# The Effect of Digital Literacy in the Establishment of Student Engagement

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**ABSTRACT**
This study aims to determine how the digital literacy variable affects student engagement. The analysis in this study used SEM-PLS. Based on a sample of students at Medan State University, it is known that digital literacy has a significant effect on student engagement. Based on the research findings, the authors suggest stakeholders to provide digital literacy training for students to increase student engagement, especially during the COVID-19 pandemic.

*Keywords: Digital literacy, Student Engagement, SEM-PLS*

## 1. INTRODUCTION

Online learning has become increasingly popular since WHO declared COVID-19 a global pandemic. Because this way of learning is the only one permitted by the Republic of Indonesia government to replace face-to-face learning, which risks becoming a transmission route for the COVID-19 virus. The problem is, online learning demands more than general literacy, such as reading, counting, and reasoning. Due to the high dependence on technology, online learning demands digital literacy. Because if students have good digital literacy skills, their learning will be more effective [1]. This is reasonable because this literacy is not only about how to use the device but also includes the use of learning management systems (LMS), accessing e-journals, and even the use of plagiarism detection tools [2].

Student engagement has an important role in learning activities [3]–[5]. This is caused by the more involved a student is, the more they will receive the information conveyed by the lecturer. There are three forms of student involvement in the form of learning, namely behavioral, emotional, and cognitive [6]. If someone has a high level in these three domains, he will not get bored quickly in participating in lecture activities, especially online lectures.

For this reason, this study seeks to investigate how digital literacy variables affect student engagement. Thus, this study is able to fill the research gap by adopting theories developed in the private/business sector.

### 1.1. Digital Literacy

The prudent adoption of digital learning modes in higher education supports the development of digitally literate students, who can operate comfortably and creatively in a technology-enabled environment in all aspects of their lives. Digital literacy, as a concept, has been discussed and criticized by many authors since the 1990s [7]–[9]. In general, digital literacy is described as an individual's awareness, attitude, and ability to use digital tools and facilities appropriately to identify, access, manage, integrate, evaluate, analyze, and synthesize digital resources, build new knowledge, create media expressions, and communicate with other people, in certain life context situations, to enable constructive social action; and to reflect on this process [10].

### 1.2. Student Engagement

Student engagement is defined as the constructive contribution of students to the flow of instruction they receive. To quantify this aspect, the Hit-Steer Observation System [11] is used. This system assesses the frequency of students' attempts to constructively influence the teacher (hit) and whether or not these influence attempts are successful in changing the behavior of the next teacher (steer). A "hit" (the effort to influence) reflects what the learner does, and it

symbolizes the involvement of the agent. "Director" reflects how the teacher responds to student suggestions and input, and it represents the teacher's motivating style (supportive vs. controlling autonomy). When trained ratters used the Hit-Steer Observation System to assess student engagement in the classroom, they found that effort to influence learners (and the ratio of this effort to all effort to influence effort that occurred during teaching — students and teachers) (a) was positively correlated with students' perceptions of the original learning climate, (b) occur more frequently in classrooms that support autonomy rather than teacher control, and (c) are positively correlated with student academic achievement [11, 13].

## 2. METHOD

Data analysis in this study used Partial Least Square Structural Equation Modeling (PLS-SEM). Although covariance-based Structural Equation Modeling (CB-SEM) has dominated previous research as a method for analyzing complex interrelationships between observed and latent variables, in recent years, studies using PLS-SEM as an analytical tool have

researchers because PLS-SEM allows them to estimate complex models with many constructs, indicators, and structural paths without requiring data that is normally distributed [15].

The two main stages in analyzing the output results in Smart PLS v 3.2.9 [16], they are the evaluation of the measurement model and the evaluation of the structural mode [14], [17]. The measurement model evaluates how the suitability of indicators forms the construct, while the structural model evaluates the relationship between existing constructs.

Sample used in this study was student in Universitas Negeri Medan. For the digital literacy construct, there are six indicators, namely technological skills, personal security skills, critical skills, device security skills, information skills, and communication skills. Meanwhile, for the Student Engagement construct, there are four indicators, namely agentic engagement, behavioral engagement, emotional engagement, and cognitive engagement. The inner model of each indicator to its construct can be seen in the next session

## 3. RESULTS

**Table 1.** Measurement Model Analysis

|  | Loading | Sample Mean (M) | Standard Deviation (STDEV) | T Values | P Values |
|---|---|---|---|---|---|
| **A <- Student engagement** | 0.798 | 0.796 | 0.044 | 18.226 | **0.000** |
| **BE <- Student engagement** | 0.841 | 0.841 | 0.031 | 26.885 | **0.000** |
| **CE <- Student engagement** | 0.896 | 0.895 | 0.017 | 52.408 | **0.000** |
| **CS <- Digital literacy** | 0.843 | 0.843 | 0.036 | 23.660 | **0.000** |
| **CS_A <- Digital literacy** | 0.661 | 0.654 | 0.082 | 8.043 | **0.000** |
| **DSS <- Digital literacy** | 0.795 | 0.796 | 0.041 | 19.210 | **0.000** |
| **EE <- Student engagement** | 0.880 | 0.879 | 0.027 | 32.177 | **0.000** |
| **PSC <- Digital literacy** | 0.720 | 0.715 | 0.083 | 8.669 | **0.000** |
| **TS <- Digital literacy** | 0.642 | 0.634 | 0.081 | 7.890 | **0.000** |

**Table 2.** Structural Model Analysis

|  | Coefficient | Sample Mean (M) | Standard Deviation (STDEV) | T Values | P Values |
|---|---|---|---|---|---|
| **Digital literacy -> Student engagement** | 0.467 | 0.478 | 0.058 | 7.998 | **0.000** |

continued to increase, even surpassing CB-SEM [14]. In addition, PLS-SEM also tends to be chosen by

In the SEM-PLS analysis, the first thing to do is to examine the measurement model. In the first analysis,

it is known that the information skill indicator has a low loading factor, so this indicator is omitted from the construct. After that, an analysis of the measurement model was carried out for the second time, the results of which can be seen in table 1.

After the evaluation of the measurement model has been completed and it is known that all indicators are able to measure the construct well, then the evaluation of the structural model can then be carried out. The results of the analysis of the structural model can be seen in table 2.

Based on table 2, it can be seen that the digital literacy variable has a significant effect with a positive direction of influence ($\beta = 0.467$, $p = 0.000$).

## 4. DISCUSSION

Stakeholders' understanding of digital literacy has become increasingly important lately because with the imposition of social restrictions during the unknown COVID-19 Pandemic, the only communication, and social activities are inevitably replaced with digital platforms, including learning activities. Based on the research findings, it is known that digital literacy has a positive and significant influence in influencing student engagement. The findings found by researchers are also in line with research conducted by [1,18,19]. Based on the findings of this study, stakeholders should pay more attention to the digital literacy of students. Do not let online learning, which is currently considered a panacea, actually becomes a boomerang that causes student learning achievement to decline [20]. There are several solutions that can be applied based on the findings of this study, the first thing is that stakeholders need to map the extent of students' understanding of digital literacy. If it is known that the digital literacy of students in an institution is already high, then online learning can continue. However, if it is known that the digital literacy level of students is below the tolerable value, then online learning must be temporarily suspended. The institution must provide digital literacy training to its students. If it is known that the digital literacy level is at the desired level, then online learning can be continued.

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