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Validity of interactive media to strengthen understanding concepts in integer class vii

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ABSTRACT

This research aims to test the validity of interactive media to strengthen the understanding of concepts in integer material for class VII MTs. The method used is qualitative and descriptive. The research instrument used a questionnaire from 3 experts, two practitioners, and 13 class VII students at MTs At-Taawun. The research results show that according to interactive media design experts, it is valid with a percentage of 91.7%, media experts with 81.7%, material experts with 90%, media practicality with 85.4%, and student trials with a rate of 87.7&. Based on the research results, interactive media on integers was declared valid with an average of 88.9%, so interactive media was declared suitable for use. The results of this research can also be used as a reference for research regarding media validity testing. The media that has been created can be used as learning media during the learning process.

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INTRODUCTION

Many learning media in the 21st century are packaged using technology. That way, learning, especially mathematics, becomes more exciting and easier to understand. Apart from that, using technology-based learning media also creates effective learning and can even increase student motivation in learning. In the 21st century, the use of learning media by utilizing technology will become a widely used strategy (Peña-Ayala, 2021), with various types of learning that can foster creative, critical attitudes (Chrysti et al., 2021) as well as student interest and achievement (Ray et al., 2019). Learning media with technology is conceptually a teaching and learning process carried out directly (offline) with support from technology (Nursyam, 2019). various learning media can be created using technology in the 21st century, namely game media, digital video and animation, augmented reality, interactive media, and others.

The large variety of technology-based learning media can enable students to learn without the role of a teacher. Namely, students learn independently (Widjayanti et al., 2018). Students can interact with learning media that the teacher has previously provided. This media is called interactive media. Interactive media combines images, text, video, animation, and audio, presented

interactively in teaching (Tambunan & Siagian, 2022). In general, interactive media has the advantage that learning becomes more fun, students' learning attitudes improve, the learning process can be carried out in the place desired by the teacher, and the quality of student learning (Pebriyanti et al., 2021). Based on the interviews and observations conducted on mathematics teachers by researchers at MTs At-Taawun, the learning process for class VII (Seven) still uses a conventional approach. The Mathematics teacher also added that students experienced obstacles in solving problems related to positive and negative integers. Many students admit that mathematics is complex (Tambunan & Siagian, 2022). On the other hand, students also need help understanding the concept of integer material. This is caused by mathematics teachers needing to start using technology in the learning process, even though teachers must develop media to deliver material appropriate to the media used (Prasetiya, 2018).

Based on the observations above, implementing the class VII learning process at MTs At-Taawun requires innovations in delivering mathematics learning. This requires finding solutions to minimize the problems and difficulties teachers and students encounter during the learning process. Facing challenges requires fun solutions and innovations that stimulate students to learn, enable each student to receive the material, and help students know and understand the material the mathematics teacher has presented during the learning process. So, from this hope, researchers are interested in creating learning media. One learning medium that is fun and can improve student learning outcomes that researchers will use to achieve effective teaching and learning is video-based interactive media created through the Canva application (Muhammad, 2020).

The Canva application is a design application that can be accessed online or offline with graphic designs such as pamphlets, presentations, invitations, graphics, banners, Facebook covers, and posters (Tanjung & Faiza, 2019). Apart from having graphic design (Pelangi, 2020) revealed that Canva has many advantages for creating learning media, including (1) the designs for making media are numerous and exciting, (2) it can increase the creativity of students and teachers in creating learning media, (3) designing learning media can be done practically and saves time, 4) designing in Canva can be done using cellphones and laptops. According to (Wulandari & Mudinillah, 2022), the advantages of Canva make it easier for teachers to create learning media, especially video-based interactive learning media as stated by (Triningsih, 2021) that The Canva application can make it easier for students and teachers during the technology-based learning process, creativity. , and skills. This is because the results of the Canva application design make students study more actively with exciting teaching materials and materials.

Research on several lessons that use interactive media shows a good response. Research conducted by Novitasari, 2016 showed a good response where interactive multimedia influenced students' mathematical abilities. Another study conducted by Wulandari (2020), namely interactive media using the Macromedia Flash application, shows a positive influence on the formation of students' interest in learning, especially in mathematics lessons. Rahma & Nurhayati (2021) further explained that interactive media using the Kahoot application has implications for increasing student motivation and learning outcomes so that it is suitable for use. From the opinions above, interactive media can be used in learning to support practical learning. Unlike previous research, this research will develop interactive video media using the Canva application containing material on integer numbers for class VII MTs.

Video-based interactive learning media can be used online or offline. Hopefully, the benefits of this interactive media in the learning process will attract more students' interest in understanding integer material conceptually and contextually. Based on the background above, the researcher wants to test the validity of interactive media in class VII MTs At-Taawun integers and contribute to developing more effective and engaging teaching methods for students to understand mathematical concepts.

METHOD

This research was carried out using qualitative and quantitative methods. Qualitative aims to describe and explain facts based on ways of thinking and points of view (Sunismi et al., 2023). In this study, the researcher describes the validity test of interactive media in integer lessons so that it

is hoped that it can optimize students in the learning process activities. Meanwhile, quantitative research is in the form of numbers from the results of a Likert scale.

Based on the above, this research uses a questionnaire as an instrument. Next, questionnaires were given to subjects, including three experts, 13 students, and two practitioners. Three experts are design experts, material experts, and learning media experts. Meanwhile, subject two practitioners came from university lecturers and mathematics teachers. The questionnaire instrument is used so that the validation test that will be carried out is more focused and does not leave the interactive learning media created (Creswell, 2008). The questionnaire used aims to measure the validity of interactive media using integer material. Interactive media was tested for validity by design experts, media experts, material experts, and practitioners. After that, it was revised to improve the media quality according to validators' comments. The fixed media was tested on 13 class VII students of Mts At-Taawun using a questionnaire to determine students' responses to using interactive media on integers. The assessment aspects on the questionnaire sheet given to validators and trials are as follows.

Table 1. Validator assessment aspects

No.	Validator	Assessment Aspects
1	Design Expert	1. Media Engineering Aspects
		2. Visual Aspect
2	Material Expert	1. Aspects of Integer Material
		2. Aspects of Practice Questions
		3. Linguistic Aspects
3	Learning Media Expert	1. Aspects of Learning Objectives and Materials
		2. Aspects of Practice Questions
		3. Linguistic Aspects
4	Practitioner	1. Material
		2. Language
		3. Graphics
		4. Learning
5	Small Group Trials	1. Fill
		2. Display
		3. Learning

The collected validation data is then analyzed by calculating the scores on each questionnaire given to design and media experts, material experts, and practitioners. Previously, the researcher provided an interactive video with a validation sheet to the validator for assessment. Next, the researcher calculates the score from the validation results; from this score, the researcher interprets its validity. Meanwhile, analysis using descriptive percentage techniques uses a formula developed by previous researchers (Sunismi & Fathani, 2016). It can be seen in Table 2 and Table 3.

Table 2. Instrument Validation Criteria

No.	Final score	Validation Criteria	Decision
1	43 – 52	Very Good	Interactive Media can be used without Revision
2	33 – 42	Good	Interactive Media can be used with Revisions
3	23 – 32	Not Good	Interactive Media can be used but must be Consulted with Experts and Practitioners.
4	13 – 22	Not Good	Interactive Media cannot be used

Table 3. Product Validation Criteria

No.	Percentage (%)	Validation Criteria	Decision
1	90 – 100	Very Valid	Interactive Media is Ready to use
2	80 – 90	Valid	Interactive Media is Ready to use
3	70 – 80	Fairly Valid	Interactive Media can be used with Slight Revisions
4	60 – 70	Less Valid	Interactive Media is Revised and Completes Deficiencies
5	0 – 60	Invalid	Interactive Media is Failing and Must be Revised Entirely

RESULT AND DISCUSSION

Results

Interactive Media Display on Integer Material

On the main menu, there is a display that displays objectives, materials, videos, simulations, and quizzes. To use it, you can click on the menu you want so that you will be directed to the destination.

Figure 1. Main Menu

In the material section, there is an explanation of integer material and examples of integer numbers, which are given using video so that students can understand more about positive and negative integer numbers. The material display has a home button to return to the menu, an X menu to return to the whole thing, and an arrow to continue explaining the material. In the video display, there is a next button to continue to the next slide.

Figure 2. Exposure to Integer Material

Interactive simulations are provided so students can fully understand positive and negative integers. When students answer, there will be a picture that answers. If the student's answer is wrong, a sad cartoon will appear with the wrong answer, whereas if the student answers correctly, a happy cartoon will appear with the correct answer. To continue with the second example question, students click the arrow button at the top left for each answer.

Figure 3. Simulation Questions

The quiz was conducted to determine how well students understood the integer material that had been studied previously using a video display. The quiz consists of 10 questions on positive integers and negative integers. The results of students' answers will appear immediately after students have finished working on the questions (Harsiwi & Arini, 2020). Results will also go into the teacher's spreadsheet directly.

Figure 4. Integer Quiz

Questionnaire Validation

Before interactive learning media on integer material is used, the researcher conducts a validation test to determine whether this media is suitable for use. Validation of teaching materials is an assessment process carried out on a press to decide whether the media is valid so that the results can determine the validity of interactive learning media for use in the learning process (Ferdianto & Setiyani, 2018). This validation is used to determine the suitability of the instrument. If validation fails, the researcher revises the instrument until it is suitable. Material validation was carried out by class VII mathematics teachers and mathematics education lecturers. Assessment is

carried out by matching the results of the assessment aspects with the assessment indicators. The assessment questionnaire indicators are as follows.

Table 4. Validation Analysis of Product Assessment Questionnaire Instruments

No.	Component	Score				
		A	B	C	D	E
	Eligibility of Content					
1	The Statements in the Instrument are Clear	3	3	4	4	4
2	Statements with appropriate instrument answers	4	3	4	4	4
	Goal Achievement					
3	Teaching Materials with Statements Made Accordingly	3	4	3	3	4
4	Objectives with Appropriate Instrument Statements	3	3	3	4	3
	Format					
5	Statements on the Instrument (General-Specific) are Appropriate	3	4	3	4	4
6	Suitability of Instrument Writing Layout	3	3	4	3	3
7	The Columns used Correspond to the Size of the Paper used	3	4	4	3	3
	Language					
8	The Language used is by EYD	4	4	3	3	3
9	The Language used is Easy to Understand	3	3	3	3	4
10	The Language used is Appropriate to the Student's Ability Level	3	3	3	3	4
	Graphics					
11	Appropriate use of Letters	3	3	3	3	3
12	Proper use of Punctuation Marks	3	3	3	4	4
13	Correspondence of the Sentences in the Instrument with the Functional Elements of Writing	3	3	4	3	4
Amount		**41**	**42**	**44**	**44**	**47**

Information A is the design expert questionnaire score, B is the media expert questionnaire score, C is the material expert questionnaire score, D is the practitioner expert questionnaire score, and E is the expert questionnaire score for class VII students. From Table 4 above, design and media experts obtained a validation score of 41 and 43, 44 from material experts, 44 from practitioner experts, and 47 from students who were a small group from the research. The results obtained, checked with the assessment guidelines, showed that all questionnaires were outstanding. Therefore, the questionnaires could only be used to make improvements.

Product Validation

After the assessment questionnaire instrument is declared feasible, it is used to assess the product. At this stage, calculations are based on validation results from media and design experts. The aspects evaluated by design experts are media engineering and visual communication. Media and design experts assess the elements of media engineering, learning design, and learning visual communication. The results of the analysis by design and media experts can be seen in Table 5.

Table 5. Validation Data from Interactive Learning Media and Design Experts

No.	Aspect	Media Expert Score	Design Expert Score
1	Aspects of Learning Media Engineering	18	20
2	Aspects of Learning Design	14	17
3	Aspects of Visual Communication	17	18
Amount		**49**	**55**
Score Percentage		**81.7**	**91.7%**

In Table 5, the percentage of assessments by media experts shows that the interactive media on integer material developed is declared valid with an average score percentage of 81.7%. In comparison, the analysis results by design experts are 91.7%, so it can be concluded that the media interactive on integer material is very valid. Therefore, interactive learning media on integer material can improve students' understanding.

Based on the questionnaire scores, validation results by material experts are as follows.

Table 6. Material Expert Validation

No	Aspect.	Material Expert Score
1	Aspects of Learning Objectives and Materials	18
2	Aspects of Practice Questions and Competency Tests	14
3	Linguistic Aspect	17
Amount		**49**
Score Percentage		**90%**

Table 6 shows that according to experts, the interactive learning media material on integer material is valid with a score percentage of 90%. Therefore, interactive media on integer material can improve students' understanding.

The practicality test was carried out by two experts, namely a mathematics teacher and a mathematics lecturer. The results of validating the practicality of interactive media are as follows.

Table 7. Results of the Validation of the Practicality of Interactive Media

No.	Aspect	Expert 1	Expert 2
1	Material Aspects	17	18
2	Linguistic Aspect	14	12
3	Graphic Aspect	15	15
4	Learning Aspects	16	16
Amount		**62**	**61**
Score Percentage		**86.1%**	**84.7%**

Referring to Table 7, it can be concluded that Interactive learning media on material was proven valid by expert practitioner trials with a score percentage of 85.4%. Therefore, learning media based on interactive learning media on proper integer material is expected to make it easier for students to learn integers, and learning objectives can be achieved optimally. The validation results from a small group of 13 Mts At-Taawun students are as follows.

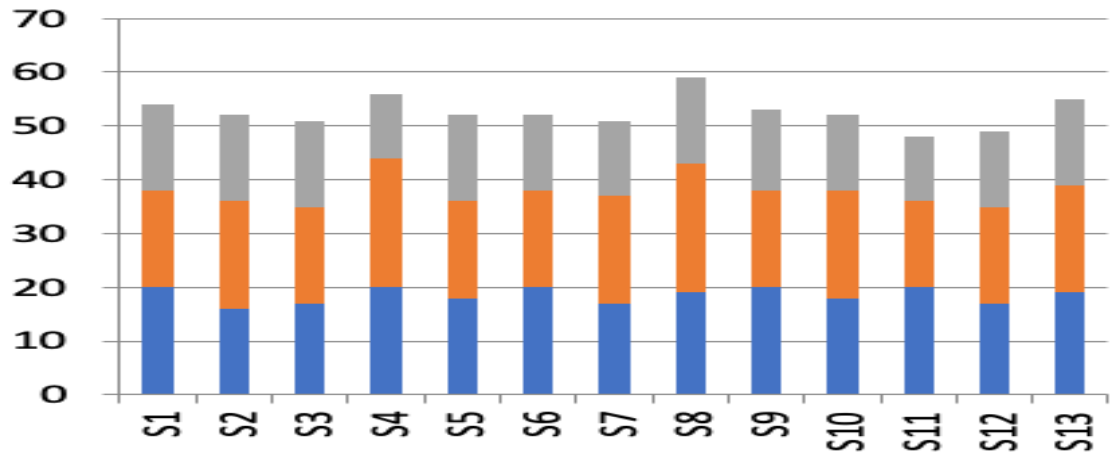

Figure 5. Validation of Small Group Trials

Information gray color for aspect instructional, orange color for aspect appearance, and blue col. or for aspect material Based on Figure 5, it can be concluded that learning media is based on interactive learning media with integer material on integer material declared valid by 13 students (small group trial) with a score percentage of 87.7%. Therefore, learning media is based on interactive learning media on integer material that can be used as a learning medium in the teaching and learning process. Based on assessments from validators, namely three experts, two practitioners, and 13 students, the validity of interactive learning media with integer material was produced with a total score percentage of 88.9% overall. So, the learning media is interactive in integer material, which can improve students' *soft* and *hard skills*.

Discussion

Based on the assessment analysis of learning media products based on interactive learning media on integer material, they are declared valid, so they are suitable to be used as a learning tool for students to understand integers. Interactive learning media makes it easy for students to access it; it is also easy to learn whole numbers because this media can be used independently. Apart from that, learning is no longer passive; it does not take long, it is simple and exciting, and the material is more accessible. Thus, interactive media can increase students' understanding. Media is a means to convey information from one person to another (Rahman & I Nyoman, 2020). Learning media is a teaching material that teachers use to get material and stimulate students' thoughts, attention, will, and attention, making the learning process more structured, controlled, and purposeful (Hakim & Haryudo, 2014). Media helps students and teachers realize the learning objectives to be achieved; media provides opportunities for students who have studied in class to implement specific skills (Susandi, 2017).

Halim Fathani et al., (2022) State that the role of learning media is: (a) being able to provide good explanations of integer material by relating it to real life; (b) providing learning motivation in completing exercises; (c) there are no limits on time, space and sensory abilities of teachers and students; (d) students are expected to be able to improve by engaging in social interactions and other learning sources. l; (e) Students can study many materials independently according to their abilities and interests. (f) Students can make improvements to their learning outcomes. Learning media can help students, especially those who struggle to understand mathematics. Interactive learning media is one of the learning media that can be used. However, before the media is needed, it is necessary to carry out a feasibility test on the media. The aim of the research (Rufaidah et al., 2018) is to develop media until it reaches media status that is suitable for use. The suitability of the media is carried out in various trials such as expert, practitioner, small group, and field trials, then revised and so on until the media developed is suitable for use in the teaching and learning process.

Assessment and testing of learning media based on interactive learning media on integer material obtained the assessment results of 3 experts, namely very valid design experts with a validity score of 91.7%. The results of the media expert assessment were good, with a validity score of 81.7%. The results of the material expert assessment are valid, with a validity score of 90%. The assessment results of 2 practitioners (mathematics teachers and mathematics lecturers) generally showed that learning media based on interactive learning media on integer material was suitable for use with a score percentage of 85.4%. The trial results were in a small group of 13 students, learning media based on interactive learning media on integer material worthy with a percentage score of 87.7%. So overall, interactive learning media on integer material is declared suitable for use with a total validity score of 87%, so it can be concluded that interactive learning media on integer material is proper to use. In line with research results (Kurniawati & Nita, 2018), theoretically, learning media created using interactive multimedia is suitable for use.

Learning media with integer material is appropriate as a learning medium because it is easy to understand and helps students solve integer problems (Arindiono et al., 2013). Not only that, interactive learning media on integer material will be able to foster student independence in the learning process and improve students' critical thinking skills (Zulhelmi et al., 2017). (Novita & Harahap, 2020) they revealed that interactive media effectively increases mastery of concepts and students' enthusiasm for learning (Putri & Sibuea, 2015). Based on these several statements, it can be concluded that interactive media as a learning medium has many advantages for student progress, especially in this case, strengthening understanding of concepts in integer material. In this way, the learning objectives designed by the teacher will also be achieved optimally (Dwiqi et al., 2020).

CONCLUSION

Based on the results of validation test data analysis by media experts, 81.7% of the criteria were valid, and design experts produced 91.7% of the perfect criteria. To test the validity of the material, a percentage of 90% was obtained. The practicality test by mathematics teachers received

86.1%, and mathematics lecturers got 84.7%. Additionally, interactive media was also tested on 13 MTs At-Taawun students, resulting in a percentage of 87.7%. The results of validity tests by media experts, design experts, material experts, and practitioners showed that interactive media was suitable for use, with an overall percentage reaching 88.9%.

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