Understanding Student Engagement in Hybrid Learning : An Analysis Impact Digital Literacy and Academic Self-Efficacy

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Abstract: This study analyzes student engagement in hybrid learning by analyzing digital literacy and academic self-efficacy. This study used a quantitative approach with the survey as a data collection method. The population in this study was 370 students, the faculty of teacher training and education at state universities in Jakarta, and private universities in Banten and Lampung. The sampling technique used was proportional random sampling, obtained by 105 respondents. Data was collected through questionnaires, and structural equation modeling (SEM) was used to analyze the relationship between constructs. The results of this study state that Digital literacy and academic self-efficacy play an important role in creating student engagement in hybrid learning. The ability of students to use digital learning resources will support active participation in the learning process. A high academic level of self-efficacy also helps them to be able to have confidence and perseverance during the learning process. Digital literacy and academic self-efficacy will bring students to be actively involved in the digital learning environment and play an essential role in shaping or maintaining student motivation and persistence in learning. Students' engagement levels can be increased by increasing their ability to use digital technology effectively and increasing their confidence that they can achieve their desired academic goals.

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Introduction

The use of technology in the field of education is necessary to improve the quality and quality of education nationally. *Digitalization* in education is defined as an overall transformation process starting from administrative services to learning process services and academic services (Tømte et al., 2019). The use of digital technology is increasingly popular in education and learning services (Wallace et al., 2022). The mode of online and hybrid learning services in educational institutions has increased after the implementation of the emergency learning era with hybrid mode during the Covid-19 pandemic (Foster-Hartnett et al., 2022; Kazu et al., 2022). The hybrid or blended learning strategy is a pedagogical approach to integrating interactive lessons with technological advances in a virtual learning environment (Migalang &; Azuelo, 2020). Hybrid learning can create a more flexible and engaging learning environment than fully online or face-to-face learning (Raes et al., 2020). Instructors in hybrid classrooms can also leverage a variety of relevant technologies in facilitating student engagement in learning (Ng et al., 2022).

Hybrid learning in practice refers to four main aspects: flexibility, interaction, learning facilities, and creating a conducive learning climate (Bruggeman et al., 2022). The use of learning resources in the form of interactive multimedia is considered an effective

hybrid learning tool (Rukayah et al., 2022). Meanwhile, for educators in particular, training is needed to implement hybrid learning mode well (Bedebayeva et al., 2022). The digital skills of educators are essential to facilitate active engagement in learning (Ng et al., 2022). Readjusting the curriculum and providing facilities and infrastructure are needed to create effective online learning (Plailek et al., 2022). Some other things that need to be considered include the characteristics, objectives, learning orientation, level of ability, readiness, and independence of student learning (Damrongpanit, 2022). Hybrid learning is a challenge for many parties, as research (Babin et al., 2022) states that students enrolled in hybrid learning have less than optimal performance in online learning sessions. Meanwhile, (Barnhart et al., 2022) stated that students prefer hybrid learning patterns over fully online learning. Students must develop self-regulated learning (SRL) to monitor their learning progress independently (Ali &; Hanna, 2021).

Digitalization in education, in turn, requires mastery of digital literacy by educators in order to provide effective learning services (Edeh et al., 2022). The implications of digitalization of education refer to the hierarchical design of learning content and the creation of learning materials by integrating technology as a form of learning efficiency (Ar et al., 2022). Teachers' digital literacy skills need to be integrated into learning meaningfully for students to empower them to acquire their digital skills independently (Riggs, 2022). The importance of mastering digital literacy is because technology has penetrated all aspects of life, where educators must accept digital change and transformation without obstacles (Alanoglu et al., 2022). In addition, at the higher education level, they must have basic academic skills such as digital literacy (Ahmed &; Roche, 2022). In teacher education programs, digital literacy significantly influences the learning process and shapes teachers' professional skills (Gökda &; Çam, 2022). Educational institutions play an essential role in guiding and shaping digital literacy so that they can contribute to the progress and development of individuals, society, and nationally (Reddy et al., 2022).

Academic self-efficacy is defined as self-confidence in his ability to achieve specific academic tasks, strongly influencing academic achievement (Tuyet Phan & Chen, 2022; Wei et al., 2022). Academic self-efficacy refers to a student's belief in his ability to master various academic challenges in higher education as an essential ingredient in creating learning success (van Zyl et al., 2022). Academic self-efficacy in digital era learning includes computer use, learning management systems, internet use, and data information (Calaguas &; Consunji, 2022). During the Covid-19 pandemic, hybrid learning causes stress and has broad implications for declining student academic performance performance (Wong &; Yuen, 2023). Providing rapid feedback and the level of academic self-efficacy can be a solution to creating learning effectiveness (Tran, 2022). Preparation and debriefing of students need to be prepared and debriefed to equip students to follow a hybrid learning system that is different from face-to-face learning (Salimi et al., 2022).

Active learning techniques as a principle in shaping students' academic experiences and need coaching in self-regulation and active participation of students in learning activities (Andres, 2020). Active participation in learning and a high cumulative achievement index (GPA) indicate students' high academic self-efficacy (Mornar et al., 2022). Active learning environments can also be influenced by social anxiety factors and the belief that students can complete an academic task (Hood et al., 2021). Educational institutions need to develop comprehensive learning strategies for students to improve academic self-efficacy aimed at improving academic performance (Fatima et al., 2022; Suryaratri et al., 2022). The dominant use of technology in hybrid learning has the potential to cause learning problems, such as academic procrastination due to excessive smartphone use. This problem of academic

cocrastination can be minimized by strengthening academic self-efficacy (Parmaksız, 2023), and also by increasing intrinsic motivation in the academic field (Bozgun &; Baytemir, 2021). Universities need to develop a curriculum with content that increases creativity, curiosity, and student involvement in learning (Ariani, 2022).

Student engagement in the learning process is essential in determining learning success in higher education (Cents-Boonstra et al., 2022; Tani et al., 2021). In online learning, involvement in learning is a significant problem influenced by factors beyond teachers' control (Al Shlowiy, 2022). The change in face-to-face learning patterns to hybrid learning causes problems related to engagement aspects, including emotional, cognitive, academic, and behavioral involvement in the online learning environment (Chaka et al., 2022; Karaoglan Yilmaz &; Yilmaz, 2022). This changing learning environment also affects the construction of student behavior so that it requires special attention and strategies in facilitating student learning activities (Al Mamun &; Lawrie, 2023).

The intensity of student involvement in learning can be used as an indicator of student progress in learning (Veerasamy et al., 2022). Teachers can facilitate student involvement in learning through affective, instructional, and managerial elements (Kurt et al., 2022). Strategic planning emphasizing pedagogical aspects can potentially increase student engagement (Tualaulelei et al., 2021). Through technological advances in education, such as augmented reality (AR) or virtual reality (VR), can be utilized to increase student engagement, situational interest, and learning performance (Sun et al., 2023). In addition, in the development of online learning design, it is also necessary to pay attention to relevance, content, and resources in achieving learning efficiency (Günüç et al., 2022; Heilporn et al., 2022)

Research on digital literacy in education has been carried out a lot, such as analyzing factors that affect digital literacy in learning (Audrin &; Audrin, 2022; Omboto et al., 2022), digital literacy development in higher education (Khan et al., 2022), assessment (Schmidt &; DeSchryver, 2021), and distance education (Gökda & Çam, 2022). Research on academic self-efficacy and its implications in academic achievement has also been widely conducted, such as (Al-Abyadh &; Abdel Azeem, 2022; Suryaratri et al., 2022), digital addiction (Parmaksız, 2022) and academic self-efficacy in online learning (Calaguas &; Consunji, 2022). Research on student engagement in online learning has been conducted (Aldaghri &; Oraif, 2022; Chiu, 2022). What is missed from some previous research results is to examine the relationship between digital literacy and academic self-efficacy, especially in hybrid learning which is now widely practiced in learning activities. This research specifically explores the urgency of digital literacy and academic self-efficacy in creating student engagement as an effort to improve the quality of hybrid learning practices.

Research Method

This study used a correlational method with a quantitative approach; it aims to describe the relationship between variables (Churchill &; Iacobucci, 2005). The subjects of this study were students of the faculty of teacher training and education at state universities in Jakarta, and private universities in Banten and Lampung provinces who had participated in hybrid learning. The population was 370 students spread across 13 different classes or study groups. The sampling technique used was proportional random sampling, obtained by 105 respondents. The data was collected through a survey with a rating scale (1-5) which was distributed via Google form to respondents. The instruments in this study were based on indicators and previous research studies. The digital literacy variable refers to (Carretero et al., 2017; De León et al., 2021) with variable indicator dimensions, namely, information and

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data literacy (DL1), communication and collaboration (DL2), digital content creation (DL3), safety (DL4) and problem solving (DL5). The variable academic self-efficacy refers to (Bandura & others, 1977; Bandura, 2006; Pajares, 2007; van Zyl et al., 2022) with three main indicators, namely magnitude (AE1), generality (AE2), and strength (AE3). The student engagement variable refers to the theoretical instrument according to (Burch et al., 2015) which includes emotional engagement (SE1), physical engagement (SE2), cognitive engagement in class (SE3), cognitive engagement outclass (SE4).

The construct of each variable was tested and evaluated for suitability through structural equation model (SEM) techniques. The combination of two statistical methods was used: path analysis and confirmatory factor analysis (CFA). The hypothesis analysis model is determined based on previous research studies presented in Figure 1 below:
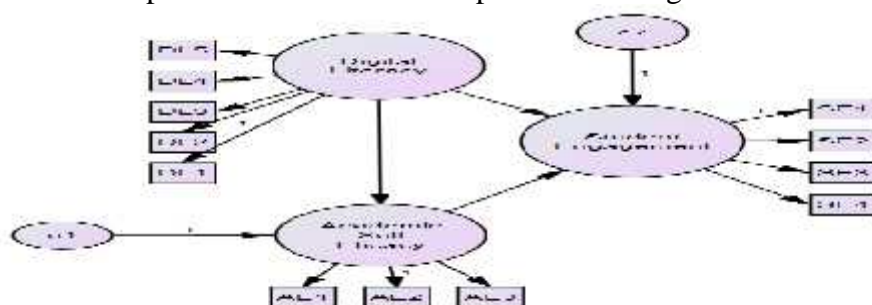

Figure 1. Structural Model Theoretical Framework

Further model identification is carried out to ascertain whether the linked theoretical framework model is under-identified, identified or over-identified. The next model is evaluated to find out the model conforms to standards (Goodnes of Fit) such as RMSEA, CFI, GFI, NFI, and other indices. Based on the model evaluation criteria, model modifications are made if needed to improve suitability.

Results and Discussion

Confirmatory Factor Analysis (CFA), an essential part of structural equation modeling (SEM) analysis aims to test and ensure a variable in the model is measured with good and precise indicators. Based on the calculation results, model modifications were made by eliminating the out layer on the construct of the academic self-efficacy (AE3) variable, namely on the "strange" indicator. The following is presented validity and reality test data; construct validity tests are carried out through the CFA test with the presentation of variable construct data that has been modified by the model as presented in Table 1 below:

Table 1. Construct Validity Test

line		S.E.	C.R.	P	Estimate
Digital_Literacy	DL1				,715
Digital_Literacy	DL2	,216	6,442	***	,724
Digital_Literacy	DL3	,238	4,415	***	,690
Digital_Literacy	DL4	,264	5,278	***	,590
Digital_Literacy	DL5	,255	6,172	***	,725
Academic_Self_Eficacy	AE1				,806
Academic_Self_Eficacy	AE2	,171	6,670	***	,934
Student_Engagement	SE1				,801
Student_Engagement	SE2	,124	8,838	***	,783
Student_Engagement	SE3	,152	10,295	***	,916
Student_Engagement	SE4	,118	9,536	***	,836

Based on the table above, all constituent indicators in each variable are declared valid based on the criteria of Critical Ratio (CR) value >1.96 dan probability (P) < 0.05, the *** sign indicates a significant value of < 0.001. The overall model estimation shows that all standardized factor loading estimates > 0.05 where all values reflect indicators in each construct. As for variable reliability analysis with CR value criteria > 0.07 and AVE value > 0.05, the constructed value is declared reliable. Based on the calculation of the reliability construct value in the digital literacy variable, a CR value of 0.84 and an AVE value of 0.51 were obtained, in the academic self-efficacy variable, a CR value of 0.86 and an AVE value of 0.76, in the student engagement variable, a CR value of 0.92 and an AVE value of 0.69 were obtained. Test the normality of data with univariate and multivariate normality is known that the CR value is at a value of $\pm$ 2.58. Based on the results above, the data obtained are normally distributed, valid, and realistic. Furthermore, the theoretical framework model was evaluated to determine the relationship between digital literacy variables, academic self-efficacy, and student engagement through SEM as in Figure 2 below:
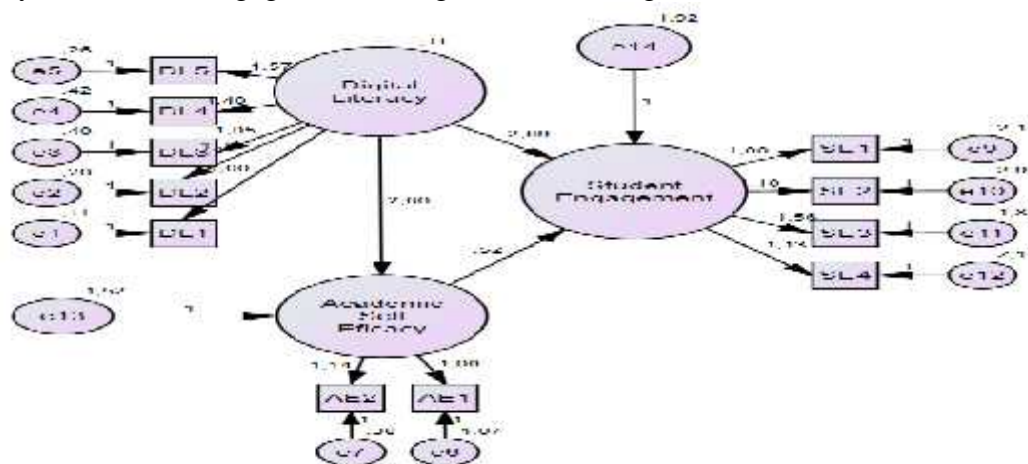

Figure 2. Theoretical framework hypothesis test

In figure 2. The hypothesis test framework above the model estimation shows that overall, all indicators have loading factors with values above 0.07 which states that these values can reflect each construct well. In the theoretical framework model, overall, there are three hypotheses tested as presented in table 2 below:

Table 2. Path hypothesis test result

	Hypothesis way		C.R.	P	Result
H[1]	Digital_Literacy	Academic_Self_Eficacy	3.905	***	Accepted
H[2]	Digital_Literacy	Student_Engagement	3.701	***	Accepted
H[3]	Academic_Self_Eficacy	Student_Engagement	3.341	***	Accepted

In the structural model, digital literacy has positive and significant influence on academic self-efficacy and student engagement. It is indicated by the magnitude of CR scores of 3,905 and 3,701 is more than 1.98 (Hayes, 2018). It illustrates that good digital literacy has implications for individual confidence in their ability to achieve academic expectations and can increase engagement in hybrid learning on behavioral, emotional and cognitive aspects. In addition, academic self-efficacy also has a positive and significant influence on increasing student engagement in hybrid-learning. It is indicated by the results of the path hypothesis test with CR scores of 3,341 > 1.98. To confirm the results of the Goodness of fit evaluation and ensure the theoretical framework model of the hypothesis test is appropriate, the model suitability analysis is presented in table 3. below:

Table 3. Model confirmatory analysis

GoF Indices	Criteria	Estimates	Fitness
Chi-Square	Small value	$2 = 55.474$	*Good fit*
P	P > 0.05	0.065	*Good fit*
NCP	Small value	14.474	*Good fit*
RMSEA	.098 RMSEA .129	0.132	*Good fit*
ECVI	Small value and close to saturated ECVI	D : 725 S : 611 I :781	*Good fit*
AIC	Small value and close to saturated AIC	D :237.02 S : 124.07 I :2143.74	*Good fit*
CAIC	Small value and close to saturated CAIC	D : 342.09 S :416.22 I : 2177.12	*Good fit*

Notes: D= Default Model; S=Saturated; I=Independence

Discussion

The urgency of student engagement in hybrid learning is not only limited to creating active student engagement, but ensuring that students get meaningful learning and feel interconnected between students, learning resources, and lecturers. The development of digital literacy in higher education encourages the use of technology that supports efficiency and improves the quality of learning services. Rapid technological advances in all sectors of life have broad implications for changing patterns of interaction, work, and learning. Digital literacy development is a priority program carried out through education policy and curriculum development (Weninger, 2022). In this study, digital literacy has a positive and significant effect on student involvement in hybrid learning which is expressed with CR values of 3,905 > 1.98. It is in line with research (Damrongpanit, 2022; ElSayary et al., 2022). These findings highlight the importance of mastering digital literacy can encourage increased access to learning resources more broadly and deeply through digital devices. Students can deepen the material and enrich study materials related to the courses they learn through the digital platform (Khan et al., 2022) in their research stated that increasing digital literacy will have implications for improving student academic performance.

Special training programs for lecturers can facilitate the development of digital competencies in managing hybrid classes and designing learning resources (Rahimi &; Tafazoli, 2022). Based on the confirmatory factor analysis (CFA), five indicators in digital literacy affect student involvement in hybrid learning namely information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. The loading factor in the information and data literacy indicator is obtained at 1.0; it explains that a student must assess and know the right digital database, web, or blog to obtain the literature and information needed in learning. Data literacy is important competency in a data-rich digital atmosphere (Gebre, 2022). The variety of information sources and data on the internet requires the students' ability to choose reliable sources of information following the development of science.

Strengthening the concept of digital literacy will bring students to connect and collaborate with other students from different backgrounds. Communication and collaboration skills as one of the indicators of digital literacy have a loading factor of 1.3. Through good digital literacy, differences in geographical conditions also allow students to continue to enrich their knowledge from various sources. For example, students in remote areas or different countries can connect with teachers and learning resources that are difficult to be available physically. Skills in using this collaborative learning platform will enrich students with knowledge that can be sourced from various relevant references. The findings

of this study are also in line with research (Le et al., 2022) which states that high-achieving students tend to use high access to the use of learning resources on digital platforms such as LMS. Digital literacy can equip students with the skills to collaborate and be able to share experiences, knowledge, and be able to solve problems together. It encourages increased active student involvement in learning activities. Analysis of the use of the right digital platform in learning can also help students to solve learning problems through virtual collaboration (Siripan &; Noirid, 2022).

The digital content creation indicator has a loading factor value of 1.05. It means that the importance of the ability to create digital content such as creating digital animations in learning or utilizing interactive digital platform is an important part of efforts to create active student engagement. Through strengthening the digital content creation aspect, students can discuss, share knowledge, and experience and collaborate in creating interesting digital content, the spurs students to collaborate and be actively involved in learning. Skills in creating interesting digital content need to be studied further, especially for prospective teacher students so that they can convey meaningful learning content messages for students. Pre-service teacher education programs need to make adjustments and evaluations in equipping students with cognitive, teaching, and digital skills needed in education in the technological era (Alnasib, 2023). Digital content creation can be utilized in creating a learning environment that is interactive, interesting and relevant to student learning needs. Interesting and educational digital content in the learning management system (LMS) can help students obtain academic achievements in online learning (Bessadok et al., 2023).

The safety indicator has a loading factor of 1.40, reflecting the importance of the ability to detect threats and risks in accessing digital platforms as a learning resource. Such capabilities are like a way to avoid viruses or check for viruses before downloading attachments on certain websites. Students who know the risks of accessing digital learning resources and privacy skills will tend to be more confident to collaborate and participate in hybrid learning. While the problem-solving indicator has a loading factor of 1.57 which illustrates the importance of students being actively involved in unfinished problem exercises through digital learning platforms. By strengthening the problem-solving aspect, students do not only act as recipients of information. Students can collaborate to build understanding, and share ideas, and solutions to a learning problem faced through digital platforms. In addition, in increasing student engagement, motivational aspects and independent learning skills also need to be improved (Kara, 2022). Educators are also enabled to carry out their professional development independently through existing learning resources.

Student involvement in hybrid learning is also influenced by academic self-efficacy as indicated by CR values of 3,341 > 1.98; the results of this study are in line with research (Al-Abyadh &; Abdel Azeem, 2022; Deng et al., 2022). Academic self-efficacy, as students' confidence in their ability to achieve academic success, is important in shaping student motivation and perseverance in learning (Oliveras-Ortiz et al., 2020). High self-confidence in learning will lead students to have the ability to overcome challenges, choose effective learning strategies, and have the motivation to always be better in academic terms (Ghani &; Taylor, 2021). Students with high academic self-efficacy will likely have the confidence and skills to adapt to technology-based learning, such as participating in asynchronous discussions in the LMS, accessing learning materials online, and doing practice questions on the provided platform. Self-efficacy academics also play a further role in increasing students' motivation to achieve their desired academic goals so they have perseverance and resilience in facing challenges to succeed in the future (Owusu-Agyeman, 2021). In hybrid learning,

students need to develop strong academic self-efficacy to continue being motivated and adaptable to different learning environments.

Student engagement is essential in hybrid learning to create meaningful learning (Malik et al., 2022; Rioch &; Tharp, 2022). The combination of face-to-face and online learning should still emphasize students' active involvement in learning to have a good learning experience and academic achievement. Student engagement in learning can be influenced by several factors, including effective technology, good instructional design, and interaction of lecturers and students in learning (Bamoallem &; Altarteer, 2022). Digital literacy in hybrid learning is a critical factor in creating student engagement in learning. The ability of students to operationalize digital devices, access and evaluate information sources from the internet has an impact on optimizing the availability of learning resources provided in hybrid learning (Cevikbas &; Kaiser, 2022). The level of academic self-efficacy in students affects involvement in learning using dominant technology in the teaching and learning process. Students with high academic self-efficacy will be more confident in facing learning challenges and initiative and have stronger motivation. Students who believe they can manage online learning effectively, manage time, and cope with difficulties will be better able to adapt to hybrid learning to achieve better learning outcomes

Conclusion

Digital literacy and academic self-efficacy are essential for student engagement in hybrid learning. The ability of students to use digital learning resources well will support active participation in the learning process. A high academic level of self-efficacy also helps them to be able to have confidence and perseverance during the learning process. Digital literacy and academic self-efficacy will bring students to be actively involved in the digital learning environment and play an essential role in shaping or maintaining student motivation and persistence in learning. Students' engagement levels can be increased by using effective technology and proper instructional design and by encouraging interaction between lectures and students. Therefore, lecturers and higher education institutions need to support the development of digital literacy for students and promote the formation of academic self-efficacy to create meaningful hybrid learning through increased active student engagement.

Recommendation

Based on the results of this study, it is recommended to conduct programs to support the development of students' digital literacy through adequate training and access to technology. Higher education institutions and lecturers can adopt a well-rounded approach to digital literacy, including introducing relevant digital tools and platforms, training on practical use, and developing a critical understanding of digital information. In addition, it is also essential to help students build their academic self-efficacy through social support, rewards, and constructive feedback.

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