

Awareness of PERMATA@Pintar Negara Centre Students about Bingo Game as Aid Tool in Teaching and Learning

Nur Shamim Hamzah¹, Ku Aqhlan Hafiey Ku Aznal Shahri¹ & Siti Munirah Mohd^{2,3}

¹Pusat PERMATA@Pintar Negara, Universiti Kebangsaan Malaysia, 43600 Bandar Baru Bangi, Malaysia.

²Kolej PERMATA Insan, Universiti Sains Islam Malaysia, 71800, Bandar Baru Nilai, Negeri Sembilan, Malaysia

³Education & Advanced Sustainability Research Unit, Kolej PERMATA Insan, Universiti Sains Islam Malaysia, 71800, Bandar Baru Nilai, Negeri Sembilan

Abstract

Gamification is an effective method for engaging students and sustaining their interest in learning. Educational games like Bingo incorporate elements like points and badges to enrich the learning experience. Playing Bingo can enhance cognitive function, communication skills, and critical thinking by encouraging active learning rather than passive memorization. This study aimed to evaluate students' awareness at the PERMATA@Pintar Negara Centre regarding using Bingo as a teaching tool. The research was conducted through purposive sampling, involving an online survey with students aged 12 to 17. The results indicate that while many students play Bingo, most are unaware of its educational potential. Therefore, it is recommended that the elements of Bingo games be introduced in teaching and learning.

Keywords: bingo game; gamification; education 4.0; secondary school.

1.0 Gamification in Teaching and Learning

Gamification in education has gained considerable attention in recent years, with studies conducted between 2020 and 2025 highlighting its potential to enhance student engagement, motivation, and learning outcomes. A thorough meta-analysis by [1] synthesised findings from 41 studies involving over 5,000 participants, revealing a significant positive effect of gamification on learning outcomes. Similarly, a study by [2] reported a moderately positive impact of gamification on students' academic performance. In the field of STEM education, a study by [3] showed that leaderboards used in gamification strategies significantly improved learning performance in university-level calculus courses. However, implementing gamification comes with its own set of challenges. Research by [4] identified some adverse effects associated with certain game design elements, noting that when gamification is not thoughtfully integrated, it can lead to decreased motivation and performance. These findings emphasise the importance of applying gamification in a deliberate and context-sensitive manner in educational settings to maximise benefits while mitigating potential drawbacks.

Harnessing the powerful benefits of gamification in education, the integration of active learning techniques through gamified approaches has emerged as a dynamic catalyst for elevating student engagement and learning outcomes. Active learning immerses students in the educational journey, compelling them to delve deep into the analysis, synthesis, and evaluation of information rather than simply absorbing it passively. By incorporating gamification elements such as points, badges, and competitive leaderboards, educators can create an engaging environment that inspires students to interact more meaningfully with the content. For instance, a study conducted by [5] revealed that the application of gamification within active learning settings at the collegiate level not only fostered significant skill development but also heightened student satisfaction, all while preserving rigorous academic performance. These compelling findings underscore the remarkable potential of merging gamification with active learning, paving the way for educational experiences that are not only more engaging but also profoundly productive.

One innovative application of gamified active learning is the incorporation of Bingo games

within educational environments. This educational adaptation reimagines the classic Bingo game, aligning its structure and content with specific learning objectives to promote active student

involvement and reinforce the learning process. For instance, a study conducted by [6] focused on the use of activity-based Bingo games within a medical education context. The researchers meticulously evaluated the impact of this interactive approach on students' academic performance. Their findings revealed that participants who engaged in the Bingo activity showed a significant improvement in their post-test scores compared to their pre-test results. Furthermore, students expressed that the Bingo game not only deepened their comprehension of complex subject matter but also rendered the learning experience more enjoyable and engaging. Similarly, a study conducted by [7] detailed the implementation of an innovative strategy known as activity Bingo to boost student engagement during fieldwork experiences. This technique involved creating a Bingo card filled with various tasks and challenges related to the fieldwork, encouraging students to take an active role in their learning process. As they sought to complete their Bingo cards, students not only participated more eagerly but also took the time to reflect on their observations and experiences in the field. This thoughtful engagement ultimately led to enhanced learning outcomes, illustrating how such a game can transform traditional educational methods. By adopting this playful and interactive approach, educators can foster an environment that encourages active learning and critical thinking. The dynamic nature of activity Bingo not only revitalises the classroom atmosphere but also encourages collaboration among students, making the learning process more engaging and impactful. Through these engaging activities, educators can effectively facilitate a richer educational experience, leaving a lasting impression on their students.

2.0 Methodology

This study was conducted in three phases to investigate students' awareness of the Bingo game as an aid tool in teaching and learning based on Fig. 1.

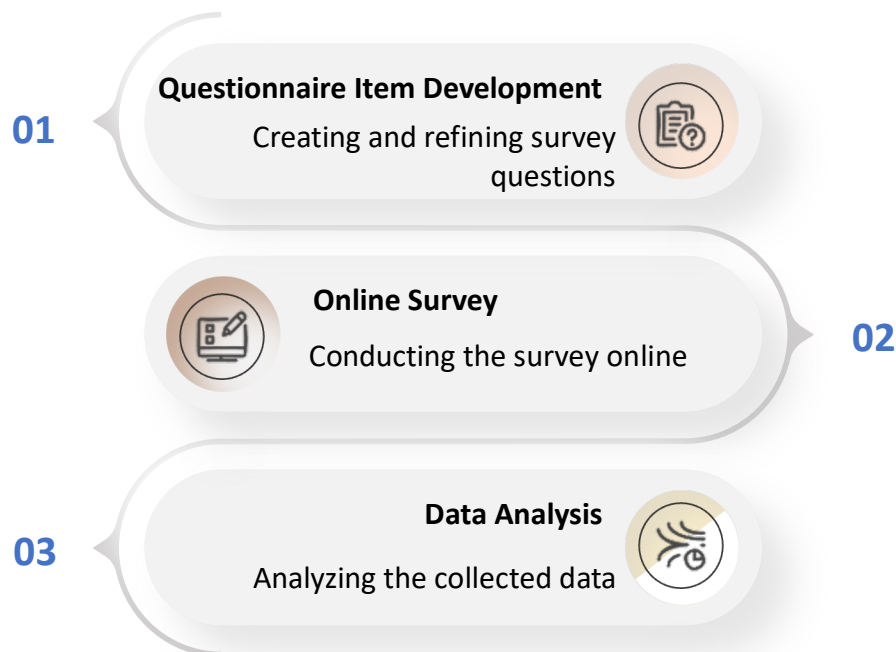


Fig. 1. Methodology

In the first phase, a questionnaire was developed to gather demographic data including age and gender. The questionnaire also includes a specific element about the Bingo game. During the second phase, an online survey was distributed to students aged 12 to 17. Participation was voluntary, allowing students to share their thoughts about the Bingo game. In the third phase, the collected data was analyzed

using Microsoft Excel. Descriptive statistics, which are percentages, were calculated using basic Excel functions to identify trends and patterns in students' responses.

3.0 Results and Discussion

The age distribution of the 60 respondents shows a diverse range of student participants within the school in Fig. 2. Most respondents are aged 14 (18 students) and 15 (17 students), indicating that early to mid-secondary school students are the most engaged in the survey. Following them are 12 students aged 13, which also demonstrates substantial participation from younger students. The groups of 16 year olds and 17 year olds, each represent a smaller portion, totalling 13 students. This variation in age suggests that the activity or survey appealed to a broad range of students but was particularly engaging for those in the middle secondary level.

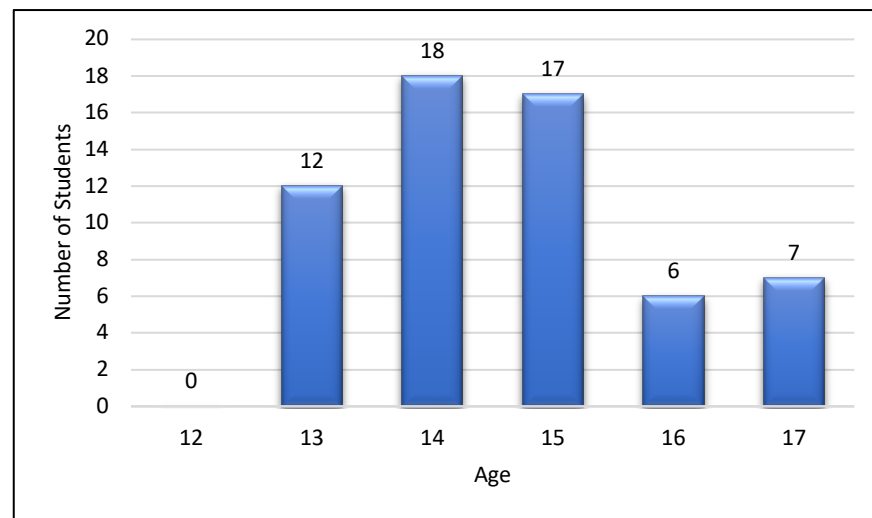


Fig. 2. Distribution of student participants according to age group ($n = 60$)

Regarding Fig. 3, based on the gender of students engaged, the survey indicates a significantly higher participation rate among female students (68%) than male students (32%). This gender gap may reflect differences in interest, availability, or engagement with the subject matter or platform used for the activity. The increased involvement of females may offer essential perspectives for upcoming planning, especially when it comes to customizing content, choosing themes, or creating follow-up activities that are engaging and accessible to both genders.

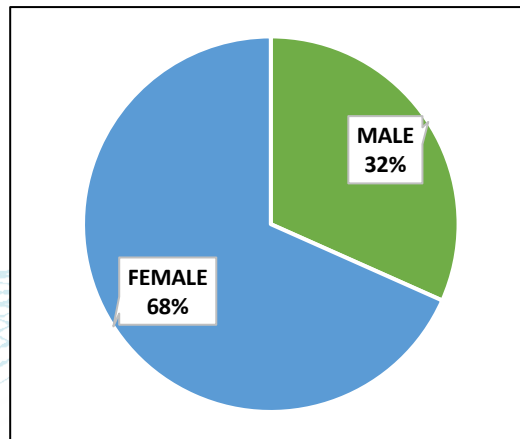


Fig. 3. Gender distribution of the students participants ($n = 60$)

Table 1 summarizes students' awareness, prior experience, and perceptions of Bingo games as a teaching tool. The data show that most respondents (93.3%, $n = 56$) are familiar with Bingo games and have prior experience playing them. The highest number of students indicated that Bingo is a popular game that students often play.

Table 1. Number of students' awareness, experience playing and perception as a teaching tool of Bingo games

Description	Yes	No
Awareness	56	4
Experience playing	56	4
Perception of Bingo as a teaching tool	21	39

However, despite this widespread awareness and experience, students' perceptions of Bingo as an educational tool are limited. Only 35% ($n = 21$) of respondents believe that Bingo can effectively support teaching and learning, while the majority (65%, $n = 39$) do not see it as such. This discrepancy highlights a significant gap between students' recreational engagement with the game and their recognition of its educational value. The findings suggest that while Bingo has the potential to be a familiar and interactive medium, further efforts are needed to help students understand how game based learning can enhance educational outcomes. Implementing structured Bingo based activities that align with curriculum content and learning objectives may increase students' acceptance of and appreciation for its academic relevance. Future research could examine the impact of such interventions on student engagement, motivation, and learning performance.

4.0 Conclusion

The findings of this study indicate a high level of student awareness and prior experience with Bingo games, demonstrating its potential as a familiar platform for engagement in educational settings. However, the relatively low perception of Bingo as a viable teaching tool underscores the need for targeted efforts to demonstrate its instructional value. Educators should consider integrating content-based Bingo activities that align with specific learning outcomes to enhance student engagement and understanding of concepts. Future efforts should focus on developing Bingo games and evaluating the effectiveness of these gamified approaches in various educational settings to encourage broader acceptance and maximize their impact on learning.

References

- [1] Li, M., Ma, S., & Shi, Y. (2023). Examining the effectiveness of gamification as a tool promoting teaching and learning in educational settings: A meta-analysis. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1253549>.
- [2] Zeng, R., & Sun, J. (2024). Exploring the impact of gamification on students' academic performance: A comprehensive meta-analysis of studies from the year 2008 to 2023. *British Journal of Educational Technology*, 55 (6), 2419-2786. <https://doi.org/10.1111/bjet.13471>.
- [3] Ortiz-Rojas, M., Chiluiza, K., Valcke, M. *et al.* (2025). How gamification boosts learning in STEM higher education: a mixed methods study. *International Journal of STEM Education*, 12, 1. <https://doi.org/10.1186/s40594-024-00521-3>.
- [4] Almeida, C., Kalinowski, M., Uchoa, A., & Feijó, B. (2023). Negative Effects of Gamification in Education Software: Systematic Mapping and Practitioner Perceptions. *Information and Software Technology*, 156. <https://doi.org/10.1016/j.infsof.2022.107142>.
- [5] Murillo-Zamorano, L. R., López Sánchez, J. Á., & Godoy-Caballero, A. L. (2021). Gamification and active learning in higher education: is it possible to match digital society, academia and students' interests? *International Journal of Educational Technology in Higher Education*, 18(1), 15. <https://doi.org/10.1186/s41239-021-00249-y>.
- [6] Sannathimmappa, M. B., Nambiar, V., & Aravindakshan, R. (2024). Engaging students through activity-based bingo games in immunology course: Determining students' perception and measuring its influence on academic performance. *Journal of Education and Health Promotion*, 13, 258. [10.4103/jehp.jehp_2074_23](https://doi.org/10.4103/jehp.jehp_2074_23).
- [7] Glessmer, M., Ziegler, M., & Reuter, R. (2023). How to create an activity bingo for teaching purposes. Retrieved from <https://mirjangulessmer.com/2023/09/06/how-to-create-an-activity-bingo-for-teaching-purposes/>. [Date: 24 May 2025].