



The Role of Distance Learning in Shaping Indonesia Golden Generation: Student Interaction, Engagement, and Satisfaction

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ABSTRACT

This research explores the critical role of student interaction in enhancing engagement and satisfaction in the context of Open and Distance Learning (ODL) at the Open University in Indonesia. Amidst the increasing adoption of digital education platforms, this study examines how dynamic and effective student interactions and engagement influence educational satisfaction outcomes in online environments. Using a quantitative approach, this study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyse responses from 120 students who participated in online tutorial sessions. The findings reveal that student interaction significantly increases student satisfaction and engagement, with engagement serving as a mediating factor that improves the overall educational experience. This study confirms that high-quality interactions are essential for student engagement and satisfaction and emphasises the need for educational platforms that support strong interactive features and prompt instructor feedback. This research contributes to the literature by emphasising the important role of interaction and engagement in ODL settings and suggests practical implications for educational practitioners and policy makers. Enhancing interactive experiences in online learning can facilitate higher levels of student engagement and satisfaction, thereby supporting the formation of a competitive and adaptive golden generation in Indonesia's digital era.

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INTRODUCTION

The use of technology in education, especially through digitalisation, is an important factor in improving the quality of education in Indonesia (Hidayat et al., 2022). The digitisation of education, which includes a change from administrative services to learning processes, has made distance learning more attractive, as done by the Open University (Zuhairi et al., 2019). As a pioneer of distance education in Indonesia, Open University has set an example for other

educational institutions, especially during the Covid-19 pandemic, when online learning became a necessity.

Globally, online education removes geographical boundaries, allowing students to learn from various locations, which has been integrated into the curriculum of many universities (Wu & Hung, 2018). Online learning provides various advantages, such as easy access to information, personalisation in teaching, and flexibility in learning, all of which support student interaction and engagement (Xu et al., 2020). However, the shift from conventional to online learning requires special attention to student interaction, which has been shown to improve collaboration and learning outcomes (Zhao & Watterston, 2021).

In the context of distance learning at open universities, students often experience limitations in interacting with classmates, tutors and materials, due to the asynchronous nature of the e-learning system, where communication is one-way (Wahyuningsih et al., 2019). Questions asked by students will only be answered when they or their tutors are online, resulting in delays in interaction. To improve learning effectiveness, we encourage tutors to be more active in online learning sessions and ensure the system provides quick responses, as ease of interaction is key to success in the learning process.

Previous research has shown that student interaction in an online learning context is critical to improving student satisfaction. According to Abdalbaki et al., (2018) and Yuce et al., (2019), interaction in discussion forums is one of the effective methods to increase student satisfaction, as it helps students feel more comfortable and engaged in the learning process. In addition, Zhao & Watterston, (2021) argue that successful online courses are often those that allow easy and diverse interaction, which adapts to the various learning needs of students. This suggests that the quality of interaction directly contributes to the level of student satisfaction. Quality interactions between students and learning materials, as well as between students and instructors, significantly influence students' positive perceptions of their learning experience (Lin et al., 2023; Martin & Bolliger, 2018).

Student engagement in online learning can be enhanced through effective and continuous interaction (Bonthu & Dayal, 2022). According to Trowler et al., (2022), student engagement is a multi-dimensional construct, which includes behavioural, emotional and cognitive dimensions, all of which can be enhanced through effective interactions. Furthermore, Bond et al., (2020) and Gledson et al., (2021) observed that students' behavioural engagement, such as the number of videos viewed and forum posts made, are important indicators of student engagement that can be enhanced through dynamic interaction. This suggests

that interaction plays an important role in motivating students to invest in the learning process, both online and offline.

Student engagement in learning is often associated with higher levels of satisfaction (Kandiko Howson & Matos, 2021). According to Nordmann et al., (2020), continuous engagement of students in the learning process is key to achieving the desired learning objectives, which directly correlates with student satisfaction. Research by (Bolliger & Halupa, 2018) also showed A significant positive relationship between the engagement of students and the satisfaction of students in the context of online programmes. This confirms that when students feel engaged, they tend to be more satisfied with their learning experience, which in turn affects their academic success.

Research by Gray & Diloreto, (2016) has found that Student engagement is mediating the relationship between instructor presence and student satisfaction, suggesting that interaction has a direct effect on satisfaction as well as increasing student engagement. In the context of online learning, effective interaction can facilitate greater engagement, which further contributes to increased satisfaction. Student engagement, as a mediator, bridges the gap between social interaction and academic satisfaction, providing further evidence that interactive and engaging learning experiences are key to achieving high learning satisfaction (Martin & Bolliger, 2018).

While many previous studies have addressed student interaction, engagement and satisfaction in the context of online learning, this study has a more specific focus on Open and Distance Learning (ODL) at the Open University of Indonesia. Research by Abdulbaki et al., (2018) emphasised the importance of discussion methods in increasing satisfaction, but did not consider the specific context of asynchronous ODL. Meanwhile, research by Zhao & Watterston, (2021) identified changes needed in post-COVID-19 education, but did not provide practical guidance for effective interaction in ODL.

Additionally, research by Kim & Kim, (2021) explains the relationship between satisfaction and academic achievement, but does not highlight the unique factors that influence students' experiences at open universities. Research by Bonthu & Dayal, (2022) emphasised the integration of social media to increase engagement, but did not explore its impact on student satisfaction in the context of online tutorials. Research by Nordmann et al., (2020) provides guidelines for online transitions, but does not focus on dynamic interactions in ODL.

Thus, the aim of this study is to analyse the influence of student interactions on their satisfaction and engagement in online tutorials at the Open

University. This research aims to fill the gap in the existing literature and provide deeper insights into how online learning technologies can be used to shape an adaptive and competitive golden generation of Indonesians in the digital era. By analysing the specific context of ODL, this research is expected to provide practical recommendations for educational institutions to improve students' overall learning experience.

RESEARCH METHODE

This research is quantitative in nature, focusing on exploring causal relationships. Utilizing a cross-sectional survey approach. Partial Least Square Structural Equation Modelling (PLS-SEM) is used to assess the hypotheses. The sample for this research consisted of students attending “Tuton” sessions at open universities across Indonesia, who were chosen due to their participation in Open Distance Education programs using purposive sampling. Questionnaires were distributed via student groups and were collected over a period of two weeks. In this process, a total of 120 students from various faculties were sampled. As per Hair & Alamer, (2022), the sample size should be 5-10 times the number of indicator variables; thus, with 18 indicators, the minimum sample size required would be 90 respondents ($18 \times 5 = 90$). Consequently, the number of respondents in this study exceeds the minimum threshold.

The data analysis in this research unfolds in several phases (Sholihin & Ratmono, 2021). Initially, there is an assessment of the model fit and quality indices to assess the model's effectiveness in this study. Next, the validation of measurement scales is conducted to examine internal consistency reliability, along with convergent and discriminant validity. Additionally, a test for common method variance is performed to check for any potential method bias in the data. Finally, the structural model is evaluated to test the research hypotheses proposed.

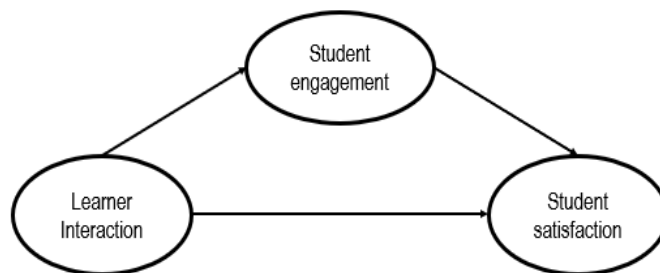


Figure 1.
Theoretical model

Measures

Learner Interaction was assessed using seven statement items developed by Gray & Diloreto, (2016). The students were queried about their perceptions of interactions among students during tutorial sessions ("tuton"). Examples of the Learner Interaction items include "I frequently interacted with other students in the course" and "I received ongoing feedback from my classmates". The items were evaluated on a seven-point Likert scale, with scores ranging from 1 (indicating strong disagreement) to 7 (indicating strong agreement).

Student Engagement was measured with five statement items, also developed by Gray & Diloreto, (2016). The students were asked about their participation in tutorial session activities. Sample items for Student Engagement include "I frequently interacted with my instructor of this course" and "I was not actively engaged in the activities required in the course". The items were evaluated on a seven-point Likert scale, with scores ranging from 1 (indicating strong disagreement) to 7 (indicating strong agreement).

Furthermore, Student Satisfaction was assessed using five statement items developed by Gray & Diloreto, (2016). The students were asked about their satisfaction with their learning experiences using tutorials. Sample items for Student Satisfaction are "I am satisfied with my overall experience in this course" and "I am satisfied with the content of the course". The items were evaluated on a seven-point Likert scale, with scores ranging from 1 (indicating strong disagreement) to 7 (indicating strong agreement).

RESULT AND DISSCUSSION

Table 1.

Details of Participant Demographics

Variable	Frequency	
	Total sample	Total percentace
Gender		
Male	39	32,6%
Female	82	68,4%
<i>Age</i>		
Under 20 years	22	18,3%
21 to 25 years	63	52,5%
26 to 30 years	30	25%
Over to 31 years	5	4,2%
Semester		
1 to 4 Semester	56	46,7%
5 to 8 Semester	62	51,7%
Over to 9 Semester	2	1,6%

Variable	Frequency	
	Total sample	Total percentage
Faculty		
Faculty of Economics and Business	22	18,3%
Faculty of Teacher Training and Education	42	35%
Faculty of Law, Social and Political Science	40	33,3%
Faculty of Math and Science	16	13,4%

The table 1 provided showcases the demographic breakdown of a sample consisting of 121 respondents. Regarding gender distribution, there are 39 male respondents (32.6%) and 82 female respondents (68.4%), indicating a higher representation of females in the sample. The age groups are segmented as follows: 22 respondents are under 20 years old (18.3%), the majority, 63 respondents, fall within the 21 to 25 years age range (52.5%), 30 respondents are between 26 to 30 years old (25%), and a smaller group of 5 respondents are over 31 years old (4.2%). This suggests that the sample predominantly consists of young adults, primarily in their early to mid-twenties.

In terms of academic progression, 56 respondents are in their first to fourth semesters (46.7%), 62 are in their fifth to eighth semesters (51.7%), and only 2 respondents have progressed beyond the ninth semester (1.6%), highlighting that most respondents are in the middle or later stages of their academic journeys. The respondents are also distributed across different faculties. The Faculty of Teacher Training and Education has the highest representation with 42 respondents (35%), followed closely by the Faculty of Law, Social and Political Sciences with 40 respondents (33.3%). The Faculty of Economics and Business comprises 22 respondents (18.3%), and the Faculty of Mathematics and Sciences is the least represented with 16 respondents (13.4%).

Table 2.

Indices of model fit and quality

Parameters	Value	Rule of Thum
Avarage path coefficient (APC)	0.568***	p-value<0,05
Avarage R-squared (ARS)	0.684***	p-value<0,05
Avarage block VIF (AVIF)	2.458	<3,3
Tenenhaus (GoF)	GoF 0.686	≥ 0,10 (<i>small effect size</i>), ≥ 0,25 (<i>Medium effect size</i>), dan ≥ 0,36 (<i>large effect size</i>)
Q-Square coefficient	(Q ²)	> 0 (<i>acceptable predictive model</i>)

Parameters	Value	Rule of Thum
Student engagement	0.589	
Student satisfaction	0.762	

Note: ***p < 0.001

PLS analysis was utilized to evaluate the fit and quality indices of the model in this study, which include the average R-square (ARS), average path coefficient (APC), and average variance inflation factor (AVIF). The findings indicated that the model appropriately fits the data [ARS = 0.684 (p < 0.001); APC = 0.568 (p < 0.001); AVIF = 2.458]. VIF values below 3.3 confirm that the model does not suffer from multicollinearity issues. PLS analysis also calculated the goodness of fit (GoF) index. The GoF index is designed to assess the fit of both the outer and inner models in PLS. Threshold values for GoF are 0.1 (low), 0.25 (medium), and 0.36 (high). The computed GoF showed a value of 0.686, which exceeds the threshold of 0.36, indicating that the model performs well in this study. Additionally, the Q2 coefficient in Table 2 shows a value greater than zero, indicating that the model has an acceptable predictive validity.

Table 3.
Evaluation of Reflective Measurements

Construct	Items	Mean	SD	Loading	AVE	CR	<i>a</i>
Learner Interaction (LI)	LI1	5,308	1,59	0.844***	0.661	0.931	0.912
	LI2	5,758	1,216	0.725***			
	LI3	5,491	1,489	0.888***			
	LI4	6,108	1,136	0.743***			
	LI5	5,325	1,730	0.894***			
	LI6	5,541	1,505	0.829***			
	LI7	5,350	1,698	0.837***			
Student engagement (SE)	SE1	5,616	1,433	0.791***	0.615	0.889	0.843
	SE2	5,533	1,505	0.739***			
	SE3	5,925	1,342	0.826***			
	SE4	6,108	1,075	0.754***			
	SE5	5,925	1,217	0.809***			
Student satisfaction (SS)	SS1	5,875	1,325	0.910***	0.790	0.958	0.947
	SS2	5,775	1,331	0.861***			
	SS3	5,333	1,480	0.835***			
	SS4	5,833	1,361	0.906***			
	SS5	5,633	1,377	0.921***			
	SS6	5,783	1,264	0.897***			

Note: ***p < 0.001

To ensure the validity and reliability of measurements, it is necessary to first assess the internal consistency of the reliability for each variable. A

measurement scale for a variable is considered reliable if it has a composite reliability (CR) score and a Cronbach's alpha (α) value above 0.70. According to Table 3, each variable exceeds this threshold. This indicates that the variable measurement scales in this study demonstrate good reliability consistency.

The second step involves testing the validity of each variable. In convergent validity testing, each survey item is considered valid if it has a loading value of 0.70 or higher. Furthermore, convergent validity can also be assessed through the average variances extracted (AVE). A variable is deemed convergently valid if it achieves an AVE value of 0.50 or higher. According to Table 3 and 4, each variable exceeds this threshold, indicating that the variable measurement scales in this study demonstrate good validity consistency.

Table 4.
Correlations

Variable	Learner Interaction	Student Engagement	Student Satisfaction
Learner Interaction	0.819		
Student engagement	0.770***	0.809	
Student satisfaction	0.813***	0.784***	0.889

Note: Square roots (AVEs) shown on diagonal. Significant ***p < 0.001

Table 5.
Full Collinearity VIFs

Learner Interaction	Student engagement	Student satisfaction
2.955	3.225	3.961

This research gathered data simultaneously from the same source. To manage the risk of common method bias, the study employed full collinearity VIF to assess the issue. The findings (Table 5) indicate that each variable displays a value below 3.3, suggesting that the data in this study are unlikely to suffer from common method bias.

Table 6.
Hypothesis Testing Result

Model 1: Full Model	
Direct Effects	
Learner Interaction → Student satisfaction	0.512***
Learner Interaction → Student engagement	0.771***
Student engagement → Student satisfaction	0.422***
Model 2: Specific Indirect Effects	
Indirect effects	
Learner Interaction → Student engagement → Student satisfaction	0.325***

R ² (Student engagement)	0.595
R ² (Student satisfaction)	0.773

Notes: ***Significant at 0.001

The R-squared values for this model indicate that 59.5% of the variance in student engagement and 77.3% of the variance in student satisfaction can be explained by the variables measured in this study. This confirms that learner interaction plays a critical role in increasing engagement and satisfaction, which are vital for successful distance education programmes."

Strong statistical support for Hypothesis 1 (H1), where the path coefficient of 0.512 ($p < 0.001$) indicates that effective interaction between students can increase their sense of satisfaction with the learning experience. Hypothesis 2 (H2) also received strong support with a coefficient of 0.771 ($p < 0.001$), confirming that learner interaction plays an important role in increasing student engagement. Hypothesis 3 (H3) and Hypothesis 4 (H4) were also statistically valid with findings showing that student engagement increased their satisfaction ($b = 0.422$, $p < 0.001$) and significantly mediated the relationship between learner interaction and student satisfaction ($b = 0.325$, $p < 0.001$).

Discussion

Table 6 illustrate the path coefficients produced by the PLS-SEM analysis for the research model used in this study. The results of this study reveal that learner interaction significantly and positively impacts both student satisfaction and engagement within the context of distance learning at an open university. This underscores the critical role of interaction in creating a supportive learning environment.

Hypothesis 1 (H1) received robust statistical support, with a path coefficient of 0.512 ($p < 0.001$). This finding indicates that effective interaction among students not only enhances their satisfaction with the learning experience but also fosters a sense of belonging within the academic community. The results align with previous research by Abdalbaki et al., (2018) and Yuce et al., (2019), who identified that interactions in discussion forums significantly contribute to students' comfort and overall engagement in the learning process. This highlights the importance of creating platforms for interaction, such as discussion boards and group activities, which can facilitate meaningful connections among learners.

Moreover, Hypothesis 2 (H2) also received strong support, with a coefficient of 0.771 ($p < 0.001$), confirming that learner interaction is a key driver of student engagement. This suggests that interaction is not merely an ancillary aspect of learning; rather, it is integral to engaging students on multiple levels – behaviorally, emotionally, and cognitively, as outlined by Trowler et al., (2022).

The findings indicate that higher levels of interaction can lead to increased motivation and investment in the learning process, which is essential for success in an online learning environment.

In terms of Hypotheses 3 (H3) and 4 (H4), the results also demonstrated statistical validity. Student engagement was found to significantly increase satisfaction ($b = 0.422$, $p < 0.001$), highlighting the direct correlation between how engaged students feel and their overall satisfaction with the learning experience. Additionally, student engagement significantly mediated the relationship between learner interaction and student satisfaction ($b = 0.325$, $p < 0.001$). This mediation effect emphasizes the importance of engagement as a conduit through which interaction translates into satisfaction.

The results affirm that student engagement is vital for achieving satisfaction in distance learning, as noted by Bolliger & Halupa, (2018). When students feel engaged – actively participating in discussions, collaborating with peers, and interacting with course materials – they are more likely to perceive their learning experiences positively. This mediation further illustrates that social interactions in online learning environments are not merely supplementary; they are essential for building a satisfying educational experience.

In terms of practical implications, these findings suggest that universities delivering distance learning programmes need to focus their efforts on developing effective and dynamic learner interactions. For example, online learning platforms should be designed to facilitate easy and engaging discussions, as well as prompt feedback from lecturers, thereby increasing student engagement and satisfaction. In addition, training programmes for teachers can be developed to enhance their online presence and improve their interaction skills with students.

CONCLUSION

This research highlights the critical role of student interaction in enhancing engagement and satisfaction in Distance Education at the Open University. The findings indicate that effective interactions among students, teaching materials, and instructors positively impact student satisfaction and strengthen engagement in online learning. Additionally, increased student engagement serves as a significant mediator between interaction and academic satisfaction, emphasizing that an interactive learning experience is essential for achieving high levels of satisfaction. The study contributes to the literature on distance learning by suggesting that universities should prioritize dynamic interactions and design online platforms that facilitate engaging discussions

and prompt feedback.

However, the generalizability of these findings may be limited due to the small sample size of 120 students, necessitating further research with larger and more diverse groups, particularly in international contexts. Additionally, this study did not delve deeply into how specific interactions influence engagement, which presents opportunities for future qualitative research. Expanding the scope to include various demographic variables, comparing different course delivery methods, and examining factors like learner autonomy and course design will be essential for a more comprehensive understanding. Furthermore, exploring the relationship between student engagement and academic performance could provide valuable insights into educational outcomes.

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