Jurnal Derivat, Volume 11 No.2 Agustus 2024
ISSN: 2549-2616

The Effect Of The Prodigy-Assisted Game_Based_Learning Model On Critical Thinking And Interest

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Abstrak

Penelitian ini bertujuan untuk mengetahui mengembangkan pembelajaran game based learning berbantuan media prodigy game yang valid, praktis dan efektif terhadap kemampuan berpikir kritis dan minat belajar siswa. Media merupakan sebuah alat dalam menyampaikan pesan yang bersumber pada guru sehingga siswa sebagai penerima mampu untuk memahami materi dengan baik. Prodigy merupakan media berbasis ICT yang didalamnya memuat permainan dan juga pembelajaran matematika sehingga dengan menggunakan media ini minat siswa dalam pembelajaran Matematika akan berkembang. Penelitian ini menggunakan Teknik pengembangan ADDIE. Hasilnya diketahui bahwa pembelajaran game based learning berbantuan media prodigy game terbukti valid, praktis dan efektif terhadap kemampuan berpikir kritis dan minat belajar siswa. Menggunakan aplikasi seperti Prodigy Game dalam pembelajaran matematika tidak hanya membantu meningkatkan kemampuan berpikir kritis siswa melalui berbagai cara yang interaktif dan terfokus, dan juga mampu mengubah persepsi mereka terhadap belajar matematika menjadi lebih positif dan menarik.

Kata Kunci: Media Prodigy, Game Based Learning, Berpikir Kritis, Minat

Abstract

This study aims to determine and develop game-based learning assisted by Prodigy game media that is valid, practical and effective on students' critical thinking skills and learning interests. Media is a tool for conveying messages sourced from teachers so that students, as recipients, can understand the material well. Prodigy is an ICT-based media that contains games and mathematics learning, so students' interest in learning mathematics will develop through this media. This research uses ADDIE development techniques. The results showed that game-based learning assisted by Prodigy game media proved valid, practical and effective in improving students' critical thinking skills and learning interests. Using apps like Prodigy Game in math learning helps improve students' critical thinking skills through various interactive and focused ways. It changes their perception of math learning to be more positive and engaging.

Keywords: *Media Prodigy, Game Based Learning, Critical Thinking, Interest*

1. INTRODUCTION

Education is a form of effort deliberately carried out to support the development of knowledge, life perspectives, life actions, and even the life skills of individuals and groups of people, both through individuals and groups (Atmajaya et al., 2023). Learning is an activity where a person makes or produces a change in behaviour that exists in knowledge, attitudes, and skills (Jayantika & Putri, 2023). Learning activities are part of the educational process and are the most basic activities. This means that the achievement of educational goals depends on the learning process experienced by students as learners. In achieving academic goals, many

components affect the implementation of the learning process in schools, including the curriculum, teachers, learning models, learning resources, and learning media (Kusuma & Hamidah, 2020). Learning can be used to achieve learning goals more enjoyably for children.

Information and communication technology (ICT) has influenced the development of the world, especially in the world of education and learning. The more time passes, the more we are required to continue to dominate the world of technology. At the global level, the development of ICT has affected all fields of life, one of which is in the world of education. So it is time for teachers to introduce and glorify their learning using technology, one of which is using learning media. The Game-Based Learning Model is learning that uses games or digital *games* for learning purposes. Children's games are an educational activity, and children's games are incorporated into schools as part of the culture (Setiawan, 2020). This model is applied by educators when they want to equip students with logical, analytical, systematic, critical, and creative thinking skills and the ability to work together in fun learning (Sholikhatun, 2023). The learning model is one of the essential components in the learning process that determines the success of student learning. Various learning models help students learn according to their learning style so that learning goals can be achieved optimally. A learning model is a plan used as a learning guide in a classroom or tutorial (Mukaromah et al., 2021).

According to Koriaty & Agustani (2016) revealed that the Indonesian word "Game" means "game".The games-based learning model is a game-themed learning model that uses fun learning elements during the learning process to produce effective learning, and the material can be delivered correctly and adequately (Rahma & Wiranti, 2024). The Game Based Learning model also has characteristics that make learning more exciting and fun, interactive and feedback can create interaction between students and teachers, and social cooperation can form communication and collaboration between students who are able to train students' social skills (Geden et al., 2021; Krath et al., 2021).

Game-based learning is an e-learning platform that can encourage students to increase their motivation to learn through gaming experiences (Noroozi et al., 2020; Wati, 2020). Game-based learning promotes active learning and engagement by allowing students to place problem-solving in a game context (Vankúš, 2021). Games are a means of entertainment to eliminate boredom or fill free time for their users. Usually, children, teenagers, and even adults can play with it. The results showed that online games had a negative effect (Huang et al., 2021; Kordyaka et al., 2020; Kwok et al., 2021). Based on the study results, it is assumed that games are wrong in the context of education. With the development of technology and an increasingly open mindset of society, games can also be used positively in education, one of which is being used as a learning medium. The game referred to above is a game that contains education. An educational game is a game in which there are elements of teaching and learning. In educational games, students can learn various things while getting their entertainment while playing them.

According to Sya'adah et al. (2023), mathematics is a language that symbolizes a set of meanings for the statements we want to convey. Mathematics is a tool for developing a way of thinking. Therefore, mathematics is indispensable for solving problems in daily life and supporting the advancement of science and technology (Engelbrecht et al., 2020; Suherman & Vidákovich, 2022). The truths in mathematics are the truth of consistency, not contradicting the truth of one concept with another. This means that learning mathematics is considered important to prepare students to use the mathematical mindset in their daily lives and in studying other sciences. Who has less attention when delivering material due to a lack of attention or interest in learning. One of the causes of the inI problem is the lack of effectiveness in using defence media.

Learning math presents various challenges for many children due to the subject's complicated and often tedious nature (Lei et al., 2022). A student's interest in learning is inseparable from learning as an encouragement or fondness for a learning activity. Learning interest arises from internal factors and psychological aspects that have a fundamental influence on the process of learning activities and progress for students, as well as progress for students (Kusuma & Hamidah, 2019). To build interest in learning, at least three elements are needed, namely focusing on a clear problem, new ideas or information, and a forum or basis for communication.

Referring to previous research, some researchers develop games to increase students' interest in mathematics, such as word wall games and Memorize card games. However, the games still do not instill the concept of problem solving so that children are less required to think critically. Therefore, the researcher aims to develop media to increase students' interest in learning mathematics in junior high school through prodigy media. Media prodigy games are educational games that aim to hone players' mathematical skills. This game was developed by a Canadian game developer, SMARTeacher Inc which focuses on creating educational software. There are eight levels of player classes in this game. The game can be played offline as well as online. Prodigy Math Game provides a unique experience through interactive math games. Players can earn rewards, complete missions and play with friends. The prodigy math game system uses a way to identify and solve daily problems, which is very often used in daily life. The educational value contained in this game is that Prodigy Math Game provides educational value in understanding/learning mathematics. Practice makes perfect, in order to understand mathematics as best as possible, regular practice is needed. Therefore, this game is very suitable for students to play. In this game, to be able to win the battle, players are required to attack the enemy. The player can only attack enemies when he can solve the math problem first. So that players can practice their math skills every time they play the Prodigy Math Game. It is hoped that the existence of this media can increase students' interest in learning mathematics in junior high school.

Menu Prodigygames

Like other gamification platforms, prodigygames has several menus, including home, classrooms, student roster, math and English.

1. Home

Home or face-to-face view of platform users. Briefly explain what kind of games students get on this platform. The platform simply invites students to play games, explore fantasy worlds, complete missions, rescue pets, and level up, all by solving math problems in witch fights! Students can play this game at school and home for free through any device. In addition, there is also much brief information about the features that users can use. Students access tools and support as they work on math problems at their own pace.

2. Classrooms

Classrooms or classrooms are menus that make it easier for teachers to divide the classes used by their students, teachers can divide them as they wish. Teachers can also see how many students are taking this class and how many students are currently active in gamification on this platform. This menu can also be synced with google classroom or clever.

3. Student Roster

Student Roster or class list is a menu that makes it easier for teachers to get information on all their students who participate in mathematics gamification. There is also data on who works on the game or enters the placement test. Not only that but parents can also be invited to join

the student guardian event. In this menu, teachers can also add who the students will be participating in the games or subtract the students who are not eligible to participate in the games.

4. *Math*

Math or mathematics is a menu where students can participate in mathematics gamification. This can be done when the teacher distributes the gamification class, and then the students log in or join games. In this menu there is also a final report. Where teachers can check the extent of students' ability or proficiency in mathematics lessons. Not only spontaneous games, but there are also scheduled games, this allows teachers to give homework and students can actively participate in learning activities independently without being accompanied by a teacher.

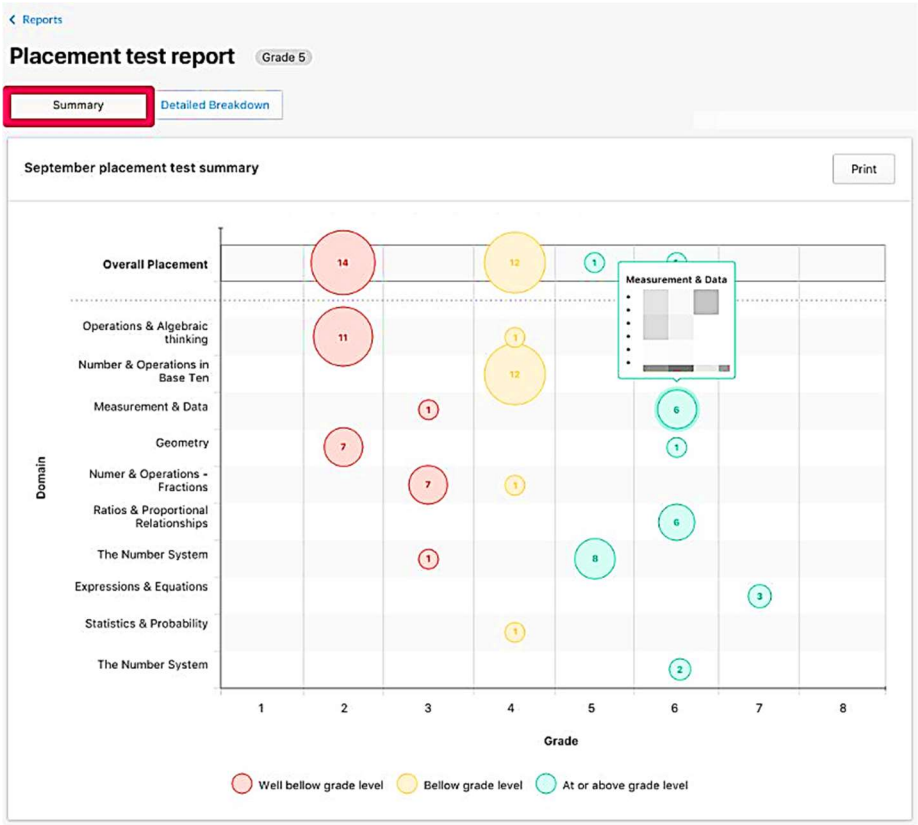

Figure 1. Student Outcome Report

5. English

English or English is a menu that makes it easier for teachers to gamify English. Like math or mathematics, in this English menu, students are also presented with games, and report cards or reports of children's success are provided. The display of the face-to-face screen is as shown in the following image:

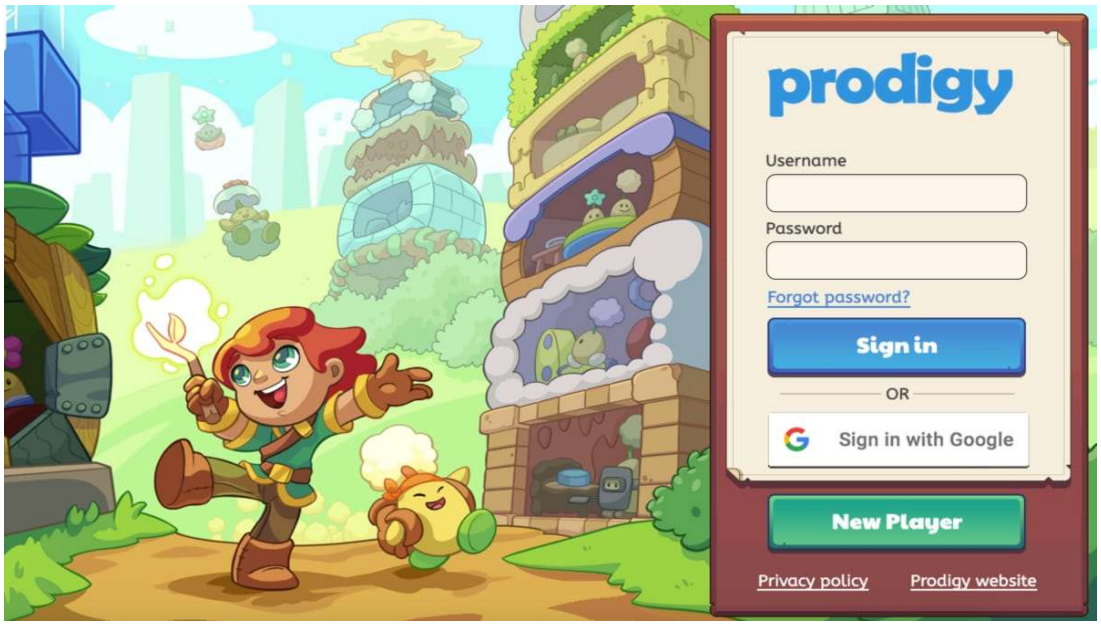

Figure 2. Home screen log in prodigygame

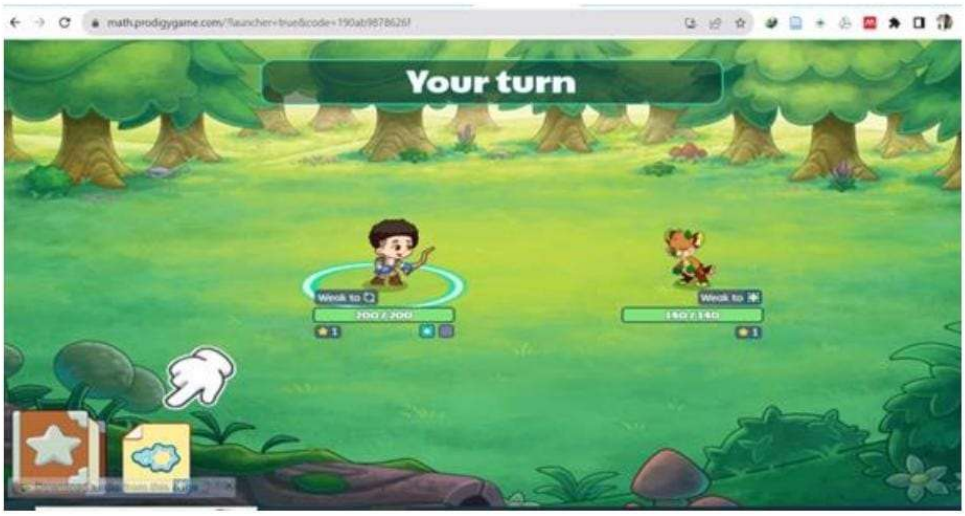

Figure 3. Math Prodigygame In-Game

The learning element in the gamification of prodigygames lies in the attacking menu to survive in the gamification. Later, students will be presented with various problems according to their school level. For example, at the beginning, the teacher has chosen a grade 1 question, and then later, students can only get math problems with exceptional difficulty for grade 1. Likewise, you will get a higher level of difficulty for higher grades.

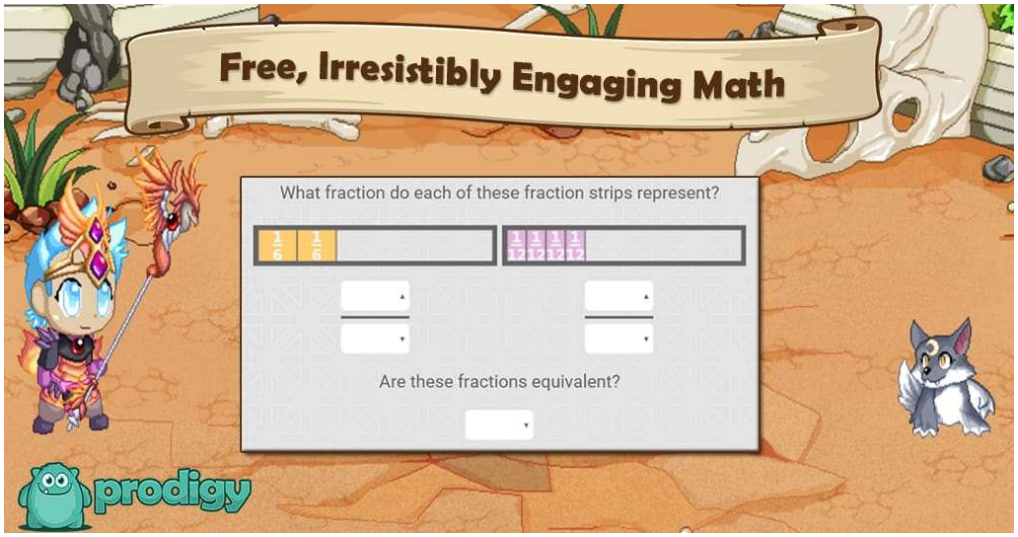

Figure 4. Math Progidygame in Game

Advantages and Disadvantages of Prodigygames as a Mathematics Learning Media

1. Pros of Prodigygames:
   a. Teachers don't need to ask questions. One advantage of this platform is that teachers don't need to make questions because the questions have been designed for grades 1 to 8, ranging from 65,000 different types of questions at each level. This means teachers do not need to exert much effort.
   b. Teachers only need to make a classroom. In addition to not needing to make questions, teachers are also facilitated by simply creating a classroom, which will then be enough to be distributed to the students, and from this class code, students can later participate in gamification. The classroom in question is the same as Google Classroom so that it can be accessed by all students and monitored by teachers.
2. Cons of Prodigygames
   a. Need to Adjust Questions to the Curriculum Because the program has provided the questions, teachers indirectly cannot make their questions. This impacts not being able to measure students' abilities as planned. This is because the tools used to measure are different question items. However, it can be overcome by editing the question items from the prodigy platform because good questions are following the curriculum.
   b. The Indonesian Language is not yet available. Prodigygames still uses English entirely, so even though all people can use it because it is not paid, it can still only be used for those who understand English because one of the most striking obstacles is the lack of mastery of foreign languages. So the role of teachers in providing direction or parental assistance is essential. This is to minimize errors in understanding the commands given.
      1) Low Image Resolution
         Suppose you look at the image resolution provided by prodigygames. In that case, it seems more suitable for tablet or smartphone users, because the image feels blurry or less clear when accessed using a computer or laptop. However, it is not a significant problem because the information can still be read clearly on the Prodigygames platform. Because the use of audio visuals has been proven to

increase students' motivation to learn (Munawaroh et al., 2022; Wijiasih et al., 2019).

2) No Question Limits
The simulations or experiments carried out by the researcher do not seem to have found any limitations on the questions given in gamification using this prodigygames. This means that the games will continue until the end of the lesson, and the teacher can only see how far or how many questions can be answered and correct them.

The researcher interviewed the homeroom teacher of grade VII of junior high school that according to him, "The problem that is often encountered in mathematics learning is the low interest of students in the learning, both in the material of fractional building space, Algebra, multiplication, etc. is still very lacking in terms of interest, and when mathematics learning will begin, it looks very low student enthusiasm". Based on the problems found in Grade VII, teachers need game-free media to increase students' interest in learning mathematics in junior high school. Therefore, the author intends to develop game media assisted by the Prodigy application to increase interest in mathematics learning in junior high school as well as to find out if there is a difference in students' critical thinking skills through a game-based learning model assisted by the Prodigy Game application.

2. RESEARCH METHODS

This research is development research, namely the development of a prodigy application that will be used as a mathematics learning medium to train children in problem solving and critical thinking. The Prodigy application is one of the developments of game-based audio-visual media because this media inserts learning in the middle of the game so that children will be more interested in learning mathematics. The development of this media is expected to increase students' interest in learning mathematics in junior high school.

This type of research is development research that uses the ADDIE model (Analysis, Design, Development or Production, Implementation or Delivery, Evaluations). The ADDIE model contains systematic and practical steps to design and develop products to solve learning problems tailored to the needs and characteristics of students (Aydin et al., 2023; Endah, 2020; Sahaat et al., 2020). This study uses the ADDIE model, which consists of four phases, with assessments carried out during each phase. Assessment is used to validate products and processes to produce quality products.

This research approach includes mixed research because, in this study, two data types will be obtained simultaneously: qualitative and quantitative. Qualitative data in this development research was obtained from experts through responses related to product quality and needs. Quantitative data was obtained from experts and users, in this case, grade VII students. Quantitative data was obtained from the validation of materials and media and the questionnaire results. So, the research instruments used in this study are questionnaires and interview guidelines, observation guidelines and documentation. In contrast, the research techniques used are interviews, documentation, observations, and distributing questionnaires to find out the level of effectiveness, efficiency, and attractiveness of the product.

The percentage descriptive method is a calculation method used by researchers to calculate the data collected by researchers. The formula uses the percentage method to measure the level of validity of learning using prodigy. The measurement of the success rate of the product is associated with the validation outcome criteria as shown in the following table:

Table 1. Percentage of Criteria from Validation Results

Valuation	Criteria
74% ≤ PSP ≤ 100%	Valid without revision
49% ≤ PSP < 74%	Valid with light revisions
24% ≤ PSP < 49%	Not yet valid with heavy revisions
PSP < 24%	Invalid

Meanwhile, the data analysis technique from the results of the questionnaire calculation uses the formula with the feasibility assessment formula below (Nopriyanti, 2020; Rahayu & Aini, 2021).

$$RS = \frac{n}{N} \times 100\%$$

With :

RS = Percentage of sub-variables
n = The sum of the values of each sub-variable
N = Maximum number of scores

Table 2. Range of Qualitative Criteria Questionnaire Percentage

Interval	Criteria
84% ≤ RS ≤ 100%	Excellent
68% ≤ RS < 84%	Good
52% ≤ RS < 68%	Pretty Good
36% ≤ RS < 52%	Not Good
RS < 36%	Bad

This research was conducted in SMP x. The subjects in this study were grade VII students. The students were divided into six groups, each with four students with heterogeneous abilities. The data analysis in this study is an analysis of the validity of the feasibility of the material aspect, an analysis of the validity of the display aspect, a practicality analysis, and an analysis of student opinions. The analysis results can be used as a reference for improving prodigy media.

3. RESULTS AND DISCUSSION

The process of developing prodigy game media to increase the interest of junior high school students in learning Mathematics. This study uses the type of ADDIE research with procedures including analysis, design, development and implementation. First, the analysis of the problems related to the development of prodigy media includes: (1) In the early stages of the analysis, this study aims to find out the needs of media in the school and the characteristics of students who use media for educational activities using prodigy games; (2) The second stage of analysis is research that focuses on development objectives, by identifying RPPs; (3) The third step of this analysis is to examine the metaphysics that are being studied in grade VII of junior high school.

Second, design includes (1) Creating a media design, setting instructional goals and aligning its delivery. From the learning content. and assessing learning outcomes; (2) Later the feasibility of the concept will be developed and tested elsewhere (validation); (3) The collection of features at this design stage, several features that can be integrated into the design of educational game learning media have been developed and tested for feasibility. The design stage is still conceptual and will be the basis and input for the next stage of development. Third,

Development includes (1) At this stage, the researcher collects and compiles learning tools that follow the level of material in grade VII or materials that are following grade VII, including learning materials practice questions; (2) Furthermore, the games developed in this study will be validated by media experts, material experts. When the product developed still has shortcomings, the researcher will revise it again until the resulting product can be implemented at the next stage.

The media development that has been carried out is then validated by a team of media experts and material experts. First, the researcher validates the material which includes four aspects, namely learning, practice, effectiveness, and concepts and is developed into 7.

Table 3. Grid of Expert Validation Sheet Material Aspects of Indicators

Aspects	Indicator	Item Number
Learning	The Mathematics learning presented is easy to understand	4
Practice questions	Students can complete the questions after being given Prodigy Media learning	1
	The suitability of the practice questions given is following the material being taught	2
Effectiveness	The effectiveness of the media in increasing students' interest in learning mathematics	3
	Student learning outcomes improve	7
Learning Concept	The learning concepts presented are easy to understand	5
	Through this media, students can more easily understand mathematical concepts	6

The assessment results from the validators are calculated and analyzed based on the following criteria percentages.

Table 4. Percentage of Criteria from Validation Results

Valuation	Criteria
$74\% \leq PSP \leq 100\%$	Valid without revision
$49\% \leq PSP < 74\%$	Valid with light revisions
$24\% \leq PSP < 49\%$	Not yet valid with heavy revisions
$PSP < 24\%$	Invalid

Based on the calculation of the score given by the validator to the media development, it shows that the material presented by game-based learning with the help of game prodigy is 82%, which means it is valid without revision. Furthermore, the researcher validated the media which included 5 aspects including: Sound, Language, design, instructions, convenience, interest and was developed into 10 questions.

Table 5. Media Expert Validation Sheet Grid

No	Aspects	Indicator	Item Number
1	Voice	The sound presented is clear and interesting	1
		Unobtrusive sound	7
2	Language	The language used is easy to understand	2
		Varied Language Options	8
3	Design	Attractive design	3
		The features presented are exciting	9

No	Aspects	Indicator	Item Number
4	Instructions	Easy-to-understand instructions	4
5	Facilities	Medium is easy to use or practical	5
		Media is easy to get	10
6	Interest	Consumer interest in media	6

Based on the calculation of the score given by the validator related to media validation, it shows that the game-based learning media with the help of the developed game Prodigy is 80%, which means it is valid without revision. The two percentages above show that the entire validation is declared valid, so game-based learning with the help of the game Prodigy is declared valid and can be implemented in the learning process.

Figure 6. Implementation of Media Prodigy in Grade VII

Fourth, implementation is when a researcher tests a product game that will be tested for feasibility in an actual situation. At this stage, it is carried out to determine how much this product affects students' critical thinking skills and interest in mathematics learning. Whether through this media, students' interest increases or vice versa. In addition, to find out how effective this game learning media is in its implementation, there are obstacles or not. The trial process was carried out in grade VII of junior high school which was carried out on May 16, 2024, with a sample of 24 students. The trial was conducted in groups, where students tried Prodigy media due to lacking facilities and infrastructure. Before the trial, the teacher gave a briefing and explanation related to game-based learning with the help of a game prodigy. After being briefed, students are allowed to operate the game. Prodigy aims to determine whether students can understand and manage the game quickly and are enthusiastic about using it. It turned out that during the trial, the students were very excited in the media prodigy.

After students are given a learning model with a game-based learning model assisted by Prodigy games, they are given a test of critical thinking skills and instructed to fill out questionnaires according to what they experienced while using the media. From the filling out of the test and questionnaire, it can be known that students' critical thinking skills and students' interests are known. That way, it is known that student satisfaction when using prodigy games in learning, so researchers can find out the feasibility of prodigy games in learning and whether they can improve students' critical thinking skills and interest in mathematics learning.

$$RS = \frac{n}{N} \times 100\%$$

$$RS = \frac{395}{468} \times 100\%$$
$$= 84{,}4017\%$$

From the results of the calculation of all aspects, it can be seen that the percentage obtained for test scores is 78 and for interest questionnaires, it is 84.4017, meaning that learning with the game-based learning model assisted by Prodigy media is excellent and very feasible to be used to improve student's critical thinking skills and interest in learning mathematics. Fifth, Evaluation includes: At this stage, after being implemented, it is necessary to evaluate whether the learning media used is declared successful, according to expectations or not and aims to find out the advantages and disadvantages of a product that has been developed and has been tested for its feasibility so that researchers can improve it.

Table 6. Criticism and Suggestions from Validators

Suggestions	Solution
Language options spoken only in English	At the beginning of the display, you will be given a choice of options in the selection of the language used
The concept of learning already exists and is described but lacks detail.	At the concept introduction stage, a video will be shown so that it is easy for students to understand the mathematical concepts discussed in the media.

From the results obtained, although there are still some records of improvement in the development of game-based learning with the help of this prodigy game media, the overall calculation results are stated to be very feasible to be used to improve student's critical thinking skills and interest in mathematics learning. The learning process so that learning is more meaningful must be presented with learning media because, with steps to arouse students' interest and motivation to learn, they can reduce or avoid verbalism, generate orderly, systematic reasoning, and foster understanding and develop values in students (Kusuma & Hamidah, 2019).

With the help of Prodigy game media, game-based learning can significantly benefit students' critical thinking skills and learning interests. Several relevant benefits are known based on the results of research in the field. Benefits to essential thinking skills: 1) Complex Problem Solving: Prodigy Games often challenge students with complex math problems and require critical thinking to find solutions. It trains students to analyze situations, formulate strategies, and find practical solutions; 2) Logical Skills Development: Students need to use logical skills to make informed decisions in navigating math games. They learn to systematically structure the steps to achieve the objectives in the game; 3) Improvement of Abstract Thinking Skills: Math games like Prodigy present mathematical concepts in different contexts, allowing students to practice and internalize abstract thinking; 4) Problem-Based Learning: By challenging students with relevant and continuous math problems, Prodigy Games helps students learn in a more in-depth way than traditional methods. They learn to understand concepts and apply them in practical contexts; 5) Live Feedback: Every action a student takes in a Prodigy Game results in immediate feedback. This helps students see the results of their decisions immediately, allowing them to learn from mistakes and improve their strategies.

Benefits of game-based learning with the help of Prodigy game media on students' learning interests: 1) Interactive and Fun Learning: Playing games like Prodigy makes learning mathematics an interactive and fun experience for students. This can increase their interest in subjects often considered difficult or tedious; 2) Relevant Context: The game provides a relevant and accurate context for applying mathematical concepts. Students can see firsthand how mathematics can be used in everyday life, increasing their interest in such learning; 3) Intrinsic Motivation: When students feel successful in completing challenges in the game, this

can increase their intrinsic motivation to continue learning and overcome new challenges; 4) Positive Collaboration and Competition: Some math game apps allow students to collaborate with their friends or compete positively. This can build a sense of community in the classroom and increase students' interest in learning.

4. CONCLUSION

Based on the results of research and development, it is known that game-based learning with the help of Prodigy game media is proven to be valid, practical, and effective for students critical thinking skills and can increase their interest in learning mathematics. Using apps like Prodigygame in math learning helps improve students' critical thinking skills through various interactive and focused ways. It can change their perception of math learning to be more positive and engaging.

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