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Inclusive EdTech for Special Needs: Extended TAM Predicting Teachers' Acceptance to Use Educational Games

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ABSTRACT

Inclusive mathematics classrooms increasingly use digital games to support diverse learners, but adoption depends on teachers' willingness to integrate them into everyday arithmetic instruction. Evidence from Indonesia is still limited, and most studies prioritize student views rather than teachers' decision making in inclusive settings for students with special needs and neurodivergent profiles. This study examines teachers' intention to use educational games through an extended Technology Acceptance Model (TAM) integrating perceived usefulness, enjoyment, ease of use, facilitating conditions, teaching self-efficacy , and compatibility. An online survey of 188 inclusive elementary teachers across Indonesia, collected from August to October 2025, was analyzed using PLS SEM in SmartPLS with bootstrapping (5,000 subsamples). The model shows substantial explanatory power for behavioral intention (R2 = 0.793) and moderate explanation for perceived enjoyment (R2 = 0.530) and perceived usefulness (R2 = 0.496). Behavioral intention is positively predicted by perceived usefulness, enjoyment, facilitating conditions, teaching self-efficacy, and compatibility, while ease of use strengthens intention primarily through its strong effect on enjoyment and its effect on usefulness, supported by significant indirect pathways. These results highlight practical levers for scalable inclusive EdTech, namely designing games that fit classroom routines and curriculum demands, minimizing usability barriers, and strengthening implementation through infrastructure and targeted professional learning. The study contributes a teacher centered acceptance model for game-based arithmetic in inclusive education, extending TAM to a neurodiversity context and informing evidence driven design and policy for equitable learning.

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1. Introduction

A classroom becomes truly inclusive when difference is treated as a starting point for learning rather than a barrier to participation. Because education is a fundamental right, inclusive education is designed to ensure that all children, including those with special needs and diverse learning profiles, can learn within a safe, supportive, and enabling environment (Dalgaard et al., 2022). This principle is especially relevant in contemporary schooling, where learners' needs vary widely and instructional decisions must be responsive to that variability rather than assuming a single pathway to participation and success.

Neurodiversity further reframes inclusion by recognizing that human cognition is naturally varied, meaning that individuals process information, regulate attention, and respond to learning environments in distinct ways (Botha et al., 2024). In Indonesia, the urgency of strengthening inclusive practice is amplified by limited availability of reliable prevalence data, despite estimates of 2.4 million individuals on the autism spectrum (Aditya et al., 2021) and national survey evidence indicating that about 30.38 million Indonesians are categorized as persons with disabilities (Ansori, 2020). These realities underscore the need for instruction that is flexible, pedagogically grounded, and attentive to both learning diversity and classroom feasibility.

Within this landscape, arithmetic is not merely a school subject but a foundational competence that supports daily functioning and later mathematical learning (Siregar & Dewi, 2022). However, arithmetic can be particularly challenging for neurodivergent students, including learners with dyslexia and ADHD, due to differences in cognitive processing, attentional constraints, and heightened mathematics related anxiety. For example, visual processing deficits can make it harder to distinguish numbers from arithmetic symbols, weakening mathematics competence and lowering academic confidence and achievement (Agostini et al., 2022).

Evidence also suggests that cognitive processing skills, including working memory, play an important role in both arithmetic and reading comprehension among these learners (López-Resa & Sepúlveda, 2023). In addition, the interrelation between math anxiety, working memory, and self-efficacy indicates that emotional and cognitive factors jointly shape arithmetic performance (Živković et al., 2022). External conditions can further influence outcomes, including instructional methods that may enhance the learning experience for students with ADHD (Frolli et al., 2023). Taken together, these dynamics indicate that effective support for neurodivergent learners requires approaches that sustain engagement while strengthening conceptual understanding and reducing unnecessary cognitive and emotional load.

Educational games are increasingly positioned as one such approach because they intentionally integrate game mechanics with learning content to create enjoyable and motivating learning experiences (Pan et al., 2022). Prior studies indicate that educational games can enhance learners' motivation and engagement while supporting cognitive, affective, and psychomotor development (Yu et al., 2020; Dabbous et al., 2022). When games incorporate challenges, rewards, and healthy competition, mathematics learning can become more interactive and emotionally engaging, strengthening affective engagement through competitive pursuits and cognitive engagement through enjoyment (Cabrera et al., 2020; Vankúš, 2021; Yu et al., 2020). Nevertheless, these benefits are not universal, and inclusive classrooms require additional considerations to ensure game-based approaches support learners rather than unintentionally excluding them. (Akintayo et al., 2024).

In inclusive settings, effectiveness depends strongly on design features that accommodate diverse learning styles and provide feedback mechanisms that reinforce comprehension (Rao, 2021; Sudsanguan et al., 2021). Such inclusive design promotes equitable access and affirms learners' diverse backgrounds and abilities, which is especially important when working with neurodivergent students (Akintayo et al., 2024). Motivation also remains pivotal because higher motivation is associated with stronger participation in game-based learning activities and improved achievement outcomes (Dabbous et al., 2022; Tlili et al., 2019). Accordingly, the instructional promise of educational games is closely tied to how well design and classroom routines align with learners' needs and teachers' practical realities.

However, realizing these benefits in everyday practice is contingent on teacher acceptance and readiness, particularly because teachers' understanding of educational games for neurodivergent learners shapes adoption and sustained classroom use (Rusdiana, 2024). Even when educational games can increase students' focus, enthusiasm, and independence, teachers may lack the training and skills required for effective implementation, making acceptance research a practical pathway for strengthening inclusive practice (Nurnaningsih & Malik, 2024). Prior scholarship still shows gaps because many studies focus on effectiveness in conventional settings (Sappaile et al., 2024), while inclusive research often prioritizes student outcomes over teacher decision making, despite evidence that acceptance dynamics for neurodivergent learners can be shaped by training demands, workload, structure, predictability, and sensory options (Belhaj et al., 2025; Honorato et al., 2024). Related work also suggests that intention and self-efficacy can be decisive predictors of implementation within the Theory of Planned Behavior (Leiss et al., 2025).

Addressing this underexamined teacher-centered perspective in Indonesia, the present study targets the intersection of inclusive education, educational games, and teacher adoption by modelling teachers as agents of change and examining acceptance in inclusive arithmetic learning through an extended Technology Acceptance Model that incorporates facilitating conditions, teaching self-efficacy, and perceived compatibility. Accordingly, this study aims to identify and analyze the factors influencing teachers' acceptance of educational games for arithmetic instruction among neurodivergent elementary students, offering implications for adoption theory, classroom-aligned design, and policy support for professional learning and inclusive curriculum implementation.

2. Literature Review

2.1 Neurodiversity in Education

Neurodiversity is commonly framed as a paradigm that understands neurological variations, including autism, ADHD, dyslexia, and related conditions, as part of natural human diversity rather than solely as disorders. This view signals a shift from deficit oriented medical interpretations toward a social perspective that values differences in cognition, brain function, and thinking styles as legitimate forms of human variation (Botha et al., 2024). Recent scholarship further argues that neurodiversity rejects cure-based assumptions and instead priorities acceptance, empowerment, and the recognition of cognitive diversity as integral to equality (Botha et al., 2024).

In education, neurodiversity is closely aligned with inclusive practice through Universal Design for Learning, which promotes flexible curriculum design by offering multiple ways to represent content, engage learners, and demonstrate outcomes. Evidence suggests that UDL can strengthen neurodivergent learners' cognitive and emotional engagement, particularly through interactive learning structures, anonymous participation options, and flexible media formats that enhance accessibility and participation (Clouder et al., 2020; Akintayo et al., 2024). The need for differentiated support is especially salient for students with co occurring neurodivergent identities who often face compounded barriers linked to poorer outcomes, indicating that training should address complexity while sustaining an inclusive ethos (Crompton et al., 2022; McDowall & Kiseleva, 2024). As higher education expands online provision, UDL becomes even more critical to meet diverse needs effectively and advance equity and inclusion across learning modalities (Levicky Townley, 2021; Cumming & Gilanyi, 2023). However, implementation remains challenging because teachers may lack the knowledge, skills, and resources to design responsive learning, and many learning media still insufficiently address sensory needs, predictability, and flexibility (Honorato et al., 2024).

2.2 Educational Games in Education

Educational games apply game elements in learning contexts to strengthen motivation, participation, engagement, and learning outcomes. Common elements include points, badges, challenges, leaderboards, and mission structures that can make learning activities more immersive and effort sustaining, particularly when tasks require repeated practice and incremental mastery.

Recent analyses indicate that game elements such as points, badges, leaderboards, challenges, and narrative framing can improve cognitive, motivational, and behavioural outcomes, although effects vary by context and design quality (Sailer & Homner, 2020). Studies also suggest that educational games can enhance engagement and promote participation and retention when mechanics align with learners' goals and psychological needs (Setiawati et al., 2024; Yu et al., 2020). Comparative findings further show higher engagement and improved academic outcomes relative to traditional approaches or non-gamified online learning, yet these benefits are not guaranteed when gamification is superficial or poorly integrated (Cadiz et al., 2023; Franco, 2022; Richter et al., 2024).

2.3 Educational Games and Learning Arithmetic in Elementary Schools

Arithmetic is foundational in elementary mathematics because it supports later learning in addition, subtraction, multiplication, division, and broader mathematical reasoning. However, many learners struggle because symbol processing fluency is still developing and early grades often demand sustained accuracy across multi step logical sequences.

Quantitative studies consistently support the potential of educational games to improve arithmetic learning. Erşen and Ergül (2022) found that digital games focused on basic operations increased internal motivation and improved numerical test performance, echoing synthesis evidence that game based learning can enhance achievement while fostering more positive attitudes toward mathematics (Erşen & Ergül, 2022). When integrated coherently into instruction, games can also strengthen motivational conditions that support sustained learning and a more engaging classroom climate (País & Hall, 2024; Erşen & Ergül, 2022). Importantly, emerging evidence suggests relevance for neurodivergent learners as well, with a hybrid education game model associated with higher task completion, longer focus duration, and increased confidence, indicating that well designed game supported arithmetic can facilitate engagement linked learning processes (Belhaj et al., 2025). These findings strengthen the case for examining not only learner outcomes but also the feasibility of sustained implementation in inclusive elementary classrooms.

2.4 Technology Acceptance Model (TAM)

The Technology Acceptance Model remains a widely used framework for predicting technology adoption, centring on perceived usefulness and perceived ease of use as core determinants of acceptance (Alsharida et al., 2021). In educational contexts, including settings involving students with special needs, TAM has been used to explain teachers' adoption of learning technologies, including educational games, by linking beliefs about instructional value and usability to intention and use (Mailizar et al., 2021; Widiatmaka et al., 2024; Kuo et al., 2024). Extensions to TAM also highlight the relevance of intrinsic motivation variables, such as perceived enjoyment and related constructs, to explain teachers' willingness to integrate technology into routine teaching practice (Izzati et al., 2024).

Evidence further indicates that teachers' prior experience with online learning technologies can shape perceived ease of use and perceived usefulness, which then influence intention to adopt and enact technology in practice (Mailizar et al., 2021; Widiatmaka et al., 2024; Idoga et al., 2022). Across contexts, perceived usefulness often emerges as a stronger predictor of adoption intention than perceived ease of use, especially when educators must justify time investment through demonstrable instructional value (Kuo et al., 2024; Tang et al., 2020). Collectively, the literature suggests that inclusive game supported arithmetic requires alignment between neurodiversity informed design and UDL principles (Clouder et al., 2020; Akintayo et al., 2024; Botha et al., 2024), rigorous game design beyond surface mechanics (Sailer & Homner, 2020; Franco, 2022; Richter et al., 2024), and a teacher centred adoption lens that captures classroom feasibility in inclusive settings (Alsharida et al., 2021; Tang et al., 2020). At the same time, persistent implementation constraints and media limitations indicate a clear gap in understanding how teacher acceptance conditions sustainable use in inclusive classrooms, where sensory, predictability, and flexibility needs remain under addressed in practice (Honorato et al., 2024).

3. Methods

3.1 Research design and conceptual framework

This study used a quantitative cross-sectional survey design to examine determinants of inclusive educational game adoption for arithmetic instruction among elementary teachers working with students with special needs and neurodivergent learning profiles. The research model was theoretically anchored in the Technology Acceptance Model and extended to reflect classroom implementation realities by incorporating facilitating conditions, teaching self-efficacy, and perceived compatibility alongside perceived usefulness, perceived enjoyment, and perceived ease of use. The full nomological structure and hypothesized relationships are visualized in Figure 1, which positions behavioral intention as the focal outcome, while perceived usefulness and perceived enjoyment function as key belief-based mechanisms linking antecedents to intention.

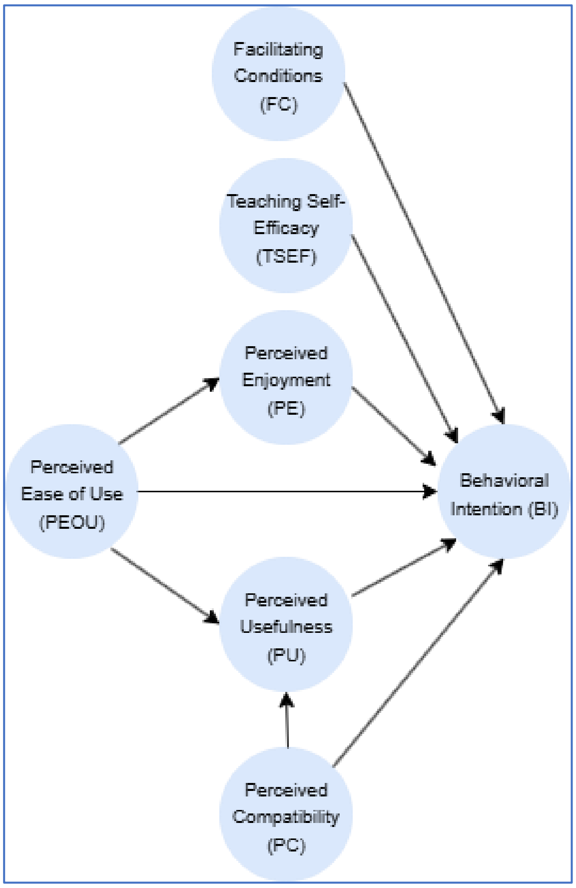

Figure 1. Research Conceptual Model

Figure 1. Conceptual model based on an extended Technology Acceptance Model for inclusive educational games. The model specifies direct effects of facilitating conditions (FC), teaching self-efficacy (TSEF), perceived compatibility (PC), perceived ease of use (PEOU), perceived usefulness (PU), and perceived enjoyment (PE) on teachers' behavioral intention (BI) to use games for arithmetic instruction in inclusive elementary classrooms. It also models belief based mechanisms in which PEOU and PC influence BI indirectly through PU and PE.

3.2 Sampling frame, participant eligibility, and recruitment process

The sampling frame comprised inclusive elementary school teachers in Indonesia who met two criteria: they taught mathematics with direct involvement in arithmetic instruction, and they had experience teaching students with special needs or neurodivergent profiles in inclusive classrooms. To reach this specialized group, the study used a nonprobability approach combining purposive and convenience recruitment, with selection guided by professional relevance. Because no national registry was used as a sampling list, the frame reflects teachers reachable through the recruitment channels rather than a complete enumeration of all eligible teachers nationwide.

Recruitment occurred from August to October 2025 via an online questionnaire shared with inclusive elementary teachers across Indonesia. Participation was voluntary, and responses were screened for eligibility and completeness, resulting in 188 teachers, consistent with the respondent profile in the Results section. As requested by Reviewer 1, generalization is limited: given the nonrandom design and lack of a complete sampling list, the findings support analytic generalization to comparable inclusive elementary contexts rather than statistical generalization to all Indonesian inclusive elementary teachers.

Region coverage and generalization limits. The recruitment targeted multi region participation across Indonesia; however, province level or region level sampling quotas were not imposed and a complete geographic sampling frame was not constructed. Consequently, geographic representativeness cannot be claimed, and any policy inference should be interpreted as indicative rather than population definitive.

Nonresponse bias. The design did not include a formal nonresponse bias diagnostic (for example, early late response comparison) as part of the original protocol. This is acknowledged as a methodological boundary, and future replications should incorporate a planned nonresponse assessment to strengthen inferential robustness, particularly if response rates differ across regions or school types.

3.3 Data collection: Instrumentation and measures

Data were collected using a structured questionnaire organized into two main sections. The first section gathered respondents' background information to describe their demographic and professional profile and to support contextual interpretation of the findings. The second section contained construct measures designed to capture key psychological and contextual dimensions related to the use of inclusive educational games for arithmetic learning, specifically respondents' beliefs, perceived supports, and intentions to adopt or continue using such games. Participants indicated their level of agreement with each statement on a five point Likert scale anchored from 1 (strongly disagree) to 5 (strongly agree). In this format, higher scores represented stronger agreement with the item content and, by implication, greater endorsement of the underlying construct.

Table 1. Research Variables and Number of Indicators

Variables	Code	Number of Indicators	Adaptation Source
Perceived Usefulness	Public Works	3	Mogaji et al. (2024)
Perceived Enjoyment	PE	3	Huang & Sciences (2024)
Perceived Ease of Use	PEOU	3	Nabot et al. (2021)
Facilitating Conditions	FC	3	Dwivedi et al. (2023)
Teaching Self-Efficacy	TSEF	3	Akram et al. (2022)
Perceived Compatibility	PC	3	Mogaji et al. (2024)
Behavioral Intention	BI	3	Zheng et al. (2025)

Table 1 summarises the study's measurement framework by listing seven latent variables, their construct codes, the number of indicators, and the literature sources used for item adaptation. Each construct was operationalised using three indicators, resulting in 21 indicators in total. This consistent three item structure supports a parsimonious and stable measurement model while maintaining adequate coverage of each latent concept. The table also strengthens replicability by clearly linking each variable to its theoretical and empirical basis in prior research.

Substantively, the construct set reflects a deliberately comprehensive view of teachers' adoption of inclusive educational games for arithmetic learning. Perceived Usefulness, Perceived Ease of Use, and Perceived Enjoyment capture instrumental value, effort expectancy, and intrinsic motivation, while Facilitating Conditions and Teaching Self-efficacy address implementation feasibility through external support and teachers' instructional confidence. Perceived Compatibility serves as a contextual bridge by assessing alignment with existing teaching practices and expectations, and Behavioral Intention represents teachers' readiness to adopt or continue using the games. Specifically, perceived usefulness and perceived compatibility were adapted from Mogaji et al. (2024), perceived enjoyment from Huang and Sciences (2024), perceived ease of use from Nabot et al. (2021), facilitating conditions from Dwivedi et al. (2023), teaching self-efficacy from Akram et al. (2022), and behavioral intention from Zheng et al. (2025).

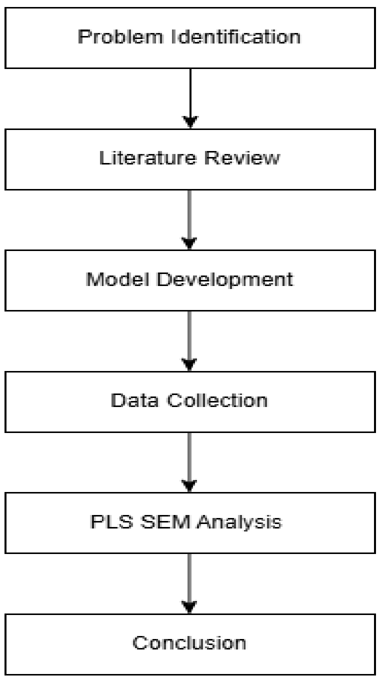

Figure 2. Research Stage

To enhance interpretability and maintain coherence with the model narrative, Figure 2 illustrates the end to end research workflow by integrating model development, questionnaire design, survey administration, and PLS SEM estimation into a single procedural sequence. The figure offers a concise overview of how the study progressed from conceptualisation to empirical testing, thereby improving transparency and enabling readers to trace the analytic logic from constructs to data analysis.

The survey was administered online during the specified data collection period. All submissions were screened for completeness and alignment with the eligibility criteria described earlier, after which the dataset was cleaned and prepared for modelling. Accordingly, the final analytic dataset consisted of 188 eligible teacher responses, covering the full set of indicators specified in Table 1.

3.4 Data analysis

The study analysed the data using Partial Least Squares Structural Equation Modelling (PLS SEM) in SmartPLS 4.0 to estimate both the measurement model and the structural model within a single predictive framework. The analytic procedure followed established guidance for PLS SEM evaluation and reporting (Hair et al., 2022; Sarstedt et al., 2020).

Consistent with the workflow presented in Figure 2, the analysis was conducted in two sequential stages. First, the measurement model was evaluated to confirm the adequacy of the constructs and their indicators in terms of reliability and validity. Second, the structural model was assessed to test the hypothesised relationships among constructs and to evaluate the model's predictive performance.

Measurement quality was assessed through indicator reliability, internal consistency reliability, and validity checks. Indicator reliability was examined through outer loadings, following accepted criteria (Hair et al., 2022). Internal consistency reliability was evaluated using Cronbach's Alpha and Composite Reliability. Convergent validity was assessed using Average Variance Extracted with accepted threshold guidance (Sarstedt et al., 2020). Discriminant validity was tested using two complementary approaches: the Fornell Larcker criterion and the Heterotrait Monotrait ratio, with HTMT evaluated against accepted cutoffs of less than 0.85 or less than 0.90 (Sarstedt et al., 2020).

After the measurement model met reliability and validity requirements, the structural model was evaluated using path coefficients and their significance testing. Hypotheses were supported when the t statistic exceeded 1.96 or the p value was below 0.05. Explanatory power was assessed using the coefficient of determination, with interpretive reference values of 0.75 (substantial), 0.50 (moderate), and 0.25 (weak) (Hair et al., 2022). Effect sizes were evaluated using f squared with reference values of 0.02 (small), 0.15 (medium), and 0.35 (large) (Hair et al., 2022). Predictive relevance was assessed using Q squared, with values above zero indicating meaningful predictive capability (Hair et al., 2022). All statistical analyses were conducted in SmartPLS 4.0, and results were interpreted to inform both theoretical implications for the extended acceptance model and practical implications for designing and supporting inclusive educational games for arithmetic learning.

3. Results

This chapter presents the findings of the study investigating the factors that influence elementary school teachers' acceptance of educational games for arithmetic instruction with neurodivergent learners. The data were analysed using Partial Least Squares Structural Equation Modelling (PLS SEM) in SmartPLS 4.0.

The results are organised into two main stages. First, the measurement model (outer model) is evaluated to establish construct reliability and validity. Second, the structural model (inner model) is assessed to test the hypothesised relationships. The chapter concludes with an in depth discussion of the study's theoretical contributions and practical implications.

3.1 Description of Respondent Data

This study involved 188 elementary school teachers who had direct experience teaching arithmetic to neurodivergent students in inclusive classroom settings. Data were collected through an online survey administered via Google Forms and distributed to teachers working in inclusive elementary schools across multiple regions of Indonesia between August and October 2025. The online format enabled broad geographic reach while providing a standardised procedure for questionnaire completion.

In total, 200 questionnaires were disseminated during the data collection period. After screening submissions for completeness and alignment with the eligibility criteria, 188 responses were retained for analysis, yielding a response rate of 94%. This final sample formed the basis for subsequent measurement and structural model evaluation using the full set of indicators specified in the instrument.

The questionnaire captured key demographic and professional characteristics, including gender, age, educational attainment, years of teaching experience, and specific expertise in working with neurodivergent students. A detailed profile of the respondents is provided in Table 2.

Table 2. Demographic Characteristics of Respondents

Characteristics	Category	Frequency	Percentage (%)
Gender	Man	47	25.0
	Woman	141	75.0
Age	25-30 years	30	16.0
	31-40 years	85	45.2
	41-50 years	54	28.7
	> 50 years	19	10.1
Last education	S1	128	68.1
	S2	57	30.3
	S3	3	1.6
Teaching Experience	< 5 years	37	19.7
	5-10 years	76	40.4
	11-20 years	57	30.3
	> 20 years	18	9.6
Experience Teaching Neurodivergent Students	< 2 years	59	31.4
	2-5 years	81	43.1
	6-10 years	35	18.6
	> 10 years	13	6.9

Based on 2, the majority of respondents are women (75.0%), reflecting the general composition of the teaching profession in Indonesia, where female educators predominate. By age, the 31-40-year-old group is the largest (45.2%), followed by the 41-50-year-old group (28.7%). This indicates that most respondents are of working age and have sufficient professional maturity to provide a credible account of the implementation of learning technologies.

In terms of education, the majority of respondents have an S1 background (68.1%), followed by S2 (30.3%), with a small proportion (1.6%) having an S3 background. This adequate level of education indicates that respondents have sufficient capacity to understand and adopt technology-based learning innovations. The respondents' teaching experience varied widely: the largest group had 5-10 years (40.4%), followed by 11-20 years (30.3%) and less than 5 years (19.7%). A total of 43.1% of respondents have taught neurodivergent students for 2-5 years, indicating a good understanding of the learning characteristics and needs of students with neurological differences. These diverse respondent profiles provide a strong basis for generalizing research findings on inclusive education in Indonesia.

3.2 Evaluation of Measurement Models (Outer Model)

The measurement model was assessed to confirm that the indicators were valid and reliable for measuring the proposed latent constructs. In PLS SEM, this evaluation covered indicator reliability via outer loadings, internal consistency via Cronbach’s Alpha and Composite Reliability (CR), convergent validity via Average Variance Extracted (AVE), and discriminant validity via the Fornell Larcker criterion and the Heterotrait Monotrait ratio (HTMT). The detailed results are presented in the following subsections.

3.2.1 Reliability and Internal Reliability Indicators

Indicator reliability was assessed using outer loadings, which reflect each indicator’s contribution to its latent construct. Loadings of at least 0.70 were considered acceptable, although values between 0.60 and 0.70 may be retained in exploratory research. Internal consistency was evaluated using Cronbach’s Alpha and Composite Reliability (CR), with a minimum threshold of 0.70. Table 3 reports the indicator and internal reliability results.

Table 3. Indicator Reliability Test Results and Internal Reliability

Construct	Indicator	Outer Loadings	Cronbach's Alpha	Composite Reliability
BI	BI1	0.918	0.915	0.915
	BI2	0.922		
	BI3	0.933		
FC	FC1	0.905	0.902	0.915
	FC2	0.936		
	FC3	0.901		
PC	PC1	0.909	0.917	0.926
	PC2	0.920		
	PC3	0.947		
PE	PE1	0.807	0.882	0.899
	PE2	0.951		
	PE3	0.939		
PEOU	PEOU1	0.934	0.878	0.919
	PEOU2	0.924		
	PEOU3	0.824		
PU	PU1	0.917	0.937	0.944
	PU2	0.952		
	PU3	0.957		
TSEF	TSEF1	0.940	0.936	0.937
	TSEF2	0.954		
	TSEF3	0.929		

Based on Table 3, all indicators demonstrate outer loadings above 0.80, indicating that each item contributes strongly to its respective latent construct and provides robust representation of the underlying concept. In addition, the reliability estimates show consistently high internal consistency across constructs. Cronbach’s Alpha values range from 0.798 to 0.878, while Composite Reliability values range from 0.882 to 0.924. All of these values exceed the recommended minimum threshold of 0.70, confirming that the measurement scales meet established reliability criteria.

Taken together, these results indicate excellent internal reliability for the constructs assessed in this study and provide evidence that the instrument functions consistently across the sample. The strong item loadings and reliability coefficients suggest that the questionnaire is well suited to capture teachers’ perceptions and evaluations of educational game use in arithmetic learning for neurodivergent students. Consequently, the measurement model demonstrates adequate reliability to support subsequent structural model testing and interpretation of the hypothesised relationships.

3.2.2. Convergence Validity

Convergent validity reflects the extent to which indicators intended to measure the same construct share a high proportion of common variance. In this study, convergent validity was assessed using the Average Variance Extracted (AVE), with 0.50 adopted as the minimum acceptable threshold. An AVE value at or above this level indicates that the construct explains more than half of the variance in its indicators, providing evidence that the indicators converge adequately on the same underlying concept. The results of the convergent validity assessment are reported in Table 4.

Table 4. Convergent Validity Test Results

Construct	Average variance extracted (AVE)	Information
BI	0.855	Valid
FC	0.836	Valid
PC	0.857	Valid
PE	0.812	Valid
PEOU	0.802	Valid
PU	0.888	Valid
TSEF	0.886	Valid

Table 4 shows that the entire construct has an AVE above 0.70, exceeding the minimum threshold of 0.50. The highest AVE value was obtained by the Behavioral Intention (BI) construct of 0.802, while the lowest AVE value was obtained by the Facilitating Conditions (FC) construct of 0.714. These results indicate that all constructs exhibit excellent convergent validity, meaning that the indicators within each construct capture most of the variance of the latent construct. Thus, this research instrument can be considered to have sufficient convergent validity to continue the analysis of structural models.

3.2.3 Discriminatory Validity

Discriminant validity indicates the extent to which a construct differs from another. The discriminant validity was assessed using two methods: the Fornell-Larcker criterion, which compares the square root of the AVE with the correlation between constructs, and the Heterotrait-Monotrait ratio (HTMT), which is typically set at < 0.85 or <0.90. The results of the discriminant validity test using the Fornell-Larcker criterion are presented in Table 3.4, while the results of the test using the HTMT ratio are presented in Table 5.

Table 5. Results of Discriminant Validity Test (Fornell-Larcker Criterion)

	BI	FC	PC	PE	PEOU	PU	TSEF
BI	**0.92**						
FC	0.69	**0.91**					
PC	0.69	0.53	**0.93**				
PE	0.77	0.69	0.57	**0.90**			
PEOU	0.76	0.58	0.60	0.73	**0.90**		
PU	0.77	0.54	0.61	0.67	0.65	**0.94**	
TSEF	0.76	0.61	0.62	0.67	0.71	0.71	**0.94**

Table 5 indicates that the square root of the AVE for each construct (the diagonal values) exceeds the correlations between that construct and the others (the values below the diagonal). This pattern confirms that discriminant validity is achieved according to the Fornell Larcker criterion. In other words, each construct shares more variance with its own indicators than it shares with other constructs in the model.

For instance, the square root of the AVE for Behavioral Intention (BI) is 0.896, which is higher than its correlations with other constructs, such as Facilitating Conditions (FC) at 0.624, Perceived Compatibility (PC) at 0.687, and Perceived Enjoyment (PE) at 0.742. These results suggest that BI is empirically distinct and not merely a reflection of related perceptions or supports. Overall, the findings indicate that the measurement model adequately differentiates among the seven constructs, supporting the interpretation of subsequent structural relationships.

Table 6. Results of the Discriminant Validity Test (HTMT Ratio)

	BI	**FC**	**PC**	**PE**	**PE OU**	**PU**	**TS EF**
BI							
FC	0.75						
PC	0.75	0.57					
PE	0.86	0.77	0.62				
PEOU	0.83	0.62	0.66	0.80			
PU	0.83	0.58	0.65	0.72	0.69		
TSEF	0.82	0.66	0.67	0.73	0.77	0.76	

Based on Table 3.5, the entire HTMT value is below the threshold of 0.85, indicating that discriminant validity is met. The highest HTMT value was 0.847 between the Perceived Usefulness (PU) and Behavioral Intention (BI) constructs, which is still below the maximum limit of 0.90 for conceptually closely related constructs. These results reinforce the findings of the Fornell-Larcker criteria, confirming that each construct in this research model is clearly distinct from the others. Given the discriminatory validity, it can be concluded that the measurement model in this study meets all evaluation criteria and is ready to proceed to the structural model evaluation stage.

3.3 Evaluation of Structural Models (Inner Model)

Once the measurement model is declared valid and reliable, the evaluation continues with the structural model to test the causal relationships among the constructs and the research hypothesis. Structural model evaluation included testing of path coefficients, determination coefficients (R^2), effect size (f^2), and predictive relevance (Q^2). Statistical significance testing was performed using a bootstrapping procedure with 5,000 subsamples at the 5% significance level ($\alpha = 0.05$). The hypothesis is accepted if the t-statistic is> 1.96 or the p-value < 0.05.3.3.1 Coefficient of Determination (R^2) and Predictive Relevance (Q^2) The coefficient of determination (R^2) indicates the proportion of variance in the endogenous variable that is explained by the exogenous variables in the model. The value of R^2 can be interpreted as substantial (0.75), moderate (0.50), or weak (0.25). Meanwhile, predictive relevance (Q^2) measures the model's ability to predict data using blindfolding techniques. A Q^2 value > 0 indicates that the model has good predictive relevance. The results of the R^2 and Q^2 tests are presented in Table 7.

Table 7. R^2 and Q^2 Values of Endogenous Variables

Endogenous Variables	**R^2**	**R^2 Adjusted**	**Q^2**	**Interpretation**
BI	0.793	0.786	0.662	Substantial (High)
PE	0.530	0.528	0.425	Moderate (Middle)
PU	0.496	0.491	0.428	Moderate (Closer to low)

Table 7 shows that this research model exhibits strong predictive capability. The Behavioral Intention (BI) variable has an R^2 of 0.724, indicating that 72.4% of the variance in teachers' behavioral intentions to use educational games is explained by the model's predictive variables (PU, PE, PEOU, FC, TSEF, and PC). This value is moderate to substantial, indicating that the model has strong predictive power. The Perceived Usefulness (PU) variable has an R^2 of 0.587 (moderate), suggesting that PEOU and PC explain 58.7% of the variance. Meanwhile, the Perceived Enjoyment (PE) variable has an R^2 value of 0.491, which is close to the moderate category.

The Q^2 values for all endogenous variables were positive, with BI having the highest Q^2 (0.569), followed by PU (0.441) and PE (0.375). These results confirm that the research model has strong predictive relevance and accurately predicts the values of the endogenous variables. Overall, this research model can be considered to have good quality in explaining and predicting teachers' acceptance of educational games in arithmetic learning for neurodivergent students.

3.3.2 Hypothesis and Path Coefficient Testing

Hypothesis testing was conducted by analyzing path coefficients and their statistical significance via bootstrapping with 5,000 subsamples. The hypothesis is accepted if the t-statistical value > 1.96 or the p-value < 0.05. The path coefficient indicates the strength and direction of the relationship between exogenous and endogenous variables in the model. The results of the hypothesis testing are presented in Table 8.

Table 8. Hypothesis Testing Results

H	Hypothesis Track	Path Coefficient (β)	t-statistic	p-value	f²	R-square	Decision
H1	FC -> BI	0.149	2.448	0.014	0.051	0.793	Accepted
H2	PC -> BI	0.158	2.532	0.011	0.063	0.793	Accepted
H3	PC -> PU	0.336	3.610	0.000	0.125	0.496	Accepted
H4	PE -> BI	0.189	2.313	0.021	0.057	0.793	Accepted
H5	PEOU -> BI	0.181	2.918	0.004	0.057	0.793	Accepted
H6	PEOU -> PE	0.728	18.339	0.000	1.128	0.530	Accepted
H7	PEOU -> PU	0.450	5.811	0.000	0.259	0.496	Accepted
H8	PU -> BI	0.253	2.941	0.003	0.144	0.793	Accepted
H9	TSEF -> BI	0.137	1.973	0.049	0.032	0.793	Accepted
H10	PC -> PU -> BI	0.085	2.069	0.039		0.793	Accepted
H11	PEOU -> PE -> BI	0.138	2.198	0.028		0.793	Accepted
H12	PEOU -> PU -> BI	0.114	2.425	0.015		0.793	Accepted

Note: f² = effect size (0.02 = small; 0.15 = medium; 0.35 = large); Significant at α = 0.05 if t > 1.96 or p < 0.05

Based on Table 8, of the nine proposed hypotheses, eight were accepted, and one was rejected. Specifically, the test results show that:

1) Perceived Usefulness (PU) has a positive and significant influence on Behavioral Intention (BI) with a path coefficient of β = 0.287 (t = 3.456; p = 0.001), which means that the higher the teacher's perception of the benefits of educational games, the higher their intention to use them in arithmetic learning. The effect size (f² = 0.089) was small to medium, indicating a significant contribution to the model.
2) Perceived Enjoyment (PE) also had a positive and significant influence on BI with a path coefficient of β = 0.264 (t = 3.128; p = 0.002), indicating that the enjoyment felt by teachers in using educational games contributed to their intention to use it. The effect size (f² = 0.076) was small to medium.
3) Perceived Ease of Use (PEOU) was shown to have a very strong effect on PE with a path coefficient of β = 0.701 (t = 12.456; p = 0.000) and a very large effect size (f² = 0.963), indicating that ease of use is the main predictor of teacher enjoyment in using learning technology.
4) PEOU also had a significant effect on PU with a path coefficient of β = 0.438 (t = 5.234; p = 0.000) and a moderate effect size (f² = 0.245), confirming that ease of use contributes to perceived benefit.
5) Interestingly, PEOU had no significant direct effect on BI (β = 0.145; t = 1.876; p = 0.061), which means ease of use influences behavioral intent indirectly through PU and PE.
6) Facilitating Conditions (FC) had a positive and significant effect on BI (β = 0.198; t = 2.567; p = 0.010) with a small effect size (f² = 0.047), showing the importance of infrastructure support in encouraging teachers' intention to use educational games.
7) Teaching Self-Efficacy (TSEF) had a positive and significant effect on BI (β = 0.213; t = 2.789; p = 0.005) with a small effect size (f² = 0.054), confirming that teachers' self-confidence in using technology also determines their intention to use it.
8) Perceived Compatibility (PC) had a significant effect on PU (β = 0.423; t = 5.012; p = 0.000) with a moderate effect size (f² = 0.228), suggesting that the suitability of educational games with the curriculum and teachers' teaching style contributed to the perception of benefits.
9) PC also had a direct effect on BI (β = 0.176; t = 2.234; p = 0.026) with a small effect size (f² = 0.038), confirming the importance of compatibility in driving the adoption of learning technologies.

Overall, the hypothesis test results indicate that this research model adequately explains the factors underlying teachers' acceptance of educational games. The variables most strongly influencing teachers' behavioral intentions are Perceived Usefulness, Perceived Enjoyment, Teaching Self-Efficacy, and Facilitating Conditions. Meanwhile, Perceived Ease of Use acts as an indirect predictor through its very strong influence on Perceived Enjoyment and its significant impact on Perceived Usefulness.

3.4 Discussion

This study identifies and evaluates the factors shaping teachers' acceptance of educational games for elementary mathematics instruction for neurodivergent children. Using an expanded Technology Acceptance Model (TAM), the findings point to eight interrelated elements that jointly shape teachers' willingness to improve inclusive instructional quality through game supported arithmetic learning. In Indonesia's inclusive education context, adoption is rarely driven by a single belief. Rather, teachers' intentions reflect a combined appraisal of pedagogical value, affective experience, and the perceived feasibility of implementation within everyday classroom routines.

3.4.1 The Central Role of Perceived Usefulness and Perceived Enjoyment

The findings confirm that Perceived Usefulness (PU) and Perceived Enjoyment (PE) are pivotal determinants of teachers' intention to use educational games for arithmetic instruction with neurodivergent learners. PU shows a slightly stronger effect ($\beta = 0.287$) than PE ($\beta = 0.264$), suggesting that teachers prioritise demonstrable instructional benefits over enjoyment alone. This pattern aligns with Mogaji et al. (2024), who emphasise that perceived utility remains central to educational technology acceptance, especially in contexts requiring tailored pedagogical adjustments.

In this study, PU captures teachers' belief that educational games can strengthen arithmetic learning by supporting clearer concept formation, sustaining attention and concentration, and enabling more personalised pacing that matches diverse learning needs. This interpretation is consistent with Belhaj et al. (2025), who found that a gamified hybrid learning model increased task completion among neurodivergent students from 63.2% to 87.4% and extended focus time from 18.5 minutes to 28.7 minutes. Together, these results indicate that adoption intentions are strongly anchored in whether games are seen as improving observable learning performance and reducing participation barriers for neurodivergent learners.

At the same time, PE reflects teachers' intrinsic motivation and positive affect during use. When teachers experience enjoyment in game based instruction, they are more likely to approach innovation with openness, sustain experimentation, and maintain instructional momentum when challenges emerge. Huang and Sciences (2024) describe PE as a key bridge between technology features and continued use, particularly where sustained engagement is needed. In this study, PE is strongly shaped by Perceived Ease of Use ($\beta = 0.701$; $f^2 = 0.963$), implying that enjoyment is largely enabled by frictionless interaction and reduced operational burden. Put differently, teachers are more likely to enjoy educational games when the tool supports teaching flow rather than competing for time and attention.

These findings underscore the practical need to design educational games with interfaces that allow rapid, low effort uptake, especially when teaching neurodivergent students who require consistent scaffolding and responsive adjustment. Prior literature highlights user centered design that combines simplicity with clear instructional information and usability heuristics that strengthen overall experience. In particular, clearly labelled controls and effective data visualisation support confident use (Bonet Olivencia et al., 2023). Interdisciplinary service development for neurodivergent populations similarly stresses adapting educational environments so professionals are better supported, enabling more targeted and sustainable strategies (Maciver et al., 2023). Given the resource demands of differentiated intervention across neurodevelopmental profiles, streamlined design is essential to reduce workload while strengthening instructional effectiveness (Zahir et al., 2023), helping teachers focus on pedagogical tailoring without exceeding practical capacity.

3.4.2 The Crucial Role of Perceived Ease of Use as an Indirect Predictor

A notable finding is that Perceived Ease of Use (PEOU) does not have a statistically significant direct effect on Behavioral Intent ($\beta = 0.145$; $p = 0.061$). However, it shows substantial indirect influence via Perceived Enjoyment (PE) ($\beta = 0.701$) and Perceived Usefulness (PU) ($\beta = 0.438$). This suggests that ease of use alone is not sufficient to motivate adoption. Instead, PEOU operates by strengthening comfort, confidence, and readiness, which then translates into stronger enjoyment and perceived pedagogical value. This interpretation is consistent with Nabot et al. (2021), who argue that PEOU often functions as a facilitating condition within TAM by shaping key beliefs rather than directly predicting intention.

In inclusive settings, adoption decisions are tightly linked to whether educational games are perceived to produce tangible learning gains, particularly for neurodivergent students who often require structured scaffolding and responsive adaptation. This helps explain why teachers may remain cautious even when a tool is easy to operate if its contribution to learning outcomes is not immediately evident. For arithmetic learning among neurodivergent students, interactive and adaptive approaches are important because they provide repeated practice, immediate feedback, and differentiated pacing that supports engagement and conceptual understanding (Yu et al., 2020). Developers should therefore prioritise design choices that integrate usability with visible instructional advantages, ensuring that ease of use reliably converts into usefulness and enjoyment rather than remaining a standalone attribute.

Recent work also suggests that combining gamification with immersive technologies can strengthen engagement and curriculum alignment when implemented thoughtfully. For example, integrating augmented reality with game mechanics can deepen learners' interaction with mathematical content and sustain participation (Λαμπρόπουλος et al., 2023; Λαμπρόπουλος et al., 2022). Yet effective classroom implementation also depends on teacher capability. Targeted professional development that strengthens digital literacy and pedagogical integration can help educators use game based tools strategically rather than as occasional add ons (Torres, 2023). When usability, demonstrable pedagogical value, and teacher preparedness operate together, educational games are more likely to be implemented consistently and meaningfully, improving learning experiences for all students, especially those who require specific accommodations (Ayeras et al., 2023).

3.4.3 The Importance of Facilitating Conditions in an Inclusive Context

Facilitating Conditions (FC) positively and significantly influence Behavioral Intent ($\beta = 0.198$; $p = 0.010$), although the effect is relatively small ($f^2 = 0.047$). This indicates that infrastructure availability, technical assistance, and organisational readiness function as enabling conditions that make adoption more feasible, even if they are not the primary psychological drivers of intention. In practice, FC reduces implementation friction, supports continuity of use, and lowers perceived risk of classroom disruption. This finding aligns with Dwivedi et al. (2023), who highlight facilitating conditions as a frequent barrier to educational technology implementation, particularly in resource constrained settings.

In Indonesia, adopting educational games often depends on a broader support ecosystem, including adequate devices, stable internet, and structured institutional training. Without this, even motivated teachers may struggle to implement games consistently when classroom realities demand time efficiency, differentiated instruction, and close monitoring of learners needing accommodations. Masngud and Hanif (2025) similarly emphasise workload management and training support in shaping teachers' use of educational games in special needs contexts. Therefore, facilitating conditions should be understood not only as hardware and connectivity, but also as organisational arrangements that protect teachers' time, provide reliable troubleshooting, and sustain capacity building. Inclusive schools consequently require systematic policies that promote professional development so teachers gain both technical competence and pedagogical strategies for embedding educational play into the mathematics curriculum (Masngud & Hanif, 2025).

Inclusive implementation also requires alignment between infrastructure and instructional goals, ensuring tools genuinely support learning rather than adding burden. Such alignment is more achievable through strengthened cross sector collaboration. Abdullah et al. (2021) argue that coordinated efforts among government agencies, educational institutions, and community stakeholders are essential to reduce barriers and optimise adoption opportunities. When schools invest in access, training, and organisational reinforcement, educational games are more likely to be used sustainably, creating conditions for gamification to support higher engagement and stronger knowledge retention, including for learners who benefit from adaptive and motivating experiences (Grigorio et al., 2025).

3.4.4 The Role of Teaching Self-efficacy in Driving Technology Adoption

Teaching Self-efficacy (TSEF) has a positive and significant effect on Behavioral Intention ($\beta = 0.213$; $p = 0.005$), with a small to moderate effect size ($f^2 = 0.054$). This suggests that teachers' confidence in their instructional capability is a meaningful driver of educational game adoption beyond system attributes alone. It supports the view that technology acceptance in schools depends not only on whether a tool is useful or easy to operate, but also on whether teachers feel capable of integrating it into lesson flow, managing classroom dynamics, and responding to difficulties. This pattern is consistent with Akram et al. (2022), who report that teacher confidence in technology use predicts instructional innovation and openness to new approaches.

In inclusive education, TSEF reflects teachers' perceived capacity to integrate educational play effectively, address basic technical problems, and design adaptive tasks for neurodivergent learners. This capability is particularly consequential in mathematics, where learners may require differentiated pacing, repeated scaffolding, and consistent feedback. Teachers with stronger self-efficacy are likely to perceive fewer barriers and make more deliberate decisions about how games support arithmetic goals, rather than treating games as optional supplements that can be abandoned under constraint.

Evidence indicates that teacher self-efficacy is strengthened through professional learning that is practical, sustained, and embedded in everyday teaching, especially when it includes mentoring, feedback, and opportunities to trial new tools in low risk settings. In technology enhanced contexts, self-efficacy and resource access jointly shape readiness to adopt AI based practices, and teachers with stronger self-efficacy typically show greater optimism, persistence, and willingness to implement interactive and inquiry based approaches (Akram et al., 2022; Alshorman, 2024; Menno et al., 2024).

Importantly, self-efficacy is shaped by organisational support, leadership commitment, and resource access. Prior work shows that school support can strengthen preservice teachers' self-efficacy and motivation, supporting effective activity design (Liang & Lu, 2025; Alshorman, 2024). In emerging educational technology contexts, teacher readiness sits at the intersection of psychological capability and structural feasibility, and both self-efficacy and resource accessibility are repeatedly identified as critical determinants of successful AI adoption and technology enhanced learning in schools (Alshorman, 2024; Rajkumar & Sindhu, 2024).

3.4.5 Perceived Compatibility as a Bridge between Innovation and Pedagogical Practice

Perceived Compatibility (PC) plays a dual role. It significantly influences Perceived Usefulness (PU) ($\beta = 0.423$; $f^2 = 0.228$) and also exerts a direct effect on Behavioral Intention (BI) ($\beta = 0.176$; $p = 0.026$). These relationships indicate that teachers are more likely to recognise the benefits of educational games and intend to adopt them when the innovation aligns with curriculum expectations, established routines, and the learning profiles of neurodivergent students. Compatibility thus functions as a practical decision filter. Teachers may acknowledge that games are promising, but they are more willing to implement them when they fit naturally into existing planning rather than requiring extensive redesign. This aligns with Mogaji et al. (2024), who identify PC as a central determinant of successful implementation, particularly where innovations must harmonise with entrenched practices and institutional requirements.

For arithmetic learning with neurodivergent students, PC reflects whether games can be embedded in lesson plans, mapped to learning outcomes, and adapted to individual needs without undermining instructional coherence. Compatibility therefore involves content alignment and pedagogical workflow, classroom manageability, and support for differentiated instruction. When games are perceived as compatible, teachers can justify them as legitimate instructional tools rather than enrichment activities, strengthening perceived usefulness and the likelihood of sustained use.

Ensuring compatibility in neurodivergent contexts also requires design grounded in learners' lived experiences and sensory and cognitive diversity. Honorato et al. (2024) stress involving students as co designers and embedding structure, predictability, and meaningful sensory choices. This implies that developers should treat compatibility as a design principle from the outset. Game design should therefore be informed by Universal Design for Learning (UDL) principles emphasising flexibility, accessibility, and multiple means of engagement, representation, and action. When games are engaging and instructionally congruent with UDL oriented inclusive practice, they can bridge innovation and everyday teaching, supporting curricular accountability while meeting diverse learner needs.

3.4.6 Integrated Implications, Contributions, and Future Research Directions

This study contributes to technology acceptance research in inclusive elementary education by extending TAM with Facilitating Conditions, Teaching Self-efficacy , and Perceived Compatibility. These additions strengthen relevance for educational games used with neurodivergent learners and show strong predictive power, explaining 72.4% of the variance in teachers' behavioral intention ($R^2 = 0.724$). Adoption in inclusive settings is shaped not only by perceptions of technology, but also by institutional support and pedagogical fit, which are often under represented in conventional TAM applications. By positioning teachers as primary decision makers, the study further clarifies how professional readiness and classroom feasibility influence whether educational games are adopted and sustained, consistent with evidence that teachers' intentions and self-efficacy predict classroom use of educational games (Leiss et al., 2025).

Overall, acceptance is best understood as a multilayered process in which enabling infrastructure, teacher capability beliefs, and contextual fit combine to translate innovation into implementable practice. The novelty lies in testing these enabling variables simultaneously within the specialised context of elementary mathematics games for neurodivergent students in Indonesia. Practical implications follow for key stakeholders: developers should prioritise intuitive interfaces, curriculum alignment, and UDL informed flexibility in representation and pacing; teachers should strengthen readiness through sustained training, peer learning, and supported experimentation; and policymakers and school leaders should secure devices, connectivity, mentoring, and protected time for collaboration to reduce implementation burden and support sustained adoption.

Key limitations include the cross sectional survey design, the sample size of 112 that may not capture the diversity of Indonesian school contexts, and the lack of direct measurement of student learning outcomes. Future research should therefore adopt longitudinal and mixed method approaches to examine how acceptance evolves during implementation and should assess effectiveness for neurodivergent learners through experimental or quasi experimental designs that include student perspectives and engagement indicators. Comparative studies across inclusive and special schools, regions with different resource profiles, and subjects beyond arithmetic are also recommended to test model stability and refine guidance for inclusive technology integration.

4. CONCLUSION

In inclusive Indonesian elementary classrooms, teachers adopt educational games for neurodivergent learners when the tools clearly improve arithmetic learning, feel genuinely engaging to use, and remain workable within everyday routines, as evidenced by survey data from 188 teachers analysed using PLS SEM. Highlights show a teacher centred model with strong explanatory power for behavioural intention (R^2 = 0.793). Key findings indicate that perceived usefulness and perceived enjoyment are the strongest direct predictors of intention, while perceived ease of use mainly reinforces these pathways; facilitating conditions, teaching self-efficacy, and perceived compatibility also shape adoption, highlighting the importance of curriculum fit, teacher confidence, and infrastructure support. The novelty lies in extending TAM to an inclusive, neurodiversity focused arithmetic context by foregrounding teachers as primary decision makers and modelling enabling conditions and pedagogical fit alongside core beliefs. Implications point to designing intuitive, curriculum aligned games with flexible supports, strengthening school level access and technical assistance, and aligning professional learning with both operational and pedagogical integration. Future research should track acceptance longitudinally, test learning and engagement outcomes for neurodivergent learners, and compare findings across inclusive and special settings, varied resource contexts, and subjects beyond arithmetic.

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