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The Impact of Implementing Game-Based Learning on Student Motivation and Engagement

Ika Agustina[1], Wang Joshua[2], Julanos [3], Matteson Niva[4]
[1]Politeknik Negeri Media Kreatif, Indonesia
[2]Académie des Beaux-Arts de Tournai, Belgium
[3]Sekolah Tinggi Teknologi Dumai, Indonesia
[4]University of Lyon, France

ABSTRACT

Background. The implementation of game-based learning is an inclusive learninggame elements into an educational context. These game elements will produce a more dynamic and interesting learning experience. This interesting interactive experience encourages students to become more involved, thereby fostering a strong desire to understand and master the learning material.

Purpose. This research was conducted with the aim of understanding the relationship between the implementation of game-based learning and student motivation and engagement. Apart from that, it also aims to find out the challenges of implementing game-based learning.

Method. The method used in this research is a quantitative method.This method is a way of collecting numerical data that can be tested. Data was collected through distributing questionnaires addressed to students. Furthermore, the data that has been collected from the results of distributing the questionnaire will be accessible in Excel format which can then be processed using SPSS.

Results. From this research, researchers were able to obtain research results on From the research results, it can be seen that game-based learning is something that has become a trend in the world of education.By adapting technology to game-based learning, education can become more relevant and dynamic, and students' diverse learning styles can be accepted.

Conclusion. From this research, researchers can conclude that the impact of implementing game-based learning,can encourage students to participate more actively in the learning process. So that student motivation and involvement becomes higher in the learning process.

KEYWORDS

Games, Learning, Motivation

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Correspondence:

Ika Agustina,
Ika.agustinapolimedia@gmail.com

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INTRODUCTION

In the current digital era, learning has experienced many changes as a result of technological advances(Bonaccorsi et al., 2020). In an era where technology increasingly dominates everyday life, it has been proven that the inclusion of technology in the world of education, especially in the teaching and learning process, can increase students' motivation to learn.(Saberi et al., 2019). This is because technology provides new and interesting learning opportunities, making students not bored while

studying. One example of technological progress is game-based learning. Therefore, a teacher needs to learn various things in creating effective learning games to be used in the learning process(Hu et al., 2019). Game-based learning is a type of learning carried out through games, which aims to train students' brains to resolve existing conflicts or problems(Tushar et al., 2018). Game-based learning also includes active learning designs that involve the use of video games to support teaching and learning(Wu et al., 2018). It is also useful to require students to actively participate in the learning process and introduce concepts to students and guide them to achieve learning goals.(Wei et al., 2018). Game-based learning teaches students to consider and connect cause and effect, maintain focus, understand visible problems, and find solutions to problems that arise.

The impact of using game-based learning on student motivation and engagement, this context can be described broadly and in depth(Ma et al., 2018). The most important thing about game-based learning is that it has a great possibility of increasing students' desire to learn, so that students tend to be more involved in the learning process when games are combined with elements in learning games such as challenges, achievements and prizes.(Liu et al., 2020). Learning tasks are presented in a fun and challenging format, fostering student interest and desire to learn more. This can encourage students to study harder, because students will learn happily without any pressure or coercion(US Preventive Services Task Force et al., 2018).

Game-based learning can also provide in-depth feedback to students directly(Shen et al., 2018). Game-based learning implementations often track student performance instantly, this can allow students to identify errors and improve their understanding(Samaniego et al., 2020). The identification of these errors can create an effective learning cycle that encourages problem solving and encourages students to achieve better achievements(M. Zhang et al., 2019). However, there are also concerns about whether game-based learning can affect student motivation and engagement. Certain students may be so focused on aspects of the game, such as getting a high score or reaching a certain level, that they ignore the actual subject matter(King & Nielsen, 2019). Therefore, to ensure student motivation and engagement remain good, game-based learning design needs to balance game elements that are in line with the essence of learning.

Learning achievement and learning motivation are two important aspects of a person's educational experience(Goyal & Ferrara, 2018). Internal drivers that encourage people to actively participate in the learning process are known as learning motivation. Highly motivated students tend to demonstrate a strong desire to achieve academic goals, face challenges, and discover new information(Chugh et al., 2018). In this case, it is important to recognize that learning motivation is a continuous process and does not just happen once. Interest in the topic, clear personal goals, and social support can influence a student's drive to learn. Overall, high motivation produces an environment that supports active and productive learning(Chen et al., 2020).

The impact of implementing game-based learning can also have an influence on student motivation and involvement in learning. Thus, it can be interpreted that learning motivation is a force that encourages certain behavior(Appova & Arbaugh, 2018). It is impossible to carry out learning activities if a student does not have the motivation to learn. Active learning in class is very important besides motivation. Whether a teacher is successful in delivering material in class depends on how active the students are in the learning process(Scrivener et al., 2018). If students are active in the learning process, the material presented by the teacher can be well received by students, but if students are passive, learning does not go well.

The type of method used in this research is a quantitative method. This method is used so that the final results of the processed data can be known clearly and precisely regarding the impact of implementing game-based learning on student motivation and engagement. The data collection

process was obtained by the researcher from the results of the respondents' answers that the researcher had carried out. Researchers created a questionnaire with 10 questions, then distributed it via Goggle from. After the data is collected, the data will be calculated into a percentage and presented in table form. In processing research data, researchers use SPSS software which aims to make it easier for researchers to process data, and the data results are more relevant.

From the results of the explanation above, researchers assume that the impact of implementing game-based learning on student motivation and engagement can be a factor in increasing student learning motivation. This research also aims to determine the advantages of the impact of implementing game-based learning used in the learning process so that the learning process is not too monotonous in learning. In this research, the researcher also used quantitative methods, the data obtained came from the results of the questionnaire that the researcher submitted. Furthermore, the researcher really hopes that the next researchers will research and study more deeply the impact of implementing game-based learning on student motivation and engagement.

RESEARCHMETHOD

Research design

This research uses a quantitative research design, which uses statistical processes to present data in the form of numbers. Researchers created twenty questions to collect information about the research to find out the results. Researchers will ask respondents to answer the questions asked, which will be presented in the form of tables and percentages. The purpose of processing this data with the SPSS application is to compare the results of respondents' answers. After this comparison, researchers can provide solutions to any information they obtain about the impact of learning technology integration on increasing student engagement.

Research procedure

In this study, researchers investigated the impact of integrating game-based learning on student motivation and engagement. The aim of the researcher is to investigate this matter so that the researcher can collect, analyze and provide understanding of the data that has been collected. In creating questions, researchers use good language that is easy for teachers and students to understand. This aims to ensure that teachers and students who respond to questions asked by researchers can be answered quickly. That way, it will be easier for researchers to test the data being investigated regarding the impact of integrating learning technology on increasing student engagement.

Research subject

In researchingthe impact of game-based learning integration on student motivation and engagement,The researcher certainly determines the subject for his research. In this research, the subject of this research is aimed at students from various educational institutions. Before distributing the questionnaire by the researcher, the researcher asked the respondents first to be willing to spend their time filling out the questionnaire that the researcher would distribute. The questionnaire each contains 10 questions aboutimpact of game-based learning integration on student motivation and engagement.

Research Ethics

After the researcher carried out several stages as previously explained, in conducting research, the researcher also paid close attention to ethics and manners in research. Researchers believe that ethics needs to be considered whenever and wherever, including in the research being conducted. This aims to gain trust and readiness from the respondents or those who are the objects

of this research. Furthermore, in this research, the researcher also explains information related to the research, one of which is information in filling out the questionnaire. This information was explained by the researcher so that the respondents were ready and willing to voluntarily provide responses and answers to the questions asked by the researcher.

Data Collection and Analysis

Data collected by researchers in researchingthe impact of game-based learning integration on student motivation and engagement,will be processed into the SPSS application. Then the data that has been obtained will be presented by researchers in the form of tables and diagrams. The purpose of presenting it in table and diagram form is to be able to see a comparison of the research results that have been carried out by researchers regardingimpact of game-based learning integration on student motivation and engagement. Next, the obtained data results are converted into percentages or averages. Then the data results will be tested again using the T-test.

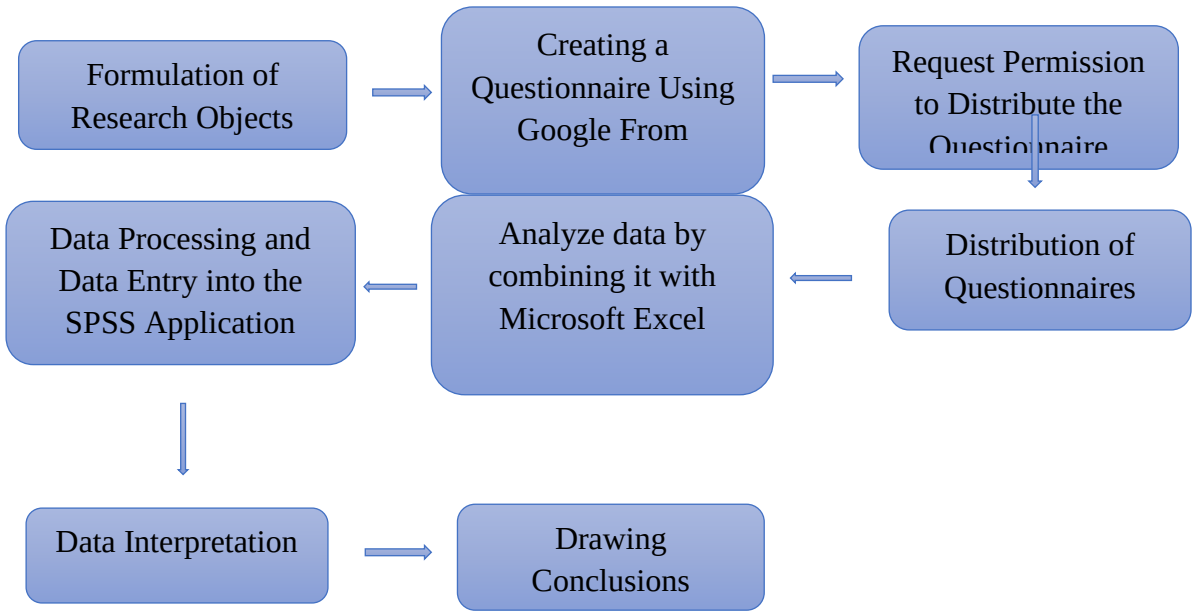
Table 1

Categories of the Impact of Game-Based Learning Integration on Student Motivation and Engagement

No	Earning Category	Level of education	Percentage (%)
1	Strongly agree	Student	>90%
2	Agree	Student	45-89%
3	Disagree	Student	16-45%
4	Don't agree	Student	5-15%

Figure 1

Data Collection and Analysis Flow



RESULTS

Impact of Implementing Game-Based Learning

An interesting innovation, game-based learning has succeeded in changing the world of education by utilizing game components to increase student motivation and engagement so as to increase student achievement in learning. This new paradigm not only conveys information in an interesting way, but also builds a fun and interactive learning experience. This method turns

learning into an educational adventure that fosters curiosity and a spirit of exploration. In game-based learning, intrinsic motivation encourages students to learn with great enthusiasm. Games can provide natural satisfaction that encourages students to learn more by offering relevant and in-depth challenges. Students also feel they have control over the learning process in a dynamic learning environment due to this high level of engagement.

Table 2

Summary of Percentage Results from Respondents' Answers

No.	Question	Strongly agree	Agree	Disagree	Don't agree
1	The impact of implementing game-based learning can improve students' abilities in using technology	26%	60%	12%	0%
2	The implementation of game-based learning can have a positive influence on students' level of persistence in completing learning tasks	25%	30%	40%	5%
3	Game-based learning has the potential to improve students' critical thinking skills in learning	33%	53%	8%	6%
4	Game-based learning can reduce students' boredom in learning	45%	50%	3%	2%
5	Students are more active and participate in learning after using games as a learning medium	65%	28%	7%	0%
6	The impact of implementing game-based learning can increase students' understanding of the learning material	20%	35%	44%	1%
7	Game-based learning can increase collaboration between students	23%	60%	10%	7%
8	The impact of implementing game-based learning can influence the development of students' social skills	30%	66%	2%	2%
9	Game-based learning can prepare students to face real-world challenges	30%	50%	10%	10%
10	Game-based learning is one type of learning that can be used in differentiated learning	60%	40%	0%	0%

Table 2The above shows the distribution of questionnaires that have been carried out by researchers. This questionnaire contains ten questions about the Impact of Implementing Game-Based Learning on Student Motivation and Engagement. In addition, during the distribution of the questionnaire, the researcher presented a percentage of each response from the respondents. Therefore, respondents can choose to answer the researcher's questions by providing options such as strongly agree, agree, disagree, or disagree. And it can also be seen from the first question asked

by researchers regarding the impact of implementing game-based learning, which can improve students' ability to use technology, getting the highest score of 60% with the agree option.

The second question regarding the implementation of game-based learning can have a positive influence on the level of student persistence in completing learning tasks, getting a percentage result of 40% disagreeing. The third question about game-based learning has the potential to improve students' critical thinking skills in learning, getting a score of 53% agree. The fourth question regarding game-based learning can reduce students' boredom in learning, obtained a percentage of 50% in agreement. Next, the fifth question regarding students being more active and participating in learning after using games as a learning medium, there were 65% of the strongly agree option. Furthermore, the sixth is regarding the impact of implementing game-based learning on improving students' understanding of the learning material, with 44% disagreeing.

The seventh question, that game-based learning can increase collaboration between students, got a percentage result of 60% agreeing. In the eighth question regarding The impact of implementing game-based learning, which can influence the development of students' social skills, is also found in the agree option as much as 66%. The ninth question about game-based learning can prepare students to face real-world challenges, getting a percentage result of 50% who agree. For the last question regarding game-based learning is one of the learning that can be used in differentiated learning, getting a percentage gain of 60% in the strongly agree option.

Table 3

Summary of Percentage Results from Respondents' Answers

No.	Question	Strongly agree	Agree	Disagree	Don't agree
1	Game-based learning can increase students' concentration in learning	33%	59%	3%	5 %
2	Game-based learning can influence effective learning time outside of student learning hours	50%	50%	0%	0%
3	Game-based learning also aims to develop broad and varied learning materials	80%	20%	0%	0%
4	Game-based learning can provide students with freedom in learning	45%	52%	3%	1%
5	Game-based learning can help teachers adapt learning materials to suit students' learning styles	67%	33%	0%	0%
6	As a teacher, you can explain well the features contained in game-based learning	50%	50%	0%	0%
7	The ability or technique of using technology for a teacher in game-based learning is very necessary	72%	28%	0%	0%
8	The relationship between students and teachers becomes more active in conducting game-based learning	44%	39%	15%	1%
9	Game-based learning can help teachers evaluate individual student understanding	85%	5%	10 %	0%

10	Game-based learning is not free from obstacles and challenges	70%	30%	0%	0%

In the statement in table 3 above, the researcher has also created ten questions. Which can be seen from the first question regarding game-based learning can increase students' concentration in learning, getting a percentage result of 59% of agree options. Next, question number two regarding game-based learning can influence effective learning time outside of student learning hours, got the same percentage score for the strongly agree and agree options of 50%. The third question, that game-based learning also aims to develop broad and varied learning materials, received a percentage score of 80% strongly agree.

The fourth question about game-based learning can provide freedom in learning for students, getting as much as 52% of the percentage score in the agree option. The fifth question is aboutGame-based learning can help teachers adapt learning materials to suit students' learning styles, getting as many as 65% of strongly agree options. The sixth question concerns As a teacher, you can explain well the features contained in game-based learning, and also get the same percentage of 50% for the strongly agree and agree options.

Next, the seventh regarding the ability or technique of using technology for a teacher in game-based learning is very necessary, getting a percentage score of 72% strongly agree. Eighth question aboutThe relationship between students and teachers becomes more active in carrying out game-based learning, getting a percentage gain of 44% strongly agree. In question number nine, that game-based learning can help teachers evaluate students' understanding individually, the highest number of options was also strongly agreed at 85%. The last question about game-based learning was not free from obstacles and challenges, getting as much as 70% of the strongly agree option.

Diagram 1

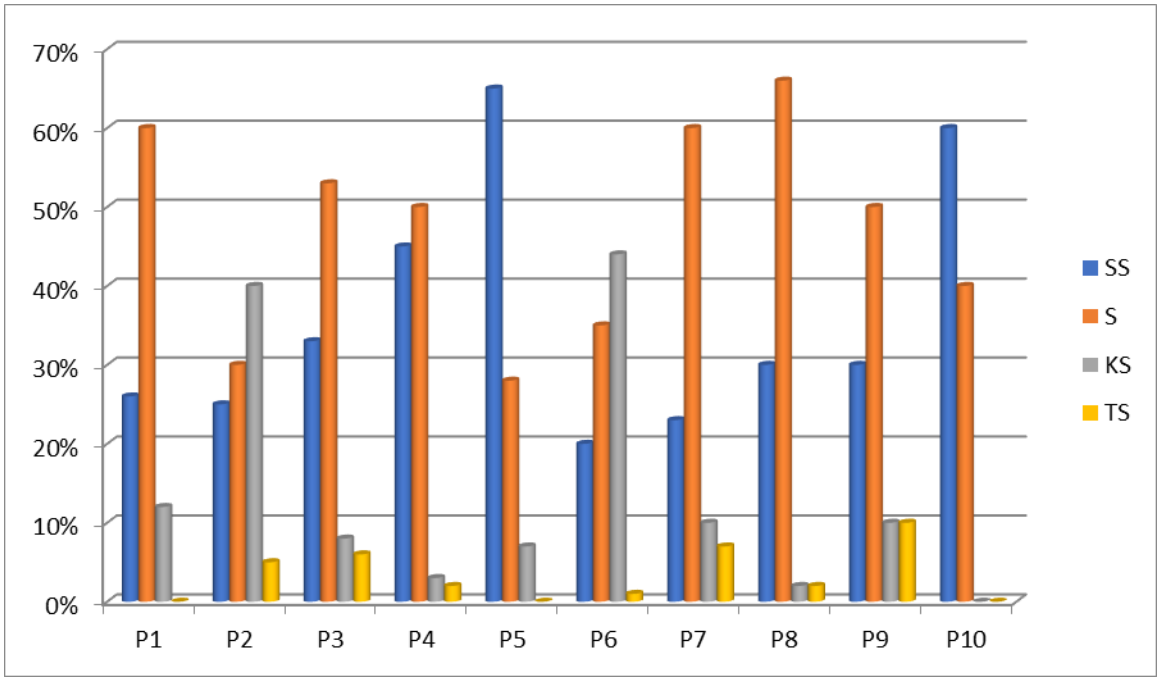


Diagram 2

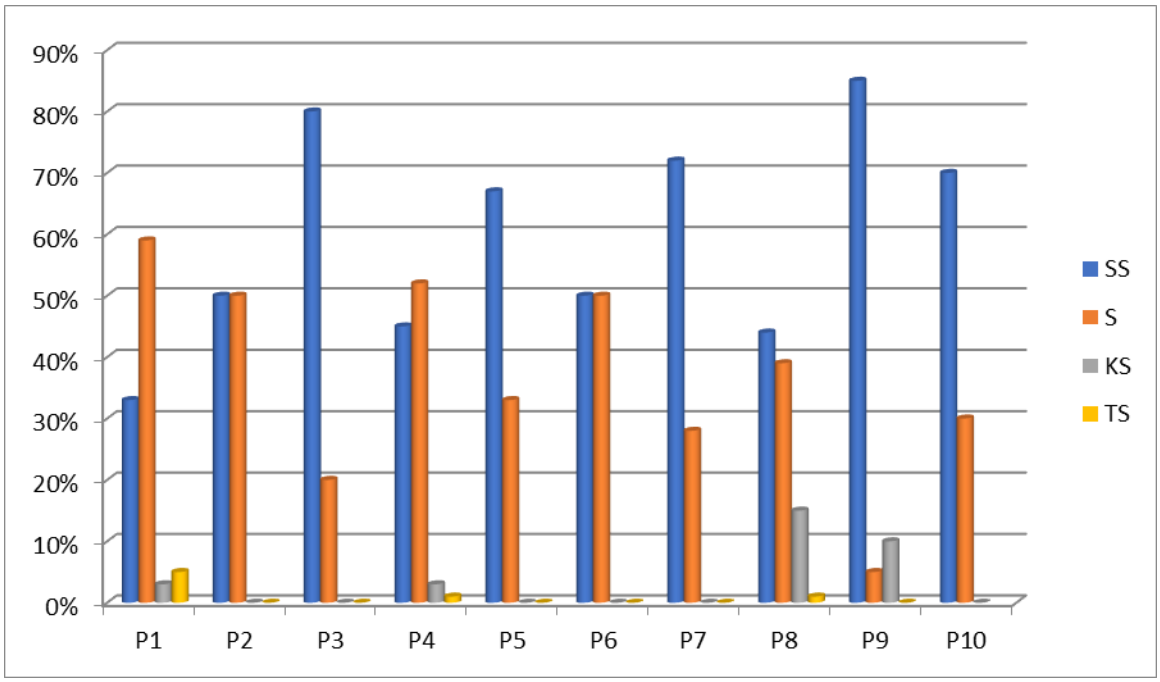


Table 3

T-test ConcerningThe Impact of Implementing Game-Based Learning on Student Motivation and Engagement

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE TEST	47.6500	20	20.26995	4.53250
	POST TEST	41,9000	20	15.67062	3.50406

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PRE TEST & POST TEST	20	-.743	,000

Paired Samples Test

		Paired Differences				
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of th Difference Lower	Upper
Pair 1	PRE TEST - POST TEST	5.75000	33.59648	7.51240	-9.97364	21.47364

Based on the results of table 3 above, it is a T-test using the SPSS application. From the research results, the researcher can conclude that the T-test in the first output section explains the mean as the average. In the Pre Test the average number produced was 47.6500,while in the Post Test section the result was 41,9000. Based on these results, it can be formulated that there are differences in the results of the respondents' answers. Next, in the Paired Samples Correlations section, you get a correlation of -743, and the sign size is 000. Next, in the Paired Samples Test section, you get a result of 33.59648 in the Std section. Deviation, while in the Std. Mean Error obtained a result of 7.51240. Based on these results, the impact of implementing game-based learning really influences student motivation and engagement.

Table 4

T-test ConcerningThe Impact of Implementing Game-Based Learning on Student Motivation and Engagement

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE TEST	8,3500	20	12.47007	2.78839
	POST TEST	2,0000	20	2.95581	.66094

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PRE TEST & POST TEST	20	,244	,300

Paired Samples Test

		Paired Differences				
					95% Confidence Interval of th Difference	
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Pair 1	PRE TEST - POST TEST	6.35000	12.09295	2.70407	.69032	12.00968

Furthermore, in table 4, there are also the results of research using the T-test. It can be seen in the first output section that the Pre Test results were 8.3500, and the Post Test results were 2.0000. In the Paired Samples Correlations section, we obtained a Correlation of 244, with a Sign result of 300. Meanwhile, in the Paired Samples Test section, we obtained a result of 12.09295 in the Std section. Diviation, and Std. The mean error is 2.70407. Based on the results of this research, it can be seen between each question asked by the researcher regarding the Impact of Implementing Game-Based Learning on Student Motivation and Engagement.

DISCUSSION

To improve the quality of learning, the use of technology in education has become a main focus. Game-based learning has emerged as one of the innovations that is currently attracting students' interest in learning in educational units(S.K. Singh et al., 2020). Leverage technology to increase interactivity and give students a fun and educational way to learn(Klein et al., 2018). By implementing technology into game-based learning, education can become more dynamic and relevant, and diverse learning styles can be accepted, and students can become more active in the learning process(Teece, 2018).

In game-based learning, students not only gain new knowledge but also improve their ability to think critically, work together, and overcome obstacles through the challenges and simulations offered.(Piñero et al., 2019). However, you also need to remember that game-based learning is not always effective. Not all students respond in the same way to the implementation of game-based learning, so it is very important for a teacher to pay attention to the diversity of his students in learning.(Reckien et al., 2018). How students respond to game-based learning can be influenced by elements such as environment, culture, and personality, and the student's daily life(Grimes, 2018).

The implementation of game-based learning has a significant impact on student motivation and engagement. This type of game-based learning can create a learning environment that is immersive, fun, and motivates students to perform at their best when used correctly(Perkovic et al., 2019). Game-based learning can be an effective tool for preparing students to face the challenges of the contemporary world of education, by considering student diversity and balancing game aspects with the substance of the subject matter.(Q. Zhang et al., 2020). However, game-based learning presents several problems. One of them is the evaluation aspect, new assessment methods must be created to meet these learning characteristics(Authors/Task Force Members: et al., 2022). Additionally, it is important to pay special attention to ensuring that students have equal access to technology so that there are no differences in their learning experiences(Canavese et al., 2018)

By understanding this problem, as educators, we must be able to create broader and more inclusive game-based learning solutions to ensure that game-based learning can benefit all students.(Oulahou et al., 2023). In facing the era of digital transformation, it is very important for teaching staff to continue to explore and develop the potential for using technology in education. Impact of Implementation Game-based learning also has many advantages, especially that it can be adjusted to the level of understanding and individual needs of students(Greczynski & Hultman, 2020). Games in learning help the learning process become more relevant, efficient and effective by offering challenges and content that suits students' abilities(Gaia Collaboration et al., 2018). Game-based learning and traditional learning approaches work well together. Students not only receive information passively, but they also participate actively in the game components(Li & Xie, 2020).

Although the impact of game-based learning has many benefits, it is important to remember that game-based learning should not be used as a substitute for traditional learning as a whole.(JA Singh et al., 2019). Therefore, game-based learning can be an effective tool to support students' academic performance and at the same time bridge the gap between different learning styles(The STARRT-AKI Investigators, 2020). Another factor in game-based learning is the adaptive factor. This factor is very important to support various student skills, such as adjusting the level of difficulty according to the student's abilities(Treibel et al., 2018). The importance of this adaptive factor can mainly be reflected in its ability to maintain students' interest and focus on learning material.

CONCLUSION

Impact of Implementation Game-based learning has been shown to be one of the effective learning methods for increasing student motivation and involvement in learning by using various mechanisms designed to encourage active student involvement. To make learning more engaging and fun, incorporate game elements such as challenging challenges, motivating rewards, and competition elements. Because students are engaged in learning experiences that are not only informative but also entertaining, intrinsic motivation, which is the internal drive to learn, becomes more resilient in the implementation of this game-based learning.

Additionally, game-based learning usually involves immediate evaluation and feedback to track student progress. This allows students to assess themselves, understand their strengths and weaknesses, and continue to improve. Having clear, easy-to-see game metrics provides a deep understanding of student achievement levels, allowing teachers to provide appropriate support when needed. In game-based learning, students feel pushed in proportion to their skill level when the challenges in the game are matched to their progress.

The impact of implementing game-based learning also cannot be considered as a solution for the best learning design. The design of the game, the quality of the learning content, and the teacher's ability to incorporate game elements into learning sub-materials are all factors that determine how effective the game is. It's important to explain game design elements that can aid learning, such as matching difficulty levels to student abilities and incorporating relevant assessment techniques. However, game-based learning can also be challenging. Potential interference caused by game elements themselves. If not organized well, students may focus too much on the entertainment element and ignore the learning objectives. As a result, game-based learning requires a balanced approach to balance fun and learning objectives.

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