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Smart Supervision: Leveraging ELISTA to Strengthen Student Motivation and Thesis Completion

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ABSTRACT

Purpose of the study: This study aims to examine how lecturer–student interactions within the ELISTA learning management system influence students' motivation to complete their final research project, focusing specifically on how feedback quality, clarity, and communication frequency contribute to strengthening their academic persistence.

Methodology: This study employed an explanatory sequential mixed-methods design using an ex post facto survey with Google Forms (Google LLC) and a Likert-scale questionnaire. Quantitative analysis used SPSS v.26 (IBM Corp.), while qualitative thematic analysis used NVivo 12 Plus (QSR International). Instruments included online surveys, ELISTA activity logs, and semi-structured interviews recorded using Zoom Cloud Meetings.

Main Findings: The study found that lecturer–student interaction via ELISTA was high (mean = 4.12), with clarity of instructions and feedback quality as dominant factors. Student motivation for thesis completion was also high (mean = 4.08), driven by intrinsic motivation and extrinsic factors such as degree achievement and career prospects. Regression analysis showed interactions significantly predicted motivation ($R^2 = 0.236$), with clarity of instructions ($\beta = 0.341$) and feedback quality ($\beta = 0.268$) contributing substantially.

Novelty/Originality of this study: This study uniquely integrates ELISTA-based thesis supervision with a mixed-methods approach, combining quantitative analysis of interaction metrics and qualitative NVivo analysis of student motivation. Unlike previous LMS studies focused on course engagement, it specifically examines how clarity of instructions and feedback quality influence both intrinsic and extrinsic motivation, providing new empirical insights for designing effective, technology-mediated academic supervision.

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1. INTRODUCTION

Higher education institutions today are confronted with demands to improve the quality of academic services and research outputs amid rapid digital transformation. Institutions are required to adopt more flexible and well-documented learning and supervision models to address lecturers' time availability and the diverse needs of students [1]-[3]. The use of Learning Management Systems (LMS) has become one of the primary responses to these demands, as such systems provide centralized access to learning materials, communication, and task

management, thereby facilitating both online and blended learning [4]-[6]. Empirical studies show that factors influencing LMS adoption (e.g., perceived usefulness and ease of use) are closely related to usage intensity and student engagement in higher education contexts [7]-[9].Academic interactions that extend beyond the limitations of face-to-face supervision [10]. Therefore, it is essential to position the examination of LMS utilization in this study: ELISTA as part of institutional efforts to improve the quality of final-project supervision.

Although traditional supervision systems play an important role, many students face tangible obstacles such as limited face-to-face meeting time, delayed feedback from supervisors, and unsystematic documentation of revisions conditions that may prolong the completion of final projects. Research on supervision practices indicates that the quality and continuity of supervisors' feedback are crucial determinants of manuscript development and the speed of thesis/dissertation completion [11]-[13]. Additionally, survey and qualitative studies highlight perceptual differences between supervisors and supervisees regarding the frequency, quality, and forms of support needed, which in turn affect students' satisfaction and progress [14-[16]. These issues are exacerbated when progress-monitoring mechanisms are unavailable or inconsistently utilized, creating the need for more adaptive and well-documented supervision solutions [17]-[19]. Thus, classic supervision problems (slow feedback, limited access to supervisors, poor documentation of revisions) remain relevant and must be addressed through approaches that integrate technology with effective supervisory practices.

Modern LMS platforms not only deliver learning materials but also offer collaborative features such as draft uploads, revision comments, discussion forums, deadline notifications, and progress tracking features that can potentially support digital supervision of final projects. Research analyzing LMS interaction data shows that such digital features can be used to measure student engagement and design adaptive interventions that enhance academic performance [20]-[22]. Several experimental and quantitative studies in higher education settings report that LMS implementation (including Moodle and similar platforms) contributes to increased motivation, self-directed learning, and ease of access to lecturer feedback when properly operated [23]-[25]. Furthermore, quantitative measures of digital engagement (engagement metrics) provide evaluation tools to assess the effectiveness of academic interaction within virtual environments [26]-[28]. Therefore, the use of ELISTA as a medium for final-project supervision offers opportunities to strengthen communication continuity and improve documentation of supervision processes.

Lecturer–student interaction is a key component shaping supervision quality: intensive, clear, and constructive interactions help students understand feedback, revise drafts, and maintain commitment until manuscript completion. In digital environments, interaction quality depends not only on frequency but also on responsiveness, depth of feedback, and regularity of communication all of which can be facilitated by LMS features if operated appropriately [29]-[31]. Empirical evidence shows that supervisor support, feedback quality, and sustained interaction influence students' experiences during final-project research and can affect outcomes such as timely completion [32]-[34]. Furthermore, studies measuring digital engagement find positive associations between indicators of interaction in virtual platforms and academic outcomes, suggesting that interactions facilitated by ELISTA may become an important determinant of students' motivation and progress [35], [36]. Consequently, exploring aspects of interaction (e.g., responsiveness, clarity of comments, frequency of contact) in the context of ELISTA is relevant for understanding how digital supervision can improve student outcomes.

Learning motivation is a strong predictor of productive learning behaviormotivated students tend to be more organized, persistent, and capable of overcoming obstacles during the process of writing final projects [37]-[39]. Research on online learning behavior and self-regulated learning shows that issues such as procrastination and low self-regulation are negatively correlated with academic progress and completion of final projects [40]-[42]. Additionally, literature reviews and empirical studies indicate that digital skills and the quality of online support (e.g., access to feedback) can enhance students' motivation and engagement within learning-management environments [43]-[45]. Thus, improving interaction quality through platforms like ELISTA has the potential to strengthen students' intrinsic and extrinsic motivation, thereby accelerating final-project completion. Examining the influence of digital interaction on motivation becomes essential to understanding the mechanisms underlying the completion of final studies.

Although Learning Management Systems (LMS) have been widely studied in the context of regular learning, research specifically exploring the role of lecturer–student interaction in LMS-based final-project supervision remains limited [10]. Most LMS research focuses on engagement, adoption, or student performance in general course settings, with few studies linking digital features to supervision outcomes such as motivation to complete final projects [46]. Moreover, although LMS interaction metrics such as message frequency, response time, and revision comments have been measured in several studies, their direct relationships with final-year students' motivation are rarely examined quantitatively [47].

In addition, disciplinary variation and supervision contexts have not been systematically mapped. Some studies show differences in supervision characteristics and feedback practices between STEM and humanities fields, yet the effects of digital interaction on motivation and progress across disciplines remain underexplored. Lecturer workload which may moderate the quality and frequency of feedback has also received limited empirical attention [48]. Other methodological limitations include the scarcity of longitudinal studies tracking students from

initial supervision to final completion, making causal relationships between LMS interaction and motivation difficult to determine [49]. Finally, mixed-method approaches combining quantitative LMS interaction logs with qualitative analyses of supervisor–student relationships remain rare, despite their importance for understanding mechanisms through which digital interaction influences motivation and final-project outcomes [50]. Therefore, research that specifically examines lecturer–student interaction through LMS platforms within the context of final-project supervision, using longitudinal and/or mixed-method designs, is highly needed to fill this literature gap.

The novelty of this study lies in its explicit focus on lecturer–student interaction mediated through a Learning Management System (LMS) as a supervision mechanism for final projects and its influence on students' motivation to complete their studies. Previous research on LMS has predominantly examined system adoption, student engagement, and learning outcomes in regular course contexts, with limited attention to supervision-specific processes in final-year research [51]. Moreover, although LMS interaction indicators such as feedback frequency, responsiveness, and communication intensity have been widely analyzed, their direct relationship with students' motivation in the context of final-project supervision remains underexplored [52]. By addressing this gap, this study extends existing LMS literature by providing empirical evidence on digital supervision practices through an institutional LMS (ELISTA), particularly within the Indonesian higher education context..

Based on these gaps, this study is important to conduct in order to provide empirical evidence on how lecturer student interaction through the LMS platform (ELISTA) influences students' motivation to complete their final projects. The findings are expected to offer recommendations for educational institutions in designing effective final-project supervision models integrating technological flexibility with supportive academic interaction. Furthermore, this research may help lecturers and students understand the factors that can maximize timely completion of final projects with high quality. More broadly, this study contributes to the higher education literature in Indonesia regarding the use of LMS for final academic supervision. Therefore, the main objective of this study is to examine the effect of lecturer–student interaction through ELISTA on students' motivation to complete their final projects.

2. RESEARCH METHOD

This study employs an explanatory sequential mixed-methods approach. The research begins with the collection and analysis of quantitative data, followed by qualitative data collection to explain and deepen the quantitative findings [53], [54]. In the first phase, the quantitative approach uses an ex post facto design because the variables of lecturer student interaction in ELISTA and students' motivation to complete their final project have occurred naturally without any intervention or manipulation by the researchers. This design was selected to determine the influence of relationships between variables based on real conditions experienced by students during the final project supervision process . The quantitative method enables the researchers to obtain an objective picture of general tendencies and the strength of the contribution of academic interaction variables to student motivation. Meanwhile, the qualitative approach in the second phase is used to explore more in-depth explanations regarding the patterns found in the quantitative results, thereby producing more comprehensive and contextual interpretations.

The population of this study consists of all students of the Physics Education program at Universitas Jambi who are currently undergoing final project supervision. This population was chosen because all students have used ELISTA as a medium of academic interaction with their supervisors, making it relevant for the purposes of this research. The sampling technique used in this study was purposive sampling. Purposive sampling is a non-probability sampling technique in which participants are selected based on specific characteristics relevant to the research objectives [55]-[57]. The sampling criteria included participants who were actively engaged in the supervision process, used ELISTA as a communication medium, and were at stages ranging from proposal preparation to thesis completion. The sample size was determined based on the requirements of regression analysis, amounting to 100 respondents, to ensure that the findings are stable, representative, and statistically robust.

Data were collected through a survey using an online questionnaire distributed via Google Forms. This method was selected because it aligns with the characteristics of respondents who are accustomed to using digital technology and provides ease of access during completion. Additional data related to interaction activities in ELISTA such as communication frequency, supervisor response time, and the quality of revision comments were also collected to strengthen the contextual basis of the analysis. Furthermore, the study utilized semi-structured interview instruments in the qualitative phase, conducted with a small subset of respondents selected purposively. The interviews were intended to deepen the understanding of lecturer–student interaction patterns, challenges encountered, and factors influencing student motivation in completing the final project, thereby complementing the quantitative analysis.

The quantitative instrument consisted of a Likert-scale questionnaire (1–5) developed based on theories of learning interaction and academic motivation. For the lecturer–student interaction variable in ELISTA, the indicators included feedback quality, clarity of guidance, communication intensity, and accessibility to the supervisor. Meanwhile, the variable of motivation to complete the final project was measured using indicators of

intrinsic motivation, extrinsic motivation, and task completion commitment. Prior to use, the questionnaire was validated by experts through expert judgment to ensure content appropriateness and clarity of indicators. Empirical validity testing was then conducted using the Corrected Item–Total Correlation method, and reliability testing using Cronbach's Alpha. The pilot testing and subsequent analysis showed that the instrument was suitable for use, with reliability values exceeding 0.70, in accordance with measurement standards in social research. Adapun kisi-kisi instrumen pada penelitian ini disajikan pada tabel 1 berikut:

Table 1. Research Instrument Grid

Scale	Variable Lecturer-Student Interaction in ELISTA	
	Indicators	Description
Likert (1-5)	Clarity of direction	Clarity of direction refers to the extent to which lecturers provide clear, structured, and understandable instructions related to thesis writing, revisions, and research procedures through ELISTA. Clear guidance helps students understand expectations, reduce ambiguity, and effectively carry out revisions.
	Quality of feedback	Quality of feedback describes the relevance, depth, and constructiveness of comments and suggestions provided by lecturers on students' thesis drafts. High-quality feedback is specific, timely, and solution-oriented, enabling students to improve their academic writing and research quality.
	Communication intensity	Communication intensity refers to the frequency and continuity of interactions between lecturers and students through ELISTA. This includes how often students receive responses, engage in discussions, and communicate progress, which supports sustained academic engagement during the supervision process.
	Ease of access to guidance	Ease of access to guidance represents the level of convenience experienced by students in accessing their supervisors through ELISTA. This indicator includes accessibility of communication features, responsiveness, and the absence of technical or administrative barriers in digital supervision.
Student Motivation Variables in Completing Final Assignments		
Likert (1-5)	Intrinsic motivation	Intrinsic motivation refers to internal drives that originate from students themselves, such as personal responsibility, academic interest, passion for the field of study, and the desire to overcome intellectual challenges. This form of motivation sustains long-term engagement and learning persistence.
	Extrinsic motivation	Extrinsic motivation refers to external factors that encourage students to complete their final projects, including the attainment of an academic degree, career advancement opportunities, social recognition, and expectations from family or society.
	Task completion commitment	Task completion commitment reflects the level of students' perseverance, consistency, and determination in completing their final projects. This indicator represents students' willingness to continue working on their thesis despite difficulties, delays, or obstacles.

Data analysis was conducted in accordance with the explanatory sequential mixed-methods design, beginning with quantitative analysis and followed by qualitative analysis [58]-[60]. In the quantitative phase, data were analyzed through prerequisite tests, including checks for missing values, reliability and validity tests, and normality, linearity, heteroscedasticity, and multicollinearity tests. After meeting all assumptions, multiple linear regression analysis was performed to examine the effect of lecturer–student interaction in ELISTA on students' motivation to complete their final project. The analysis was conducted using SPSS, with interpretations including regression coefficients, significance values, and the magnitude of predictor contributions.

In the qualitative phase, interview data were analyzed using thematic analysis assisted by NVivo software. The analytical process involved transcription, coding, categorization, and theme generation to uncover in-depth explanations related to the quantitative findings. NVivo was employed to map relationships between codes, identify theme emergence, and enhance analytical rigor. Integration of quantitative and qualitative findings was carried out through meta-inference to produce a comprehensive understanding of how interaction in ELISTA influences motivation to complete the final project.

The research procedure began with a preparation stage, which included the development of research instruments, expert validation, and refinement of the questionnaire. The second stage was implementation, namely the distribution of questionnaires to respondents who met the criteria through online media. Once the data were collected, the researchers conducted data cleaning to ensure valid and complete responses before proceeding to further analysis. The next stage involved data analysis using the statistical techniques predetermined according to the study objectives. Finally, the researchers compiled the research report, which includes interpretation of findings, discussion, conclusions, and recommendations for enhancing technology-based final project supervision.

3. RESULTS AND DISCUSSION

A total of 100 Physics Education students at Universitas Jambi participated as respondents in this study. All respondents were students currently undergoing the final project supervision process and actively using ELISTA as a communication medium with their supervisors. Most respondents were in the stage of writing the results and discussion chapters (42%), followed by the data analysis stage (33%), and the remaining students were at the proposal preparation or thesis finalization stages (25%). The majority of students reported using ELISTA at least 2–3 times per week to upload revisions, consult with their supervisors, or request feedback.

The research instruments were tested through validity and reliability analyses. The validity test using the Corrected Item–Total Correlation indicated that all items in both the lecturer–student interaction instrument within ELISTA and the motivation instrument had item correlation values above 0.30, thus meeting the validity criteria. Furthermore, the reliability test using Cronbach's Alpha produced a value of 0.891 for the interaction instrument and 0.874 for the motivation instrument, indicating that both instruments are highly reliable and suitable for use, as the alpha values exceed the minimum threshold of 0.70.

Descriptive analysis results showed that the level of lecturer–student interaction within ELISTA fell into the high category, with an average score of 4.12 on a 1–5 Likert scale. The highest-scoring indicators were clarity of guidance and quality of feedback, indicating that students perceived ELISTA as particularly beneficial for receiving clear instructions and structured revision comments. Meanwhile, the variable of motivation to complete the final project was also in the high category, with an average score of 4.08. Intrinsic motivation received the highest score, illustrating that most students were driven by internal factors, such as the desire to graduate on time and achieve optimal academic outcomes.

Table 1. Descriptive Statistics of Research Variables

Variables	Indicators	Mean	Category
Lecturer-Student Interaction in ELISTA	Clarity of direction	4.21	High
	Quality of feedback	4.19	High
	Communication intensity	4.05	High
	Ease of access to guidance	4.03	High
Mean Variable		4.12	High
Motivation for Completing Final Projects	Intrinsic motivation	4.18	High
	Extrinsic motivation	4.02	High
	Task completion commitment	4.03	High
Mean Variables		4.08	High

Before entering the hypothesis testing stage, several prerequisite tests were conducted. The Kolmogorov–Smirnov test results showed a significance value > 0.05 for both variables, indicating a normal distribution of the data. Then, the Levene linearity test results showed a significance value < 0.05, indicating a linear relationship between lecturer-student interaction and motivation to complete the final assignment. The Glejser Heteroscedasticity test showed a significance value > 0.05, indicating that the regression model was free from heteroscedasticity symptoms. The multicollinearity test obtained a Tolerance value > 0.10 and VIF < 10, confirming that there was no multicollinearity between predictors. The results of the prerequisite tests are shown in Table 2 below:

Table 2. Results of the Analysis Prerequisite Test

Jenis Uji	Parameters/Indicators	Results	Decision
Normality Test (Kolmogorov–Smirnov)	Sig. Interaction	> 0,05	Normal
	Sig. Motivation	> 0,05	Normal
Linearity Test (ANOVA Linearity)	Sig. Linearity	< 0,05	Linear
Heteroscedasticity Test (Glejser)	Sig. Residual	> 0,05	Free from heteroscedasticity
Multicollinearity Test	Tolerance	> 0,10	No multicollinearity
	VIF	< 10	No multicollinearity

Overall, the prerequisite test results indicate that the data meets the assumptions to proceed to the regression analysis stage. Multiple linear regression analysis was conducted to examine the effect of Lecturer–Student Interaction in ELISTA (with two main predictors: clarity of instructions and quality of feedback) on Motivation to Complete the Final Assignment. The test was conducted using SPSS and the results are presented in Table 3.

Table 3. Multiple Linear Regression Results

a. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	0.486	0.236	0.221	0.382

b. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	7.214	2	3.607	24.689	0.000
Residual	23.362	160	0.146		
Total	30.576	162			

c. Coefficients

Variabel	B	Std. Error	Beta	t	Sig.
(Constant)	1.284	0.218	—	5.890	0.000
Clarity of Direction	0.331	0.092	0.341	3.587	0.001
Quality of Feedback	0.267	0.104	0.268	2.567	0.011

The analysis results indicate that lecturer–student interaction within ELISTA has a significant effect on students' motivation to complete their final projects. The R value of 0.486 indicates that the strength of the relationship between the predictor variables and motivation falls within the moderate-to-strong category, while the R^2 value of 0.236 confirms that 23.6% of the variation in motivation can be explained by the clarity of guidance and the quality of feedback provided through ELISTA. Thus, this platform is proven to make a meaningful contribution to enhancing student motivation, although most of the variation in motivation is still influenced by other factors beyond the scope of this study. The ANOVA test shows a significance value of $p = 0.000$, confirming that the regression model is overall appropriate for use and that both predictors simultaneously have a significant effect on motivation to complete the final project.

More specifically, the regression coefficient results show that clarity of guidance has the strongest influence on student motivation, with $\beta = 0.341$ and $p = 0.001$. Each one-unit increase in instructional clarity is shown to increase motivation to complete the final project by 0.331 points, indicating that students are greatly supported when the guidance provided by lecturers through ELISTA is clear, well-structured, and easy to understand. Meanwhile, the quality of feedback also makes a significant contribution, with $\beta = 0.268$ and $p = 0.011$, whereby improvements in the quality of revisions and comments can increase student motivation by 0.267 points. These findings indicate that constructive, timely, and specific feedback from lecturers is an important factor in maintaining students' enthusiasm throughout the final project writing process. Overall, these results affirm that technology-based academic interaction, particularly through ELISTA, plays a crucial role in supporting a more effective and motivated completion of final projects.

After the quantitative analysis stage demonstrated that lecturer–student interaction within ELISTA has a significant effect on motivation to complete final projects, this study proceeded with a qualitative analysis stage to deepen the understanding of this relationship. The qualitative approach was used to explore students' perspectives more comprehensively regarding their experiences interacting through ELISTA, including how they perceive the guidance provided, the quality of feedback, and other factors that encourage or hinder their motivation. Semi-structured interviews were analyzed using thematic analysis supported by NVivo, enabling the researchers to map patterns, themes, and tendencies that were not fully revealed through quantitative data. Accordingly, this stage provides richer and more comprehensive context to support the interpretation of the regression findings and to generate a deeper understanding of the role of technology-based academic interaction in the process of completing final projects.

Motivation is one of the key factors determining students' success in completing their final projects. Motivation can encourage students to remain committed, persist consistently, and overcome various obstacles that arise during both the research and writing processes. In general, student motivation is divided into two types: extrinsic motivation, which stems from external factors, and intrinsic motivation, which arises from within the students themselves. To gain a deeper understanding of how these forms of motivation operate, an analysis was conducted using NVivo and visualized in the form of a Hierarchy Chart in Figure 1.

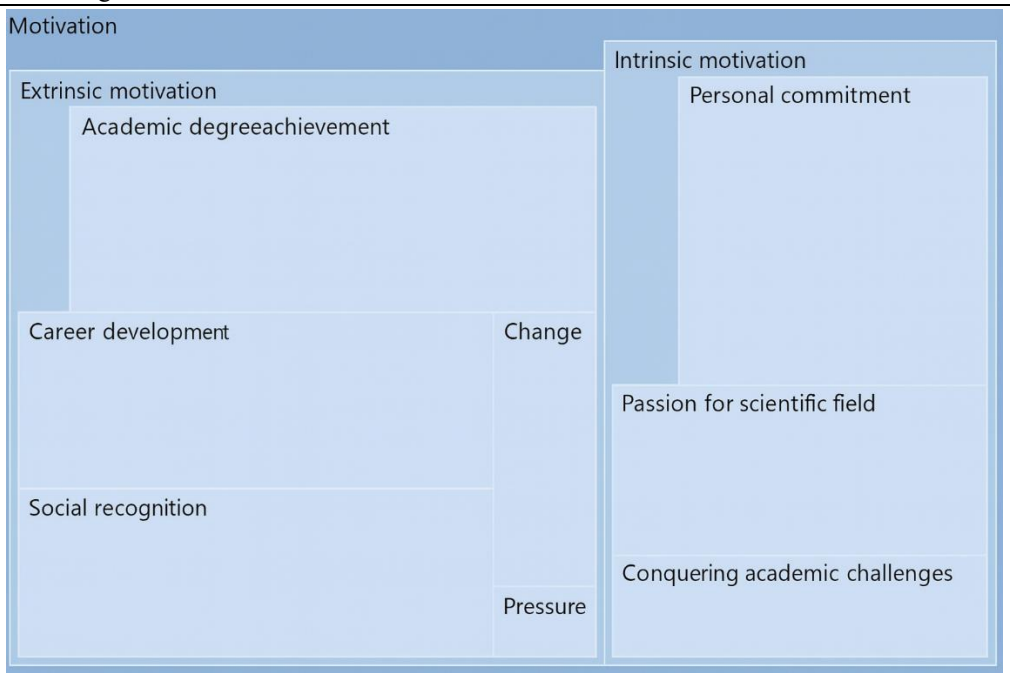

Figure 1. Student Motivation Hierarchy Chart

Based on the results of the NVivo analysis visualized through the Hierarchy Chart in Figure 4.1, students' motivation in completing their final projects can be categorized into two main groups: extrinsic motivation and intrinsic motivation. Extrinsic motivation emerges as a drive originating from external factors that encourage students to achieve their academic goals (coding references: 7 direct, 293 aggregated; item codes: 4 direct, 11 aggregated). Coding references refer to the number of quotations or segments of interview transcripts associated with a particular theme. Seven direct quotations indicate that there are seven explicit statements from students or lecturers that directly mention extrinsic motivation. Meanwhile, the 293 aggregated references indicate the total occurrences of this theme, including all related subthemes, such as attainment of an academic degree, career development, social recognition, family support, and external pressure.

These findings confirm that extrinsic motivation is an important factor that repeatedly appears in the statements of both students and lecturers and encourages students to complete their final projects. Within extrinsic motivation, the most dominant factor is the attainment of an academic degree (coding references: 105 direct, 105 aggregated; item codes: 10 direct, 10 aggregated), indicating that most students are motivated to complete their final projects in order to obtain a diploma as a form of formal recognition. The next factor is career development (coding references: 81 direct, 81 aggregated; item codes: 10 direct, 10 aggregated), which emphasizes that students perceive graduation as a gateway to better employment opportunities. In addition, social recognition (coding references: 72 direct, 72 aggregated; item codes: 9 direct, 9 aggregated) also plays an important role, as successfully completing the final project enhances students' status and appreciation within their social environment. Other factors, such as family support (coding references: 20 direct, 20 aggregated; item codes: 5 direct, 5 aggregated) and external pressure (coding references: 8 direct, 8 aggregated; item codes: 5 direct, 5 aggregated), also contribute, although with lower frequencies.

Meanwhile, within intrinsic motivation (coding references: 14 direct, 198 aggregated; item codes: 5 direct, 10 aggregated), the most prominent factor is personal commitment (coding references: 78 direct, 78 aggregated; item codes: 10 direct, 10 aggregated). This indicates the presence of internal drives in the form of students' sense of responsibility and consistency toward their academic goals. Another important factor is passion for the field of study (coding references: 60 direct, 60 aggregated; item codes: 9 direct, 9 aggregated), which motivates students to engage deeply with their research topics. In addition, academic challenge (coding references: 46 direct, 46 aggregated; item codes: 9 direct, 9 aggregated) also plays a role, as students view the final project as an opportunity to test their abilities in addressing complex scientific problems.

Overall, the results indicate that students' motivation in completing their final projects is influenced not only by external factors, such as the attainment of an academic degree and social recognition, but also by internal factors in the form of personal commitment and passion for the field of study. The combination of extrinsic and intrinsic motivation serves as an important foundation that encourages students to remain consistent, enthusiastic, and capable of overcoming various obstacles throughout the final project writing process. To further strengthen these findings, the following section presents interview excerpts that illustrate the importance of motivation in influencing students' success in completing their final projects.

In your opinion, what are the main factors that influence students' success in completing their final assignments on time, and how do you play a role in supporting this?

Answer:

"The main factor: Students' internal motivation, such as the desire to complete their studies or contribute to the field of knowledge, plays a crucial role in ensuring they remain committed to completing their final project. When this motivation wanes, students may struggle to maintain their productivity. My role is to maintain and enhance student motivation by providing consistent moral support. I consistently remind them of the importance of this final project in their academic development and its impact on their future. Furthermore, I reward their achievements at every stage, no matter how small, to keep their spirits high."

Furthermore, the results of student interviews also show that motivation is an important factor in influencing the completion of final assignments.

What is your primary motivation for completing your final project?

Answer:

"As a 21-year-old undergraduate student in Mathematics Education, my primary motivation for completing my final project is the desire to make a tangible contribution to the world of education, particularly in mathematics learning. I want to produce research that not only meets academic requirements but can also be applied in the teaching and learning process at school. Furthermore, I view my final project as an academic challenge that I must overcome to prove my ability to analyze, organize, and convey ideas systematically."

Overall, both extrinsic and intrinsic motivation play important and complementary roles. Extrinsic motivation—particularly the attainment of an academic degree—emerges as the strongest factor driving students to complete their final projects; however, intrinsic motivation remains essential in maintaining consistency and ensuring the quality of the process. These two types of motivation complement each other and constitute a key determinant of the successful and optimal completion of final projects.

Based on the quantitative analysis results, lecturer–student interaction through ELISTA is proven to have a significant effect on motivation to complete final projects, with an R^2 value of 0.236, indicating that clarity of guidance and quality of feedback explain 23.6% of the variation in student motivation. Both predictors make significant contributions, with clarity of guidance ($\beta = 0.341$; $p = 0.001$) as the most dominant factor, followed by quality of feedback ($\beta = 0.268$; $p = 0.011$). These findings indicate that clear instructions and constructive feedback play a crucial role in maintaining students' motivation throughout the supervision process. To deepen these quantitative findings, qualitative analysis using NVivo provides a more detailed picture of how students interpret these interactions. The Hierarchy Chart shows that their motivation is influenced not only by external factors such as degree attainment and career opportunities, but also by internal factors such as personal commitment and the drive to overcome academic challenges. Interview excerpts further confirm that clear feedback, moral support, and appreciation from lecturers are highly beneficial in sustaining students' consistency and enthusiasm in completing their final projects. The integration of these findings demonstrates that technology-based academic interaction is not only statistically significant, but also meaningful in terms of students' psychological experiences during the final project completion process.

These findings are consistent with a number of previous studies that emphasize the importance of interaction quality within Learning Management Systems (LMS) for student motivation and academic success. A recent study by Goh [61], shows that persistence and consistency in interaction behaviors within LMSs directly contribute to improved academic achievement, thereby reinforcing the present finding that lecturer–student interaction through ELISTA influences motivation to complete final projects. In addition, research on GMCLMS by Ahmed et al. [62], confirms that the integration of mobile- and cloud-based interactive features can enhance engagement and learning outcomes, supporting the importance of instructional clarity and feedback quality in digital platforms. Another study by Simon et al. [63] reveals that both students' and lecturers' perceptions of LMS features and interaction quality are key factors influencing motivation and academic success, aligning with the qualitative findings that highlight the roles of intrinsic and extrinsic motivation in final project completion. These findings are further supported by a systematic review on LMS effectiveness, which concludes that consistent LMS use enhances motivation, engagement, and the quality of learning experiences [64]. Other quantitative studies have found that LMS implementation has a significant effect on student motivation and satisfaction [65], while research on LMS use and writing motivation demonstrates that digital systems can increase learning drive in the context of academic skills development [66]. Furthermore, a systematic review on LMS utilization emphasizes that LMSs promote learner autonomy and self-regulation [67], which is relevant to the present findings showing that students' motivation in completing final projects is strengthened by structured and interactive digital support.

These findings are also aligned with the theoretical framework of Self-Determination Theory, which posits that intrinsic motivation develops when basic psychological needs—namely competence, autonomy, and

relatedness are fulfilled [68], [69]. Clear guidance and high-quality feedback from lecturers through ELISTA are believed to satisfy students' needs for competence and relatedness, enabling them to feel capable and supported in completing their final projects. In addition, the literature on self-efficacy provides empirical support for these findings: several studies indicate that self-efficacy and self-directed learning capacity have significant effects on motivation and learning outcomes in online learning contexts [70]. Thus, this study not only reinforces prior empirical evidence, but also demonstrates how the integration of LMSs as a supervision medium can fulfill students' psychological needs and strengthen their self-belief two crucial aspects that facilitate intrinsic motivation and academic success in final project completion.

The novelty of this study lies in the integration of an ELISTA-based final project supervision model with a mixed-methods analysis that examines the effects of instructional clarity and feedback quality on student motivation, while simultaneously mapping motivational structures through qualitative NVivo analysis. Unlike previous studies that generally evaluate LMSs solely in terms of instructional effectiveness, this study specifically investigates the dynamics of intrinsic and extrinsic motivation within the context of final project supervision and links them to the principles of Self-Determination Theory. This approach generates new empirical evidence on how digital interactions in academic supervision can shape more structured motivational patterns and support more productive final project completion.

The findings of this study have important implications for the development of final project supervision strategies in higher education, particularly in the use of digital platforms such as ELISTA to enhance the effectiveness of academic communication. The evidence that clarity of guidance and feedback quality significantly influence student motivation suggests that technology-based interaction can serve as a strategic instrument in promoting the timely completion of final projects. Moreover, the qualitative findings revealing the structure of intrinsic and extrinsic motivation provide an empirical basis for developing more personalized, adaptive, and needs-based supervision policies. Accordingly, this study can serve as a reference for designing more standardized digital supervision models oriented toward improving students' research productivity. The limitations of this study include the relatively small number of participants, which requires caution in generalizing the findings. In addition, the qualitative data relied solely on interviews without document or observational triangulation; therefore, the depth of interpretation can be enhanced in future research.

4. CONCLUSION

This study shows that lecturer-student interaction through the ELISTA platform significantly increases motivation to complete final assignments, with clarity of direction and quality of feedback proving to be the main predictors, explaining 23.6% of the variation in student motivation. Quantitatively, both aspects of interaction contribute positively to increased motivation, while qualitative analysis reveals that student motivation is formed through a combination of extrinsic factors such as degree attainment, career opportunities, and social recognition, as well as intrinsic factors such as personal commitment, passion for the field of study, and encouragement to face academic challenges. These findings confirm that technology-based academic interaction is not only statistically effective but also psychologically meaningful for students, as it is able to meet the needs of competence, social support, and clarity of guidance required to maintain enthusiasm in the process of compiling final assignments. Overall, ELISTA has proven to be a strategic guidance medium in improving the quality of academic communication and student productivity in completing final assignments. Future research is recommended to involve a more diverse number of participants and add data triangulation, such as document analysis and observation of the guidance process, to strengthen the validity of the findings and expand the generalizability of the results.

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USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the preparation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

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