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Exploring the Influence of Game-Based Learning and School Environment on Learning Achievement: Does the Mediation of Self-Intention Matter?

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ABSTRACT

Objective: This research aims to explore the influence of game-based learning and the school environment on student learning achievement and the mediating role of self-intention in influencing game-based learning and the school environment. **Method:** The quantitative survey method involved 100 students of MA Ma'arif Al-Mukarrom, Kauman, and Ponorogo, using probability sampling techniques with proportionate stratified sampling techniques. Data was collected through a questionnaire with a Likert scale, and data analysis was carried out using relevant statistical techniques. **Results:** The research results show a positive but less significant influence on game-based learning and the school environment on student learning achievement; however, with self-intention mediating it, it has a positive and significant influence. The implications of this research include the importance of developing learning strategies to improve more effective and efficient education and a school environment that can support learning. Recommendations for research are the need to integrate elements of motivation and self-development in game-based learning design and develop meta-cognitive skills. The final one is creating a school environment to create an atmosphere of motivation and social support and facilitate learning experiences. **Novelty:** This research highlights the role of student enthusiasm in connecting learning through games, school atmosphere, and learning achievement. This adds insight into the interaction of these factors and underlines the importance of paying attention to students' enthusiasm for learning.

INTRODUCTION

One of the crucial components in the current era is the use of learning models. A suitable learning model will also create a good learning atmosphere for good learning achievement. One learning model is the Game-Based Learning model. Game-based learning is an enjoyable learning model. This learning model uses an approach through a game to deliver learning. This learning model greatly emphasizes students' involvement in learning (Barz et al., 2024). This learning model involves in-depth planning to combine games into a medium for conveying learning. The current problems regarding the use of this learning model are expected to make it easier for students to understand the learning that has been delivered. The game-based learning model emerged because of innovation to eliminate boredom in students. In a game, students will be more active so that students focus on learning. Apart from this, today's students like playing games. So, learning through a game approach will be more interesting (Dahalan et al., 2024).

Then, in the implementation of education, one of the factors that is sometimes given less attention but is very important is the school environment. The environment in

General is everything that is around us, both living and non-living. Then, in another view, it is explained that the environment is a place for humans to obtain existence in space and time (Primawardani et al., 2024). The environment will shape a person's character or personality in a social system. A good environment will form a good character in a person; conversely, someone who lives in a lousy environment will also create a good character. So, this is proof that the environment has a significant influence on a person. This is, of course, also in line with the school environment. A good school environment will create good participants and vice versa. So, there needs to be particular emphasis on creating a good school environment that can encourage students to learn. Then, good human resources will also be created (Rahmawati et al., 2024).

One of the indications of whether a lesson is successful is by looking at a student's learning achievement. Learning achievement is an activity carried out by the teacher to monitor and assess the learning process. Then, at the end of the lesson, the teacher will provide an evaluation to determine the student's learning achievement. Student results are used as the primary reference to determine the success or failure of the learning that has been carried out (Vantika et al., 2024). Two things can influence a student's learning achievement: firstly, the student's abilities and external factors, be it the environment, learning process, teachers, learning, and others. In the current era, learning achievement does not only focus on cognitive aspects but also affective and psychomotor aspects. The current problem is that there are still many students whose learning achievement still needs to meet the expected results because learning is still massive, both in terms of the environment, learning model, and other things (Nurhayati et al., 2024).

Self-intention refers to a person's goal or determination to carry out an action or achieve something. An inner awareness or desire motivates individuals to act according to their desires. Self-intentions can be essential in guiding actions and directing people's efforts toward achieving their goals. For example, someone with a solid self-intention to learn and improve their skills may be more persistent in pursuing additional education or training. A person who intends to help others may be involved in volunteer activities or work in a field that serves the community. Self-intention is often an essential foundation in achieving success or achieving goals because it encourages individuals to act consistently and persistently in the face of obstacles or challenges that may arise along the way. It can also provide focus and direction in people's lives, helping them prioritize their time and resources to achieve what they want.

LITERATURE REVIEW

The urgency of the influence of game-based learning on learning achievement is becoming increasingly prominent in the era of digital education that continues to develop. The game-based learning approach changes the traditional learning paradigm and enriches students' learning experience. Game-based learning utilizes interactive elements, challenges, and rewards to create a fun and engaging learning environment (Yeh et al., 2019). In this way, students are actively involved in the learning process and develop critical skills such as problem-solving, cooperation, and critical thinking. In the context of learning achievement, game-based learning has been proven to increase material retention, intrinsic motivation, and overall student engagement. Game-based learning allows students to learn independently and improve their understanding of course material by providing immediate feedback and the opportunity to learn from failure. Therefore, in facing increasingly complex educational demands, game-based

learning is becoming increasingly urgent as an effective tool for improving learning achievement and preparing students to face future challenges.

The urgency of the influence of game-based learning on self-intention is becoming increasingly important in the context of modern education, which continues to develop. Game-based learning approaches have been proven effective in increasing students' intrinsic motivation, which is the foundation of solid self-intention in learning (Karakoç et al., 2022). By utilizing elements such as challenges, reward systems, and direct feedback, game-based learning can arouse students' interest and intention to learn more actively. When students feel involved in an exciting and enjoyable learning experience, they tend to develop more robust personal goals for achieving success in learning. In addition, game-based learning also provides opportunities for students to take control of their learning process, strengthening their sense of responsibility and autonomy in achieving their academic goals. Thus, the influence of game-based learning on self-intention enriches students' learning experiences and helps build a solid foundation for better and sustainable academic achievement.

The Influence of School Environment on Self-intention and Learning Achievement

The importance of the school environment in achieving learning achievement cannot be underestimated. A conducive school environment can have a significant positive impact on student learning achievement. Factors such as adequate physical facilities, qualified teacher support, a supportive social climate, and an inclusive learning culture are essential in establishing an effective learning environment. When students feel comfortable, inspired, and supported in their school environment, they are more motivated to learn and achieve high levels. Therefore, attention to developing and maintaining a positive school environment must be a priority for every educational institution because this directly impacts student learning achievement.

The role of self-intention in achieving learning achievement is critical. Self-intention includes students' motivation, goals, and self-awareness of their learning process. Students who intend to learn and achieve academic goals are more focused and persistent. Positive self-intentions also help students overcome challenges and obstacles in learning (Hikmawati et al., 2022). Psychologically, self-intention is an internal driver that motivates students to participate actively in their learning process. With a solid intention to learn, academic achievement can be improved. Therefore, educators and supervisors must foster positive learning intentions in students and help them identify and formulate clear goals to achieve optimal learning achievement. Thus, awareness of self-intention is critical in helping students achieve their maximum learning potential.

The Influence of Self-intention on Learning Achievement

The influence of self-intention on learning achievement is an essential aspect of the learning process. Self-intention refers to an individual's internal motivation to learn and achieve educational goals. When someone has strong self-intention, they tend to be more committed to studying the material diligently and focused. This internal motivation encourages students to overcome obstacles and challenges in learning and to achieve high achievements. In addition, self-intention also plays a role in maintaining perseverance and perseverance in facing learning difficulties, which ultimately strengthens overall learning achievement. Thus, developing strong self-intention can be critical in increasing individual learning achievement, creating a solid foundation for continued academic and personal growth.

The Role of Self-Intention on The Influence of Game-Based Learning and School Environment on Learning Achievement

The role of self-intention in the context of game-based learning is critical in influencing learning achievement. First, self-intention allows students to develop intrinsic solid motivation toward learning. In a gaming environment, when students feel they have control over their learning goals, they tend to be more mentally and emotionally invested in the learning process (Karakoç et al., 2022). Thus, they are more likely to explore learning material more deeply and strive to achieve deep understanding. Second, self-intention facilitates personalized learning experiences. In game-based learning, students can choose a learning path that suits their interests, needs, and ability level. This helps build a greater sense of engagement because learners feel control over their learning experience. By designing their learning goals, students can feel more empowered to achieve the desired learning success.

Self-intention plays a crucial role in influencing learning achievement in the school environment. First, self-intention allows students to direct their attention and effort toward specific learning goals. In a school environment that is often complex and full of distractions, setting and prioritizing one's learning goals helps students focus their energy on the most important things to achieve academic success. Second, self-intention plays a role in forming a proactive and resilient learning attitude. When students understand their own goals and feel they have control over their learning process, they tend to be more motivated to overcome obstacles and difficulties that may arise in their learning journey. This is important in creating a school environment that encourages students' mental resilience and ability to face academic challenges with confidence and determination.

This research explores the influence of game-based learning and the school environment on student learning achievement and the mediating role of self-intention in influencing game-based learning and the school environment. This research differentiates itself by exploring the critical role of students' self-intentions as a mediator in the relationship between game-based learning, the school environment, and learning achievement. This approach provides new insights into the complexity of the interactions between these factors and highlights the importance of understanding individual psychological factors in modern learning contexts. In doing so, this research contributes to the literature on game-based learning and school settings and explores new areas in understanding the role of self-intentions in the learning process.

RESEARCH METHOD

Research Design

This research applies a quantitative approach with survey research methods (Apriliani et al., 2023; Putra et al., 2022; Widayanto et al., 2021). This research design uses an explanatory and correlational approach using Partial Least Squares Structural Equation Modelling (PLS-SEM), an approach used to explore the relationship between variables in a conceptual model. PLS-SEM is a multivariate statistical method to analyze a structural model's relationship between latent or measured variables. Using this approach, this research combines explanatory and correlational elements to understand better the complexity of the relationships between variables in a conceptual model. PLS-SEM allows researchers to test models holistically, including identifying cause-and-effect relationships and correlation relationships between variables, thereby providing a

deeper understanding of the observed phenomenon. This research uses non-probability sampling with a purposive sampling technique. The sample in this research was 100 students at MA Ma'arif Al-Muharram Ponorogo.

Data Collection

The data collection technique used in this research is a four-variable questionnaire. Research design with an explanatory and correlational approach to determine the relationship between independent variables (game-based learning and school environment), mediation (Self-intention), and dependent variables (learning Achievement). This research uses a Likert scale of 4 alternative answers from strongly agree to strongly disagree (Daryono et al., 2020; Widyastuti et al., 2023). Data collection was carried out using a survey method via Google Forms. Research instrument variables are shown in Table 1.

Table 1. The construct of the research variables.

No	Variable	Indicators	Construct	References
1	Game-Based Learning (X1)	Engagement	GBL1	(Kebritchi et al., 2010; Kiili, 2005; Partovi & Razavi, 2019; Soflano et al., 2015; Tsai et al., 2016)
2		Progression	GBL2	
3		Performance	GBL3	
4		Collaboration	GBL4	
5		Problem-Solving Skills	GBL5	
6		Feedback and Reflection	GBL6	
7		Knowledge Acquisition	GBL7	
8	School Environment (X2)	Physical Environment	SE1	(Ikhsan et al., 2017; Johnson, 2009; Lavrijsen et al., 2022; Marini & Hamidah, 2014; Nurfirdaus & Sutisna, 2021)
9		Social Environment	SE2	
10		Emotional Environment	SE3	
11		Academic Environment	SE4	
12		Institutional Support	SE5	
13		Inclusivity and Equity	SE6	
14	Self-Intention (Z)	Goal Setting	SI1	(Fukuchi et al., 2018; Margolis & Mccabe, 2006; Philpott, 1995; Roeser & Peck, 2009; Schunk, 1995)
15				
16		Motivation	SI2	
17		Planning and Strategy	SI3	
18		Self-Monitoring	SI4	
19		Persistence and Resilience	SI5	
20		Self-Reflection and Evaluation	SI6	
21	Learning Achievement (Y)	Academic Performance	LA1	(Jung et al., 2002; Marpaung, 2015; Mulyaningsih, 2014;
22		Content Mastery	LA2	
23		Skill Development	LA3	

No	Variable	Indicators	Construct	References
24		Engagement and Participation	LA4	Thaib, 2013; Tiantong & Teemuangsai, 2013)
25		Critical Thinking and Problem Solving	LA5	
26		Learning Progress	LA6	

Hypothesis

Regarding the continuity between the concept and the results of previous research, we formulate the following hypothesis:

H-DIR1: Game-based learning has the effect of improving student learning achievement

H-DIR3: Game-based learning has the effect of increasing self-intention

H-DIR2: School environment has the effect of increasing learning achievement

H-DIR4: School environment has the effect of increasing self-intention

H-DIR5: Self-intention has the effect of improving learning achievement

H-IND1: Self-intention mediates the positive influence on the influence of game-based learning on learning learning development

H-IND2: Self-intention mediates the positive influence on the influence of the school environment on learning achievement

Data Analysis

Statistical analysis of this research uses the PLS-SEM measurement technique. The outer model testing stage is a measurement model testing stage that aims to prove the validity and estimate the reliability of indicators and constructs. Several requirements that must be met are the indicator loading factor (λ >0.700) and the reflective construct AVE (>0.500) (Apriliani et al., 2023; Daryono et al., 2024; Fauzan et al., 2023; Supriyanto et al., 2022). Reliability estimates use Cronbach Alpha, Rho_A, and CR values (>0.700). The goodness of fit model testing stage aims to test the predictive power and feasibility of the model. The criteria that must be met include predictive relevance to see the model's predictive power on the blindfolding output (Daryono et al., 2023; Hariyanto et al., 2022). The inner model testing stage tests the significance of the direct (H-DIR$_{1-5}$) and indirect effects (the mediating role of H-IND$_{1-2}$).

RESULTS AND DISCUSSION

Results

PLS-SEM analysis: Evaluation of structural model (Inner Model)

Evaluation of measurement models is critical to ensure that the indicators used to measure latent constructs or variables are consistent with the research objectives and of good quality. Examining construct validity is the primary goal of measuring model evaluation. Analyzing the relationship between the indicator and the measured construct can ensure that the indicator truly reflects the intended aspect of the construct. By analyzing factor loadings, reliability, and discriminant validity, researchers can decide which indicators should be included in the analysis and which should be omitted.

The convergent validity measurement uses a factor loading value limit of 0.700. Based on Table 2, the overall loading factor value for each sub-variable is >0.700 (0.700 –

Inclusivity and Equality to 0.924 – Emotional Environment). This can be interpreted as meaning that the level of correlation between sub-variables and variables that can be explained is 70.000% to 92.400%. The Average Extracted Variance (AVE) value for each variable has a value of >0.500 (0.617- Learning Achievement (Y) to 0.676- Game Based Learning (X1). So, it can be concluded that each sub-variable and variable in the instrument in the research model has supported convergent validity requirements.

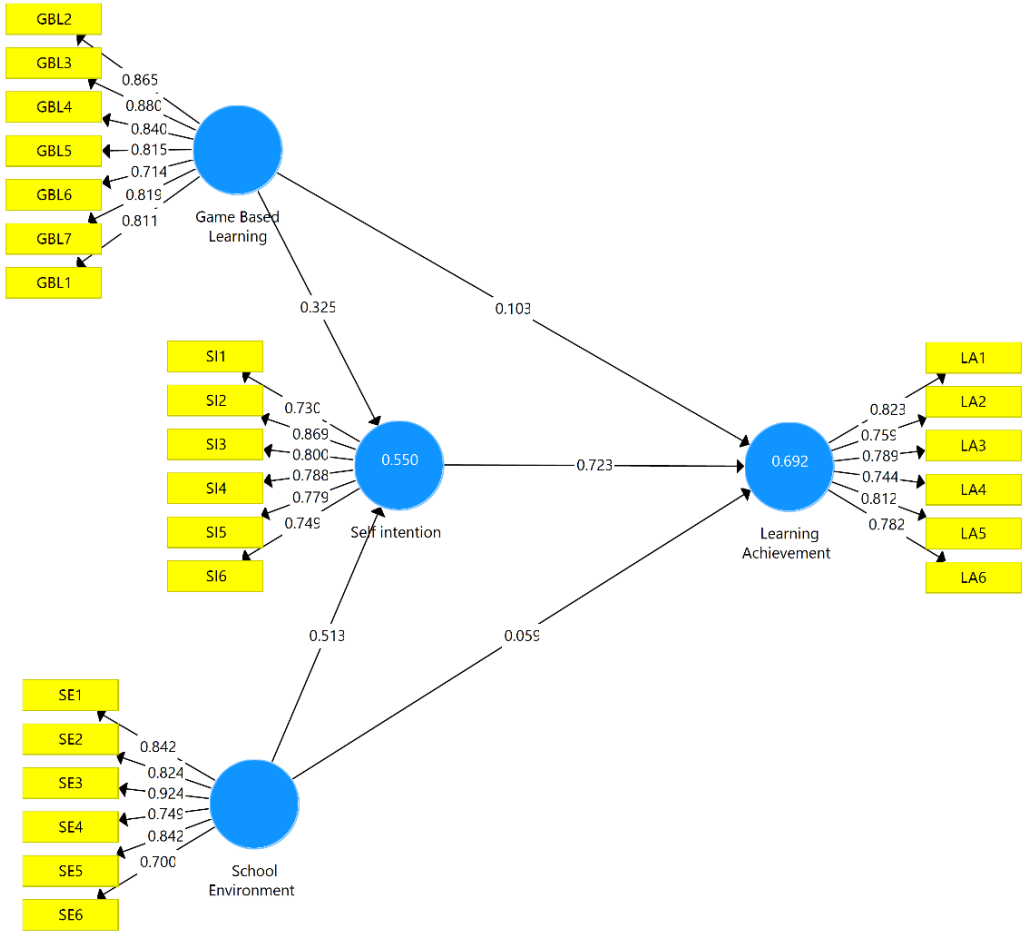

Figure 2. Evaluation of the measurement model.

Based on the loading factor coefficient value, the most dominant statement item in measuring student learning achievement is the Emotional Environment construct 0.924 (SE3). This can be interpreted that the Emotional Environment construct can measure teacher professional competence by 92.40%. Meanwhile, the weakest items are Inclusivity and Equality at 0.700 (SE6) or 70.000%).

Table 2. Outer model: Convergent validity and reliability.

No	Variable	Indicator	Conver Validity		Consistency Reliability		
			FL (λ>0.700)	AVE (>0.500)	CA (α>0.700)	rho_A (φ>0.700)	CR (δ>0.700)
1	Game-Based Learning (X1)	GBL1	0.811	0.676	0.919	0.923	0.936
2		GBL2	0.865				
3		GBL3	0.880				
4		GBL4	0.840				

No	Variable	Indicator	Conver Validity		Consistency Reliability		
			FL (λ>0.700)	AVE (>0.500)	CA (α>0.700)	rho_A (φ>0.700)	CR (δ>0.700)
5		GBL5	0.815				
6		GBL6	0.714				
7		GBL7	0.819				
8	School Environment (X2)	SE1	0.842	0.667	0.898	0.913	0.923
9		SE2	0.824				
10		SE3	0.924				
11		SE4	0.749				
12		SE5	0.842				
13		SE6	0.700				
14	Self-Intention (Z)	SI1	0.730	0.620	0.876	0.877	0.907
15		SI2	0.869				
16		SI3	0.800				
17		SI4	0.788				
18		SI5	0.779				
19		SI6	0.749				
20	Learning Achievement (Y)	LA1	0.823	0.617	0.876	0.878	0.906
21		LA2	0.759				
22		LA3	0.789				
23		LA4	0.744				
24		LA5	0.812				
25		LA6	0.782				

The Fornell-Larcker test is one of the methods used in Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate the discriminant validity of the constructs in a model. This test aims to ensure that the different constructs in the model can be distinguished from each other. This is done by comparing the variance explained by the construct with those explained by other constructs in the model. If the variance explained by one construct is more significant than that explained by another, then the construct has good discriminant validity. A variable is declared reliable if it has CA, Rho_A, and CR values >0.700. The SmartPLS output in the table below shows that all variables have CA values (0.876 to 0.919), rho_A (0.877 to 0.923), and CR (0.906 to 0.936). Thus, the internal consistency of the instrument's reliability in 3 aspects is>0.700, which is reliable in measuring teacher professional competence. The Fornell Larcker value is explained by looking at the correlation value of the latent variable with the correlation variables of other latent variables. Based on Table 3, the correlation value of Learning Achievment (Y) → Learning Achievment has a value of 0.822, which is greater than the correlation value of game-based learning (XI) with other variables (School environment → 0.573; Self-Intention → 0.547; and Game-based learning → 0.505. And so on, to assess correlation with other variables.

Table 3. Discriminant validity: The Fornell Larcker.

Variable	Y	X2	Z	X1
Learning Achievement (Y)	**0.822**			
School Environment (X2)	0.573	**0.785**		
Self-Intention (Z)	0.547	0.614	**0.817**	
Game-Based Learning (X1)	0.505	0.600	0.690	**0.787**

One of the primary purposes of HTMT testing is to measure discriminant validity in the model. HTMT is used to examine the extent to which the constructs measured by different indicators represent the same or different constructs in the model. HTMT is also helpful for assessing multicollinearity between constructs in the model. Multicollinearity can occur when constructs are strongly related to each other, which can cause problems in the estimation and interpretation of results in SEM analysis. The PLS-Algorithm test results in Table 4 reveal that the HTMT value in all dimensions is <0.90 (0.601 to 0.941). So, Fornell-Larcker and HTMT on the correlation of all variables in this research data instrument fulfill the discriminant validity test in measuring student learning achievement.

Table 4. Discriminant validity: The HTMT.

Variable	Y	X2	Z	X1
Learning Achievement (Y)				
School Environment (X2)	0.628			
Self-Intention (Z)	0.601	0.674		
Game-Based Learning (X1)	0.666	0.941	0.760	

Evaluation of structural models

Structural evaluation in testing on PLS-SEM has the main objective, namely, to assess the prediction accuracy of the proposed model. This is done by evaluating the extent to which the model can explain variations in empirical data and predict endogenous variables well. Overall, structural evaluation aims to improve understanding of the phenomenon studied in the research context. By analyzing the relationships between variables, researchers can identify the factors contributing to the phenomenon and develop more profound insight into the dynamics involved.

Table 5. Measurement of structural model: R2, F2.

Variables	R2		F2	
	Value	Decision	Value	Decision
Learning Achievement	0.692	Substantial	-	-
School Environment	-	-	0.006	Small
Self-Intention	-	-	0.764	Large
Game-Based Learning	0.550	Moderate	0.021	Small

Table 5 shows R^2 (Coefficient of Determination) provides an overview of how well the PLS-SEM model explains variation in the observed endogenous variables (constructs). The higher the R^2 value, the more significant the proportion of variation in the construct that the model can explain. R^2 allows comparison between different PLS-SEM models. Researchers can use R^2 values to compare the effectiveness of different models in explaining variation in observed constructs. Based on the table below, the R2 coefficient for the learning achievement variable obtained a value of 0.692; this can be

interpreted as self-intention, game-based learning, and school environment. The influence on learning outcome variables is 69.200%, and other variables outside the research model influence the remaining 30.800%.

f^2 (effect size) is one of the measures in PLS-SEM to evaluate the strength of the effect of latent variables on the observed construct. Precisely, f^2 measures the predictive power of a latent variable against a particular construct in the model. Precisely, f^2 is calculated by dividing the square of the latent variable regression loading on a particular construct by the residual error (error variance) amount from that construct. The results show how much the latent variable explains variation in the observed construct. f^2 helps determine how significant the contribution of latent variables is to the observed construct. f^2 allows comparison between the contributions of several latent variables to the same construct. So that it can be determined which latent variables have the most decisive influence on the observed construct. So, the output effect size shows that the most dominant variable in influencing teacher professional competence is self-intention (f2 = 0.764 in the strong category), and the weakest variable is academic supervision (f2 = 0.06) in the small category.

Measurement of direct effects

One of the main goals of hypothesis testing is to examine the relationships between variables in a proposed model. This is done by analyzing the strength and significance of the relationships between the variables identified in the model. Direct effect evaluation allows researchers to test the consistency between empirical findings and the theory that supports the model. Furthermore, this test analyses the significance of the mediation effect in the research model. This is important for understanding the mechanisms underlying relationships between variables and how certain variables can mediate or change relationships between other variables.

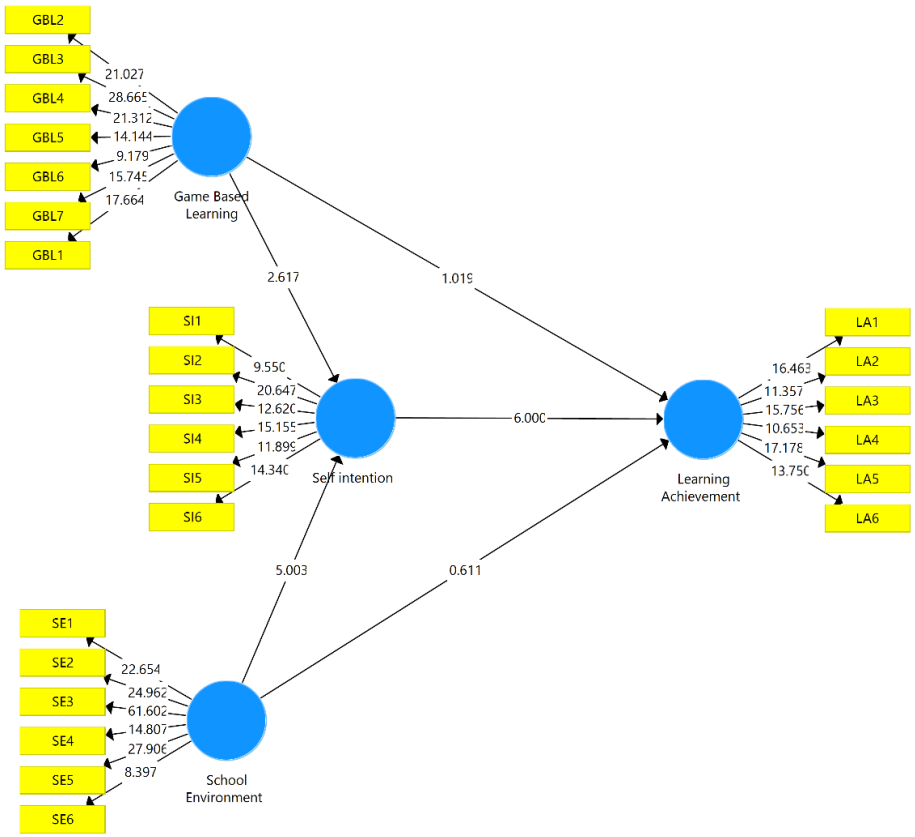

Figure 3. Mechanisms underlying relationships between variables.

A hypothesis can be accepted with significant criteria if it has a T-statistic value above 1.96. Meanwhile, the hypothesis can be accepted with positive or negative influence if the B-value coefficient value shows the direction of positive or negative influence. Based on the table below, hypothesis H1 (game-based learning (X1) → learning achievement (Y)) obtains β-values = 0.103 and P values = 0.340 (0.05). This shows that the game-based learning variable (X1) has a positive effect but is not significant for learning achievement (Y). This means that when the game-based learning variable (X1) increases, the learning outcome variable will also increase, but not significantly.

In hypothesis H2 (game-based learning (X1) → self-intention (Z), the β-values are 0.325, and the P values are 0.008 (0.050). This shows that the game-based learning variable (X1) has a positive effect and is significant for self-intention (Z). This means that when the game-based learning variable (X1) increases, the self-intention variable will also increase and be significant. In hypothesis H3 (Self Intention (X2) → Learning Achievement (Y), β-values = 0.059 and P values = 0.552 (0.050). This shows that the school environment (X2) has a positive but insignificant effect on the learning results (Y). This means that when the school environment variable (X2) increases, the learning achievement variable will also increase, and vice versa.

In hypothesis H4 (School Environment (X2) → Self-Intention (Z)), the β-values are 0.513, and the P-values are 0.000 (0.050). This shows that the school environment (X2) positively and significantly affects self-intention (Z). This means that when the school environment variable (X2) increases, the self-intention variable will also increase, and vice versa. In hypothesis H5 (Self Intention (Z) → Learning Achievement (Y), the β-values are 0.723, and the P values are 0.000 (0.050). This shows that self-intention positively and significantly affects learning achievement (Y). This means that when the self-intention variable increases, the learning outcome variable will also increase, and vice versa.

Table 6. Results of path coefficients: Direct effects.

Hypothesis	Path Analysis	β-Values (+/-)	Sample Mean	SDV	T-Statistics (>1,96)	P-Values (<0,05)	Decision
H-DIR$_1$	GBL → LA	0.103	0.114	0.108	0.955	0.340	Rejected
H-DIR$_2$	GBL→ SI	0.325	0.339	0.122	2.662	0.008	Accepted
H-DIR$_3$	SE → LA	0.059	0.064	0.098	0.595	0.552	Rejected
H-DIR$_4$	SE → SI	0.513	0.506	0.102	5.020	0.000	Accepted
H-DIR$_5$	SI → LA	0.723	0.703	0.116	6.222	0.000	Accepted

The mediating role of self-intention on the influence of game-based learning and professional school environment on achievement results

Based on the table below, in the H-IND1 hypothesis, the results of testing the mediating effect of the self-intention (Z) variable can be concluded that there is a positive (β-values = 0.235) and significant influence (T statistic 2.580 > 1.960 and P values 0.010 <0.050) between game-based learning factors (X1) and learning achievement (Y). So, H-IND1 states, "There is a positive and significant influence on the role of self-intention in mediating academic supervision on learning achievement.".

In the H-IND2 hypothesis, the results of testing the mediation effect of the self-intention (Z) variable can be concluded to show that there is a positive (β-values =

0.371) and significant (T statistic 3.697 > 1.960 and P values 0.000 <0.050) influence between school environment factors (X2) and learning achievement (Y). So H-IND2 states, "There is a positive and significant influence on the role of self-intention in mediating the professional learning community on teacher professional competence.".

Table 7. Results of path coefficient: Indirect effects.

Hypothesis	Path Analysis	β-Values (+/-)	SDV	T-Statistics (>1,96)	P-values	Decision	Mediating Role
H-IND$_1$	GBL→ SI → LA	0.235	0.091	2.580	0.010	Accepted	Full mediation
H-IND$_2$	SE → SI →LA	0.371	0.100	3.697	0.000	Accepted	Full mediation

Discussion

The results of testing the H1 hypothesis show a statistical T value of 0.955, meaning it is insignificant because the statistical T value is >1.96, so the first hypothesis is rejected. Game-based learning has a positive influence on improving learning achievement; however, it is not significant. Student involvement is not able to encourage students to receive feedback and reflect. Game-based learning can improve learning achievement significantly if student involvement is accompanied by increased feedback and reflection. So, there needs to be more ability to reflect on learning experiences, identify strengths and weaknesses, and make student improvement plans.

However, this differs from research conducted by Zhang & Yu (2022), which states that game-based learning can improve learning achievement because good teacher performance in using game-based learning methods can increase student progress. This can increase individual development in skills, knowledge, and understanding of the subject matter. This also aligns with research (XX), which states that good teacher performance can increase progress. Thus, there is an increase in social and emotional development, which is reflected in interaction and involvement in the academic environment. Structuring the school environment for students can be essential to improving their learning achievement. The results of this research state that students' emotional environment greatly influences student learning achievement. So, resources for mental well-being must be available, such as counseling or emotional support services. This research is in line with research by Ardiyansyah et al. (2019), which states that the emotional environment can improve the physical environment so that there is an increase in the availability of facilities and infrastructure that support learning activities.

However, this is different from research by Santoso et al. (2023), which explains that the academic environment is less influential and, therefore, becomes one factor limiting student learning achievement. Therefore, there is a need for accessible curriculum and learning materials that suit various learning styles. The academic environment does not affect inclusiveness and equality in the learning environment. So, there is a need for policies and practices that remove barriers to equitable participation. Self-intention has a significant impact on a person's learning achievement. In this research, self-motivation is an important aspect, so it is necessary to have energy, perseverance, and interest in pursuing academic or personal goals. Good motivation will improve planning and strategy. Students can maintain motivation even in the face of obstacles or failure.

Self-intention has less influence on improving learning achievement due to a lack of reflection and self-evaluation. So, it is necessary to practice regularly reflecting on learning experiences, achievements, and failures. Reflection and self-evaluation cannot improve goal-setting. So, there needs to be involvement in the goal-making process that considers individual interests, desires, and commitments. Student learning achievement is greatly influenced by critical thinking and problem-solving. So, there is a need for the ability to analyze, evaluate, and synthesize information critically. This aligns with research by Firdaus et al. (2018), which states that critical thinking and problem-solving can improve academic achievement. So, significant achievements in specific fields of study are recognized.

However, this explanation differs from the research by Zheng et al. (2020), which states that content mastery has little influence on learning achievement. So, an in-depth and comprehensive understanding of specific subject matter or topics is needed. This aligns with research by Harahap et al. (2019), which states that content mastery does not increase involvement and participation. So, there needs to be active involvement in academic, social, or extracurricular activities.

Self-intention supports continuous independent learning. In game-based learning, students can take the initiative to complete learning tasks. The ability to set goals and plan their learning strategies are essential skills to help them learn effectively in games and real life. Thus, the role of self-intention in game-based learning not only increases current learning achievements but prepares students to become independent and sustainable learners in the future. Finally, self-intention helps strengthen the relationship between the school environment and learning achievement. When students feel autonomy in setting their learning goals, they are more likely to feel emotionally and socially engaged in the school environment. Thus, self-intention can help build positive bonds between students, teachers, and the school, increasing students' learning motivation, participation, and overall academic achievement.

CONCLUSION

Fundamental Finding: Increasing self-intention in mediating the influence of game-based learning and the school environment on learning achievement significantly impacts modern education. By understanding how self-intention mediates the relationship between the use of game-based learning, the school environment, and learning achievement, we can identify factors that can increase learning effectiveness. **Implications:** The implications of this research enable the development of learning strategies that are more efficient and relevant to student needs. Game-based learning can increase student motivation and engagement, while a supportive school environment creates a supportive context for effective learning. **Limitations:** This research has several limitations. Using a quantitative approach may only partially capture part of a student's learning experience. External factors were not considered, such as the desire to implement game-based learning or cultural factors. Sample limitations and focus on Madrasah Aliyah may also limit the generalizability of the findings. Further research that combines quantitative and qualitative approaches and involves broader educational contexts may be needed for better understanding. **Further Research:** Further research is needed to develop a deeper understanding of the influence of game-based learning and the school environment on learning achievement. This research can involve a broader approach, including combining quantitative and qualitative methods and involving various educational contexts. In this way, we can

gain a more holistic insight into how these factors interact and how their influence can be optimized to improve student learning achievement in different types of schools.

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