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THE DEVELOPMENT OF INTERACTY-ASSISTED LEARNING MEDIA FOR JUNIOR HIGH SCHOOL STUDENTS : STATISTICS MATERIAL

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ABSTRACT

The advancement of educational technology has driven the need for innovative learning media, particularly in abstract subjects such as mathematics, including statistics. However, teaching at SMP Negeri 1 Tilango is still predominantly lecture-based and relies on static media, which results in low student engagement and understanding. The purpose of this study is to develop interactive learning media based on Interacty for the statistics material taught to eighth-grade students. This study is a type of research and development (R&D) using the Plomp development model, which consists of five phases: initial investigation, design, realization/construction, test-evaluation-revision, and implementation. The subjects of this study were eighth-grade students at SMP Negeri 1 Tilango. Validation was conducted by media and content experts, resulting in feasibility percentages of 83.3% (highly feasible) and 80% (feasible), respectively. The limited product trial also showed very positive responses from both teachers (93.75%) and students (86.59%). These results indicate that the interactive learning media based on Interacty meets the criteria of practicality and feasibility in terms of both content and media. Therefore, the developed media is considered suitable for use in the mathematics learning process, particularly in statistics, as it can increase student engagement and help them understand concepts in a more enjoyable and interactive way.

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INTRODUCTION

Mathematics is one of the subjects that plays a crucial role in shaping students' logical, systematic, and critical thinking skills. This is because mathematics learning requires students to understand patterns, relationships, and structures that involve logical reasoning, sequential thinking, and the ability to draw conclusions. Sumarmo et al. (2012), stated that "*the ability and disposition to think logically, critically, and creatively are essential competencies that must be possessed and developed in students learning mathematics*." This statement shows that

mathematics education not only teaches computational skills but also contributes to the development of logical and critical thinking patterns in students.

This is evident from the fact that mathematics is taught from an early age. Furthermore, the objectives of mathematics education, as outlined in Regulation of the Minister of Education and Culture No. 22 of 2016, emphasize that mathematics learning is directed toward enabling students to understand concepts, reason, solve problems, and communicate ideas accurately and efficiently. To achieve these goals, the government has provided various facilities to support the learning process in schools and enhance teacher competence, including the provision of educational technology and curriculum updates that emphasize student-centered learning, as well as webinars to support the teaching process.

However, in reality, these supports have not fully addressed the challenges in mathematics learning, particularly in the topic of statistics. According to Rahayu et al. (2020), statistics is a branch of applied mathematics that studies the collection, interpretation, classification, summarization, description, synthesis, analysis, and explanation of data. One of the main roles of statistics is to equip students with the ability to observe real-life phenomena, systematically process information, interpret results, and draw conclusions based on numerical evidence. These skills are not only useful in academic contexts but also serve as a fundamental basis for making logical and objective decisions in various real-world situations.

Nonetheless, many students encounter difficulties when learning statistical concepts. Through a review of studies on students' difficulties in learning mathematics in Indonesia, it was found that numerous challenges persist, particularly in the area of statistics. One reason for the low performance in mathematics is the lack of student interest in the learning process, including in statistics, which many students find unappealing (Yusuf et al, 2025). A study by Febrianti and Chotimah (2020) revealed that 83% of students had difficulty solving statistical problems, particularly in connecting mathematical ideas to diagrams and in expressing mathematical ideas, situations, and relationships orally or in writing using graphs and algebra. Furthermore, 88% of students struggled to formulate questions based on what they had learned—an indicator categorized as a high level of difficulty. Rahayu et al. (2020) also found that students lacked understanding of how to calculate the mean, median, or central tendency. Students tended to rush through problems, which led to inaccurate calculations and limited comprehension of the questions. These challenges, as summarized by the researcher, stem from students' insufficient grasp of basic statistical concepts. Most students found it difficult to understand the questions and determine how to solve them. This could be attributed to the teaching methods or media used, which were ineffective in helping students understand the material.

This condition was also observed by the researcher at the research site, SMP Negeri 1 Tilango, where eighth-grade students experienced similar difficulties in understanding statistical concepts, as reported in several previous studies. These problems are suspected to be caused by several factors in the teaching and learning process at school, including teacher-centered learning methods, lack of variety in teaching strategies, limited use of engaging instructional media, insufficient teacher innovation in utilizing active learning tools, and a decline in student enthusiasm during the learning process. In fact, instructional media play a crucial role in supporting the creation of effective learning experiences and helping students comprehend the material. According to Panggarra et al. (2022), instructional media refers to any tools used by educators as a means to deliver learning content so that it can be received accurately and effectively by students. Christiana et al. (2024) similarly assert that learning media can include aids ranging from reading material to digital technology that support teaching and learning activities. In line with this, Prasetyo et al. (2021), states that good instructional media should possess characteristics of both effectiveness and efficiency. Effectiveness means the media can deliver the material quickly and improve student understanding after its use, while efficiency

refers to the media being simple in design and easy to operate. Prayekti et al. (2023) adds that the use of instructional media strengthents teacher-student introduction, ultimately echancing students' learning experiences.

Therefore, there is a significant need for innovative instructional media, especially in mathematics learning, which tends to be abstract. Media that actively engage students can greatly enhance the learning process particularly through the use of digital tools such as interactive learning media. Faturrokhman et al. (2024) explains that interactive learning media involves the use of technology in education that allows for two-way interaction between students and the learning content. Similarly Amatullah et al. (2022) explain that technology-based interactive media involves both software and hardware that allow students to independently explore content through available controls, enabling them to personalize their learning path. Interaktive media offer varios benefits in enhancing of learning. A study by Andika et al. (2024) demonstrated that digital learning such as through interactive learning media can increase students' willingness to learn and positively influence learning outcomes. Similar findings were reported by Muthi et al. (2017) who, through a literature review of 10 scientific articles, found that interactive learning media such as Quizizz, Canva, and digital simulations can enhance students' interest and understanding in mathematics, provided that the media are of high quality and that teachers have the necessary skills to use them.

One promising interactive media platform is Interacty a digital platform that enables teachers to create interactive learning content using various features such as quizzes, puzzles, educational games, and other activities. Interacty offers more than 20 activity templates that can be used to present material in a more engaging and challenging way. Unlike conventional media, interactive tools like Interacty allow students to actively participate in the learning process from reading the material and playing educational games to completing practice exercises in a fun and engaging manner because the platform requires active student involvement. A study by San et al. (2024) revealed that using the Interacty platform in learning can increase students' motivation and improve learning outcomes.

Thus, the objective of this study is to develop interactive learning media based on Interacty for teaching statistics in junior high school. The researcher considers the development of web-based interactive learning media using Interacty to be essential in order to deliver statistical material in a more engaging, concrete, and comprehensible manner. It also aims to address issues related to student participation and motivation through the use of interactive learning tools. Moreover, to date, no Interacty-based media specifically designed for teaching statistics at the junior high school level has been found.

METHOD

The method used in this study is Research and Development (R&D). According to Sugiyono (2016), development research is a type of research that aims to produce a specific product and test its effectiveness. The product developed in this research is an interactive learning media based on Interacty for teaching Statistics to junior high school students. The media development process follows the Plomp development model, which consists of five stages: (1) preliminary investigation, (2) design, (3) realization or construction, (4) test, evaluation, and revision, and (5) implementation (Rochmad, 2012). This research was conducted at SMP Negeri 1 Tilango, involving 23 eighth-grade students and one mathematics teacher as research subjects.

The steps in the development process using the Plomp model are as follows:

a. Preliminary Investigation Stage

At this stage, information related to the needs and problems found in the school was collected and analyzed. This stage includes needs analysis and learning context analysis to identify the obstacles faced by both students and teachers during the learning process.

b. Design Stage

The researcher designed a solution in the form of learning media based on the previous analysis, aiming to address the problems that were identified earlier.

c. Realization or Construction Stage

At this stage, the media was developed based on the design that had been created, resulting in the initial prototype of the interactive learning media based on Interacty.

d. Test, Evaluation, and Revision Stage

After the initial prototype was developed, this stage involved testing, evaluating, and revising the media. The initial prototype was validated by a subject matter expert and a media expert to assess its content, appearance, and interactivity. The validation results served as the basis for revising the product to make it more feasible and practical. The revised media was then tested in a limited trial involving teachers and students to assess its usability and the level of understanding of the media content. Data were collected through user response questionnaires.

e. Implementation Stage

This is the final stage, which involves implementing the media on a broader scale to observe its effectiveness in the classroom learning process.

The instruments used in this research include media and content expert validation sheets, questionnaires for collecting teacher and student responses toward the developed media, as well as interviews and documentation to support qualitative data during the media development process.

The data analysis technique used to analyze the media and content validation results employed a Likert scale to determine the feasibility level of the developed learning product. The rating scale is shown in the following table:

Table 1. Likert Scale Criteria for Validation Ouestionnire Assesment

Criteria	Score
Very Good (VG)	5
Good (G)	4
Fair (F)	3
Poor (P)	2
Very Poor (VP)	1

Qualitative data in the form of comments, suggestions, or feedback from experts were used as the basis for improving the developed learning media. The quantitative validation scores collected from the validators were calculated to determine the average score of each aspect using the following formula:

$$P = \frac{Total\ Score\ From\ Data\ Collection}{Total\ Score\ of\ Criteria} \times 100\%$$

Deskription : P = Percentage of fesibility/Response

The feasibility percentage result was then categorized based on product quality criteria as shown in the table below:

Table 2. Percentage Range and Product Quality Criteria

Percentage Score	Criteria
81% - 100%	Very Valid
61% - 80%	Valid
41% - 60 %	Fairly Valid
21% - 40%	Less Valid
0% - 20%	Invalid

Source : Ridwan (2015) in sari and Hakim (2019)

For the analysis of teacher and student responses, the researcher used a four-point scale: Strongly Agree (score 4), Agree (score 3), Disagree (score 2), and Strongly Disagree (score 1). The results of the assessment were calculated as a percentage of responses, which were then categorized into response criteria as shown below:

Table 3. Response Categories Toward Learning Media

Score	Criteria
$75\% < skor \leq 100\%$	Very Good
$50\% < skor \leq 75\%$	Good
$25\% < skor \leq 50\%$	Fair
$\leq 25\%$	Poor

According to Trianto (as cited in Seytandaru et al, 2017), if the response percentage from students or teachers reaches 50% or more, the learning can be categorized as positive.

RESULTS AND DISCUSSION

Results

The result of this study is an interactive learning media based on Interacty for Grade VIII statistics material in junior high school. The following describes the development procedure of the media.

a. Initial Investigation Stage

In the initial investigation stage, the researcher conducted a needs and learning context analysis. Data were collected through interviews and direct classroom observations. The needs analysis was carried out to gather information about the current state of mathematics learning at the school. The findings revealed that teachers predominantly used lecture-based methods and relied mainly on printed media such as textbooks and technology-based media like PowerPoint presentations, without any interactive elements. In the classroom, only a small portion of students actively participated. Moreover, the topic that students found most difficult to understand was statistics. The learning context analysis was conducted by reviewing the availability of facilities, the curriculum implemented, the role of the teacher, and the learning environment. The analysis showed that the school had adopted the Merdeka Curriculum and was equipped with supporting facilities such as a computer lab, internet access (Wi-Fi), and

policies allowing students to bring mobile phones to school. However, this potential had not been optimally utilized, as teachers were not yet accustomed to using technology in line with current developments to support mathematics learning. Based on the results of the initial investigation, the researcher proposed a solution in the form of developing an interactive learning media based on Interacty for the topic of statistics. This media can be accessed via laptops or smartphones. It is expected to enhance student engagement, facilitate conceptual understanding, enable independent learning at home, assist teachers in delivering statistical material more effectively, and promote a student-centered learning environment.

b. *Design Stage*

In the design stage, the researcher designed the learning media and research instruments to be used in the development process. This stage included the selection of appropriate technology (website or platform), instructional content design, flowchart design, and the development of research instruments. For the technology selection, the researcher chose the Interacty platform as the basis for media development, while Canva was used to create the visual design. The visuals were exported in JPG/PNG format and then uploaded to Interacty. The instructional content was developed based on the statistics material aligned with the Merdeka Curriculum, referring to learning outcomes and objectives covering the topics of measures of central tendency and measures of data dispersion. The flowchart design was created based on the content structure and the interactive features available on Interacty. Meanwhile, the research instrument design included an interview guide sheet, media validation sheet, material validation sheet, teacher response questionnaire, and student response questionnaire.

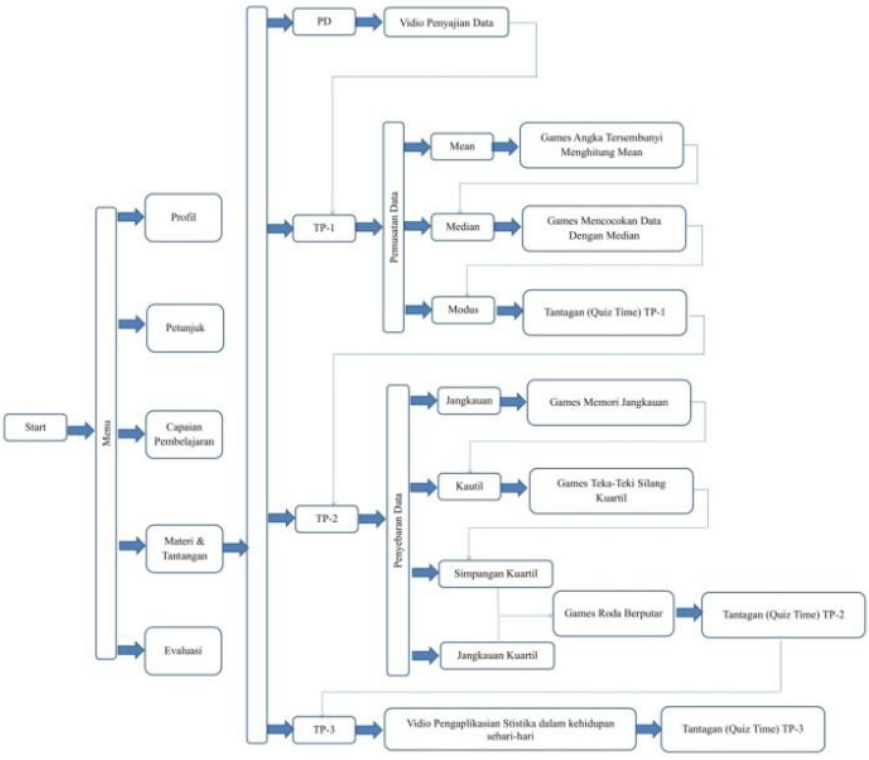

Figure 1. Media Flowchart

c. *Realization/Construction Stage*

The third phase is the realization or construction stage. In this phase, the design created in the previous stage was implemented into an interactive learning media based on Interacty for teaching statistics to Grade VIII junior high school students. The structure of this interactive

learning media refers to the media layout model developed by Talapiu et al. (2025), which aligns with the curriculum applied at the school. This includes a cover page, menu, profile, learning outcomes, content, quiz, about, and instructions, resulting in the first prototype. However, the researcher made several modifications by arranging the interactive learning media to consist of the following components: cover page, menu, profile, instructions, learning outcomes, content & challenges (quizzes), which include games, and evaluation. Below is an image showing the prototype design.

Figure 2. Initial Display of The Media

The initial page contains a “START” button. When this button is clicked, it will display the screen shown below, which directs the user to the “Menu” button.

Figure 3. Initial Display of The Media

The menu display presents six navigation buttons: Profile, Instructions, Learning Outcomes, Materials & Challenges, Evaluation, and EXIT

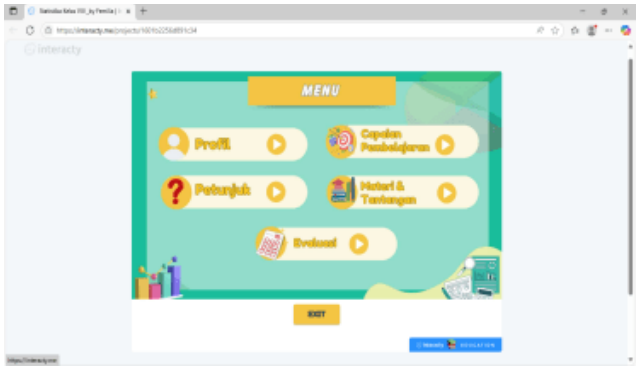

Figure 4. *Menu Display*

The Profile page shows the profile of the developer of the interactive learning media based on Interacty for the Grade VIII Statistics material at the junior high school.

Figure 5. Profile Display

The Instructions page shows how to use or operate the interactive learning media based on Interacty.

Figure 6. Profile Display

The Learning Outcomes section contains information related to the learning outcomes and learning objectives for the Grade VIII Statistics material at junior high school.

Figure 7. Leraning Outcomes Display

On the material and challenges page, there are four stages of learning. The first stage presents an introductory video about data presentation, followed by TP-1 which covers the topic of Measures of Central Tendency, TP-2 containing material related to measures of data dispersion, and finally TP-3 presenting a contextual video about measures of central tendency and data dispersion in daily life. Each TP includes games for each topic as well as quiz challenges that students must complete before moving on to the next TP (Learning Objectives).

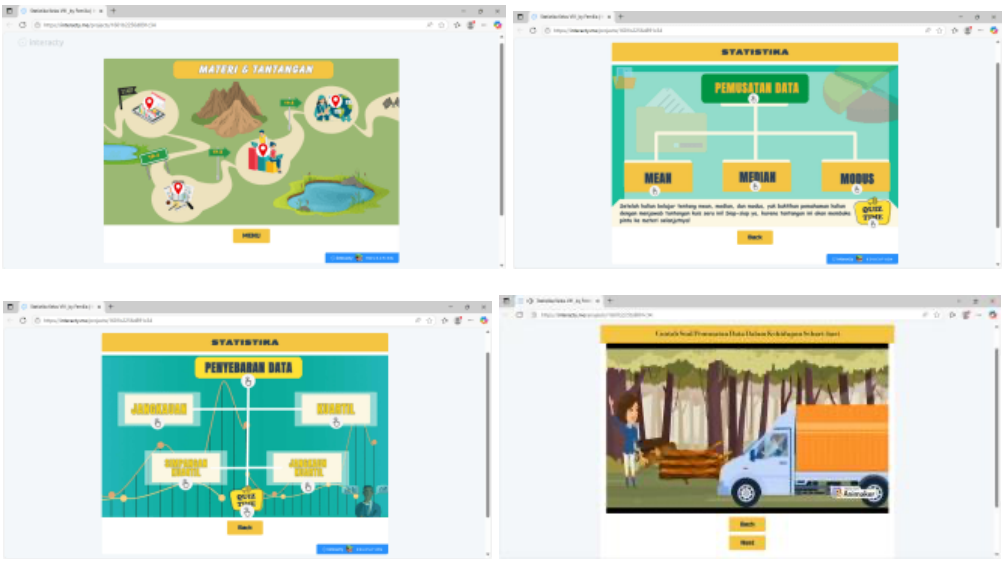

Figure 8. Material & Challengges Display

The evaluation page displays a barcode or QR code for multiple-choice and essay questions, where students complete the given questions by answering on their own answer sheets.

Figure 9. Evaluation Display

d. *Test, Evaluation and Revision Stage*

At this stage, there are three main activities carried out by the researcher: validation, revision, and limited trial. The research instrument, which was previously designed in the design phase, was used as a tool for the media and material related to the developed learning media. The media validation involved six validators, consisting of three media experts and three material experts. The media experts were lecturers from the Mathematics Department at Gorontalo State University (UNG), while the material experts consisted of two lecturers from the Mathematics Department at UNG and one mathematics teacher from SMP Negeri 1 Tilango.

The results of the media validation, assessed from four aspects—visual display, navigation, interactivity, and technical aspects—received a total feasibility score of 83.3%, categorized as very feasible. The material validation, based on indicators such as curriculum, material, language, material presentation, and evaluation, received a feasibility score of 80%, also categorized as very feasible. After the validation, there were comments and suggestions regarding the developed learning media. The conclusions from the validators were as follows: Media Validator 1 stated, “Feasible to be trialed in the field without revision,” while Media Validators 2 and 3 stated, “Feasible to be trialed in the field with revisions.” For the material validators, Validator 1 concluded, “Feasible to be trialed in the field without revision,” and

Validators 2 and 3 concluded, “Feasible to be trialed in the field with revisions.” Based on the feedback and suggestions from both media and material validators, the media was finalized and ready for field trials.

In the limited trial, the researcher selected Class VIII-1, which consisted of 23 students and one mathematics teacher. The product trial was conducted over two learning sessions. The first session took place on May 23, 2025, during which the researcher introduced how to use the learning media, followed by the first learning process, ending with a quiz challenge.

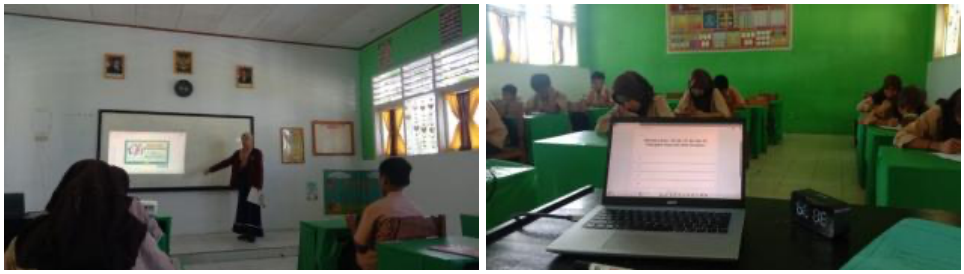

Figure 10. Documentation on May 23, 2025

The second meeting continued on May 26, 2025, where the mathematics teacher at SMP Negeri 1 Tilango conducted the learning process using the developed media, guided by the researcher and assisted by the interactive learning media guidebook based on Interacty, which was prepared by the researcher to serve as a reference for the teacher in using the developed media.

Figure 11. Documentation on May 26, 2025

Afterwards, the researcher collected data from the teacher and students regarding their responses to the use of the interactive learning media based on Interacty for the Grade VIII Statistics material at junior high school. The results of the analysis of the teacher’s and students’ response questionnaires can be seen in the following table.

Table 4. Result of Teacher and Student Response Questionnaires

No.	Respondent	Number of Respondents	Response Persentage	Criteria
1.	Teacher	1	93.75%	Very Good
2.	Student	23	86.59%	Very Good

As shown in Table 4, the feasibility percentage based on the teacher's response is 93.75%, which falls under the "Very Good" category. The students' response percentage is 86.59%, which also falls under the "Very Good" category. These results indicate that the developed learning media has a positive impact on the learning process. This is in line with Trianto's statement that if the response percentage from both students and teachers reaches 50% or more, the learning process can be categorized as positive. This means that the interactive learning media based on Interacty that was developed provides a positive impact on learning, especially in the statistics material.

e. *Implementation Phase*

The final phase is the implementation phase. Due to limited time and funding, this development product was handed over to the mathematics teacher for implementation across all Grade VIII classes at SMP Negeri 1 Tilango. The final product of the interactive learning media development based on Interacty for Grade VIII Statistics material can be accessed at: https://interacty.me/projects/1601b2256d891c34, and the user guidebook for the media is available at:
(https://drive.google.com/file/d/1v3gyeYg3F_YLSFcwGfTZOoed-wJu15S7/view).

Discussions

Based on the validation results by media experts and subject matter experts, the developed instructional media obtained a feasibility percentage of 83.3% from media experts, which falls into the 'highly feasible' category, and 80% from subject matter experts, categorized as 'feasible'. Furthermore, limited product trials indicated a very positive response from both teachers and students, with percentages of 93.75% and 86.59%, respectively, both of which fall into the 'very good' category. Referring to Trianto's opinion, which states that if the teacher and student response reaches 50% or more, the learning implementation can be categorized as positive, it can therefore be concluded that the developed instructional media is considered positive and appropriate for use in the learning process

The interactive learning media based on Interacty for the statistics topic in Grade VIII of junior high school was developed as a solution to the problems encountered at SMP Negeri 1 Tilango and can also be used in other schools. This media can be accessed via laptops or mobile phones and supports independent learning by students at home. Its development makes use of both static and interactive features available on Interacty, enabling the media to enhance students' learning motivation, especially in mathematics. Through an engaging and interactive approach, this media is expected to foster active student participation and support the smooth and successful implementation of classroom learning.

The findings of this study are in line with those of San et al. (2024), who found that using interactive media through the Interacty platform can improve student learning outcomes. However, the difference lies in the research method: San's study was classroom action research, while this study focuses on the development of learning media using Interacty, which, due to time constraints, was limited to the media feasibility stage and did not proceed to testing its effectiveness on learning outcomes.

Furthermore, a study by Talapiu et al. (2025) also developed interactive learning media by utilizing technologies such as PowerPoint combined with various supporting websites. Their findings indicate that the developed media met the "very feasible" criteria in terms of practicality and feasibility. Similarly, this study used the Plomp development model; however, the difference lies in the media platform used this research employed Interacty, while Talapiu's study utilized a combination of PowerPoint and iSpring Suite.

In addition, the research by Putriyani and Edriati (2023) developed a learning media on statistics in the form of animated videos using Powtoon for junior high school students. Compared to this study, the difference lies in how the statistics material is presented. While Putriyani and Edriati presented the material through video format, the media developed in this study presents the material through an interactive platform that includes content, statistics learning videos, and quiz games using features provided by Interacty. By leveraging these interactive features, the media aims to address the issue of students' lack of interest in learning statistics, as stated by

Yusuf et al. (2017), who noted that students tend to dislike statistics. Therefore, providing interactive media that not only contains learning material but also integrates games may serve as a solution to increase students' motivation to learn.

This Interacty-based interactive learning media encourages active student involvement, shifting the classroom dynamic from teacher-centered to student-centered learning, where students play a more significant role in the learning process.

CONCLUSION

This study aims to develop interactive learning media based on Interacty for the Grade VIII Statistics material in junior high school. Based on the development results and discussion, it can be concluded that the media developed has gone through the Plomp model stages systematically and received positive responses from validators, teachers, and students. Validation results showed that the media achieved a feasibility percentage of 83.3% (very feasible category), and the material scored 80% (feasible category). Moreover, the responses from teachers and students regarding the use of the media were very positive, with percentages of 93.75% and 86.59%, respectively. These findings indicate that the interactive learning media based on Interacty has a positive impact in supporting the mathematics learning process, especially for the Statistics material.

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