Lecturer's Experience and Perspective on Game-Based Learning in Technical and Vocational Education and Training

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Abstract

Vocational education equips students with the skills needed for specific trades, and Game-Based Learning (GBL) is gaining attention as an innovative method to enhance student engagement and learning outcomes. However, implementing GBL in Technical and Vocational Education and Training (TVET) faces technological barriers, educators' preparedness, and aligning games with curriculum goals. This study explores the perspectives and experiences of lecturers at Kolej Komuniti Ledang regarding GBL in vocational teaching. The research employed a mixed-methods approach, combining quantitative questionnaires with semi-structured interviews. 42 lecturers participated, providing insights into their views on GBL's effectiveness, implementation challenges, and applicability to TVET. The study explored how GBL impacts student engagement, motivation, and skill development. Findings indicate that lecturers perceive GBL as highly effective in increasing student engagement, focus, and knowledge retention, especially in practical, hands-on lessons. This study underscores the potential of GBL in vocational education while emphasizing the importance of addressing technological and training challenges to optimize its effectiveness in enhancing student outcomes.

Keywords: Game-Based Learning (GBL); Lecturer Experience; Lecturer Perspective Technical and Vocational Education and Training (TVET).

1.0 Introduction

Vocational education prepares students for specific trades, crafts, and careers. In recent years, there has been a growing interest in using innovative instructional methods, such as Game-Based Learning (GBL), to improve students' learning experiences and outcomes. GBL is an instructional strategy that includes game aspects such as competition, prizes, and interactivity in the learning environment to increase student engagement and motivation. (Hamari et al., 2016). Gaming-based learning refers to a game element that may motivate and inspire players, enabling the incorporation of instructional content into games (Mohamed Rosly & Khalid, 2017). Using GBL in the teaching and learning process transforms the activity into a formal, serious game that increases student engagement and enjoyment (Cugelman, 2013).

Traditional teaching approaches may not be practical for maximizing learning potential with digital games. As new technologies emerge, it's essential to shift the focus from the technology to establish a model that allows teachers to decide how to utilize it in practice and which pedagogical tactics to implement. Game-based learning includes digital games or game-like aspects in the teaching process, encouraging learners to engage with the subject in a more immersive and motivating way (Gee, 2007).

Game-based learning simulates real-world events in technical and vocational education (TVET), providing students with hands-on experience and practical skills in a safe environment (Sánchez-Mena & Martí-Parreño, 2017). However, implementing GBL in vocational education can be tricky since it involves alignment with curricular goals, technological infrastructure, and educators' willingness to adopt new pedagogical techniques. GBL provides substantial advantages in vocational education, where practical skill development is crucial. Vocational training frequently requires students to learn hands-on, real-world skills that are difficult to replicate in a regular classroom environment fully. This makes GBL ideal for vocational instruction, where experience learning is vital to student success.

Innovative teaching strategies are crucial in vocational education and training, especially in TVET, to guarantee that students are sufficiently prepared for issues they will face in the real world. The viewpoints and experiences of the lecturers are crucial to GBL's success. While certain educators believe that game-based learning (GBL) is a helpful tool for encouraging active student engagement and enhancing retention of material, others may find it challenging to put into practice because of technological constraints, the difficulty of creating game-based activities, or the inconsistency between GBL and conventional assessment criteria. These worries are supported by the answers to the questionnaire and interview questions, where lecturers disagreed on how GBL affected students' educational experiences, especially in developing practical and technical skills. This study explores the viewpoints and experiences of Kolej Komuniti Ledang, lecturer, with a particular emphasis on their opinions about the advantages, difficulties, and efficacy of GBL in vocational education. Determining the best way to include GBL into TVET to improve student outcomes and the quality of educators requires an understanding of these variables.

The primary objective of this research is to explore and understand the experiences and perspectives of lecturers at Kolej Komuniti Ledang regarding implementing Game-Based Learning (GBL) in vocational education. This study investigates explicitly how GBL influences students' learning experiences and outcomes, focusing on how lecturers identify its impact. Additionally, the study seeks to examine lecturers' views on integrating GBL in their teaching practices. Lastly, the research aims to understand the lecturers' perspectives on the effectiveness and applicability of GBL for Technical and Vocational Education and Training (TVET) students, particularly in enhancing their skills and knowledge. This research will seek to answer the following questions: How do lecturers at Kolej Komuniti Ledang identify the impact of GBL on their students' learning experiences and outcomes; what are the lecturers' views on the use of GBL in their teaching practices, and what are the lecturers' perspectives on the effectiveness and applicability of GBL for TVET students in terms of enhancing their skills and knowledge.

This study makes significant contributions to vocational education, specifically in understanding how GBL might improve teaching and learning experiences. The study emphasizes the potential of GBL to promote student engagement, motivation, and practical skill learning by concentrating on the viewpoints of the Kolej Komuniti Ledang lecturer. The findings will give valuable insights into how GBL may be more successfully integrated into TVET, assisting lecturers in adopting creative techniques that better reflect the hands-on character of vocational topics. Furthermore, this study will provide practical advice for overcoming GBL implementation obstacles, allowing lecturers to create more dynamic and participatory learning environments. Understanding lecturers' perspectives on the success of GBL can help drive decisions that lead to developing a more engaging and effective curriculum customized to the requirements of TVET students. This adds to the larger goal of increasing the quality of vocational education, ensuring that students are more equipped for the needs of today's workforce.

i. Game-Based Learning in Education

Game-based learning has become an innovative teaching approach for increasing student engagement, motivation, and learning results. Research has repeatedly demonstrated that GBL can promote deep learning by promoting active engagement and problem-solving, particularly in areas that benefit from experiential learning (Plass et al., 2015). Because of its capacity to encourage students and offer fast feedback, GBL has been effectively implemented in various educational sectors, including language learning and scientific education (Hamari et al., 2014). GBL strategies greatly enhance student recall and application of learned material, especially in STEM (Science, Technology, Engineering, and Mathematics) courses, claim Clark, Tanner-Smith, and Killingsworth (2016). GBL can help students understand abstract topics more concretely by introducing aspects of narrative, competitiveness, and teamwork (Huang et al., 2020). This teaching method is in line with constructivist learning theories, which hold that knowledge is created by students actively engaging in activities that test their capacity for problem-solving.

ii. Game-Based Learning in TVET

The use of GBL in Technical and Vocational Education and Training (TVET) has grown in recent years, as vocational education is practical and skill-based. GBL allows students to imitate real-world work contexts and participate in problem-solving and critical thinking without the hazards associated with actual practice (Sung et al., 2021). Research by Wouters and van Oostendorp (2013) shows that GBL improved vocational students' learning experiences by making complicated topics more intelligible via immersive learning environments. GBL in TVET can enhance collaboration, decision-making, and technical abilities, preparing students for future employment (Sánchez-Mena & Martí-Parreño, 2017). GBL enables vocational students to acquire critical thinking, problem-solving, and decision-making skills through simulations, role-playing, and interactive situations (Connolly et al., 2012). In TVET, where practice-based learning is critical, GBL provides distinct benefits by allowing students to engage in practical learning via digital

platforms. Ebner and Holzinger (2020) found that incorporating GBL into vocational programs helps students better comprehend complicated ideas by envisioning real-world applications of their talents.

iii. Teachers' Experience with GBL in TVET

Research has found that teachers have had diverse experiences utilizing GBL in their classrooms. In research by Turan and Meral (2018), several teachers acknowledged that GBL increased student involvement but also recognized the need for substantial preparatory time and resources. Similarly, O'Brien and Pitera (2019) discovered that teachers faced achievements and problems with GBL, such as managing classroom dynamics and ensuring that game material was relevant to practical objectives. According to Lopez and Tucker (2019), some teachers are worried that games might divert attention from the main learning objectives or that they lack the technical know-how necessary to create and execute GBL successfully. Its acceptance may be boosted by addressing these issues through professional development and showcasing the real advantages of GBL in vocational education (Squire, 2011).

iv. Lecturer' Perceptions of Game-Based Learning

Despite GBL's established benefits, academic judgments of its efficacy and practicality are essential in determining its acceptance. Teachers who see GBL as a helpful teaching tool are more likely to include it in their courses. In contrast, others may encounter obstacles such as a lack of technical understanding, time restrictions, and inadequate institutional support (Turan & Meral, 2018). Educators are typically hesitant to employ game-based learning (GBL) owing to obstacles in aligning game mechanics with learning objectives and evaluation methodologies (Sánchez-Mena & Martí-Parreño, 2017).

Furthermore, a lack of training and institutional support may reduce instructors' motivation to implement GBL. Clark et al. (2016) stressed that while many educators see the potential of GBL to improve learning, they may feel unprepared to create and execute game-based experiences due to needing more technical skills or resources. This is especially helpful when using particular talents might be expensive or dangerous (Mitgutsch & Alvarado, 2012). For example, game-based simulations allow students to practice in real-world work environments, learn from mistakes, and hone their skills in a low-risk environment. According to Westera (2017), TVET students exposed to GBL exhibit enhanced motivation and performance in skill-based examinations. Additionally, GBL encourages lifelong learning, which is vital in the field of vocational training because the technological environment is constantly changing (Anastasiadis, Lampropoulos, & Siakas, 2018)

2.0 Methodology

The study used a mixed-methods approach to address the research challenge by providing data triangulation. This would create a compelling argument if both qualitative and quantitative data yielded the same results (Leedy & Ormrod, 2013). The mixed-methods study included a quantitative component using a lecturer quantitative questionnaire. A qualitative study employed

interview questions to collect lecturer opinions on implementing games in teaching TVET students.

The sampling method used is Stratified Random Sampling, where 46 lecturers at Kolej Komuniti Ledang are sampled. However, with only 42 lecturers responding out of 46 selected, the response rate is 91.3%. According to Krejcie and Morgan's (1970) sample table, 40 respondents were required to represent the population in this study. 5 lecturers participated in the interview section of this study. Data were collected by an online survey and augmented with face-to-face semi-structured interviews. By the principles of informed consent and withdrawal, all participants were provided information about the investigation's objectives and were advised that they might withdraw at any moment. The lecturer's quantitative questionnaire (with minor adjustments from Karadag, 2015) has 12 items and uses a five-point Likert scale. Responses are based on a five-point Likert Scale (i.e., 5=Strongly Agree, 4=Agree, 3 = Neutral, 2=Disagree, 1=Strongly Disagree). The two sections of the questionnaire are Part 1, which includes respondent demographic data and Part 2, which contains items based on the constructs needed to address the study objectives. The calculated Cronbach's Alpha in the dataset is approximately 0.95, indicating a high internal consistency or reliability level among the items. Descriptive analysis was used to obtain a comprehensive overview using SPSS Statistics version 29.0. The questionnaire was distributed via Google Forms, allowing researchers greater flexibility in the data collection process.

A self-report quantitative questionnaire was administered to the lecturers to measure their thoughts on GBL's impact on their teaching and student outcomes. This mixed-methods study concluded with semi-structured interviews. These interviews will explore their experiences with GBL in greater detail, focusing on their views regarding its impact on student learning, challenges they have faced in implementation, and their overall perception of its effectiveness in vocational education. After conducting the interview, the collected data was coded.

The analysis comprised of two main components. A survey of lecturers was done first, and then a semi-structured, phenomenological interview was conducted. The IBM Statistic Package for Social Science (IBM SPSS) version 29 was used to analyse the data gathered throughout the investigation. Descriptive statistics were employed to analyse the data gathered. The data is presented as a mean and standard deviation. The mean value acquired from data analysis is then interpreted into a level using the mean interpretation table. Thematic analysis will assess the qualitative data collected during the interviews. This method will enable the discovery of reoccurring themes and patterns connected to lecturers' experiences, perspectives, and obstacles in utilizing GBL.

3.0 Results and Discussion

The demographic data shows that the sample is nearly evenly split by gender, with 54.8% male and 45.2% female respondents. The respondents work across various fields, with Pastry and Automotive being the most common fields (23.8%), Refrigeration and Air Conditioning (19.07%), and Business and Pengajian Am at 16.6%. This spread suggests a diverse group of professionals involved in the study, representing various technical and business-oriented fields.

In terms of age, most respondents are between 36-45 years old (64.3%), followed by 19% in the 46-55 age range, while 14.3% are younger (25-35 years old), and a small percentage (2.4%) are between 56-65 years. Regarding teaching experience, the largest group has 16-20 years of experience (38.1%), followed by those with 11-15 years (31%), while fewer respondents have either less than 10 years (11.9%) or more than 20 years of teaching experience (16.7% for 21-25 years and 2.4% for 26-30 years). This indicates a majority of experienced educators in the sample. In this research, there were 14 questionnaires that the researcher gave to 42 respondents. The following table contains the lecturer's perspective on implementing GBL in teaching. The questionnaire scale is strongly agreed, agree, neutral, disagree, and strongly disagree.

Table 1: Distribution according to demographic

Variable	Category	Frequency	Percentage %
Gender	Male	23	54.8
	Female	19	45.2
Field	Pastry	10	23.8
	Automotive	10	23.8
	Refrigeration and Air Conditioning	8	19.07
	Business	7	16.6
	Pengajian Am	7	16.6
Age	25 - 35 years	6	14.3
	36 – 45 years	27	64.3
	46 – 55 years	8	19.0
	56 – 65 years	1	2.4
Teaching Experience	5 – 10 years	5	11.9
	11 - 15 years	13	31.0
	16 - 20 years	16	38.1
	21 - 25 years	7	16.7
	26 - 30 years	1	2.4

The data table shows that the item "Game-based learning is fun for students" received a Very High interpretation with a mean score of 4.24 and a standard deviation of 0.089, indicating substantial agreement among respondents. Similarly, "GBL helps students achieve a high level of focus" also had a Very High interpretation with a mean score of 4.29 and a standard deviation of 0.078. However, the item "I think developing teaching games is difficult" received a Moderate interpretation with a mean score of 2.69 and a standard deviation of 0.105, reflecting some challenges in implementing GBL. The lowest score was found in the item "I often use GBL applications like Kahoot or Quizziz", with a mean score of 1.88 and a standard deviation of 0.078, showing the low frequency of use in practice.

Table 2: Lecturer Experience and Perspective on Game-Based Learning

No	Item	Mean SD	Result
1	Game-based learning is a suitable teaching and learning tool because it is effective in the learning process.	4.14 0.073	Very High
2	I think developing games for teaching is difficult.	2.69 0.105	Moderate
3	The implementation of Game-Based Learning in teaching and learning is effective for TVET students.	4.24 0.067	Very High
4	I find that my students are actively engaged in class when using Game-Based Learning.	4.26 0.084	Very High
5	Game-based learning helps students achieve a high level of focus during the learning process.	4.29 0.078	Very High
6	Teaching using Game-Based Learning is fun for students.	4.24 0.089	Very High
7	Students' interest increases when Game-Based Learning is used in the classroom.	4.21 0.087	Very High
8	The use of Game-Based Learning enhances students' knowledge.	4.21 0.064	Very High
9	Game-based learning helps students healthily compete with their peers.	4.19 0.085	High
10	The use of Game-Based Learning helps lecturers achieve learning outcomes effectively.	4.21 0.073	Very High
11	Game-based learning is suitable for implementation in practical and hands-on classes.	4.21 0.073	Very High
12	The implementation of Game-Based Learning in the classroom can improve my teaching competence.	4.14 0.073	High
13	I prefer using Game-Based Learning during teaching and learning because this approach is easier compared to traditional methods.	4.12 0.073	High
14	I often use Game-Based Learning applications in education (Examples: Kahoot, Quizziz, etc.).	1.88 0.078	Low

Face-to-face semi-structured interviews were carried out with five lecturers. The questions were open-ended and partly reflected the survey questionnaire. The interviews were transcribed, and the responses were categorized as use of digital tools, interactive learning, positive student response, increased motivation, teacher preparedness, internet connectivity issues, collaboration, time management, and critical thinking. When discussing the experience with digital games, lecturers highlighted varying experience levels. One of them mentioned limited use, primarily engaging students through interactive tools like QR codes for ice-breaking activities as an introduction to digital platforms in learning.

She stated, "*Well, to be honest, I haven't used digital games extensively in my teaching. I've mainly incorporated them in simple activities like ice-breakers using QR codes. But even with that limited use, I've noticed the students engage better when there's some digital interaction. I see the relevance and potential of using more of these tools*".

The lecturers cited many positive impacts of engagement with game-based activities. All lecturers emphasized the positive impact digital games had on student engagement. Students were highly motivated and engaged, especially when games were introduced through familiar tools like mobile phones. Lectures also highlighted that the competitive aspects of digital games, such as scoring and rewards, increased motivation:
"Students who were sleepy or disengaged suddenly become more focused and interested. They're naturally competitive, and when there's a reward in place, they try even harder. That sense of competition boosts their motivation". One of the lecturers emphasized how games help align teaching with students' existing interests in gaming, keeping them engaged even during typically challenging times, such as afternoon classes. A teacher said, *"Visual aids, interactive questions, and real-time feedback help them grasp the content faster. It's like the lesson comes alive for them".*

Despite the enthusiasm for digital games, significant barriers were identified. The lecturer pointed out that their preparedness is a crucial obstacle, as many need more training or proficiency with digital tools. Others also support this theme. Some lecturers need more interest in gaming, which hinders their ability to implement it effectively in their teaching.

For example: "*For me, the biggest challenge is teacher preparedness. Some lecturers, myself included, aren't fully equipped with the technological knowledge we need. We know the games can be effective, but it becomes difficult to integrate them into our teaching if we don't know how to use them properly. Some teachers are simply not comfortable with the technology".*
"……..yes, I agree. Even if the technology is available, some teachers just aren't enthusiastic about gaming. That lack of interest can be a real barrier. They might not see how valuable these tools are, and that limits how much they get used."

Another essential barrier mentioned was internet connectivity issues**.** Some students experienced slow or inconsistent internet connections, which affected their ability to participate in real-time digital games, making the gaming process unfair. They highlighted how digital games promote collaboration, allowing students to work together on tasks and projects. Another lecturer pointed out that digital games help students develop time management skills, as they are often required to provide quick responses under timed conditions: *"In these games, they have to answer quickly, so they learn to manage their time effectively while still being accurate. It also helps with critical thinking because they can't just answer quickly. They have to be right".*

The study indicates that GBL respondents agree it enhances student engagement, focus, and learning outcomes. The item "GBL is a suitable teaching and learning tool because it is effective in the learning process" had a high mean score of 4.14 (SD = 0.073), reflecting strong agreement among teachers. Similarly, "GBL helps students achieve a high level of focus" received a mean score of 4.29 (SD = 0.078), reinforcing Clark et al.'s (2016) conclusion that GBL maintains student attention more effectively than traditional methods. Respondents also agreed that "GBL is fun for students" (Mean = 4.24, SD = 0.089). The very high mean, 4.26 (SD=0.084) demonstrates that educators see an apparent increase in student participation and attentiveness, one of GBL's main benefits.

However, developing educational games poses a challenge, with the item "I think developing teaching games is difficult" receiving a moderate mean score of 2.69 (SD = 0.105). This result suggests that while GBL is valued, lecturers face difficulties creating game-based content, highlighting the technical and instructional design challenges in GBL implementation. Moreover, the item "I often use GBL applications like Kahoot and Quizziz" had a low mean score of 1.88 (SD = 0.078), indicating limited use of these tools, likely due to insufficient training.

GBL's effectiveness for Technical and Vocational Education and Training (TVET) students was also highly rated, with the item "GBL is effective for TVET students" scoring 4.24 (SD = 0.067). This suggests that GBL's interactive nature is particularly well-suited for vocational education, as it provides a practical platform for students to apply theoretical knowledge, a conclusion supported by Lester et al. (2013). The high score means 4.21 supports the idea that GBL can capture students' attention, encouraging them to engage more deeply with the content. Teachers also perceive that GBL leads to more excellent knowledge retention and understanding among students by a mean of 4.21.

Respondents agreed that GBL helps students healthily compete with their peers, with a mean score of 4.19 (SD = 0.085). This study shows that GBL benefits students and improves teaching practices. The item "GBL helps lecturers achieve learning outcomes effectively" received a mean score of 4.21 (SD = 0.073), stating that teachers find GBL to be a helpful method for

achieving educational objectives. Lecturers see GBL as highly suitable for practical lessons, likely because it encourages interactive and experiential learning by scoring mean = 4.21. Respondents believe that GBL can enhance their teaching skills, though the score is slightly lower than some other items by scoring mean = 4.14. The lecturer also believes that "GBL can improve their teaching competence" (Mean = 4.14, SD = 0.073), highlighting the potential of GBL to encourage innovation in instructional methods.

The study's findings showed that the mean for lecturers' perception of the GBL in TVET students is high and highly satisfying. The data show that gamification in teaching and learning is seen positively. This is because most students studying in community college are weak academic achievers and more skilled in practice, making the gamification approach, a teaching and learning method based on blended learning, extremely effective for them. The study provides insights into lecturer experiences with digital gaming. Gamification has been shown to increase student motivation during classroom teaching and learning, with a high mean score on the questionnaire. According to the data, lecturers' preparedness to utilize gamification in teaching and learning is moderate. Lecturers should be given training in the use of games in the classroom through hands-on activities, gradually demonstrating to them how various pedagogical strategies may be applied to achieve different outcomes.

Another big obstacle was technology concerns, including unreliable internet connectivity, as one of the lecturers mentioned. Community college lecturers see the gamification method positively. Lecturers thought that gamification was one of the most efficient methods they could use throughout the teaching session. Digital games help students learn crucial skills like time management and critical thinking. The interactive and fast-paced character of digital games aided cognitive development and intellectual agility.

4.0 Conclusion

In conclusion, this study aims to provide valuable insights into implementing Game-Based Learning (GBL) in vocational education at Kolej Komuniti Ledang. By exploring lecturers' experiences and perspectives, this research highlights the challenges and opportunities that arise from incorporating GBL into teaching practices. The findings of this study have important implications for educational practice and policy. On a practical level, the research can guide educators in effectively integrating GBL into their classrooms, ensuring that it enhances student engagement and improves learning outcomes. For policymakers, the results may inform decisions on adopting and scaling innovative teaching methods like GBL, particularly within the context of Technical and Vocational Education and Training (TVET). Educational stakeholders design policies that promote the effective use of technology and game-based strategies in curriculum development, ultimately improving the quality of vocational education and aligning it with the needs of the 21st-century workforce.

The study is limited by its small sample size, which limits the wide way the results can be applied. Because the research only represents lecturers in one community college, the viewpoints and experiences presented may not represent the more significant community lecturers who use or benefit from digital games in education. A broader, more diversified sample would offer a more complete picture of how digital games are used in various educational contexts and topic areas. The study did not incorporate student viewpoints, limiting knowledge of how digital games affect learners. As the primary users of these technologies, their thoughts on engagement, learning outcomes, and skill development would give a more comprehensive picture of the usefulness of digital games.

Future research should include longitudinal studies that follow the influence of digital games on learning outcomes in specific TVET (Technical and Vocational Education and Training) subjects. Knowing that TVET focuses on hands-on skills and practical knowledge, it would be helpful to investigate how long-term use of digital games impacts students' skill development, information retention, and overall performance in technical disciplines. There is a need to examine lecturer training and support for incorporating digital games into the classroom. Many lecturers confront obstacles because they need more technological skills or expertise in game-based learning. Future research should examine how professional development programs focusing on digital tools give lecturers the skills and confidence they need to utilise digital games effectively.

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Author Contributions
S.H. Rosli: Conceptualization, Methodology, Result, Discussion, Conclusion, editing; **R. Ekhwan**: Abstract, Data collection, Writing-Reviewing; **H. Hassan**: Introduction, Data collection.

Conflict Of Interest
The manuscript has not been published elsewhere and is not being considered by other journals. All authors have approved the review, agree with its Submission and declare no conflict of interest in the manuscript.

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