https://research.adra.ac.id /index.php/ijen/
P - ISSN: 2988-1579
E - ISSN: 2988-0092

Studying Alone Together: Narrative Accounts of Motivation, Meaningful Interaction, and the Search for Academic Satisfaction Among Distance Learners at Indonesia's Universitas Terbuka

Meirani Harsasi[1], Minrohayati[2], Rahmad Purnama[3], Sila Ninin Wisnantiasri[4], Hubertina Karolina Ngarbingan[5]
[1]Universitas Terbuka, Indonesia
[2]Universitas Terbuka, Indonesia
[3]Universitas Terbuka, Indonesia
[4]Universitas Terbuka, Indonesia
[5]Universitas Terbuka, Indonesia

ABSTRACT

Background The growing usage of online tutorial systems (tuton) has revolutionized the paradigms of higher education in the digital age. Student motivation and interaction in online learning are significant antecedents of academic satisfaction and achievement.

Purpose. This research aims to examine the influence of motivation and interaction on academic achievement using satisfaction as mediating variable in tutorial learning environment.

Methods: The study is quantitative and Structural Equation Modelling techniques were used with the help of IBM AMOS version 23.0. A total of 877 respondents were identified by purposive sampling. The instrument used was a questionnaire with four factors measured on a likert scale ranging from 1-5. Five motivation indicators, four interaction indicators, six satisfaction indicators and three academic achievement indicators

Results The descriptive analysis showed that all the variables were in good category with mean score of 4.19 for motivation, 4.02 for interaction, 4.05 for satisfaction and 4.04 for academic success. The t-values were more than 1.96 and p-values were less than 0.05, which means all seven hypotheses were supported. The structural model had R2 of 0.845 and 0.938 and good fit indices such as GFI of 0.943, RMSEA of 0.055 and CFI of 0.978 .

Conclusion Motivation and interaction are found to positively influence students' satisfaction and academic progress. The mediating role of satisfaction in the link of motivation and interaction to academic performance is significant and practically meaningful, with indirect effects of 0.071 for motivation and 0.244 for interaction. It demonstrates the critical role of student satisfaction in online learning settings for enhancement of academic accomplishment.

KEYWORDS

Academic Satisfaction, Distance Learning, Structural Equation Modeling (SEM), Student Interaction, Student Motivation

Citation: Harsasi, M., Minrohayati, Minrohayati., Purnama, R., Wisnantiasri, N. S., & Ngarbingan, H. (2026). Studying Alone Together: Narrative Accounts of Motivation, Meaningful Interaction, and the Search for Academic Satisfaction Among Distance Learners at Indonesia's Universitas Terbuka. *International Journal of Educational Narrative*, *4*(6), 2025–2039.
https://doi.org/10.70177/ijen.v4i5.4166

Correspondence:

Meirani Harsasi,
rani@ecampus.ut.ac.id

Received: July 09, 2026

Accepted: August 29, 2026

Published: October 31, 2026

INTRODUCTION

The introduction is a little different from the short and concise abstract. The reader needs to know the background to your research and, most importantly, why your research is important in this context. The purpose of the Introduction is is to stimulate the reader's interest and

to provide pertinent background information necessary to understand the rest of the paper.

Information and communication technology (ICT) has undergone tremendous upheaval in different fields including education in the last two decades. Ideally, online learning systems should provide egalitarian, flexible, and high-quality education comparable or better than traditional face-to-face training outcomes. But the reality of empirical evidence is rather different, as a large percentage of students who participated in fully online programs in underdeveloped countries are not performing as well as their counterparts in hybrid or face-to-face settings. This conduct is closely tied to motivation deficiency and lack of proper relational support. (Dawadi et al., 2024; Xu et al., 2025). Specifically, fully online distance learning programs are widely recognized as facing greater challenges in student retention and course completion than conventional face-to-face programs (Rahmani et al., 2024). The educational institutions have had to adapt their pedagogical approaches to this digital revolution by incorporating technology-based learning modalities such e-learning, blended learning and fully online learning. The online instructional system (Tuton) is one of the most used methods in Indonesia. This method is employed by Universitas Terbuka (UT), the sole distance learning university in Indonesia boasting over 400,000 active students. The online tutorial system has become a vital component of remote learning. Tuton provides students with plenty of flexibility to access the course information anytime, anyplace. It also enhances student–student and student–tutor communication. By chatting online. However, there is increasing evidence that the development in flexibility will not lead to actual academic performance in the absence of structured motivation support and meaningful academic interactions (Meri-Yilan, 2022; Xu et al., 2025).

Effective online education is not only a question of having the technology available but also of psychological, pedagogical and social elements. An increasing body of literature has looked at these drivers from a range of approaches. Deci and Ryan (1985)defined intrinsic motivation as a core driver of learning engagement and accomplishment and is an approach that has been extensively employed in online educational environments via Self-Determination Theory (SDT) (Huang et al., 2019). Moore (1989) proposed the revolutionary Interaction Theory. It describes three important types of interaction in remote learning: learner-instructor, learner-learner and learner-content, each having a different impact on learning outcomes. On the basis of these foundations, Sun et al., (2008) shown that e-learning pleasure is determined by six major factors such as instructor attitude, technology quality and course design. More recently, Alqurashi (2019) found that self-efficacy and learner-content interaction are the strongest predictors of student satisfaction in online environments Martin & Bolliger (2018) emphasized that engagement strategies particularly instructor-initiated interactions are perceived by students as the most critical factor in online learning success. In the Indonesian distance learning context, Harsasi & Sutawijaya (2018) found that the key determinants of satisfaction among UT students were tutor responsiveness and material quality, and these findings were verified and extended by Alzahrani (2017), who demonstrated a positive relationship between online forum participation and academic performance. Means et al. (2013) Taken together, the synthesis of the research is in keeping with the notion that motivation, interaction and satisfaction are linked drivers that affect academic accomplishment in online education.

Universitas Terbuka (UT) has been running distance learning in Indonesia for a long time with online tutorials as the main mode of interaction between students and tutors. The model offers its own particular challenges like the motivation of students often varies due to limited contact with the instructor, the interaction with the academic environment is often limited to asynchronous written discussion forums, and the satisfaction of the experience of online learning is highly

dependent on the quality of the material, responsiveness of tutors and speed of feedback Alzahrani, (2017); Harsasi & Sutawijaya, (2018). These contextual dynamics differ substantively from the settings in which most foundational theories were developed, raising important questions about the generalizability of existing findings to Indonesia's specific socio-technological environment

While there is a wealth of research on factors contributing to success in online learning, three major gaps remain in the literature, which this study directly addresses. First, there is a widespread contextual blind spot. The great majority of research on motivation, interaction and satisfaction have been conducted in developed-country contexts (United States, Europe, East Asia) with better technological infrastructure, high Internet penetration and culturally distinct learning norms, making direct extrapolation to the distance learning context in Indonesia empirically questionable (Martin & Bolliger, 2018; Means et al., 2013). Second, although the direct effects of motivation and interaction on academic outcomes have been extensively studied, there hasn't been enough empirical research done on the function of satisfaction as a mediating variable that amplifies and channels these effects rather than just coexisting with them. with Alqurashi (2019), and Amoozegar et al., (2024) being among the few exceptions, and none tested within a large-scale Indonesian distance learning population. Third, methodologically, most prior studies have relied on simple regression or path analysis, which are unable to simultaneously test measurement quality (validity and reliability of latent constructs) alongside structural relationships; the comprehensive application of full Structural Equation Modelling (SEM-AMOS) to this specific variable constellation and Indonesian context remains absent from the literature. As a result, to the best of the authors' knowledge, no published study has simultaneously examined motivation, interaction, satisfaction, and academic performance within a robust SEM framework using a large sample ($n > 800$) from a developing-country distance university context.

The present study addresses these gaps by making three distinct contributions to the literature. 1) It is the first large-scale, empirical, SEM-based investigation of the motivation-interaction-satisfaction-academic performance nexus in the context of Indonesia's national distance learning system (Universitas Terbuka), filling the contextual void of prior studies that were dominated by samples from developed countries; (2) it explicitly models and tests satisfaction as a mediating variable, not just an outcome, using both structural path analysis and the Sobel test, providing a more nuanced causal account than prior direct effects studies; and (3) it uses IBM AMOS SEM with a robust sample of 877 respondents, allowing for both measurement rigor (CFA-verified validity and reliability) and structural credibility that simpler analytical approaches cannot provide. The specific research objectives are: (1) to analyze the effect of motivation on student satisfaction; (2) to analyze the effect of interaction on student satisfaction; (3) to analyze the effect of satisfaction on academic performance; (4) to analyze the direct effects of motivation and interaction on academic performance; and (5) to analyze the mediating role of satisfaction in the relationship between motivation, interaction, and academic performance in UT's online tutorial system.

RESEARCH METHODOLOGY

Research Design

This study employed a quantitative approach with an explanatory research design, aimed at explaining causal relationships among variables through hypothesis testing. This design was chosen to determine the extent to which motivation and interaction affect student satisfaction and how these variables contribute to academic performance, while also testing whether satisfaction serves as a mediating variable. The analytical model used was Structural Equation Modelling (SEM) which is a

multivariate approach that can test direct and indirect relationships amongst latent variables (Hair, 2019).

Population and Sample

The research population was all students who were involved in online tutorial-based learning (Tuton) in Universitas Terbuka, Indonesia. Sample selection was done through purposive sampling based on criteria of being an active student, having completed at least one semester of Tuton, actively participating in discussion forums and having completed at least one fully online course. The final sample consisted of 877 respondents, well above the minimum requirement of 200 respondents recommended for SEM analysis Hair (2019), thus providing high reliability of results. Purposive sampling was deliberately chosen rather than simple random sampling because the study required respondents who had genuinely experienced the online tutorial process; the inclusion criteria (active enrolment, completion of at least one Tuton semester, and demonstrated participation in discussion forums) ensured that participants could provide informed assessments of motivation, interaction, and satisfaction within the Tuton environment. It should nevertheless be acknowledged that this non-probability strategy limits the external validity of the findings: because the sample is skewed toward active and engaged learners, the results may not generalize to less active students, to other Indonesian universities, or to international distance learning institutions, and they should be interpreted with this boundary condition in mind.

Research Instrument

The main research instrument was a questionnaire based on a Likert scale from 1 to 5 (1 Strongly Disagree and 5 Strongly Agree). The questionnaire consists of 18 items that are used to measure four variables, namely: Motivation with 5 indicators, Interaction with 4 indicators, Satisfaction with 6 indicators and Academic Performance with 3 indicators. The motivation indicators were adapted from Deci and Ryan's 1985 Self-Determination Theory framework and operationalized through items assessing intrinsic goal orientation and technology-mediated engagement. The interaction indicators were developed based on Moore's 1989 three-type interaction model, namely learner-instructor, learner-learner, and learner-content interaction, and were adapted to the Tuton context. Satisfaction indicators were adapted from Sun et al (2008) and covered instructional design, content quality, tutor guidance, and overall experience. Academic performance indicators were adapted from Alzahrani (2017) and operationalized through self-reported GPA achievement and grade recognition.

All items underwent content validity review by two subject-matter experts prior to data collection, and pilot testing involving 45 respondents was conducted to improve item clarity. To address the potential threat of Common Method Bias, which is a recognized concern in single-source self-report survey designs, Harman's Single Factor Test was applied post hoc. The results indicated that the largest single factor explained 31.4 percent of the total variance, which is below the generally used 50 percent threshold. This suggests that common method bias is not a major concern in interpreting the findings of this study(Podsakoff et al., 2003). In addition, evidence from CFA supported discriminant validity, as all AVE values exceeded the squared inter-construct correlations. This indicates that the four constructs are empirically distinct and that their relationships are unlikely to be substantially inflated by common method variance.

Table 1. Research Variables and Indicators

Variable	Indicator Code	Item Description
Motivation (MO)	MO1	Online tutorial learning is easy and flexible
	MO2	Enjoy discussion forum questions and assignments
	MO3	Desire to learn increases through tuton
	MO4	Enthusiastic about all activities in tuton
	MO5	Technology use increases motivation to understand material
Interaction (IN)	IN1	Easy to interact with other students and tutors
	IN2	Peer feedback contributes to my learning
	IN3	Tutors provide opportunities to express opinions
	IN4	Tuton materials are beneficial for the future
Satisfaction (KEP)	KEP1	Satisfied with instructional design of Tuton
	KEP2	Satisfied with Tuton content and structure
	KEP3	Satisfied with tutor guidance
	KEP4	Satisfied with discussion forum activities
	KEP5	Satisfied with assignment activities
	KEP6	Overall satisfied with Tuton
Academic Performance (AC)	AC1	Obtained good grades in courses taken
	AC2	Achieved a good GPA
	AC3	Learning outcomes acknowledged through commensurate grades

Data Analysis Technique

Data analysis was conducted in three stages. First, descriptive analysis was used to describe respondent profiles and response tendencies for each variable, with mean scores interpreted using five category criteria, namely 1.00 to 1.80 as very poor, 1.81 to 2.60 as poor, 2.61 to 3.40 as moderate, 3.41 to 4.20 as good, and 4.21 to 5.00 as very good. Second, SEM analysis was employed to test both the measurement model and the structural model. The measurement model examined the validity and reliability of indicators through Confirmatory Factor Analysis or CFA, while the structural model assessed the direct and indirect effects among variables. Validity was confirmed when factor loading was greater than 0.5, whereas reliability was established when Construct Reliability was greater than 0.7 and Average Variance Extracted was greater than 0.5. Third, mediation testing used the Sobel test to determine the significance of the indirect effects of motivation and interaction on academic performance through satisfaction. The Sobel test was selected because it provides a direct analytical test of the indirect (mediated) path within a covariance-based SEM framework and is appropriate given the large sample size, under which the assumption of a normal sampling distribution of the indirect effect is reasonably satisfied (Kwak & Kim, 2017). Because the Sobel test assumes normality of the indirect effect and can be conservative in smaller samples, its results were interpreted alongside the standardized indirect-effect estimates; future replications are encouraged to corroborate these findings using bootstrapped confidence intervals for the indirect effects, which do not rely on the normality assumption and provide a more robust test of mediation.

RESULT AND DISCUSSION

Descriptive Analysis

All four variables were categorized positively based on respondent assessments. The overall mean scores and categorizations are presented in Table 2.

Table 2. Descriptive Analysis Summary of Research Variables

Variable	Mean Score	Std. Dev.	Min	Max	Category
Motivation (MO)	4.19	0.10	4.06	4.32	Good
Interaction (IN)	4.02	0.20	3.79	4.25	Good
Satisfaction (KEP)	4.05	0.06	3.94	4.12	Good
Academic Performance (AC)	4.04	0.01	4.03	4.05	Good

For motivation, the highest scoring indicator was MO5 Technology use increases motivation to understand course material with a mean of 4.32 and a very good interpretation, while the lowest was MO3 Desire to learn increases through Tuton with a mean of 4.06 and a good interpretation. This pattern suggests that students' motivational engagement is more closely associated with the practical value of technology than with intrinsic interest in Tuton itself, which is in line with Technology Acceptance Model research distinguishing perceived usefulness from enjoyment (Davis, 1989). For interaction, the highest indicator was IN4 Tuton materials are beneficial even in the future with a mean of 4.25 and a very good interpretation, whereas the lowest was IN1 Easy to interact with other students and tutors with a mean of 3.79 and a good interpretation. This finding indicates that students regard the course materials as useful, but they still experience some difficulty in interpersonal communication. As a result, the issue appears to be more related to system design and interaction features than to the quality of the learning content.

For satisfaction, all indicators were within the good category, with scores ranging from 3.94 to 4.12. The lowest was KEP3 Satisfied with tutor guidance with a mean of 3.94. Together with the low score on IN1, this result suggests that tutor student interaction remains the least developed aspect of the Tuton experience and may require further improvement. The academic performance variable showed the narrowest range, with means from 4.03 to 4.05 and a standard deviation of 0.01. This suggests a very consistent pattern of responses which could be indicative of the characteristics of the sample, especially the use of purposive sampling with active and engaged learners.

Measurement Model (CFA) Results

The measurement model was tested using first-order Confirmatory Factor Analysis (CFA). Results confirmed that all indicators for all variables demonstrated good validity and reliability, as presented in Table 3.

Table 3. Summary of CFA Results – Loading Factor, CR, and AVE

Variable	Indicators	Loading Factor Range	CR	AVE	Conclusion
Motivation	MO1–MO5	0.729 - 0.878	0.911	0.672	Valid & Reliable
Interaction	IN1–IN4	0.744 - 0.855	0.889	0.667	Valid & Reliable
Satisfaction	KEP1–KEP6	0.844 - 0.884	0.946	0.746	Valid & Reliable
Academic Performance	AC1–AC3	0.870 - 0.893	0.912	0.776	Valid & Reliable

All the standardized factor loadings (λ) were above 0.50, CR values were above 0.70, and AVE values were above 0.50, confirming convergent validity and construct reliability for all the

measured variables (Hair, 2019). Satisfaction had the highest AVE (0.746) and CR (0.946) among all variables indicating the strongest construct reliability.

Structural Model Results and Goodness of Fit

Sample size requirement was far exceeded with a sample size of 877. The assumption of multivariate normality was not met (critical ratio=164.971 > ±2.58) and thus, the assumption of normality can be considered acceptable due to the Central Limit Theorem, especially for large samples (Kwak & Kim, 2017). Furthermore, no evidence of serious multicollinearity was found.

The structural model was estimated using Maximum Likelihood Estimation (MLE), producing two structural equations:

$$KEP = 0.213 \times MO + 0.734 \times IN, R^2 = 0.845 \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$AC = 0.194 \times MO + 0.484 \times IN + 0.332 \times KEP, R^2 = 0.938 \ldots\ldots\ldots\ldots (2)$$

Equation 1 shows the variation in student satisfaction explained by motivation and interaction is 84.5%. This is a large explanatory effect and denotes a strong conceptual relationship between both predictors and the satisfaction construct in the Tuton context. As shown in equation 2, together motivation, interaction and satisfaction explain 93.8% of the variation in academic achievement. While these R^2 values are very high by social science standards, they should be interpreted with caution. However, high R2 values are not uncommon in SEM studies with large samples, and they do not necessarily imply overfitting, especially when the model fit indices provide evidence of an adequate fit between the model and the data. The RMSEA was 0.055, the GFI was 0.943 and the CFI was 0.978 (Byrne, 2016). At the same time, the relatively high R^2 for academic performance may partly reflect the self-reported nature of the measure, since students assessed their own GPA and grade satisfaction alongside satisfaction-related variables. More specifically, an R^2 of 0.938 implies that 93.8 percent of the variance in academic performance is accounted for by only three predictors, which is exceptionally high for a phenomenon that is typically multifactorial in nature. Although Harman's single-factor test indicated that common method variance was not the dominant source of variance (31.4 percent), it cannot fully rule out the possibility that the shared self-report format inflated the observed associations and, consequently, the explained variance. This value should therefore be read as an upper-bound estimate that is likely influenced to some degree by common method bias, and future studies incorporating objective performance data (e.g., registrar-verified GPA or learning-analytics indicators) are needed to establish its robustness. This issue should be considered as a methodological limitation. The goodness-of-fit results are presented in Table 4.

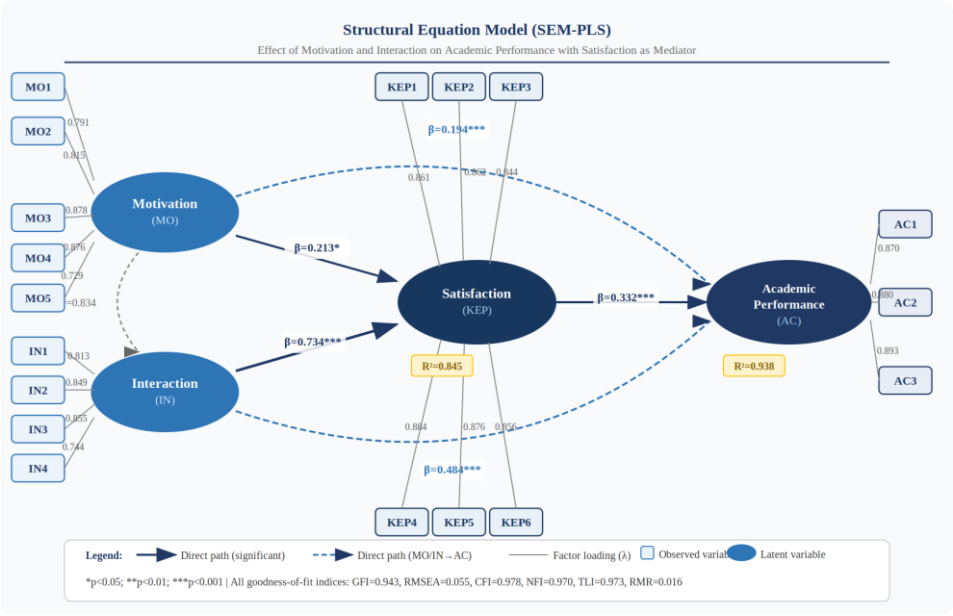


Figure 1. Structural Equation Model (SEM-PLS) – Path Diagram with Standardized Coefficients
Note: *p<0.05; ***p<0.001 | Solid arrows: main structural paths Dashed arrows: direct paths (MO/IN→AC) | R^2(KEP)=0.845; R^2(AC)=0.938

Table 4. Goodness of Fit Indices of the Structural Model

GOF Index	Acceptable Threshold	Model Value	Conclusion
GFI (Yang & Lin, 2023)	≥ 0.9 (Good Fit)	0.943	Good Fit
RMR(Yadav & Tandel, 2021)	≤ 0.05 (Good Fit)	0.016	Good Fit
RMSEA(Pauls & Daseking, 2021)	≤ 0.08 (Acceptable Fit)	0.055	Good Fit
TLI(Azhra et al., 2023)	≥ 0.9 (Good Fit)	0.973	Good Fit
NFI(Wicaksono et al., 2024)	≥ 0.9 (Good Fit)	0.970	Good Fit
AGFI(Yang & Lin, 2023)	≥ 0.9 (Good Fit)	0.923	Good Fit
RFI(Liu et al., 2021)	≥ 0.9 (Good Fit)	0.963	Good Fit
CFI(Azhra et al., 2023)	≥ 0.9 (Good Fit)	0.978	Good Fit
IFI(Hidayat & Patricia Wulandari, 2022)	≥ 0.9 (Good Fit)	0.978	Good Fit
PNFI(Bardakci et al., 2021)	> 0.5 (Good Fit)	0.805	Good Fit

All ten goodness-of-fit indicators met the good fit criteria, confirming that the theoretical model has adequate fit with the empirical data and that hypothesis testing can proceed.

Hypothesis Testing Results

A summary of the results of all seven hypothesis tests is shown in Table 5. The hypotheses were all accepted as the path coefficients, t-values and p-values met the predetermined acceptance criteria at 0.05 level of significance.

Table 5. Summary of Hypothesis Testing Results

Hyp.	Path	Path Coeff. (β)	t-value	p-value	Conclusion
H1	Motivation → Satisfaction	0.213	4.708	0.000	Accepted
H2	Interaction → Satisfaction	0.734	14.305	0.000	Accepted
H3	Satisfaction → Academic Performance	0.332	5.909	0.000	Accepted
H4	Motivation → Academic Performance	0.194	5.423	0.000	Accepted
H5	Interaction → Academic Performance	0.484	7.602	0.000	Accepted

H6	Motivation → Satisfaction → Academic Perf.	0.071	3.682	0.000	Accepted
H7	Interaction → Satisfaction → Academic Perf.	0.244	5.461	0.000	Accepted

H1: Effect of Motivation on Satisfaction. Motivation positively and significantly affects student satisfaction, with a coefficient of 0.213, a t-value of 4.708, and a p-value of 0.000. This finding is consistent with Deci & Ryan (1985), Self-Determination Theory theory that says intrinsically motivated students are more likely to be satisfied because they learn for the sake of learning and not due to external pressure. In the Tuton context, students with higher motivation are more likely to participate in discussion forums, persist with technically demanding course materials and control their pace of learning independently. These practices make for a more engaging and satisfying learning experience. The result is in line with Alqurashi; Huang et al. (2019; 2019). who also reported positive associations between motivation and satisfaction in online learning settings.

At the same time, the effect of motivation is notably weaker than the effect of interaction, which has a coefficient of 0.734. This finding differs somewhat from studies such as Hartnett et al.; Kuo et al (2011; 2014) which emphasized motivation as a central determinant of online learning satisfaction. In the context of UT's asynchronous Tuton model, however, this difference is understandable. Because students often study independently without real-time instructor presence, satisfaction may depend more strongly on the availability and quality of interaction than on motivational factors alone. From this perspective, motivation appears to be an important but not sufficient condition for satisfaction, particularly in learning environments where interaction opportunities are limited.

H2: Interaction Effect on Satisfaction Interaction had the biggest direct effect on satisfaction (Coefficient = 0.734, t-value = 14.305, p-value = 0.000). This implies that interaction is an important predictor of student satisfaction in the Tuton environment. Following Moore's Interaction Theory (1989), it is believed that the quality and intensity of interaction will form the overall experience of the learners. However, the strength of the effect in this study appears to be larger than that reported in many earlier investigations. Online learning is one of the most appreciated parts of online learning. Martin & Bollige (2018) while learner-instructor contact is significant but less dominant while (Kuo et al., 2014).

A reasonable explanation is that UT's Tuton system places interaction at the centre of the learning experience. In this asynchronous model, discussion forums often serve as the primary, and in some courses the only, formal channel of academic contact between students and tutors. As a result, students' perception of course quality may depend heavily on the quality of these interactions. Students' evaluation of the learning experience is positively related to responsive, clear and supportive interaction. This could be why the interaction-satisfaction relationship is very strong in this context as opposed to blended/hybrid learning contexts where the face-to-face contact might reduce the dependence on online interaction.

On the other hand, the lower score for IN1, ease of interaction, with a mean of 3.79, indicates that there is a scope of improvement. While interaction has a strong positive effect on satisfaction, institutions should further reduce the barriers in communication channels, so that students can interact with tutors and peers more easily and consistently.

H3: Effect of Satisfaction on Academic Performance. Student satisfaction has a positive and significant effect on academic performance, with a path coefficient of 0.332, a t-value of 5.909, and a p-value of 0.000. This finding supports the Oliver's (1980) theory of customer satisfaction, that the higher the satisfaction of students with learning experiences, the more likely students will show higher commitment, higher effort, and better academic outcomes. Satisfied students are more likely

to engage with course materials, persevere through academic challenges, and perform better in the online learning environment (Rice, 2022).

The coefficient value suggests a moderate influence meaning that contentment is a significant prediction of academic success but not the only predictor. This is in line with the idea that performance is affected by various aspects like motivation, interaction, prior knowledge and learning methodologies. At the same time, this finding is essential since it fills a vacuum in the literature. Satisfaction has been mostly seen as an outcome variable in previous studies particularly Masa'deh et al.; Ouajdouni (2023; 2024), whereas the present study shows that satisfaction also functions as a predictor of academic performance. Satisfaction, in this sense, seems to play a dual role: it is affected by learning experiences, and it also helps in transforming those experiences into academic outcomes.

H4 and H5: The Direct Influence of Motivation and Interaction on Academic Achievement. Motivation with a coefficient value of 0.194 and a t-value of 5.423, as well as interaction with a coefficient of 0.484 and a t-value of 7.602, both showed a positive and significant direct influence on academic achievement. These findings show that the influence of both not only runs through satisfaction but also contributes directly to students' academic achievement. This pattern of partial mediation is theoretically important as it suggests that satisfaction does not fully mediate the relationship between motivation and interaction with academic achievement. In other words, motivation and interaction work through more than one pathway, either through the cognitive-affective pathway through satisfaction or through the direct behavioural pathway related to engagement and cognitive support.

The coefficient of the greater direct pathway of interaction than motivation indicates that interaction has a relatively stronger role in driving academic achievement. These findings are consistent with Vygotsky's view that social interaction is a significant component of cognitive development as students develop academic competence through dialogue and exchange with other more competent parties. For Tuton, the findings indicate that improving the quality of interaction could be a significant institutional priority. These results require a careful interpretation at the same time. Although interactions show greater direct influence, this does not mean that motivation is less important. Motivation still has a significant contribution to academic achievement, although the magnitude of the effect is smaller than interaction. Therefore, these results are more accurately understood as an indication that both variables are equally relevant, but with different powers of influence.

Moreover, these results contradict some studies in motivation-rich learning contexts such as face-to-face learning or gamification-based e-learning (Salman et al., 2024) which emphasize the salient role of motivation in performance. The differences suggest that the relative importance of motivation and interaction as determinants of academic achievement may depend on the context of learning, including the extent to which opportunities for interaction are available in a learning environment.

H6 and H7: Mediating role of satisfaction. The results of Sobel test indicated that satisfaction significantly mediates the relationship between motivation and academic achievement with indirect effect of 0.071 and t value of 3.682 and the relationship between interaction and academic achievement with an indirect effect of 0.244 and t value of 5.461. The partial mediation pattern, where both direct and indirect pathways are significant, suggests that satisfaction is a reinforcer rather than a total substitute for the direct effect of motivation and interaction. The magnitude of the mediating effect of interaction which is significantly higher than motivation through satisfaction shows that interaction has a more dominant role in this system. Thus, interactions not only provide

a stronger direct influence on academic achievement but also generate additional gains through greater satisfaction. These findings directly address the second gap identified in the introduction. Previous studies have tended to place satisfaction as an end result, rather than as a mediation mechanism, so its role as a bridge has been theoretically estimated but has not been empirically confirmed in the context of distance learning in Indonesia. Through simultaneous confirmation of both mediation pathways with a large sample-based SEM approach and verification of the Sobel test, this study provides empirical support for the mediating role of satisfaction in this educational ecosystem, although the cross-sectional design means that this evidence is associational rather than strictly causal.

Overall, a model that places motivation and interaction as antecedents, satisfaction as mediators, and academic achievement as outputs, represents one of the study's main conceptual contributions. Within the boundaries of a cross-sectional, single-institution design, the model offers a structured causal account of how psychological and interactional input can be translated into academic achievement in the context of the largest distance education institution in Indonesia.

CONCLUSION

This study provides empirical evidence based on a large-scale Structural Equation Modelling analysis of 877 online tutorial students at Universitas Terbuka that motivation and academic interaction are significant determinants of student satisfaction and academic performance in the distance learning environment in Indonesia. The main conclusions can be summarized as follows: intrinsically driven learners have improved academic performance, both directly and through the mediator of increased pleasure. Moreover, the quality of academic engagement is the major driver in this ecosystem, which impacts the student pleasure and therefore academic accomplishment the most. It has been confirmed that student satisfaction is not only a by-product of good teaching but also an active bridge that amplifies the effects of motivation and interaction on the final academic outcomes, supporting its mediating role as theoretically informative and practically relevant in the Indonesian distance learning context.

The findings are directly and practically relevant to the management of online higher education institutions in Indonesia and similar developing country environments. The institutional focus must be on systemic changes to the infrastructure of interaction – increasing standards of tutor responsiveness (e.g. mandatory 24-hour reply to windows), redesigning discussion forums to promote substantive peer-to-peer dialogue rather than transactional responses and embedding collaborative assignments which require genuine learner-learner interaction. From a motivation perspective, adaptive content delivery and tailored feedback mechanisms have been proven beneficial in maintaining intrinsic motivation Salameh ; Salman et al (2025; 2024) and should be scaled within UT's Tuton platform. From a theoretical perspective, the study makes several contributions to the literature. First, it empirically confirms the mediating effect of satisfaction in the motivation-performance and interaction-performance chains in a non-Western, mass-scale distance education context. In so doing, the study extends the applicability of SDT and Moore's Interaction Theory beyond their original contexts. However, this study has recognized limitations that should be addressed by future researchers: the cross-sectional design precludes causal inferences about long-term developmental trajectories; the sample, although large, is bounded to UT students and may not generalize to other Indonesian universities or international distance learning institutions; and the instruments, though validated, measure self-reported perceptions rather than objective behavioral indicators of interaction or motivation. Future research should consider longitudinal designs to track the development of motivation and interaction over the course of

academic semesters; examine possible moderating variables such as student age, study program and digital literacy; and investigate whether the satisfaction-as-mediator model holds equivalently across different faculties or disciplines within the diverse program portfolio at UT.

DECLARATION OF AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the authors did not use AI-assisted writing tools. All content was developed, written, and reviewed by the authors, who take full responsibility for the accuracy and integrity of this publication.

ACKNOWLEDGEMENT

The authors would like to express sincere gratitude to Universitas Terbuka for institutional support, to all student respondents who voluntarily participated in this study, and to colleagues who provided valuable feedback during manuscript preparation. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.
Author 4: Formal analysis; Methodology; Writing - original draft.
Author 5: Supervision; Validation.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

Alqurashi, E. (2019). Predicting student satisfaction and perceived learning within online learning environments. *Distance Education*, *40*(1), 133–148. https://doi.org/10.1080/01587919.2018.1553562

Alzahrani, D. M. G. (2017). The Effect of Using Online Discussion Forums on Students' Learning. *The Turkish Online Journal of Educational Technology*, *16*(1).

Amoozegar, A., Abdelmagid, M., & Anjum, T. (2024). Course satisfaction and perceived learning among distance learners in Malaysian Research Universities: The impact of motivation, self-efficacy, self-regulated learning, and instructor immediacy behaviour. *Open Learning: The Journal of Open, Distance and e-Learning*, *39*(4), 387–413. https://doi.org/10.1080/02680513.2022.2102417

Azhra, S. Y., Alsamiri, Y., & Putro, N. H. P. S. (2023). The Emotional Intelligence and Burnout of In-service English Teachers in Yogyakarta. *Jurnal Penelitian Dan Evaluasi Pendidikan*, *27*(2), 257–268. https://doi.org/10.21831/pep.v27i2.68992

Bardakci, S., Cayci, K., Colkesen, A., & Fatih, A. (2021). How to become a constructivist teacher: The impact of philosophical thoughts on constructivist learning beliefs. *Research in Pedagogy*, *11*(1), 214–233. https://doi.org/10.5937/IstrPed2101v214B

Byrne, B. M. (2016). *Structural Equation Modeling With AMOS: Basic Concepts, Applications, and Programming, Third Edition* (0 ed.). Routledge. https://doi.org/10.4324/9781315757421

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Dawadi, S., Goshtasbpour, F., & Kukulska-Hulme, A. (2024). Equitable Access to Higher Education Learning and Assessment: Perspectives from Low-Resource Contexts. *Journal of Interactive Media in Education*, *2024*(1), 2. https://doi.org/10.5334/jime.832

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. Springer US. https://doi.org/10.1007/978-1-4899-2271-7

Hair, J. F. (2019). *Multivariate data analysis* (Eighth edition). Cengage.

Harsasi, M., & Sutawijaya, A. (2018). Determinants of Student Satisfaction in Online Tutorial: A Study of A Distance Education Institution. *Turkish Online Journal of Distance Education*, *19*(1), 89–99. https://doi.org/10.17718/tojde.382732

Hartnett, M., St. George, A., & Dron, J. (2011). Examining motivation in online distance learning environments: Complex, multifaceted and situation-dependent. *The International Review of Research in Open and Distributed Learning*, *12*(6), 20. https://doi.org/10.19173/irrodl.v12i6.1030

Hidayat, R. & Patricia Wulandari. (2022). Data Analysis Procedures with Structural Equation Modelling (SEM): Narrative Literature Review. *Open Access Indonesia Journal of Social Sciences*, *5*(6), 859–865. https://doi.org/10.37275/oaijss.v5i6.142

Huang, F., Teo, T., & Zhou, M. (2019). Factors Affecting Chinese English as a Foreign Language Teachers' Technology Acceptance: A Qualitative Study. *Journal of Educational Computing Research*, *57*(1), 83–105. https://doi.org/10.1177/0735633117746168

Kuo, Y.-C., Walker, A. E., Schroder, K. E. E., & Belland, B. R. (2014). Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. *The Internet and Higher Education*, *20*, 35–50. https://doi.org/10.1016/j.iheduc.2013.10.001

Kwak, S. G., & Kim, J. H. (2017). Central limit theorem: The cornerstone of modern statistics. *Korean Journal of Anesthesiology*, *70*(2), 144. https://doi.org/10.4097/kjae.2017.70.2.144

Liu, M., Jacob, R., Belusko, M., Riahi, S., & Bruno, F. (2021). Techno-economic analysis on the design of sensible and latent heat thermal energy storage systems for concentrated solar power plants. In *Renewable Energy* (Vol. 178). Elsevier BV. https://doi.org/10.1016/j.renene.2021.06.069

Martin, F., & Bolliger, D. U. (2018). Engagement Matters: Student Perceptions on the Importance of Engagement Strategies in the Online Learning Environment. *Online Learning*, *22*(1), Article 1. https://doi.org/10.24059/olj.v22i1.1092

Masa'deh, R., Almajali, D., Alrowwad, A., Alkhawaldeh, R., Khwaldeh, S., & Obeidat, B. (2023). Evaluation of factors affecting university students' satisfaction with e-learning systems used dur-ing Covid-19 crisis: A field study in Jordanian higher education institutions. *International Journal of Data and Network Science*, *7*(1), 199–214. https://doi.org/10.5267/j.ijdns.2022.11.003

Means, B., Toyama, Y., Murphy, R., & Baki, M. (2013). The Effectiveness of Online and Blended Learning: A Meta-Analysis of the Empirical Literature. *Teachers College Record: The Voice of Scholarship in Education*, *115*(3), 1–47. https://doi.org/10.1177/016146811311500307

Meri-Yilan, S. (2022). (Re)considering Motivational Scaffolding: A Mixed-Method Study on Turkish Students' Perspectives on Online Learning Before and During the Pandemic. *Open Praxis*, *14*(3), 179–189. https://doi.org/10.55982/openpraxis.14.3.466

Moore, M. G. (1989). Editorial: Three types of interaction. *American Journal of Distance Education*, *3*(2), 1–7. https://doi.org/10.1080/08923648909526659

Oliver, R. L. (1980). *A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions* -. https://journals.sagepub.com/doi/abs/10.1177/002224378001700405

Ouajdouni, A. (2024). E-Learning in Morocco: Definitions and Leading Approaches for Assessing the Success of Information Systems. In S. Goundar (Ed.), *Massive Open Online Courses—Learning Frontiers and Novel Innovations*. IntechOpen. https://doi.org/10.5772/intechopen.1006484

Pauls, F., & Daseking, M. (2021). Revisiting the Factor Structure of the German WISC-V for Clinical Interpretability: An Exploratory and Confirmatory Approach on the 10 Primary Subtests. *Frontiers in Psychology*, *12*, 710929. https://doi.org/10.3389/fpsyg.2021.710929

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Rahmani, A. M., Groot, W., & Rahmani, H. (2024). Dropout in online higher education: A systematic literature review. *International Journal of Educational Technology in Higher Education*, *21*(1), 19. https://doi.org/10.1186/s41239-024-00450-9

Rice, M. F. (2022). OLJ December 2022 26(4). *Online Learning*, *26*(4). https://doi.org/10.24059/olj.v26i4.3752

Salameh, W. A. K. (2025). Exploring the impact of AI-driven real-time feedback systems on learner engagement and adaptive content delivery in education. *International Journal of Science and Research Archive*, *14*(2), 098–104. https://doi.org/10.30574/ijsra.2025.14.2.0299

Salman, O. K., Khasawneh, Y. J. A., Alqudah, H., Alwaely, S. A., & Khasawneh, M. A. S. (2024). Tailoring gamification to individual learners: A study on personalization variables for skill enhancement. *International Journal of Data and Network Science*, *8*(2), 789–796. https://doi.org/10.5267/j.ijdns.2023.12.025

Sun, P.-C., Tsai, R. J., Finger, G., Chen, Y.-Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, *50*(4), 1183–1202. https://doi.org/10.1016/j.compedu.2006.11.007

Wicaksono, P. A., Sari, D. P., Azzahra, F., & Sa'adati, N. A. (2024). Analysis of Consumer Behaviour in Purchasing Second-Hand Fashion Products: An Extended Theory of Planned Behaviour Model. *International Journal of Sustainable Development and Planning*, *19*(8), 2955–2964. https://doi.org/10.18280/ijsdp.190813

Xu, D., Avakian Orona, G., & Li, Q. (2025). Interaction-oriented Instructional Practices Show Promise in Enhancing Overall Performance and Narrowing Racial Achievement Gaps in College Online Courses. *Online Learning*, *29*(3). https://doi.org/10.24059/olj.v29i3.4626

Yadav, M., & Tandel, B. (2021). Structural Equation Model-Based Selection and Strength Co-Relation of Variables for Work Performance Efficiency Under Traffic Noise Exposure. *Archives of Acoustics*, 155–166. https://doi.org/10.24425/aoa.2021.136569

Yang, H.-H., & Lin, J.-Y. (2023). Students' persistence intention in MOOCs in the psychomotor domain: An extended 3P model of the teaching and learning perspective. *Frontiers in Psychology*, *14*, 1094138. https://doi.org/10.3389/fpsyg.2023.1094138

Copyright Holder :
© Meirani Harsasi et al. (2026).

First Publication Right :
© International Journal of Educational Narratives

This article is under:

