Volume: 9 Issues: 66 [September, 2024] pp. 170 - 183
Journal of Islamic, Social, Economics and Development (JISED)
eISSN: 0128-1755
Journal website: www.jised.com
DOI: 10.55573/JISED.096614

ENGINEERING SUPERVISORS' PERCEPTION OF THE FINAL-YEAR PROJECT WRITING INSTRUCTION ON THE LEARNING MANAGEMENT SYSTEM

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Article history
Received date : 2-8-2024
Revised date : 3-8-2024
Accepted date : 2-9-2024
Published date : 30-9-2024

To cite this document:
Farhana Shukor, Mah, B. Y., & Ahmad Zia Ul-Saufie (2024). Engineering supervisors' perception of the final-year project writing instruction on the Learning Management System. *Journal of Islamic, Social, Economics and Development (JISED)*, 9 (66), 170 – 183.

Abstract: *It is typical to find more online courses globally during this endemic period with various technological tools available to support teaching and learning in higher education institutions. The Constructivist Learning Theory served as the foundation for this study as students used learning platforms to prepare their final year projects, building their knowledge based on experiences and social interactions. This study investigated how eight supervisors from four engineering faculties perceived the academic writing instruction provided to students completing their projects. Students must discuss their strategies and implementation with their supervisors to finish their final-year projects. The supervisors respond in semi-structured interview sessions on how utilising a learning management system (LMS) for final-year projects has several advantages, including improved content delivery, attendance tracking for record-keeping, assignment submission for evaluation, and discussion to boost participation. Difficulties include supervisors' lack of technical training utilising AI techniques, occasional limitations on follow-up activities, and poor engagement among interfaculty members. Supervisors can fulfil pedagogical requirements to guarantee that outcomes have been fully attained by closely modifying the steps to conduct language teaching and learning, especially to guide students on final-year projects. It is relevant because supervisors will help students apply what they have learned in the classroom to real-world problem-solving.*

Keywords: *Constructivist Learning Theory; Instructional Model; Final year projects; Supervisors; Semi-structured interview*

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Introduction

Learning Management Systems (LMS) are getting more places with more frequent utilisation in the digital era. LMS is crucial in facilitating content delivery, attendance tracking, and assignment submission, providing an interactive platform for discussion and collaboration. Higher education institutions have made the Final Year Project one of their mandatory exams to better prepare students with exceptional writing skills. In the higher education context, LMS guarantees that students can acquire the skills required for the working world, particularly in the administration of final-year projects.

In the Learning Management System, students can relate their prior knowledge to real-world scenarios for their final-year projects. It helps them hone essential teamwork, communication, and problem-solving skills that assist them in their professional careers. Skills required for science and engineering graduates entering the industry include interpersonal relations, problem-solving, written and spoken communication, teamwork, and problem-solving (Khoo et al., 2018). Through the continuous guidance and assessment facilitated by the LMS, students can better prepare themselves to face the working world, making them more competent and competitive in an increasingly complex and high-tech industry. Therefore, this study's primary goal is to investigate the obstacles to final-year projects and methods for overcoming them from the supervisors' point of view.

Literature Review

Benefits of Using LMS for Final Year Projects Supervision

LMS has become an increasingly important tool in higher education, especially final-year project assessment. For supervisors, LMS offers various benefits that help out their duties more effectively and efficiently. One of the main benefits of LMS for supervisors is the ease of managing documents and course materials. It supports the claim by Brady et al. (2020) that academicians, especially supervisors, are often observed to utilise LMSs as repositories of materials and for assessment purposes.

Supervisors can upload all necessary materials, such as project guidelines, schedules, and assessment rubrics, to the system so students can easily access them. It leads to the monitoring purposes of the progress of projects in real-time through assignment submissions and progress reports that are uploaded into the system, allowing for immediate and ongoing feedback. It reduces the need to distribute physical materials and ensures students have equal access to related information about their studies.

From a communication point of view, LMS offers a variety of communication tools that facilitate interaction between supervisors and students. Zhang & Hyland (2021) highlighted that the supervisor contributed a lot in shaping students' understandings of the writers' roles and research knowledge with students' collaborative construction of their interactions. Supervisors can use discussion forums, instant messages, and email to communicate with students directly. It ensures that supervisors are always reachable and provide the support students need. This ease of communication also allows supervisors to manage inquiries and problems more efficiently without face-to-face meetings that may be time-consuming.

Previous studies have also shown that LMSs help reduce the administrative workload for supervisors. Khatser & Khatser (2022) detailed that the lesser administrative work of supervisors as learning management systems (LMS) allows them to create, host, and manage

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various content for students. Supervisors can focus more on academic advising and research by automating several tasks, including scheduling, automatic evaluation, and assignment submission. Agricola et al. (2021) stressed that supervisors can empower students or deepen their comprehension by adjusting to their needs and improving how students perceive their supervision. LMS systems assist supervisors in reducing time-consuming administrative tasks, freeing them to focus on direct interaction and student guidance.

LMS also offers benefits in the form of data analysis. Supervisors can access reports and analyse student performance to identify trends and patterns in learning. Zhang et al. (2020) highlighted that learning management systems (LMS) enable early identification of struggling students by predicting student success and encouraging improved performance during the study. This data can help supervisors make evidence-based decisions and improve their instructional strategies. Harris et al. (2022) illustrated how assessments based on learning progressions can assist in informed decisions regarding instruction and learning. LMS facilitates supervisors by providing comprehensive data analysis, helping them identify learning patterns and improve teaching strategies based on student performance reports.

Overall, research from the past indicates that supervisors can gain from using LMS in final-year project management in several ways. It facilitates document management, progress monitoring, evaluation, communication, and data analysis and helps in reducing administrative workload. With the continued development of educational technology, LMS usage in higher education has a vital role in strengthening the education system.

Challenges Using Learning Management System of Final Year Projects

Although Learning Management Systems (LMS) offer many benefits in higher education, there are many challenges that final-year project supervisors face. Previous studies have outlined some of the main issues supervisors often face when managing student projects through LMS. One of the main challenges is technical issues. It is because the primary cause of LMS failure in higher education institutions is technological factors in implementing Web 2.0 and social media (Alhazmi & Rahman, 2012). Bouhout and Askitou (2023) supported this claim as the extent of technological competencies influences their supervision function. Supervisors who face difficulties accessing the system, internet interruptions, and system failures can hinder communication and monitoring of student progress. These problems not only interfere with the smoothness of educational development but also increase the workload to solve these technical issues.

Besides, not all students are motivated or have enough self-discipline to manage their time and assignments effectively without closer supervision. As engagement is a leading predictor of a student's learning outcomes, supervisors face a problem in monitoring, especially in tracking the progress of final-year projects using learning management systems (Almoslamani, 2018). Vytasek et al. (2020) elaborated that one of the challenges associated with monitoring and facilitating student involvement in learning management systems is the requirement for more comprehensive data regarding individual students' learning processes to generate timely and relevant feedback. Hence, it is challenging for supervisors to find ways to motivate students and keep them actively engaged in online learning.

In addition, LMS integration with other systems is also a big challenge for supervisors. Kurata et al. (2018) supported this claim as engineering programme undergraduates opined that they benefitted immensely from LMS usage with more efficient collaborative learning tools. Many

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institutions have multiple systems for academic, financial, and administrative management, and ensuring that all of these systems work seamlessly with an LMS can be a complex and time-consuming task. Díaz et al. (2015) elaborated that integrating learning management systems with digital repositories can be demanding in the academic setting, especially when developing e-learning courses. Difficulty in this integration can reduce the efficiency and effectiveness of LMS use in final-year project management. Overcoming these challenges requires continuous efforts from educational institutions to provide adequate support, protect data privacy, and ensure seamless integration with other systems.

Research Framework

The theoretical framework of this study forms a comprehensive basis for organising and understanding the context of academic writing feedback using LMS in final-year projects in a Malaysian public university. Figure 1 shows the research framework of this study elaborating on Inquiry-Based Science Teaching (IBST) that supervisors adapt while conducting their lectures and monitoring students' work in completing their Final Year Project.

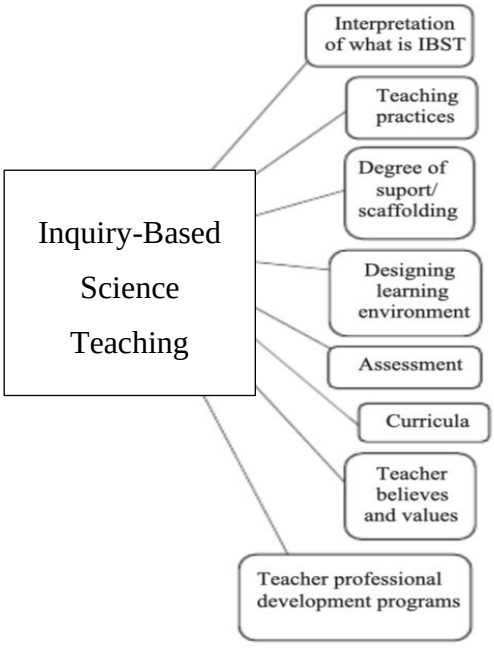

Figure 1: Inquiry-Based Science Teaching (IBST) Framework by Constantinou et al. (2018)

As in most cases, the pedagogical considerations are not fixed to one particular model, including monitoring Final Year Projects using e-learning platforms, but are open to various tools. As a result, supervisors are to create their instructional models and determine the fundamentals of a successful pedagogical setup. Georgouli et al. (2008) presented a theoretical framework that combined in-person instruction with online distribution techniques, drawing inspiration from the blended learning paradigm. It leads to the formulation of a teaching framework for a web-enhancing programme through e-learning.

The four main parts of this structure are Activities, Community, Content, and Administration. With tools for information provision, student motivation, activity setup, interaction support, and the creation of new knowledge, each is integrated into a course to improve learning in various ways. The framework serves as a generic framework for creating an instructional model that is "learner-centred" across disciplines and incorporates an appropriate pedagogical setup.

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Thus, this adapted framework suits the teaching and monitoring project of engineering undergraduates for this study.

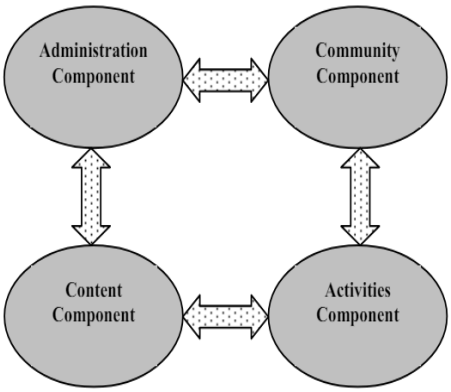

Figure 2: Theoretical framework for the instructional model by Georgouli et al. (2008)

Besides this approach, supervisors need to monitor progress in final-year projects within 14 weeks of the semester, considering the pedagogical setup by Merrill (2002) on the five instructional principles. These principles include demonstration, application, task-centred, activation, and integration. He highlighted that:

1. Students are working to find solutions to real-life obstacles
2. New knowledge is based on the activation of prior understanding.
3. The learner gets exposed to new information.
4. The learner applies new information to their projects.
5. The learner incorporates new information into their environment.

Conceptual Framework

Incorporating Inquiry-Based Science Teaching (IBST) Framework by Constantinuo et al. (2018), the instructional model by Georgouli et al. (2008), and the pedagogical setup by Merrill (2002) on the five instructional principles, this study is then based on this conceptual framework:

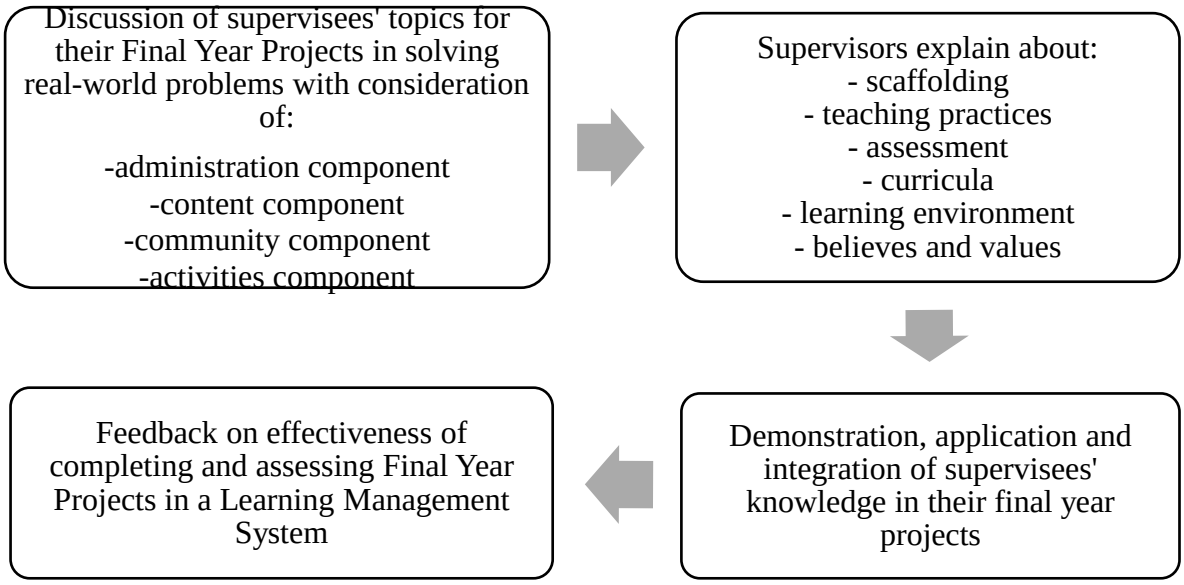

Figure 3: Conceptual Framework

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Research Methodology

Constructivist learning is the base which states that students use learning platforms to prepare their final-year projects, building their knowledge based on experiences and social interactions. Constructivism is more focused on how people learn and how they can actively participate in class activities, as explained by Gunduz and Hursen (2015). Due to that, there are three elements that supervisors briefed the students on the need to know in completing their final year projects, which include subject matter (topics of their Final Year Projects), academic writing, and the Learning Management System.

The supervisors discussed supervisees' topics for their Final Year Projects in solving real-world problems considering four components: administration, content, community, and activities for 12 weeks. It is then the second phase, whereby supervisors help to scaffold ideas, integrating them into teaching practices for assessment purposes based on the curricula. Supervisors ensure that students place their beliefs and values in the learning environment, covering their weekly tasks before the semester ends.

Supervisors double-check demonstration phases in Phase 3, which is the analysis, monitoring, and delivery phase. They also apply knowledge to their final-year projects. The final phase is the evaluation phase, in which the supervisors give feedback on the effectiveness of completing and assessing final-year projects in a Learning Management System. They learned about the nature of technical knowledge and its applications during these stages.

UFuture

UFuture is a learning management system (LMS) that serves as an online learning platform with various features for teaching and learning activities at Universiti Teknologi MARA. Students can obtain the course materials and exams using this learning management system (LMS). Supervisors can use this LMS, UFuture, by logging in to UFuture, joining a group/course in UFuture, and leaving a group/course once the semester ends.

The most applicable features that all supervisors should be familiar with in using this LMS to guide and assess students' final-year projects include (https://sites.google.com/view/edutechseries/edutech-series/online-classroom/ufuture-for-lecturers): upload course materials, create online discussion, create online class, create online class schedule and attendance, verify and print online students attendance, create an assignment, create rubric in UFuture, create CDL-CQI report in UFuture, create entrance and exit survey and Blended Learning (BL) reporting.

Supervisors fully utilise features like uploading course materials, creating online discussions, creating online class schedules and attendance, and creating assignments. Firstly, supervisors can upload class materials in UFuture in Course Content, Group Content, or Learning Activities. The course learning materials for UFuture are uploading files, linking to a website, and linking to YouTube. Meanwhile, there are three ways to create online discussion in UFuture: Create in the Course Forum, Create in Group i-Discuss, and Create in Learning Activities.

As for creating the schedule and attendance in UFuture, supervisors followed these four steps: add the class schedule, students sign in their attendance, the lecturer verifies the attendance, and generate the verified student attendance list. Besides that, for creating assignments for students, supervisors can create two types of assignments (individual and group). Even until the

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deadline, students may submit their assignments again. However, they may only send one file attachment, no more than 100 MB, per assignment. To submit more documents, supervisors and students can upload them to a Google Drive folder and share the link in the comment box. The three sources are topics for final year projects, academic writing sources in Final Year Projects, and information about UFuture as the learning management system used by supervisors with eight supervisors involved in semi-structured interview sessions. As the efficacy of inquiry-based instructional strategy in a different, equally complex, and challenging academic subject, it can exist in various teaching environments, including language arts and science (Jordan, 2021). It leads to the finding that the qualitative inquiry research design employed in this study was appropriate because it allowed for flexibility and accuracy in examining opinions regarding the efficiency of using the Learning Management System to direct and grade final-year projects at a public university in Malaysia.

The researchers comprehensively explore the factors that influence their understanding, use of feedback, and perceptions of the feasibility. The researcher uses an inductive approach, obtaining descriptive data through interviews. Thus, qualitative inquiry enables the researcher to acquire a comprehensive and rich knowledge of the perspectives, experiences, and perceptions of feedback aligned with the purpose. This qualitative approach focused on student understanding, feedback utilisation, and viability in offering a comprehensive understanding of how well a learning management system guides and evaluates final-year projects.

Data Collection

Eight final-year project supervisors from the engineering faculty at a local university are the study sample in this study. The selection of this sample is to ensure variation in views and experiences, as well as to obtain more comprehensive information. Data were collected through semi-structured interviews, allowing flexibility in questions and more opportunity for supervisors to share their in-depth insights. Respondents are free to answer, and the researcher can add follow-up questions based on the answers given, for it is an exploratory interview (Magaldi & Berler, 2020).

Purposive sampling is the sampling technique employed in this study, with individuals carefully selected to match the goals of the investigation based on suitable attributes. The target population of this study is final-year supervisors in Malaysian public universities who are involved in final-year projects. Samples have close experience with the LMS utilised in the mentoring and evaluation process as they ensure the final-year projects are successful. By selecting active supervisors with at least two years of experience in final-year projects, this study can gain relevant and practical insights into the effectiveness and challenges of LMS use.

The participant selection process begins by identifying final-year project supervisors from various engineering faculties in Malaysian public universities. These criteria ensure that participants can provide informative and meaningful feedback. When conducting a study in a natural setting, researchers use qualitative research methods such as understanding sentiments, analysing words, and gathering deep insights about the topic under examination (Creswell, 2014). The interview questions include the effectiveness of the LMS, the challenges faced in its use, and suggestions for improvement for the system.

Data Analysis

This data analysis used a qualitative methodology that included coding approaches and thematic analysis. These two approaches are frequently employed in qualitative data analysis to find the

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primary themes and patterns in the data gathered. The coding process began with an initial reading of the transcripts for the data content. The researcher then marked the parts of the text related to the main issues of the study and gave labels to those parts. These codes can be keywords or phrases that describe the content of the text.

The analysis process begins with open coding, where all interview transcripts are read carefully before identifying the initial codes of this study. These codes emerged from the analysis to identify key themes of LMS use by final-year project supervisors. Once the theme is categorised, the researcher revises and perfects it to ensure it represents the data accurately. The themes answered the research questions and provided in-depth information on the effectiveness and challenges of LMS use. With this technique, this study was able to identify key themes that reflect the views and experiences of final-year project supervisors regarding LMS and further provide valuable insight for improving the system.

Identification is the foundation for arranging the primary themes that arise from the coded data in a thematic analysis. Kiger & Varpio (2020) purported that with its benefits and drawbacks described, thematic analysis is a potent and adaptable technique for analysing qualitative data that gives researchers the freedom to carry it out carefully and systematically. These themes aid in understanding patterns and relationships in the data by representing various aspects of the research subject. The thematic analysis is in several stages, including data familiarisation, initial code generation, theme search, revision, and naming.

Results

The benefits and difficulties supervisors had when supervising and evaluating final-year projects are discussed in this section.

1. Benefits of using a Learning Management System for Final Year Projects

Four themes emerged from their perspectives about the benefits they encountered from the thematic analysis:

More effective content delivery

Firstly, the first theme from the interview session is for supervisors to deliver content superbly. It is evident as one of them responded:

> *"It is a centralised platform for all teaching materials, assignments, discussion forums, and assessments".* [P7]

> It is also clear that having a unified system gives supervisors the best feeling of supervision, as accessibility ease of the system will help allocate more time for supervision.

> *"By automating and digitising processes, we can reduce our administrative workload and devote more time to academic guidance, which I think is more valuable".* [P1]

Attendance for documentation purposes

Supervisors also mentioned that having such an LMS can ease them, especially for auditing purposes.

> *"While teaching online last time during the lockdown period, I used to have stored the attendance record of my students all over the place, and I needed more time to*

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find them when asked to submit for auditing purposes. But now, with this feature, we can just make use of it fully". [P6]

In another case, it is also important to note a comment regarding how this kind of attendance tracking feature will have a digital record of every work and participation in class.

"I can track individual and group progress more effectively and it allows me to provide more precise and focused guidance, as well as identify any problems or weaknesses in the project at the early stage". [P8]

Assignment submission for assessment purposes

In another case, additional supervisors mentioned how much easier it was for them to remain updated on progress. One of the participants responded that:

"I can see the progress of student projects in real-time through assignment submissions and progress reports uploaded to the system. This allows me to provide immediate and continuous feedback, which is very important to keep students on track". [P5]

Another response noted that LMS provides tools for more systematic and transparent evaluation.

She claimed:

"We need to actively remind students about what needs to be achieved and understand their progress regularly. This not only helps students stay on track but also allows us to ensure students submit before deadlines". [P3].

Discussion for increased engagement

Most study participants indicated that their relationships were good, with increased engagement, as supervisors and students are key in ensuring successful final-year projects. This is being acknowledged by one of the respondents:

"I can use discussion forums, instant messages, and email to communicate with students directly. This ensures that I am always reachable and able to provide the support students need at any time". [P2]

It is also noted that one of the participants is keen on more discussions with his students to ensure life-long learning and solve real-world problems from their increased engagement. It is true, as he mentioned:

"Students are expected to communicate well in an online platform, knowing what is going on around the world, considering application of academic concepts learned in classroom". [P4]

Challenges using Learning Management System for Final Year Projects

Three themes emerged from their perspectives about the challenges they encountered with the thematic analysis:

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Lack of technical training using AI tools

Most supervisors faced the first challenge due to the rapid emergence of generative artificial intelligence (AI) in education. It gives the challenge to integrate technology into teaching practices and critically assess its impact on learning outcomes and student engagement.

> *"We have taught the course the best that we could especially by embedding some known AI tools. However, it is very disappointing when we encounter the more recent tools and we did not have the time to join any courses to be trained in using the latest AI tools. If I may suggest, most probably many webinars on the latest AI tools by the experts could be scheduled for us to attend at our own convenience time. For instance, when we are free from any classes".* [P4]

It is also perceived that using new technologies, especially AI tools, in the LMS requires adaptation and adequate support. As a result, supervisors cannot take full advantage of the tools and features.

> "*As for me, I encountered few times when I experimented on the latest AI tools to be integrated in my teaching, I got frustrated when I failed to use it successfully after several attempts. It is even more embarrassing when I did not manage to showcase it in live classes with my students. I resorted to use the more conventional way when I failed. Luckily, I still managed to deliver the course content"*. [P5]

Limitation in follow-up activities from time to time

Some supervisors spoke about difficulty deciding on the follow-up activities as it all depends on the students. One of them pointed out that feedback should be tailored according to the student's level of education.

> *"Distinction of students' level of education is important to be done by supervisors as undergraduates need more basic and detailed feedback as well as activities. More advanced students in writing especially final year projects need lesser guidance but are able to complete tasks in time".* [P1]

Meanwhile, one suggested using a more common platform to communicate with the students besides contacting them personally.

> *"Supervisors can hold regular online meeting sessions like Google Meet, webex or Zoom to ensure all students are taken care of and do their work to be able to submit all of their final year projects. Most of them did not like to ask questions by switching on their microphone but they asked questions in the chat box. When it is urgent, I normally contacted them by sending messages or calling them via WhatsApp or Telegram".* [P6]

Low engagement among interfaculty members

Establishing a rapport with the language department instructors is the final theme. This is to ensure that more comprehensive comments and improvements can be made to their final-year projects. He mentioned that;

> *"Supervisors from the faculty can collaborate in the same platform so that they can provide effective feedback to the students on their final year projects by using online*

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> *assessment tools such as assessment rubrics, providing detailed and specific comments".* [P8]

Another supervisor emphasised that there is a need to have a balanced assessment of content, format, and language, which is essential to ensure high project quality.

> *"Many supervisors tend to judge the content of the project more than the format and language. Although content is important, aspects of format and language should also not be neglected as they affect the overall quality of writing*". [P3]

Discussion

Findings from semi-structured interview sessions with eight supervisors show several advantages of using LMS. Among them is better content delivery, where supervisors can organise and deliver information in a more organised and easily accessible manner for students. It helps students obtain the information for their projects more quickly and efficiently (Tran & Meacheam, 2020). The LMS also provides an attendance tracking function that assists supervisors in keeping students' attendance records. It ensures that students follow the designated coaching sessions and receive continuous feedback. (Buckley et al., 2022) supported this claim that students who fail to attend LMS courses are students who are in danger of failing. Submitting assignments for assessment through the LMS also speeds up the assessment process and provides faster feedback to students (Zong et al., 2021). It allows for a discussion session that enhances participation and collaboration between students and supervisors. Thus, it helps students to develop written and oral communication skills and teamwork.

Although LMS offers various benefits for the management and evaluation of final-year projects, these challenges require attention and solutions to ensure the effectiveness and smoothness of the learning and teaching process. One of the main challenges is the lack of technical training for supervisors who use AI techniques. Supervisors report difficulties in understanding and applying the latest technology in the LMS, which can affect coaching effectiveness. Supervisors reported difficulties continuously monitoring student progress due to technical limitations in the LMS. It can affect their ability to provide continuous and effective feedback. Chugh et al. (2022) shared this view and opined that the fundamental causes of feedback problems include the content, the procedures followed, and the expectations of all parties involved. It often prevents the exchange of ideas and best practices that can lead to innovation and improved project quality (Kezar & Holcombe, 2020). This situation can affect holistic and comprehensive guidance, affecting students' learning outcomes.

The supervisor suggested that the university provide ongoing training and technical support for all LMS users. This comprehensive training should cover the basic and advanced use of the LMS with the latest technology applications integrated into the system. It is verified that with adequate training, supervisors and students can maximise the potential of the LMS, better understand all its functions, and reduce the difficulties in its use (Costa et al., 2020). Ongoing technical support is also crucial to address any technical issues that may arise to ensure a smooth and productive user experience (Sulaiman et al., 2023). Another suggestion is the addition of features that facilitate better interaction between supervisors and students. It includes providing more stable video conferencing, interactive discussion rooms, and real-time collaboration tools. These features enable supervisors and students to interact and collaborate more effectively for guidance and assessment.

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Students will achieve better results in their final year projects, thereby improving the overall quality of the engineering education offered by the university. By following these procedures, students will manage their projects more effectively, hone critical abilities like cooperation, communication, and problem-solving, and produce superior final-year deliverables.

Conclusion

This study focuses on opinions from four supervisors of engineering faculties and investigates how well a learning management system (LMS) guides and assesses final-year projects. The results of semi-structured interviews with eight supervisors indicated that the LMS had several pertinent advantages, including better content delivery, attendance tracking for record keeping, assignment submission for evaluation, and discussions to increase participation. However, this study also identified several challenges, such as a lack of technical training for supervisors, occasional limitations on follow-up activities, and poor engagement among inter-faculty members. To improve the effectiveness of the LMS, supervisors suggest continuous training and technical support, increased stability and reliability of the system, and the addition of features that facilitate better interaction between supervisors and students.

The study also emphasises the importance of interpersonal relationships, problem-solving, written and verbal communication, and teamwork in final-year projects via LMS usage. In conclusion, although LMS offers many benefits in guiding and evaluating final-year projects, there is a need for continuous improvement in training, support, and interaction facilitation to overcome the challenges. With these improvements, LMS has great potential to support the development of critical skills and prepare engineering students for better career prospects.

Recommendations for future research

Recommendations for future studies include evaluating what types of training are most effective to ensure that all LMS users have the latest skills and knowledge. In addition, studies on faculty interaction through LMS can provide valuable insight into how this platform can enhance collaboration and knowledge sharing among faculty. Research can involve case studies or experiments to see how cross-faculty interaction through certain features in the LMS, such as more interactive discussion spaces and real-time collaboration tools. Finally, research on the effectiveness of implementing new features in LMS, such as more stable video conferencing and more interactive discussion rooms, can help universities understand and improve the LMS user experience. This research could guide LMS system optimisation to satisfy diverse user needs and guarantee their continued relevance and efficacy in the dynamic setting of higher education.

Acknowledgements

The authors thank Universiti Teknologi MARA (Malaysia) for providing access to relevant information about our work and anonymous referees whose comments have improved the manuscript presentation.

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Journal of Islamic, Social, Economics and Development (JISED)
eISSN: 0128-1755
Journal website: www.jised.com
DOI: 10.55573/JISED.096614

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Volume: 9 Issues: 66 [September, 2024] pp. 170 - 183
Journal of Islamic, Social, Economics and Development (JISED)
eISSN: 0128-1755
Journal website: www.jised.com
DOI: 10.55573/JISED.096614

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