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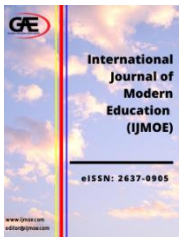

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TRANSFORMING CONTRACT ADMINISTRATION COURSE THROUGH INTERACTIVE TEACHING AND LEARNING FOR QUANTITY SURVEYING UNDERGRADUATES

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Abstract:

In recent years, the landscape of higher education has increasingly embraced interactive learning methods to enhance student engagement and learning outcomes. This study evaluates the effectiveness of interactive activities integrated into a Professional Practice course at Universiti Teknologi MARA (UiTM). Employing a quantitative research design, data were collected from final-year students in the Bachelor (Hons) Quantity Surveying program using a structured questionnaire. The analysis focused on students' perceptions of the clarity, usefulness, and timing of learning materials and activities, as well as the effectiveness of engagement strategies. The findings reveal high mean scores for the clarity and utility of the materials, indicating that the course design effectively communicates content in a practical and comprehensible manner. Additionally, students rated the timing of activities positively, suggesting a well-aligned instructional approach. The study also highlighted a strong perception of engagement, with high scores for both overall student involvement and the interactive nature of course activities. This suggests that gamification tools and the flipped classroom model significantly contribute to maintaining student interest and promoting active participation. The results underscore the success of interactive learning strategies in creating an engaging and effective educational environment. The consistent positive feedback reflects the effectiveness of these pedagogical methods in enhancing student learning experiences. The study concludes that continued innovation and refinement of interactive learning practices are crucial for further improving educational outcomes and preparing students for future challenges.

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Keywords:

Contract Administration, Construction Industry, Interactive Learning, Gamification Quantity Surveying, Teaching and Learning.

Introduction

In recent years, the landscape of higher education has undergone a significant transformation, driven by advances in technology and evolving pedagogical theories. Among these changes, the integration of interactive activities into university subjects has emerged as a powerful approach to enhance student engagement and learning outcomes. Interactive activities encompass a wide range of pedagogical tools and strategies designed to actively involve students in the learning process, promoting deeper understanding, critical thinking, and retention of knowledge.

Traditional classrooms, which often rely on lecture-based teaching, may not engage all students effectively. Passive learning methods can result in decreased attention, participation, and retention of information. Research by the National Survey of Student Engagement (NSSE) in 2019 found that only forty-nine percent (49%) of first-year students frequently participated in classroom discussions, indicating low engagement levels in traditional settings. In the nutshell, students have different learning styles-visual, auditory, kinaesthetic, and others but traditional classrooms often emphasize a single mode of instruction, usually auditory (lectures). This can disadvantage students who do not learn best through listening alone. To support that, a study by Felder and Brent (2005) noted that up to sixty percent (60%) of students benefit from learning styles other than the auditory mode, which is the primary method used in traditional classrooms.

Interactive activities are founded on the principles of active learning, which emphasize student participation and engagement over passive absorption of information. According to Prince (2004), active learning strategies have been shown to significantly improve student performance across various disciplines, including science, engineering, and mathematics. By shifting the focus from traditional lecture-based teaching to more participatory methods, educators can create a more dynamic and inclusive classroom environment that caters to diverse learning styles.

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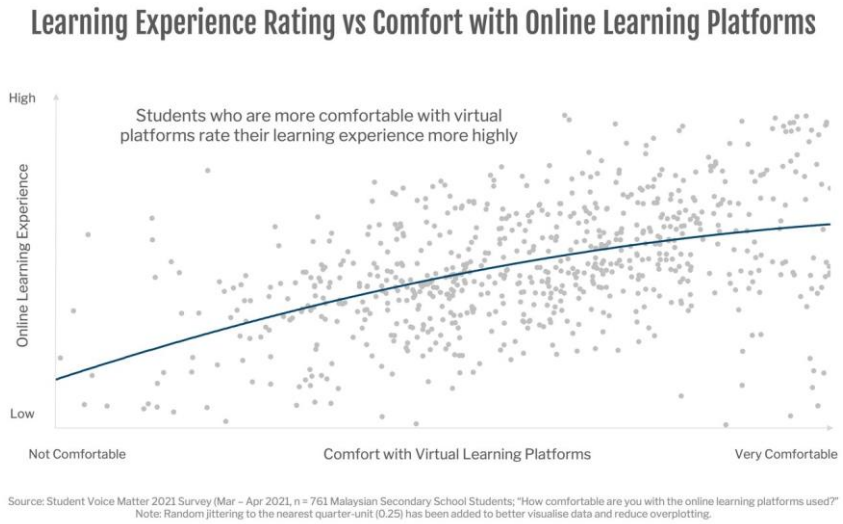

Figure 1: Gartner Hype Cycle of Key MOOC Events/Developments

Source: (Student Voice Matter. (2022). Learning experience rating vs comfort with online learning platforms: Survey results)

According to Figure 1, it is important to ensure that learners are comfortable and confident in using virtual learning platforms. As educational institutions continue to rely on online and blended learning environments, focusing on user experience and providing adequate support can significantly improve students' satisfaction and learning outcomes. The data highlights that enhancing students' comfort with technology is not only beneficial but essential for maximizing the effectiveness of online education.

One prominent example of interactive activities is the flipped classroom model, which reverses the traditional learning sequence by delivering instructional content online, outside of class, and dedicating in-class time to exercises, projects, and discussions. Research by Bishop and Verleger (2013) highlights the effectiveness of flipped classrooms in enhancing student engagement and improving learning outcomes. Platforms such as UFuture at Universiti Teknologi MARA (UiTM) facilitate this model by providing a Learning Management System (LMS) where lecture videos, notes, and assessments are accessible, allowing students to learn at their own pace and focus on active problem-solving during class sessions.

Gamification is another innovative approach to interactive learning, where game design elements are incorporated into educational activities to motivate and engage students. Tools like Kahoot!, Quizziz, JumpFrog, and crosswords offer interactive and competitive elements that can make learning more enjoyable and effective. Deterding et al. (2011) highlighted in their study that gamification can enhance student motivation and participation by introducing elements of challenge and reward into the educational experience.

Interactive activities also leverage collaborative technologies to foster communication and teamwork among students. Discussion forums, peer reviews, and real-time feedback mechanisms provided through LMS platforms enable continuous interaction between students and instructors, facilitating a more responsive and supportive learning environment. Freeman et al. (2014) demonstrated that such active learning strategies lead to increased student performance and retention, as they encourage students to engage with the material and with each other more deeply.

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In summary, the integration of interactive activities in higher education is revolutionizing the way university subjects are taught and learned. By adopting active learning, flipped classrooms, gamification, and collaborative technologies, educators can create more engaging and effective learning experiences that cater to the diverse needs of modern students. As higher education continues to evolve, the emphasis on interactive learning will undoubtedly play a crucial role in preparing students for the challenges of the future. This paper is aimed to survey the feedback of the learners among contract administration course on the transformation of the course delivery method towards interactive learning.

Interactive Learning

Interactive learning has increasingly become a focal point in contemporary higher education, aiming to enhance student engagement, comprehension, and retention through active participation and collaboration. This pedagogical approach encompasses a variety of strategies and technologies designed to transform passive learning into an active, dynamic process, thereby fostering a deeper understanding of the subject matter. The integration of interactive learning tools and methods is seen as a crucial development in addressing the challenges of traditional educational practices and meeting the diverse needs of modern students.

Evolution and Importance of Interactive Learning

The shift towards interactive learning is driven by the recognition that traditional lecture-based teaching methods often fail to engage students fully or cater to their individual learning styles. According to Freeman et al. (2014), active learning, which is a core component of interactive learning, significantly increases student performance in science, engineering, and mathematics disciplines. This finding underscores the broader applicability of interactive learning across various fields of study.

Interactive learning methodologies, such as flipped classrooms, gamification, and collaborative learning, aim to create more engaging and effective educational experiences. These methods leverage technology to provide students with interactive content, real-time feedback, and opportunities for peer-to-peer interaction, which are essential for developing critical thinking and problem-solving skills (Prince, 2004). The flipped classroom model, for instance, has gained popularity for its ability to maximize classroom interaction by moving traditional lecture content online, allowing students to engage in hands-on activities during class time (Bishop & Verleger, 2013).

Impact on Student Engagement and Achievement

The primary benefit of interactive learning lies in its capacity to actively involve students in the learning process. This engagement is crucial for fostering intrinsic motivation and a genuine interest in the subject matter. A study by Deslauriers et al. (2019) found that students in active learning environments reported higher levels of motivation and perceived learning gains compared to those in traditional lecture settings. This enhanced engagement is particularly important in higher education, where students are expected to develop self-directed learning habits and critical thinking skills. Furthermore, interactive learning promotes better retention of information. Research by Freeman et al. (2014) indicates that students in active learning settings outperform their peers in traditional classrooms, with lower failure rates and higher exam scores. This is attributed to the deeper cognitive processing that occurs when students engage actively with the material, as opposed to passively receiving information.

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Personalized Learning and Technological Integration

Technological advancements have played a pivotal role in the adoption and success of interactive learning. Adaptive learning technologies, for example, personalize the educational experience by tailoring content to individual student needs and learning paces. This personalization is crucial for addressing the diverse learning styles and abilities within a classroom (Picciano, 2017). Tools such as interactive simulations and virtual labs offer immersive learning experiences that can enhance understanding and application of complex concepts (Chen et al., 2020). Moreover, the integration of gamification into educational practices has shown promise in increasing student motivation and engagement. Gamification strategies, which include elements such as point scoring, leaderboards, and badges, create a game-like environment that makes learning more enjoyable and competitive (Deterding et al., 2011). These elements have been shown to enhance participation and perseverance, particularly in online and blended learning environments. Various studies from 2020 to 2024 have explored the integration of interactive technologies, such as virtual and augmented reality, into higher education. These technologies create immersive learning environments that enhance student engagement and make complex concepts more accessible. The impact of these tools on learning outcomes and student satisfaction has been positive, with many institutions reporting improved academic performance and deeper learning experiences (Gunbatar, 2021; Scager et al., 2016)

Challenges and Future Directions

Despite the numerous benefits, the implementation of interactive learning is not without challenges. Technological barriers, such as inadequate infrastructure and lack of access to digital devices, can hinder the effectiveness of interactive learning strategies (Ertmer & Ottenbreit-Leftwich, 2010). Additionally, the need for continuous faculty development and support is paramount. Educators must be equipped with the necessary skills and knowledge to design and facilitate interactive learning experiences effectively (Keengwe, Onchwari, & Agamba, 2014).

In summary, interactive learning represents a significant advancement in educational pedagogy, with substantial benefits for student engagement, understanding, and retention. Continued research and investment in technology, faculty training, and innovative teaching practices are essential to overcoming the challenges and fully realizing the potential of interactive learning in higher education.

Interactive Learning of Professional Practice Course

Interactive learning has emerged as a pivotal pedagogical approach in higher education, particularly within the context of professional practice. This educational strategy emphasizes active engagement and collaboration among students, fostering a deeper understanding of the subject matter. Within this framework, various tools and methodologies, such as gamification and flipped classrooms, have been effectively utilized to enhance the learning experience.

Gamification involves incorporating game elements into non-game contexts to motivate and engage students. In the realm of professional practice, tools such as Kahoot, Quizzes, JumpFrog, and crosswords have been employed to create an interactive and stimulating learning environment. Kahoot platform allows instructors to create quizzes that students can participate in real-time. The competitive and interactive nature of Kahoot fosters engagement and helps in reinforcing the material covered in lectures (Licorish et al., 2018).

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For quiz, online quizzes were developed using Quizzes provide immediate feedback, allowing students to assess their understanding and instructors to identify areas where further clarification is needed (Zhao et al., 2021). To create interactive gamification JumpFrog platform that incorporates physical activity into learning, promoting both cognitive and physical engagement. The course use Crosswords for puzzles activities. These puzzles are used to reinforce terminology and concepts in a fun and challenging way, aiding in memory retention and recall (Aziz et al., 2019).

The flipped classroom model has gained significant traction in professional practice education. At Universiti Teknologi MARA (UiTM), the U Future platform is utilized as the Learning Management System (LMS) to support this approach which the objective to help the students in teaching and learning process. Pre-recorded lecture videos with effective durations are created and uploaded on U Future platform. This allows students to access the material at their convenience, promoting self-paced learning (Chen et al., 2020). Comprehensive lecture notes are provided for students to supplement the video lectures. This ensures that students have access to detailed information for further reading and understanding. In addition, all assessments, including assignments and quizzes, are uploaded to U Future. This centralized approach allows students to easily access and submit their work, streamlining the assessment process. U Future also serves as a platform for student discussions and feedback. Students can engage in discussions with their peers and receive timely feedback from instructors, fostering a collaborative learning environment (Deslauriers et al., 2019).

A systematic review highlighted the growing use of flipped classrooms, where traditional lecture content is delivered outside the classroom through videos and reading materials, and in-class time is used for interactive, hands-on activities. This approach has been shown to increase student engagement, improve understanding, and enhance academic performance. The review also discusses various technologies used in flipped classrooms, such as learning management systems (LMS), video creation tools, and online assessment platforms (Yıldız et al., 2022)

The integration of gamification and the flipped classroom model in interactive learning has shown to significantly enhance student engagement and learning outcomes. The use of gamification tools like Kahoot and crosswords makes learning enjoyable and memorable, while the flipped classroom model allows for more interactive and personalized learning experiences. This combination not only improves students' understanding and retention of the material but also prepares them better for real-world professional practice by encouraging active participation and critical thinking (Freeman et al., 2014).

In conclusion, the adoption of interactive learning strategies, including gamification and flipped classrooms, has proven to be highly effective in professional practice education. By leveraging platforms like U Future and incorporating engaging tools, educators can create a dynamic and supportive learning environment that enhances student engagement and fosters a deeper understanding of the subject matter.

Theoretical Framework-Constructivist Learning Theory

Constructivist Learning Theory posits that learners actively construct their own understanding and knowledge of the world through experiences and reflection. Rather than passively absorbing information, students build new knowledge by connecting it to their existing

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cognitive frameworks (Grubaugh et al, 2023). This theory emphasizes the importance of active engagement, hands-on activities, and social interaction in the learning process. Key figures like Jean Piaget and Lev Vygotsky contributed to its development, highlighting the roles of cognitive development and social context in how individuals learn. Constructivism underlines the idea that learning is an individualized process, shaped by personal experiences and social interactions.

The Constructivist Learning Theory (CLT) emphasizes three (3) core principles that guide its approach to education. According to Holt (2023), Active Learning asserts that learning is an active process where students construct new knowledge based on their existing knowledge, experiences, and interactions. This contrasts with traditional approaches where students are passive recipients of information. In the context of this paper, this principle supports the shift from passive lectures to more interactive and participatory methods like flipped classrooms and gamification. He added, Knowledge Construction suggests that knowledge is not simply transmitted from teacher to student but is actively built by the student. The flipped classroom model, where students engage with content before class and then apply their knowledge during class through discussions and activities, exemplifies this principle. Lastly, Student-Centred Learning places the learner at the centre of the educational process, emphasizing that students learn best when they are involved in meaningful tasks (Holt, 2023). Gamification and interactive learning strategies, as discussed in your paper, are designed to make learning more engaging and relevant, thereby encouraging students to take ownership of their learning.

Research Methodology

This study employs a quantitative research design to assess the respondent's experience of the interactive learning features embedded in Professional Practice Course. The respondents are selected among final year students of the Bachelor (Hons) Quantity Surveying program at Universiti Teknologi MARA (UiTM) Shah Alam. Quantitative research was selected for its ability to provide objective, numerical data that can be analysed statistically to draw generalizable conclusions. The target population for this study consists of final year students enrolled in the Bachelor (Hons) Quantity Surveying program at UiTM Shah Alam. A total of 139 questionnaires were distributed to these students to gather their feedback and insights regarding the features. Out of the 139 distributed questionnaires, 67 were completed and returned, yielding a response rate of 49%. Data were collected through a structured questionnaire designed to capture various aspects of the course, including course interactive activities and engagement. The questionnaire was distributed to the respondents in online via Google forms. The collected data were analysed using SPSS 23.0 software. Descriptive analysis was employed to summarize and describe the main features of the data. This included calculating mean scores to measure respondents' perception on the interactive activities provided within the course.

Results and Discussions

This analysis focuses on evaluating the activities embedded in Professional Practice Massive Open Online Courses. The survey emphasizes the respondents' perception on the interactive activities and engagement of the course. The findings are derived from statistical measures including mean, and standard deviation which provide a comprehensive view of the course's performance especially interactive activities and engagements.

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Measuring Respondents' Perception on the Interactive Activities Provided Within the Course

Table 1 presents three (3) key metrics evaluating the quality and effectiveness of the learning materials and activities, each measured by the mean score and standard deviation.

Table 1: Measuring Respondents' Perception on the Interactive Activities Provided Within the Course

Description	Mean	Standard deviation
Clearly, well explained and useful.	4.52	.53252
The timing of activities was appropriate for the content.	4.42	.55457
Usefulness of materials.	4.52	.53252

The high mean score of 4.52 indicates that the participants found the materials to be clearly explained and highly useful. This suggests that the instructional design effectively communicated the content in an understandable and practical manner. The relatively low standard deviation of 0.53252 implies that there was a consistent perception among the respondents, with most agreeing on the clarity and utility of the materials.

With a mean score of 4.42, the timing of the activities was also rated positively, suggesting that the schedule and pacing of the activities were well-aligned with the learning content. The standard deviation of 0.55457, although slightly higher than that of the other metrics, still indicates a general consensus among the respondents, but with a slightly broader range of opinions compared to the other items. This slight variation could be attributed to individual differences in learning pace or preferences for activity timing. The usefulness of the materials also received a high mean score of 4.52, mirroring the score for clarity and usefulness. This reinforces the idea that the materials provided were not only clear but also practical and beneficial for the learners. The identical standard deviation (0.53252) to the first metric suggests a similar consistency in responses, indicating that learners uniformly found the materials to be valuable.

The high mean scores across all three metrics reflect a positive reception of the learning materials and activities. Learners perceived the materials as clear, well-explained, and useful, which is crucial for effective learning. The alignment of activity timing with content further supports a structured and well-organized learning environment. The consistency in responses, as indicated by the relatively low standard deviations, suggests that the majority of learners shared similar positive experiences. This uniformity in feedback can be attributed to the quality of the instructional design and the effectiveness of the teaching strategies employed.

In summary, the high mean scores and consistent responses highlight the success of the current educational practices in delivering clear, useful, and well-timed learning experiences. Continuing to build on these strengths while addressing minor variations in timing preferences will further enhance the effectiveness of the educational program.

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Measuring Respondents' Perception On Engagement Of The Activities.

Table 2 presents data on respondents' perceptions regarding the engagement level of activities used in the course, specifically looking at two aspects: overall engagement with students and the effectiveness of interactive engagement.

Table 2: To Measuring Respondents' Perception on Engagement of the Activities

Description	Mean	Standard deviation
Highly engaged with students	4.63	.51745
Provide effective and interactive engagement with students	4.58	.55457

Referring to Table 2, The high mean score of 4.63 suggests that students felt very engaged by the activities provided in the course. This indicates a high level of participation and involvement in the learning process. The relatively low standard deviation of 0.51745 indicates that this perception of high engagement is shared consistently among the respondents, demonstrating a general agreement on the effectiveness of the engagement strategies used.

With a mean score of 4.58, the activities were also rated highly in terms of providing effective and interactive engagement. This suggests that the interactive elements of the course, such as discussions, quizzes, and other interactive tools, were successful in maintaining students' interest and active participation. The standard deviation of 0.55457, though slightly higher than that of overall engagement, still shows a high level of agreement among respondents, with only a minor variance in perception.

The high mean scores for both overall engagement and interactive engagement indicate that the activities used in the course were well-received and effective in fostering student participation. This positive feedback is crucial as engagement is a key factor in promoting active learning and improving educational outcomes. The consistency in responses, as reflected by the low standard deviations, further reinforces the reliability of these results. It suggests that the strategies employed to engage students were effective across a diverse group of learners, highlighting the broad applicability of these methods. In conclusion, the results from Table 2 indicate that the engagement activities used in the course were highly effective in engaging students and promoting interactive learning. Maintaining and enhancing these engagement strategies will be critical in ensuring continued success in fostering active and involved learners.

Conclusion

The integration of interactive learning methods in higher education, particularly in the context of the Contract Administration course, has proven to be transformative. This study highlights the significant positive impact these methods have on student engagement, understanding, and retention. The findings show that interactive elements such as gamification tools and the flipped classroom model are not only effective in maintaining student interest but also in promoting active participation, which is critical for mastering the complex content of the course. The primary objective of this study was to assess whether the integration of interactive learning strategies could enhance the learning experience for Quantity Surveying undergraduates. Based on the high mean scores for clarity, usefulness of materials, and student

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engagement, it can be concluded that the objectives of the study have been achieved. The data indicates that students responded positively to these interactive methods, validating the effectiveness of the course redesign.

The results also indicate that students highly value the interactive elements embedded in their courses. The data showed high mean scores for both the clarity and usefulness of the learning materials, as well as the timing and alignment of activities. This suggests that the instructional design effectively supports student learning by providing clear, practical, and well-structured content. Moreover, the findings highlight a strong positive perception of student engagement with the course activities. High mean scores for overall engagement and the effectiveness of interactive elements demonstrate that the strategies employed, including gamification tools and the flipped classroom model, are successful in maintaining student interest and active participation. The low standard deviations across these metrics further suggest that these perceptions are consistent among the respondents, reflecting a broad agreement on the effectiveness of the interactive learning methods.

This study contributes to the growing body of literature on interactive learning in higher education by providing empirical evidence of its benefits in a specialized subject area such as Contract Administration. The research offers valuable insights for educators and curriculum designers on how to effectively incorporate interactive learning techniques to enhance student outcomes. Additionally, it provides a framework that other institutions can adopt to improve their own teaching practices.

Recommendation for Future Study

While this study successfully demonstrates the benefits of interactive learning, it also opens up several avenues for future research. Future studies could explore the long-term effects of these methods on student performance in professional practice and their applicability in other technical subjects. Moreover, further research could examine the potential challenges and limitations of implementing such strategies on a larger scale, particularly in different cultural and educational contexts. This structure ensures a comprehensive conclusion that not only wraps up the study's findings but also addresses its implications and potential future directions.

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