



Adaptive Gamified Learning through Powtoon for Children with Special Needs' Body Safety Awareness

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Abstract

Children with special needs often face challenges in understanding abstract concepts such as body safety and personal boundaries. Traditional teaching approaches may not fully accommodate their diverse learning styles and cognitive abilities. This study aims to develop and evaluate an adaptive gamified learning model using Powtoon to enhance body safety awareness among children with special needs in elementary education. The research employed a developmental research design (R&D) using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). Participants consisted of teachers and students from a special education school. Data were collected through observation, interviews, and questionnaires, then analyzed descriptively to assess the feasibility, effectiveness, and engagement level of the Powtoon-based learning media. The findings indicate that the integration of gamification elements such as points, rewards, and interactive storytelling within Powtoon significantly increased students' attention, motivation, and comprehension of body safety concepts. Teachers also reported that the media facilitated personalized learning, allowing instruction to adapt to each child's pace and needs. In conclusion, the adaptive gamified learning model using Powtoon proved effective in promoting body safety awareness and supporting inclusive education. This study highlights the importance of leveraging digital technology to create accessible, engaging, and value-based learning experiences for children with special needs. The results contribute to the growing discourse on personalized and adaptive learning approaches that integrate technology for meaningful educational impact.

Keywords:

Gamified Learning; Powtoon; Children with Special Needs; Body Safety Awareness; Inclusive Education

A. INTRODUCTION

Education in the digital era demands not only the integration of technology but also pedagogical innovation that ensures inclusive and meaningful learning experiences. Gamification has gained attention as an approach to enhance motivation; however, its implementation remains focused on improving academic performance rather than strengthening value-based or preventive learning (Badryatusyahryah et al., 2019). In particular, attention to the use of gamified digital media in inclusive education remains limited, especially in raising awareness of sensitive issues such as body safety among students with special needs (Putra et al., 2024). This reflects the integration between gamification and inclusive as well as preventive education, demonstrating how digital animation can serve as an adaptive medium to enhance engagement and moral awareness among diverse learners.

The use of gamification in education has shown significant potential in addressing the declining motivation and participation often observed in traditional learning. Studies have

demonstrated that gamified learning environments can enhance students' focus, enthusiasm, and academic performance (Mahmubi & Homaidi, 2025). By incorporating elements of play, students are encouraged to take an active role in the learning process, resulting in deeper understanding and more sustainable learning experiences (Purba et al., 2024).

For students with special educational needs (SEN), gamified learning media also offer unique advantages. Interactive visuals, structured feedback, and accessible platforms such as Powtoon provide multisensory learning opportunities that can accommodate different learning styles and abilities (Hakeu et al., 2023). Powtoon, as a visual animation tool, allows educators to design engaging and simplified content that promotes body safety awareness through storytelling and interactive activities. Such approaches are crucial for SEN learners, who benefit from visual reinforcement and consistent feedback mechanisms.

However, despite the proven benefits, the integration of gamification in inclusive education remains limited, particularly in contexts involving awareness-based education such as body safety. Prior studies have primarily focused on gamification for motivation and academic performance, while few have addressed its application in value-based or preventive education (Badryatusyahryah et al., 2019; Purba et al., 2024).

Therefore, this research seeks to explore the implementation of gamification using Powtoon as an educational medium for body safety awareness among children with special needs. The objectives of this study are to describe the design process, assess the effectiveness of Powtoon-based gamified learning, and evaluate its impact on students' engagement and comprehension. This study contributes to the growing discourse on inclusive digital education by demonstrating how gamification can support adaptive, value-oriented learning for diverse learners

B. METHODS

This study employed a Research and Development (R&D) approach using the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation (Branch, 2009). The model was chosen because it provides a systematic framework for developing and evaluating instructional media suitable for diverse learners, including children with special needs.

The research was conducted at a special education school in Central Java, involving twelve students aged 8–12 years with mild intellectual disabilities, and three teachers as facilitators. Ethical considerations were strictly observed throughout the study. Permission was obtained from the school authorities and parents, and the confidentiality of participants' identities was maintained. Data were collected using observation sheets, teacher evaluation rubrics, and student questionnaires. The observation instrumented include indicators such as student attention, participation, responses to the Powtoon based media, and ability to answer comprehension questions. Each indicator was rated using a four point rubric and accompanied by sample classroom activities.

Each instrument was validated by experts in educational technology and special education to ensure content relevance. Data validation was also strengthened through triangulation of observations, teacher feedback, and field notes, as well as member checking with teachers to confirm data interpretations.

The procedure followed the ADDIE stages: needs analysis, design of Powtoon-based gamified media, development of learning materials, classroom implementation, and evaluation through feedback and assessment. Quantitative data were analyzed using descriptive statistics, while qualitative responses were examined thematically to assess engagement and comprehension levels.

C. RESULT & DISCUSSION

Learning Engagement and Motivation

The findings revealed a significant increase in student engagement and motivation after the implementation of Powtoon-based gamified learning media. Students showed higher levels of

participation during interactive storytelling, responded enthusiastically to animations, and completed gamified tasks with greater interest—contrasting with traditional lessons where engagement typically decreased over time.

This improvement aligns with previous research demonstrating that gamification enhances motivation and participation. (Mahmubi & Homaidi, 2025) similarly reported rising trends in motivation, participation, and learning engagement when gamified elements such as points, badges, and rewards were used. Their results showed progressive increases across three learning cycles, comparable to the upward trends observed in this study. For example, student motivation in their study increased from 56% to 85%, mirroring the strong motivational gains seen in our findings. Likewise, their improvement in active participation (58% to 87%) aligns with the substantial rise in participation observed in the current implementation.

The table presents the development of students' motivation and learning engagement across three instructional cycles in the study (Mahmubi & Homaidi, 2025). The data show a consistent increase in all indicators: student motivation rose from 56% in Cycle 1 to 85% in Cycle 3, active participation increased from 58% to 87%, and learning engagement improved from 55% to 82%. These stable, strong, and consistent upward trends indicate that the sustained implementation of gamified learning models can significantly enhance students' motivation and participation. The quantitative data from their study are presented in Table 1 below.

Table 1. Progress of Students' Motivation and Engagement Across Learning Cycles

Indicator	Cycle 1 (%)	Cycle 2 (%)	Cycle 3 (%)	Trend
Student Motivation	56	72	85	↑ Stabil
Active Participation	58	74	87	↑ Kuat
Learning Engagement	55	69	82	↑ Konsisten

Source: Adapted from Mahmubi & Homaidi (2025)

The data in Table 2 show a clear comparison of students' engagement before and after the implementation of gamified learning in the study (Mahmubi & Homaidi, 2025). Student motivation increased from 56% to 85%, active participation rose from 60% to 87%, and learning satisfaction improved from 55% to 78%. These results indicate substantial gains across all indicators, demonstrating that the use of gamified learning strategies has a strong positive impact on students' motivation, participation, and overall learning experience. The quantitative data from their study are presented in Table 2 below.

Table 2. Comparison of Student Engagement Before and After Gamified Learning

Indicator	Before Implementation (%)	After Implementation (%)	Improvement (%)
Student Motivation	56	85	+29
Active Participation	60	87	+27
Learning Satisfaction	55	78	+23

Source: Adapted from Mahmubi & Homaidi (2025)

The consistency between the current findings and those (Mahmubi & Homaidi, 2025) strengthens the argument that gamification reliably enhances engagement. In addition, our study

adds new insights by showing that similar improvements occur in special education settings, a context less explored in earlier research. These results further support who argued that reward-based interactions promote persistence and motivation—an effect clearly visible in this study as students displayed sustained excitement and participation throughout the activities (Badryatusyahryah et al., 2019).

Pedagogically, the increase in student motivation suggests that teachers should adopt structured gamification elements to maintain engagement throughout learning sessions. Incorporating short, interactive tasks and visual rewards can help prevent attention decline, especially in classrooms with diverse learning needs.

Comprehension of Body and Motivation

The use of animated storytelling and interactive quizzes in Powtoon significantly improved students' comprehension of body safety concepts, with pre–post test results indicating an average gain of 38%. Students were able to recall key messages and apply them during discussions, demonstrating meaningful conceptual understanding.

These outcomes align with (Putra et al, 2024), who found that visual gamified media enhance elementary students' conceptual comprehension by making abstract topics more concrete and memorable. The present study builds on this by applying gamification to value-based learning—specifically child protection—an area rarely examined in previous literature. Unlike prior research that focused primarily on cognitive subjects, this study shows that gamified animation can effectively support sensitive moral education topics for children with special needs.

Teacher feedback and media suitability also support these findings. As noted by (Demszky et al., 2024), teacher evaluation is crucial for determining the effectiveness of digital media, particularly its accessibility and appeal to students with learning difficulties such as dyslexia. The positive feedback in this study corresponds with (Zykrina et al., 2022), who emphasized that Powtoon's visual clarity, interactive design, and ease of use make it highly suitable for diverse learners. By combining these aspects, the current study demonstrates that Powtoon is not only engaging but also pedagogically appropriate for inclusive learning environments.

Furthermore, the observed improvement in both comprehension and motivation supports findings by (Mulyani et al., 2024) and (Sudarmawan et al., 2024), who stated that digital visual media and gamification can reduce learning barriers and facilitate better understanding through multisensory interaction. Therefore, the present study contributes comparative evidence that Powtoon-based gamification supports both cognitive (concept mastery) and affective (motivation) domains, particularly in inclusive and special needs contexts.

From a pedagogical perspective, using animated storytelling helps teachers convey sensitive topics safely and effectively. This implies that educators should integrate visual narratives and guided discussions when teaching body safety, as these approaches make abstract protection concepts more concrete and emotionally safe for children with special needs.

Teacher Feedback and Media Feasibility

Based on teacher evaluation rubrics, the Powtoon-based gamified media achieved a feasibility score of 91.5% (very feasible). Teachers emphasized its practicality, engaging visuals, and its ability to foster a positive classroom atmosphere. They also reported increased collaboration among students, as gamified challenges motivated them to assist peers.

These findings are consistent with (Purba et al., 2024), who concluded that gamified technologies foster cooperative learning and enhance inclusivity. Likewise, Lubis et al. (2023) found that positive teacher perceptions are strongly associated with successful digital tool integration—supporting the idea that educator acceptance plays a key role. However, this study reveals an additional dimension: emotional engagement, where students developed attachment to animated characters, indicating deeper involvement beyond typical cognitive engagement reported in earlier studies.

The results strongly support the research objectives outlined in the introduction, namely to design, implement, and evaluate adaptive gamified learning for children with special needs. The

increased motivation, engagement, and comprehension observed indicate that Powtoon-based gamified media effectively address learning barriers commonly encountered in special education settings.

Scientifically, these findings demonstrate that combining multimedia storytelling with gamified feedback systems creates a personalized and emotionally engaging learning experience. The improvement in body safety comprehension shows that digital gamification can be applied beyond cognitive learning outcomes to support moral and value-based education, aligning with the main theme of *Impactful Education: Integrating Knowledge, Technology, and Values for Society*.

While consistent with prior studies emphasizing the motivational benefits of gamification (Badryatusyahryah et al., 2019; Mahmubi & Homaidi, 2025), this research introduces a new application area preventive education for children with disabilities—thus contributing a novel perspective to the discourse on inclusive digital learning.

Pedagogically, the high feasibility score indicates that teachers can easily incorporate Powtoon-based gamification into daily instruction. The findings suggest that digital animated media should be included in inclusive teaching strategies to enhance participation, collaboration, and emotional engagement.

D. CONCLUSION

This study aimed to design, implement, and evaluate Powtoon-based gamified media to support body-safety learning for children with special needs. The findings indicate that combining gamification with animated visual storytelling meaningfully enhances engagement, motivation, and comprehension in preventive value-based education an area insufficiently addressed in current literature, which remains largely centered on academic and cognitive outcomes. The results therefore advance the theoretical understanding that gamification can function not only as a motivational mechanism but also as a medium for affective and morally oriented learning, expanding existing models of inclusive digital pedagogy.

From a practical perspective, the high feasibility ratings from teachers demonstrate that Powtoon-based gamified media can be readily integrated into everyday instructional routines in special education settings. This provides educators with a structured, accessible, and adaptable tool for addressing sensitive topics such as body safety, which often require emotional sensitivity and visual reinforcement. The findings also suggest that digital animation can foster collaborative learning and emotional connection, offering additional value beyond traditional materials.

However, several limitations should be noted. First, the study involved a relatively small sample of students with mild intellectual disabilities, which may limit the generalizability of the results to other disability categories or broader populations. Second, the short duration of the intervention did not allow for assessing long-term retention or behavioral transfer of body-safety knowledge. Third, the study relied on teacher-facilitated implementation, which may vary across classrooms depending on teacher digital literacy and instructional style.

Future research should therefore examine the long-term impact of gamified preventive education, explore its application across diverse disability groups, and investigate how teacher training influences the fidelity and effectiveness of implementation. Comparative studies using different types of gamified platforms could also provide deeper insights into which design features most effectively support inclusive, value-based learning. Expanding the research across regions or cultural contexts will further strengthen the generalizability of the findings and support broader adoption.

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