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Key Factors Influencing Learning Management System (LMS) Satisfaction Among Maritime Students: Insights from the Diploma Nautical Studies and Diploma Marine Engineering Programs

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Abstract - This study investigates student satisfaction with the Learning Management System (LMS) at the Akademi Laut Malaysia (ALAM), focusing on students enrolled in the Diploma Nautical Studies (DNS) and Diploma Marine Engineering (DME) programs. A quantitative research approach was employed, utilizing a structured questionnaire to collect data from 86 participants. The study analyses key factors influencing LMS satisfaction, including system content, instructional clarity, engagement, interaction, and perceived learning performance. Results indicate that while both DNS and DME students exhibit a generally positive level of satisfaction, DNS students report slightly higher mean satisfaction scores. Although the differences in satisfaction between the two groups were not statistically significant, the findings suggest variations in how the LMS meets the specific needs of each program. The study highlights the importance of optimizing LMS features to enhance student engagement and academic performance, particularly for DME students. Recommendations include improving content organization, engagement tools, and instructional materials to foster a more supportive learning environment.

Keywords: Learning Management System, student satisfaction, maritime education

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1.0 INTRODUCTION

The rapid advancement of technology has significantly transformed the educational landscape, with Learning Management Systems (LMS) emerging as a pivotal tool in supporting online and blended learning environments. LMS platforms, such as Moodle, Blackboard, and Canvas, are designed to facilitate the management of educational content, student engagement, communication, and performance tracking (Almaiah et al., 2020). As higher education institutions increasingly rely on LMS to enhance learning outcomes, understanding the factors that influence student satisfaction with these systems becomes crucial (Shahzad et al., 2021). In the context of maritime education, the use of LMS plays an important role in delivering flexible, accessible, and structured learning experiences. At the Akademi Laut Malaysia (ALAM), the LMS is widely used to support students enrolled in the Diploma Nautical Studies (DNS) and Diploma Marine Engineering (DME) programs. While LMS platforms are intended to streamline the learning process, their effectiveness is often determined by how students perceive the system's ease of use, engagement features, and overall support for academic performance (Baber, 2021). Consequently, student satisfaction with the LMS is a key indicator of its success and a critical measure for continuous improvement.

Numerous studies have explored the factors that influence LMS satisfaction, including system content, instructional clarity, engagement, interaction, and perceived learning performance (Al-Fraihat et al., 2020; Cheng et al., 2020). These factors contribute to how students engage with the platform and their overall satisfaction. However, there is limited research specifically focusing on the LMS experiences of maritime students, particularly comparing satisfaction levels between students from different academic programs such as DNS and DME. This study addresses this gap by investigating the factors

influencing student satisfaction with the LMS at ALAM and comparing the experiences of DNS and DME students and to identify areas for enhancement to improve the learning experience and academic performance.

2.0 LITERATURE REVIEW

This section reviews relevant literature focusing on key factors influencing student satisfaction with Learning Management Systems (LMS), including system content, instructional information, engagement, interaction, learning performance, perceived LMS, and perceived students' satisfaction. These factors provide a framework for understanding how LMS usage affects students' experiences and academic outcomes in higher education.

2.1 System Content and Organization

The organization and accessibility of content in an LMS play a critical role in shaping student satisfaction. Poor content structure or difficulty in navigating materials can lead to frustration and hinder learning. Studies have highlighted the importance of clear and intuitive content organization, noting that students prefer systems where materials are well-organized and easy to find (Shahzad et al., 2021). Research suggests that content organization impacts how efficiently students engage with the LMS, directly influencing their learning outcomes (Almaiah et al., 2020). An LMS that allows for easy access to relevant course content, assignments, and resources can significantly enhance student satisfaction and overall learning experience (Cheng et al., 2020).

2.2 Instructional Information and Clarity

Instructional clarity within the LMS is another key factor influencing student satisfaction. The quality and comprehensibility of instructions provided through the LMS can either enhance or impede students' ability to use the system effectively. Clear and well-structured instructional materials are associated with higher levels of student satisfaction, as they reduce confusion and increase the efficiency of learning processes. Almaiah et al., (2020) highlight that unclear instructional design often results in poor student engagement and learning experiences, emphasizing the need for easily accessible tutorials and guidelines. Research also shows that students benefit from multimedia instructional aids, such as video tutorials or interactive guides, which further support understanding and ease of use (Shahzad et al., 2021).

2.3 Student Engagement

Student engagement within the LMS is critical to maintaining high levels of satisfaction. Engaging students through interactive features, such as quizzes, discussion forums, and gamified learning elements, has been shown to significantly increase their motivation and satisfaction with the system (Vanduhe, 2020). Gamification has been found to enhance both the learning experience and student participation, creating a more dynamic and enjoyable educational environment (Baber, 2021). Moreover, research indicates that systems that provide personalized feedback and progress tracking features help maintain engagement by giving students a sense of accomplishment and control over their learning journey (Alraimi et al., 2020). These features, when effectively integrated into the LMS, foster an engaging and supportive learning environment that positively impacts satisfaction.

2.4 Interaction and Communication

Effective communication between students and instructors, as well as among students themselves, is a fundamental aspect of successful LMS use. Studies show that systems facilitating both synchronous and asynchronous communication tend to improve student satisfaction, as they allow for more flexible and accessible interaction (Mishraa et al., 2020). Real-time chat functions, forums, and discussion boards enable students to connect with peers and instructors, thereby promoting collaborative learning (Bond et al., 2020). Furthermore, LMS platforms that support frequent and transparent communication are more likely to create a sense of community, which is essential for student engagement and satisfaction (Cheng et al., 2020). However, limitations in communication tools, such as delayed

responses or complex interfaces, can reduce satisfaction, particularly when students struggle to access support when needed (Baber, 2021).

2.5 Learning Performance and Outcomes

Research consistently shows that students' perception of how well an LMS supports their learning performance strongly influences their satisfaction with the system (Shah et al., 2021). LMS platforms that provide tools for tracking progress, accessing grades, and managing assignments tend to foster a more structured and efficient learning environment (Al-Fraihat et al., 2020). Shahzad et al., (2021) found that students who perceive the LMS as contributing positively to their academic success are more likely to engage with the system and report higher satisfaction levels. In contrast, when LMS features are seen as inadequate for supporting academic achievement, students may become disengaged and dissatisfied (Almaiah et al., 2020). Therefore, systems that not only organize learning content effectively but also actively support students in achieving their academic goals are more likely to lead to positive educational outcomes.

2.6 Perceived Learning Management System (LMS)

Perceptions of the LMS itself—its ease of use, usefulness, and technical stability—are essential in determining students' satisfaction and continued use. Studies show that when students perceive the LMS as easy to navigate and useful for their academic work, they are more likely to engage with it consistently and report higher satisfaction levels (Al-Fraihat et al., 2020). Baber (2021) notes that students who perceive the LMS as user-friendly and adaptable to their learning needs tend to achieve better academic outcomes. Additionally, Shahzad et al., (2021) found that technical issues or a lack of system reliability can significantly diminish students' perceptions of the LMS, ultimately lowering their satisfaction. Therefore, a well-designed LMS that aligns with students' expectations for functionality and reliability is crucial for maintaining satisfaction.

2.7 Perceived Students' Satisfaction

Perceived student satisfaction with the LMS reflects their overall experience with the platform and its ability to support their academic and personal needs. Studies indicate that satisfaction is multifaceted, involving elements such as the quality of content delivery, ease of interaction with peers and instructors, and the effectiveness of the system in facilitating learning (Alraimi et al., 2020). Cheng et al., (2020) found that when students perceive the LMS as enhancing their academic performance and engagement, their overall satisfaction increases. Additionally, Vanduhe (2020) suggest that personalized learning experiences, where the LMS adapts to students' learning styles and progress, significantly contribute to higher satisfaction levels. Therefore, perceived satisfaction is a critical outcome of the LMS experience and can serve as a key indicator of the system's success in supporting students' academic journeys.

3.0 RESEARCH METHODOLOGY

This research employed a robust quantitative approach to assess student satisfaction with the Learning Management System (LMS) in ALAM's Diploma Nautical Studies (DNS) and Diploma Marine Engineering (DME) programs. Utilizing a descriptive and comparative research design, the study involved 86 participants, capturing both their overall satisfaction and the key influencing factors. Data was gathered through a structured questionnaire using a 5-poin Likert scale, allowing for a precise measurement of satisfaction levels. The analysis incorporated descriptive statistics to summarize satisfaction, an independent t-test to identify significant differences between the DNS and DME groups, and Cronbach's Alpha to ensure the survey instrument's reliability. Additionally, mean scores were ranked to pinpoint the most influential satisfaction factors.

Convenience sampling was employed due to the accessibility and relevance of the student cohort, acknowledging the potential limitations in generalizability. Ethical considerations were meticulously addressed; participants were informed about the study's purpose, assured of their anonymity, and provided informed consent. Despite constraints like sample size and the inherent bias of convenience sampling, the methodology was judiciously selected to meet the study's objectives. The quantitative approach facilitated precise comparisons and statistical validation, offering actionable insights for LMS

enhancement at ALAM. This rigorous methodology provides a valuable foundation for understanding and improving LMS satisfaction in the maritime educational context.

4.0 ANALYSIS AND DISCUSSION

4.1 Factor Validation

Here are the **Cronbach's Alpha** values for each factor group, which indicate the internal consistency of the survey responses.

Table 1. Cronbach's Alpha values for each factor

Factor	Cronbach's Alpha Value
System Content	0.864
Instruction Information	0.760
Interaction	0.812
Engagement	0.966
Learning Performance	0.916
Student Satisfaction	0.903
Overall	**0.975**

All factors having the Cronbach's Alpha values between 0.70 and 0.90 are ideal, reflecting good internal consistency (Alotaibi,2022; Li et al., 2023).

4.2 Independent t-test

Here is the t-test result

Table 2. t-test result

Statistic	Value
t-value	1.24
p-value	0.22

This table shows the t-statistic and p-value from the independent t-test conducted to compare the overall LMS satisfaction between DNS and DME students. As the p-value (0.22) is greater than the significance level (0.05), the difference in satisfaction between the two groups is not statistically significant.

4.3 Comparison of student satisfaction

The comparison of student satisfaction between DNS and DME programs reveals that DNS students have a higher mean satisfaction score of 4.09. DME students have a slightly lower mean satisfaction score of 3.89. This suggests that DNS students are slightly more satisfied with the LMS than DME students. This difference could indicate varying perceptions or experiences between the two groups when using the LMS.

Table 3. Mean Value for each factor

Factor	DNS Mean	DME Mean
System Content	3.91	3.59
Instruction Information	3.95	3.72
Interaction	3.89	3.65

Engagement	4.06	3.74
Learning Performance	4.13	3.78
Student Satisfaction	4.09	3.89

This section presents the analysis of the collected data and discusses the findings in the context of the existing literature. The analysis focuses on key factors influencing student satisfaction with the Learning Management System (LMS) at the Akademi Laut Malaysia (ALAM), specifically comparing the satisfaction levels of students in the Diploma Nautical Studies (DNS) and Diploma Marine Engineering (DME) programs.

4.3.1. Overall Satisfaction with the LMS

The findings indicate that both DNS and DME students express a generally positive level of satisfaction with the LMS, with DNS students reporting a slightly higher mean satisfaction score (4.09) compared to DME students (3.89). Although the independent t-test results ($t = 1.24$, $p = 0.22$) show no statistically significant difference between the two groups, the difference in mean satisfaction levels suggests that DNS students perceive the LMS more favourably. This could be attributed to variations in how the LMS aligns with the specific learning needs and curriculum structure of the two programs. The overall positive satisfaction aligns with existing literature, which suggests that LMS platforms, when properly designed and managed, can provide valuable support to students in higher education (Al-Fraihat et al., 2020). However, the slight difference in satisfaction between DNS and DME students suggests that further customization or optimization may be needed to cater to the specific needs of DME students, potentially improving their engagement and academic performance.

4.3.2. System Content and Organization

The system content factor emerged as one of the most important for both DNS and DME students. However, DNS students rated this factor more positively (mean score: 3.91) compared to DME students (mean score: 3.59). This difference suggests that DNS students find the organization and accessibility of the content in the LMS more suitable for their learning style and program requirements. According to (Shahzad et al., 2021), well-organized content in an LMS can significantly enhance students' satisfaction by making resources easy to access and use. For DME students, the lower satisfaction with system content may indicate that the LMS does not align as well with their specific academic needs. Improving content structure, ensuring clear categorization, and providing easier access to course materials could improve satisfaction for DME students (Almaiah et al., 2020).

4.3.3. Instructional Information and Clarity

Instructional information and clarity were similarly rated by both DNS and DME students, though DNS students reported slightly higher satisfaction (mean score: 3.95) compared to DME students (mean score: 3.72). This factor encompasses how clearly the LMS conveys instructions, assignments, and learning expectations to students. Previous studies have shown that when instructions are clear and easy to follow, students experience less frustration and greater satisfaction with the system (Owusu-fordjour et al., 2020). The difference in satisfaction may reflect varying levels of complexity in the curricula for DNS and DME programs. DNS students may find the instructional design within the LMS better suited to their needs, while DME students may benefit from additional clarity in the presentation of instructional materials. Incorporating multimedia tutorials and interactive guides can help both groups but may be especially beneficial for DME students (Almaiah et al., 2020).

4.3.4. Student Engagement and Interaction

Engagement and interaction were key factors influencing satisfaction, with DNS students rating engagement higher (mean score: 4.06) compared to DME students (mean score: 3.74). DNS students also rated interaction (mean score: 3.89) higher than DME students (mean score: 3.65). This suggests that DNS students perceive the LMS as more engaging and supportive of communication between peers

and instructors. The literature supports the idea that engagement tools, such as discussion forums, real-time chats, and interactive quizzes, enhance the learning experience and increase student satisfaction (Vanduhe, 2020). The slightly lower engagement and interaction scores among DME students may indicate that they are not fully utilizing or benefiting from these features. Improving the functionality of interactive tools or providing additional opportunities for collaborative learning could enhance their experience (Mishraa et al., 2020).

4.3.5. Learning Performance and Outcomes

Both DNS and DME students rated learning performance as a key factor in their satisfaction with the LMS, with DNS students again reporting higher satisfaction (mean score: 4.13) than DME students (mean score: 3.78). The perceived contribution of the LMS to academic success and performance was significant for both groups, but DNS students felt that the LMS had a greater positive impact on their learning outcomes. Previous research has shown that when students perceive the LMS as directly contributing to their academic performance, they are more likely to engage with the system and report higher satisfaction (Shah et al., 2021). The lower satisfaction score among DME students could indicate that the LMS tools and resources are less aligned with their specific learning objectives. Enhancing the LMS's ability to support assignment submissions, grading, and academic progress tracking could help address this gap (Al-Fraihat et al., 2020).

4.3.6. Perceived LMS and Student Satisfaction

Perceptions of the LMS's usability, usefulness, and reliability play a significant role in determining overall student satisfaction. DNS students generally perceived the LMS more favourably than DME students, which is reflected in the slightly higher satisfaction scores across all factors. Baber (2021) found that user-friendly LMS platforms that are seen as reliable and easy to navigate result in higher student satisfaction. For DME students, improving the perceived ease of use and addressing technical issues could boost their overall satisfaction with the system (Shahzad et al., 2021).

The analysis highlights that while DNS students report slightly higher satisfaction across all factors, there is no statistically significant difference between DNS and DME students' overall satisfaction with the LMS. Factors such as system content, engagement, interaction, and learning performance emerged as critical for both groups, with DNS students consistently rating the LMS more favourably. The findings suggest that while the LMS at ALAM is generally effective, there is room for improvement, particularly in addressing the needs of DME students. Enhancing the LMS's content organization, improving engagement tools, and providing clearer instructional materials could result in a more positive experience for all students. Additionally, addressing technical issues and ensuring that the LMS is perceived as reliable and easy to use could further increase student satisfaction.

4.4 Areas of enhancement

Based on the research paper's findings, the following areas of enhancement are identified to improve student satisfaction with the LMS at ALAM.

4.4.1 Content Organization and Accessibility.

Enhance course content organization by using a standardized format, clear labels, and centralized resources to improve accessibility, especially for DME students who reported lower satisfaction in this area.

4.4.2 Instructional Clarity and Support.

Improve instructional clarity by adding multimedia elements and offering instructor training. Provide students with support resources like FAQs and tutorials for clearer, more comprehensive learning materials.

4.4.3 Student Engagement and Interaction.

Boost student engagement by adding interactive features like forums, real-time chats, quizzes, and gamified activities. Tailor collaboration tools and gamification to each program's curriculum for active participation.

4.4.4 Personalized Learning Experience.

Tailor LMS features for DNS and DME students by using adaptive learning paths and personalized dashboards to track progress and offer targeted feedback, creating a more personalized learning experience.

4.4.5 Technical Stability and Usability.

Improve LMS stability and usability by conducting regular audits, offering responsive technical support, and gathering student feedback to quickly resolve technical and usability issues for a seamless experience.

4.4.6 Communication Tools.

Enhance communication by adding timely notifications, instant messaging, and virtual office hours in the LMS to improve interactions between students and instructors, fostering a more supportive learning environment.

4.4.7 Learning Performance Tracking.

Enhance learning performance tracking by adding grade tracking, assignment feedback, and self-assessment tools in the LMS, helping students monitor progress and set academic goals effectively.

By focusing on these areas, the LMS can be optimized to better support the diverse learning needs of DNS and DME students, thereby enhancing overall student satisfaction and academic outcomes.

5.0 CONCLUSION

The study concluded that while students in both Diploma Nautical Studies (DNS) and Diploma Marine Engineering (DME) at ALAM generally express positive satisfaction with the Learning Management System (LMS), DNS students report slightly higher satisfaction levels. Key factors influencing this satisfaction include system content, engagement, interaction, and learning performance. The findings suggest that the LMS effectively supports students' academic experiences but also indicate potential areas for improvement, particularly in enhancing the LMS experience for DME students through better content organization and engagement tools.

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