology can assist the process of presenting material comprehensively to students, making the learning process more effective, as well as increasing students' willingness to learn well and helping teachers create understanding in learning. (Shoiynbayeva, Gulnara T., 2021)..

The increase in willingness to learn through the effective use of digital learning media is inseparable from the increased capacity possessed by the digital media, where the better the existing capacity, it will tend to make the media to be used can improve the quality and ability of students to understand learning well, and will tend to create high student willingness to learn. (García-Ros, Gonzalo and Alhama, 2023)..

The better and better understood by students the creation of learning materials through digital technology, the better the process of applying the learning methods that will be delivered, so that it will affect students' ability to filter learning materials properly, and can easily understand well the delivery of materials delivered with this technology. (Robinson, Guy M., Hardman, Michael and Matley, 2021)..

One of the subjects that teachers should always use digital learning media is Physics. This lesson requires the use of digital technology in the process of delivering learning materials. Through this digital technology, the delivery of learning materials can be clearly directed and able to improve student learning ability, as well as create the capacity for effective use of technology in the learning process.

In Medan City there are around 49,816 high school students, while the number of high school teachers in Medan City is 3002 people, where of these students around 65% of students have not been able to improve their ability to learn. This is triggered by at least 65% of teachers in Medan City not being able to provide learning materials properly, where the teacher is unable to improve the ability to use digital learning media properly, so that the available material is not clear and makes students not understand and understand well the learning material provided by the teacher. This indicates that the use of digital learning media is unable to increase effectiveness and is unable to increase creative power in the process of delivering learning materials through digital media which ultimately affects the learning process.

2. Literature Review

2.1. Creative Delivery of Learning Materials

In order for students to find the learning process interesting, relevant, and productive, it is imperative that educators use creativity when presenting their subject matter. (O'Connor, Jane, 2023). Here are some creative ways that can be used to deliver learning materials:

1. The use of Interactive Multimedia by using content that can be made more interesting and easy to understand by utilizing interactive simulations, infographics, animations, and videos. Students can see ideas from multiple points of view and utilize multimedia assistance in simplifying complex concepts.
2. *Project-Based Learning*, where teachers can use project-based projects to encourage students to find original answers to real-world problems, rather than just giving lectures. Examples include creating prototypes or models, designing experiments, or creating campaigns to raise awareness of environmental issues.
3. Learning with Narratives or Stories (*Storytelling*), where students may find it easier to remember and understand difficult subjects if taught through stories or narratives. Stories related to the subject can be fairy tales, true stories, or fictional events.
4. *Experiential Learning*, where learning can be made more interesting and meaningful by involving students in practical activities or hands-on experiences such as field trips, laboratory experiments, or real-life simulations.
5. Integrating AR/VR Technology, where learning can be made more interesting and meaningful

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by engaging students in practical activities or hands-on experiences such as field trips, laboratory experiments, or real-life simulations.

6. Using Digital Collaborative Tools, where with the help of apps like Google Jamboard, Padlet, and Miro, students can collaborate virtually in groups even if they are geographically dispersed. These resources facilitate communication, idea exchange, and teamwork on projects.
7. Using the *Flipped Classroom* Learning Method, which involves students watching videos or reading books on their own at home, then using class time for participatory exercises such as debates, problem-solving, or group projects. This frees up more class time for in-depth group projects.
8. *Case-Based Learning* involves teaching specific topics through real-world case studies, particularly in areas such as business, law, economics and medicine. Students get the opportunity to apply theory to a practical environment and hone their analytical and problem-solving skills. (Wang, Jingying, 2018).

By utilizing this creative approach, the learning process can become more interesting and meaningful, thus helping students to be more engaged and motivated to learn. (Eberle, Julia and Hobrecht, 2021)..

The indicators of creativity in delivering learning materials are:

1. Vary learning methods by employing a variety of teaching strategies, including debates, experiments, storytelling, simulations, discussions and flipped classes.
2. Technology integration through the efficient use of digital platforms, interactive simulations, multimedia tools and educational software.
3. Innovative presentation of content through the ability to convey information in interesting and unique ways, such as through games, stories or art projects.
4. The development of creative thinking skills by using activities or projects that encourage students to solve problems, think creatively, or get out of the box, as well as open-ended questions that encourage critical and reflective thinking in them. (Juuti, Kalle, Kervinen, Anttoni and Loukomies, 2022)..

2.2. Effectiveness of Using Digital Media

The extent to which digital media improves student learning outcomes, engagement, motivation, and skills can be used to measure how effective it is as a teaching tool. (Pilario, 2024). Here are some aspects that show the effectiveness of using digital media:

1. Improve concept understanding, where students can learn abstract or difficult subjects using interactive visual media such as simulations and animations. Simulations in physics or chemistry, for example, can help students understand ideas that are difficult to convey through text alone, such as force, energy, or chemical reactions.
2. Increases student engagement and motivation, where with the use of challenges, incentives, and achievements, digital media that incorporates game elements can increase student motivation and engagement. In a good sense, it increases fun and competitiveness in learning.
3. Facilitate collaborative learning, where with features such as online chat, group projects, and real-time document sharing, digital media such as *Google Classroom*, *Microsoft Teams*, or other platforms facilitate student collaboration.
4. Developing digital skills, where students who use digital media are better able to acquire critical digital literacy skills such as using digital devices, surfing the internet, and solving problems using technology.
5. Optimizing educational resources, where digital media gives users access to free and open educational resources, such as free software, digital textbooks, and journals. (Michos, Konstantinos, 2022).

With these aspects in mind, digital media can be used effectively to improve the quality and effectiveness of learning. However, it is important to ensure that technology is used in an appropriate

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way and does not disrupt the learning process. (Abdulrahaman, M. D., 2020).

Indicators of the effectiveness of using digital media in the learning process are:

1. Improved learning outcomes, where there is an increase in student learning outcomes through formal (such as exams, quizzes and assignments) and informal (such as observation classes and feedback) channels.
2. Level of student engagement, where students engage in online forums, interactive tests and group projects as a means of learning more regularly.
3. Increased motivation and learning satisfaction, where students' level of satisfaction with the teaching strategies used, as determined by surveys or personal reflection.
4. Thinking and problem-solving skills, where students showed improvement in their capacity to analyze information, construct arguments, and solve sophisticated problems. (Al Ghatrifi, Maryam Omer Madhaffar, Al Amairi, Jawaher Salim Sultan and Thottoli, 2023)..

2.3. Student Learning Ability

A student's ability to understand, assimilate and apply newly acquired knowledge and abilities is known as learning ability. These skills cover a range of cognitive, emotional and psychomotor aspects that influence how students absorb knowledge, overcome challenges and adjust to diverse learning environments. (Javaid, Mohd, Haleem, Abid and Suman, 2023).. Here are some important components of student learning ability:

1. Cognitive ability is a student's capacity to retain knowledge over a long period of time.
2. Metacognitive skills, where students must be able to identify their learning style as well as their strengths and weaknesses in order to learn as effectively as possible.
3. Psychomotor ability is the ability to organize one's movements and physical abilities, such as writing, using tools, or conducting laboratory tests.
4. Adaptability is the ability to deal with new or evolving educational situations with a constructive perspective, free from feelings of helplessness or fear of failure.
5. Literacy skills are the ability to write in a clear, organized, and topic-relevant manner and to read with ease. (Qaiser, Muhammad Talal, 2023)..

The indicators of student learning ability are:

1. Cognitive indicators are the ability of students to understand and articulate the fundamental ideas and concepts that are taught
2. Metacognitive indicators are the ability to recognize one's learning strengths and weaknesses.
3. Psychomotor indicators are the capacity to use theoretical information in practical situations, such as experiments, making projects, or making presentations.
4. Indicators of academic success are grades or scores that demonstrate mastery of subject matter on exams, quizzes, or assignments. (Kummer, Natalie, 2022)..

2.4. Technology Use Capacity

The ability of an individual, in this case a student, to use digital technology successfully and efficiently to support learning and other academic tasks is referred to as technology utilization capacity. This competency includes technical proficiency, knowledge of hardware and software operations, and the capacity to best integrate technology into education. (Laseinde, Opeyeolu Timothy and Dada, 2023).

Students can use technology to improve their academic performance and personal growth by learning how to use it and becoming better equipped to overcome learning obstacles in the digital age. (Costa, Paulo Dias, 2023).

Here are some key aspects that reflect the capacity to use technology:

1. Digital literacy is the ability to utilize and navigate various digital platforms, including word processing software, online browsers, video conferencing applications, and learning management systems (LMS).
2. Basic technology skills are the ability to use devices such as computers, tablets, smartphones,

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printers and other learning-related equipment.

3. The use of technology for learning is the ability to use technology in routine educational activities. Examples include the use of apps for note-taking, concept mapping, group projects and virtual experiments.
4. Creativity and technological innovation is the ability to create new work or complete project tasks using creative tools and programs, such as graphic design software, simple coding applications or simulation tools.
5. Self-management of learning using technology is the capacity to engage with content or instructors through distance learning platforms, access digital resources, and enroll in online courses or learning programs.
6. The use of technology for self-evaluation and self-development is the capacity to monitor learning progress using digital tools and applications, such as learning data analysis software, *e-learning platforms* with automated evaluation, and quizzing applications. (Hämäläinen, Raija, 2021)..

By understanding and developing this capacity to use technology, students can be better prepared for the challenges of learning in the digital age and utilize technology to support their academic success and personal development. (Iglesias-Pradas, Santiago, 2021).

The indicators of technology use capacity are:

1. Digital literacy indicator, where students have access to a variety of digital tools and resources, including word processing programs, presentation software, learning management systems (LMS), and online chat and email services.
2. Basic technology skills indicator, where students have the ability to operate hardware, including computers, tablets, smartphones, printers and other educational gadgets.
3. Indicators of technology utilization for learning, where additional learning tools such as e-books, online academic journals, and instructional films can be found by students using technology.
4. Technology responsiveness and adaptation indicator, where when learning with the latest equipment or software, students can adjust quickly. (Philippe, Stéphanie, 2020).

2.5. Conceptual Framework

The description of the research conceptual framework is:

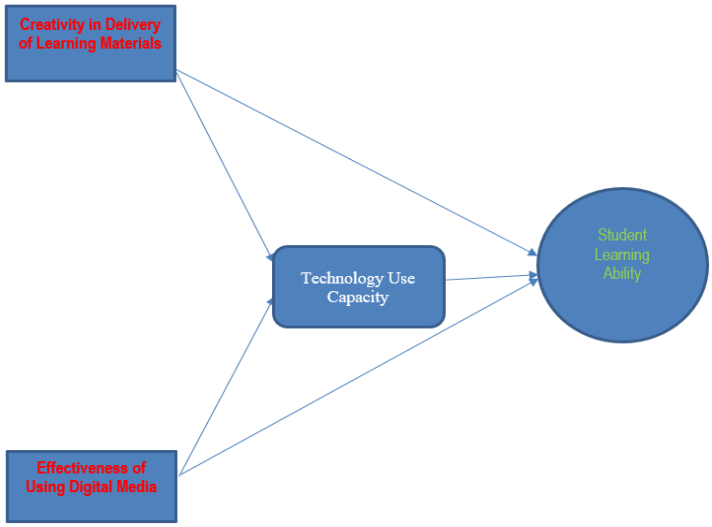

Figure 1.
Conceptual framework.

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2.6. Hypothesis

1. Creativity in delivering learning materials affects students' learning ability
2. Creativity in the delivery of learning materials affects the capacity to use technology
3. The effectiveness of using digital learning media affects students' learning ability
4. Effectiveness of digital media use affects the capacity to use technology
5. Capacity to use technology affects students' learning ability
6. Creativity in delivering learning materials affects students' learning ability through the capacity to use technology as an intervening variable.
7. The effectiveness of using digital learning media affects students' learning ability through the capacity to use technology as an intervening variable.

3. Research Methods

This research method was carried out using a quantitative descriptive method using the *structural equation model* (SEM) method analysis, where according to (Bakhtiari, Vahid, 2023) Structural Equation Modeling with PLS outlines a multivariate statistical method for examining the complex relationships between latent variables and observable variables. With a single model that covers everything, SEM allows researchers to test and estimate correlations consisting of many variables at once. The population in this study were 49,816 students and 3002 teachers of Senior High Schools in Medan City, where the sampling method was carried out using the *simple random sampling* method, where according to (Bakhtiari, Vahid, 2023) the sampling method using *simple random sampling* is a sampling technique where everyone in the population has the same opportunity to be selected as a sample. The number of samples taken can be done using the Slovin formula as follows:

3.1. Number of Students

$n = N / (1 + Ne^2) = 49{,}816 / (1 + 49{,}816 \times 0.1^2) = 99.99 = 100$ high school students in Medan City.

3.2. Number of Teachers

$n = N / (1 + Ne^2) = 3002 / (1 + 3002 \times 0.1^2) = 99.97 = 100$ high school teachers in Medan City.

total sample size of 200 samples

4. Research Results and Discussion

4.1. Research Results

4.1.1. Descriptive Testing

Descriptive testing was carried out by analyzing the characteristics of 200 high school teachers and students in Medan City. The descriptive analysis of the characteristics of respondents according to the following table is:

Table 1.
Respondent characteristics.

Variables	Category	Frequency	Percentage (%)
Gender	Male	175	87.5
	Female	25	12.5
Age	20-24 Years	125	62.5
	25-30 Years	45	22.5
	31-40 Years	30	15

The table above explains that the respondents who answered the most questions based on gender were male respondents at 87.5% or 175 respondents, while the least respondents answered the question were female respondents at 12.5% or around 25 respondents. Characteristics of respondents based on age, the respondents who answered the most questions were respondents in the age range of 20-24

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years by 62.5% or 125 respondents, while the fewest respondents answered were respondents in the age range 31-40 years by 15% or 30 respondents. The output of the SEM test can be described through the following *Bootstraping* diagram:

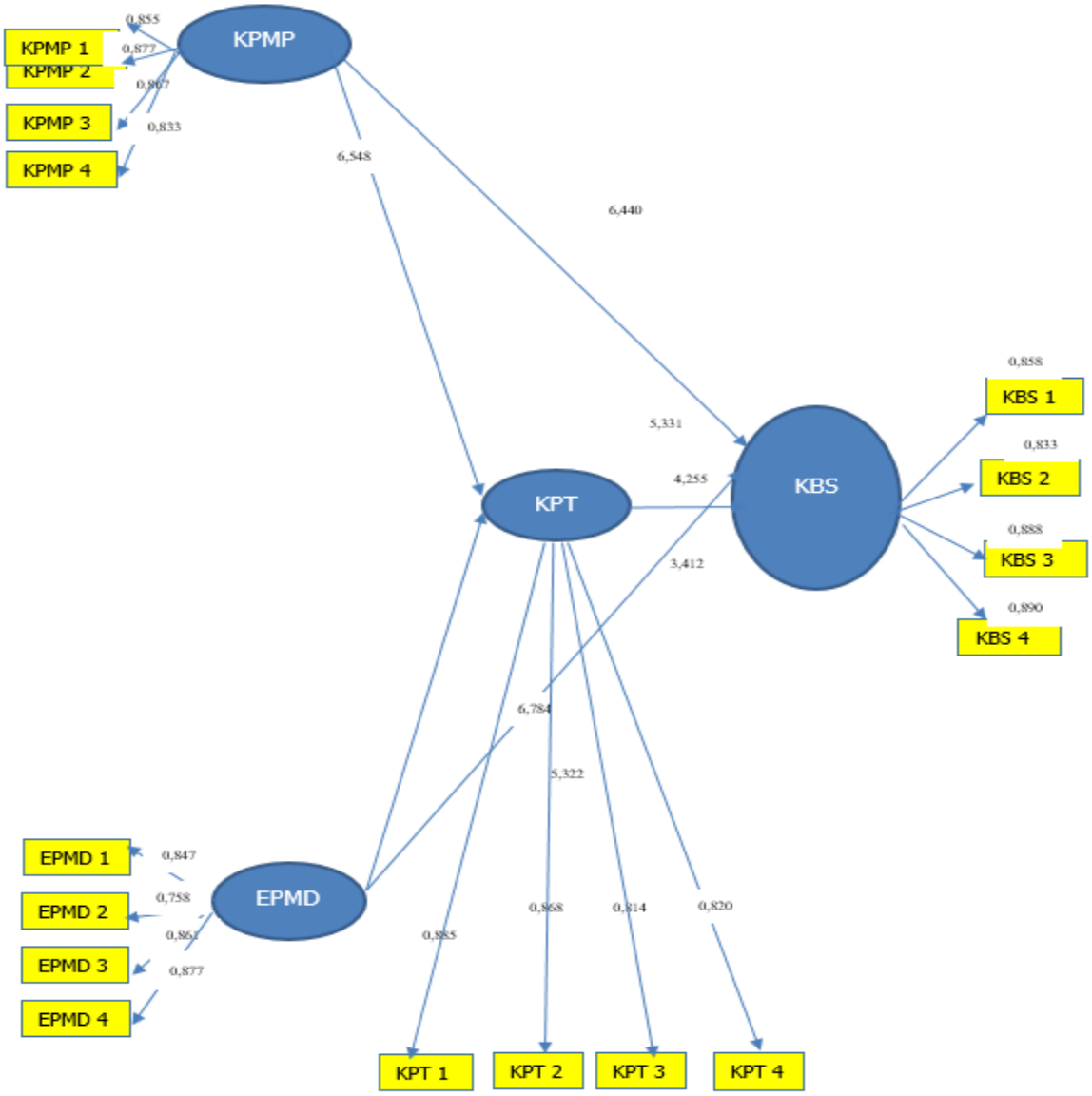

Figure 2.
Bootsraping diagram.

4.2. Convergent Validity Analysis

(Bakhtiari, Vahid, 2023) states that *convergent validity* analysis shows that the method for calculating how closely or highly related indicators (latent variables) are to a construct. The results of the *convergent validity* test in this study are:

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Table 2.
Convergent validity test.

Variables	Indicator	Outer loading
Creativity of learning material delivery **(X)**$_1$	KPMP 1	0.855
	KPMP 2	0.877
	KPMP 3	0.867
	KPMP 4	0.833
Effectiveness of digital media use (X)$_2$	EPMD 1	0.847
	EPMD 2	0.758
	EPMD 3	0.861
	EPMD 4	0.877
Student learning ability (Y)	KBS 1	0.833
	KBS 2	0.858
	KBS 3	0.888
	KBS 4	0.890
Technology use capacity (Z)	KPT 1	0.875
	KPT 2	0.868
	KPT 3	0.814
	KPT 4	0.820

Table 2 above states that the data from each variable is appropriate and suitable for use.

4.3. Average Variant Extracted (AVE) Analysis

(Bakhtiari, Vahid, 2023) states that the AVE test is used for confirmatory factor analysis (CFA) or structural equation modeling (SEM), the Average Variance Extracted (AVE) test is a method used to evaluate the convergent validity of a latent construct in a measurement model. The results of the *Average Variant Extracted* (AVE) test are in the following table:

Table 3.
AVE test.

Variables	AVE
Creativity of learning material delivery (X)$_1$	0.838
Effectiveness of digital media Use (X)$_2$	0.874
Student learning ability (Y)	0.844
Technology use capacity (Z)	0.855

Table 3 above describes the *Average Variant Extracted* (AVE) value greater than 0.5, which means that the data distribution is valid and appropriate or suitable for use.

4.4. Composite Reliability Analysis

According to (Bakhtiari, Vahid, 2023) *Composite Reliability* testing is a technique used in confirmatory factor analysis (CFA) and structural equation modeling (SEM) to evaluate the internal consistency (reliability) of a latent construct in a measurement model called the Composite Reliability Test (CR). This can be seen in the following table:

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Table 4.
Composite reliability test.

Variables	Composite reliability
Creativity of learning material delivery $(X)_1$	0.885
Effectiveness of digital media Use $(X)_2$	0.825
Student learning ability (Y)	0.765
Technology use capacity (Z)	0.875

Table 4 above states that the *composite reliability* value is greater than 0.6, where the distribution of data is relevant and appropriate or suitable for use.

4.5. Discriminant Validity Analysis

In Discriminant Validity analysis it is important to ensure that variables that should not be correlated or only slightly correlated, do indeed show this pattern. The results of the *Discriminant Validity* analysis can be seen in Table 5.

Table 5.
Discriminant validity analysis.

	Student learning ability moderating effect 1	Student learning ability moderating effect 2	Student learning ability moderating effect 3	Student learning ability moderating effect 4
Creativity in delivery of learning materials	0.770	1.000	0.745	0.624
Effectiveness of using digital media	0.667	0.745	1.000	0.727
Student learning ability	0.758	0.787	0.847	0.767
Technology use capacity	1.000	.745	0.668	0.637

Based on Table 5 above, it can be seen that the AVE value of the construct equation does not affect each other, so it has met the *Discriminant Validity* value.

4.6. Path Coefficient Testing

As for the *path coefficient* test, it can be seen through the following table:

Table 6.
R square test.

Variables	R square
Creativity of learning material delivery $(X)_1$	0.888
Effectiveness of digital media use $(X)_2$	0.848
Student learning ability (Y)	0.858
Technology use capacity (Z)	0.868

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From Table 6 above, the R Square value of the student learning ability variable is explained by the variable creativity of delivering learning materials, the effectiveness of using digital media and the capacity to use technology by 85.8%, while the remaining 14.2% can be explained by other variables not presented in this study.

4.7. Hypothesis Test

The results of hypothesis testing can be seen as follows:

Table 7.
Hypothesis test.

Hypothesis	Influence	T-Statistics	P-value	Results
H1	Creativity in the delivery of learning materials on student learning ability	6.440	0.001	Accepted
H2	Effectiveness of using digital media on student learning ability	5.322	0.000	Accepted
H3	Creativity in the delivery of learning materials on the capacity to use technology	6.548	0.002	Accepted
H4	Effectiveness of using digital media on capacity to use technology	6.784	0.004	Accepted
H5	Capacity to use technology on student learning ability	4.255	0.000	Accepted
H6	Creativity of learning material delivery on student learning ability through the capacity to use technology as an intervening variable	5.331	0.000	Accepted
H7	Effectiveness of digital media use on student learning ability through technology use capacity as an intervening variable	3.412	0.000	Accepted

According to Table 7 above, it can be concluded that partially the variables of creativity in delivering learning materials and the effective use of digital media affect students' learning abilities and affect the capacity to use technology. Simultaneously, the variable delivery of learning materials and the capacity to use technology affect students' learning ability through the variable capacity to use technology as an intervening variable.

5. Discussion

5.1. Creativity in Delivering Learning Materials Affects Student Learning Ability

The results of the study state that the creativity of material delivery affects the learning ability of high school students in Medan. This is in accordance with research from (Ripoll, Vanessa, Go dino-Ojer, Marina and Calzada, 2021) which states that teachers who are able to convey learning material will have an impact on understanding the material that creates students' learning abilities.

5.2. The Effectiveness of Digital Media Use on Student Learning Ability

The results of the study explain that the effective use of digital media affects the learning ability of high school students in Medan City. This is in line with research (Alexa, Villavicencio Queijeiro, 2022) which states that the more effective the teacher is in the use of digital media in delivering learning materials will create students' willingness to learn and make them improve their learning abilities.

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5.3. Creativity in the Delivery of Learning Materials Affects the Capacity to Use Technology

According to the results of existing research, the variable creativity of material delivery affects the capacity to use technology of high school students in Medan City. This is in accordance with research (Kumar, Vishawash, 2021) which states that the more creative the delivery of learning materials will have an impact on increasing the capacity to use digital technology in order to support the learning process to create learning that is able to produce 4C abilities and teacher pedagogical abilities.

5.4. Effectiveness of Digital Media Use Affects Capacity to Use Technology

According to the results of existing research, the variable effectiveness of using digital media affects the capacity to use technology of high school students in Medan City. This is in accordance with research (Yu, Xiaoling, Jiang, Ming and Liu, 2023) which states that the more effective the use of digital media, the better a teacher's capacity to use technology and be able to create students who have the ability to understand material and issues related to the learning process.

5.5. Technology Use Capacity Affects Student Learning Ability

The results of the study state that the capacity to use technology affects students' learning ability. This is in accordance with research (Wang, Yongliang, Pan, Ziwen and Wang, 2023) which explains that the better the capacity of digital technology for the learning process and the delivery of amteri from the teacher, the better the understanding of students receiving learning material and the more students will be able to learn seriously.

5.6. Learning Material Delivery Creativity Affects Student Learning Ability Through Capacity to Use Technology as an Intervening Variable

The results of the study describe that the variable creativity of material delivery affects the learning ability of high school students in Medan through the capacity to use technology as an intervening variable. This is in accordance with research (Kummer, Natalie, 2022) which explains that the more creative the delivery of amteri, the more able the teacher will be to create the capacity to use technology that will be used as learning media, then it will create more ability from students to understand the subject matter presented.

5.7. Effectiveness of Digital Media Use Affects Student Learning Ability Through Capacity to Use Technology as an Intervening Variable

The results of the study describe that the variable effectiveness of media use affects the learning ability of high school students in Medan through the capacity to use technology as an intervening variable. This is in accordance with research (Costa, Paulo Dias, 2023) which states that the more effective the use of digital media for delivering material in class, the more real the increase in students' willingness to learn will be which makes the level of students' ability to understand the learning process better, so that the more real the ability and capacity of the technology used that can provide benefits to improve students' abilities and potential.

6. Conclusion

From the results of this study, the conclusions are that partially the variables of creativity in delivering learning materials and the effective use of digital media affect student learning abilities and affect the capacity to use technology. Simultaneously, the variable delivery of learning materials and the capacity to use technology affect students' learning ability through the variable capacity to use technology as an intervening variable. The more creative the delivery of learning materials, as well as the more effective the use of digital media through the creation of appropriate technology use capacity will have an impact on improving students' learning abilities and producing creative students who are able to translate learning materials significantly. It is recommended that some high schools in Medan

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City implement a creative and effective learning process in delivering learning materials, where learning materials should be implemented through a digital system that creates a teaching system using AI or artificial intelligence in order to create an understanding of student learning so that students have student learning abilities.

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