

The Role of Technological Knowledge on Student Engagement on Senior High School Students

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ABSTRACT

This study examines the impact of technological knowledge on student engagement among senior high school students, focusing on the challenges posed by the Covid-19 pandemic. Technological knowledge is defined as individuals' proficiency in utilizing various information technologies to complete tasks. Student engagement is characterized by active participation in teaching and learning activities, leading to improved learning outcomes. The research addresses the concerning issue of low student engagement observed during the pandemic and investigates the potential of technological knowledge to foster increased engagement. The study includes a sample of 270 students selected through a non-probability random sampling method. Multiple regression analysis is employed to assess the relationship between variables. The findings reveal a significant positive influence of technological knowledge on student engagement. Furthermore, a comparison test indicates that grade 10 students exhibit higher levels of both technological knowledge and student engagement. Online class students demonstrate greater technological knowledge, while hybrid class students display higher emotional engagement. This study contributes valuable insights for enhancing student engagement through technological knowledge in the context of senior high school education during the pandemic.

Keywords: Technological Knowledge, Student Engagement, Senior High School, Covid-19 Pandemic, Online Class, Hybrid Class.

1. INTRODUCTION

The COVID-19 pandemic that hit caused the learning process to change drastically. Learning is now no longer face-to-face and present at school and online learning is mandatory for all students. The condition of home learning makes teachers as well as students experience various difficulties due to limitations in virtual space, ranging from difficulties in interacting to difficulties in delivering material. The students feel burdened because the assignments are too many and piling up, eliminating the enthusiasm for learning and making motivation and grades decrease. Many students admit that it is difficult to focus and concentrate, get tired quickly and get bored easily. This makes student responses to questions and discussions online very minimal. Students are often late for virtual class, some students don't even turn on the camera as proof of attendance at home learning, or are seen doing other things, not looking at the screen when the teacher gives an explanation. From the problems experienced by high school students, the authors found that the things above were in accordance with the negative indicators of student engagement as described in the research by Skinner et al. (2008).

Various data and research evidence show that student engagement is closely related to technological knowledge and also self-efficacy. (Chang & Chien, 2015; Firdausih & Patria, 2018; Schindler et al., 2017; Singh & Abdullah, 2020; Zapata-Cuervo et al., 2021; Olivier et al., 2019; Lindsey, 2017). Students with high technological knowledge will have high self-efficacy and will then show a high level of student engagement. Vice versa, students with low technological

knowledge will also have low self-efficacy so that they will show a low level of student engagement.

Seeing that there are inconsistencies or differences in results between one research result and other raises doubts, so the researcher wants to do another study with the same variable. Seeing evidence of how technological knowledge has a role in student engagement the researcher intends to look at the relationship between the following variables with the aim of knowing the role of technological knowledge in student engagement.

2. LITERATURE REVIEW

Student engagement refers to the time and effort students invest in educational activities that yield beneficial outcomes from their institutions. It also includes the initiatives taken by educational institutions to encourage student participation in these activities (Kuh, 2009). Essentially, student engagement or involvement indicates the degree to which students participate in school activities and academic endeavors, as well as their commitment to achieving learning goals. This engagement encompasses measurable aspects such as learning behaviors, assignment completion, school attendance, attentiveness to teachers and lessons, and various disciplinary behaviors (Ali & Hassan, 2018). The concept of student engagement is typically categorized into three dimensions: behavioral engagement, emotional engagement, and cognitive engagement (Zapata-Cuervo *et al.*, 2021).

The COVID-19 pandemic has drastically reshaped the landscape of student engagement. One of the critical factors influencing engagement during this period is technological knowledge, which refers to an individual's proficiency in using technology and information (Koehler & Mishra, 2009). The integration of technology in education has been shown to positively affect various indicators of student engagement and is believed to enhance learning outcomes (Wardoyo *et al.*, 2021). Given the shift to remote learning, the ability to effectively use technology has become essential for maintaining student engagement. Proficiency in using digital tools and platforms enables students to participate actively in virtual classrooms, complete assignments, and stay connected with teachers and peers.

Moreover, the use of technology in education has been linked to increased motivation and interest in learning. For instance, interactive digital platforms can make learning more engaging and accessible, catering to different learning styles and preferences. This adaptability is crucial during the pandemic, as traditional face-to-face interactions are limited. Therefore, enhancing students' technological knowledge can play a significant role in sustaining and potentially boosting their engagement in a remote learning environment. Understanding the importance of this relationship is key to developing strategies that support student engagement and learning outcomes in the context of ongoing educational disruptions caused by the pandemic.

3. METHODS

The respondents were high school students in grades 10, 11, and 12 from X Senior High School. Characteristics such as age, gender, religion, and residence were not restricted by the researchers. The sample comprised 270 students selected through non-probability sampling. Data was collected via online questionnaires using Google Forms, distributed to students engaged in home learning during the COVID-19 pandemic. The link was shared through class group chats. The research instrument was a questionnaire measuring technological knowledge and student engagement. Student engagement was assessed with the Student Engagement Scale by Gunuc and Kuzu (2014), based on Kuh's (2009) theory, comprising 39 positive items across behavioral, emotional, and cognitive dimensions. Technological knowledge was measured using the

Technological Knowledge dimension from the TPACK. xs instrument (Schmid et al., 2020), with 7 positive items, based on Koehler and Mishra's (2009) TPACK theory.

Data processing was conducted using SPSS Version 28.0.1. A pilot test for validity and reliability was performed on the first 30 participants. After obtaining satisfactory results, all data were used to test assumptions and hypotheses. The data distribution was examined, followed by regression tests to determine the impact of the independent variable on the dependent variable. Additional demographic analysis was also conducted to enrich the research discussion.

characteristics of the subjects of this study were high school students in grades 10, 11 and 12 who were in X Senior High School. Other characteristics such as age, gender, religion, place of residence was not limited by the researchers. In its implementation, the researchers involved high school students in grades 10, 11 and 12 who studied at X Senior High School using the non-probability sampling method. The total participants in this study were 270 students. Research data collection was carried out by distributing online questionnaires in the form of Google Forms to students who were doing home learning during the COVID-19 pandemic. The Google Form link is shared via conference chat in each class group. The research instrument used in this study was a questionnaire containing measuring tools of technological knowledge and student engagement.

4. RESULTS AND DISCUSSION

The correlation test between Technological Knowledge and Student Engagement, conducted using Pearson's correlation, yielded results of $r = 0.392$ and $p = 0.001$, indicating a significant positive relationship between these variables. This suggests that as Technological Knowledge increases, Student Engagement also tends to increase, and conversely, higher levels of Student Engagement are associated with higher Technological Knowledge. The statistical significance ($p < 0.05$) reinforces the strength of this positive correlation, highlighting the interdependence between these two factors in the context of high school education.

Table 1 Correlation Test Result

Correlation Test	r	p	Interpretation
TKSE	0.392	<0.001	35

The regression test of the Technological Knowledge variable on Student Engagement revealed that Technological Knowledge plays a significant role in Student Engagement. The coefficient of determination (R^2) is 15.40%, indicating that Technological Knowledge accounts for 15.40% of the variance in Student Engagement. The remaining variance is explained by other factors not included in this study. This suggests that students who are proficient in using technology tend to be more engaged in their learning activities at school, while students with lower technological proficiency are less involved in these activities. To enhance the research outcomes, the researchers undertook an additional data analysis. This supplementary analysis involved applying a different test using several control variables, including gender, grades, type of class (online or hybrid), and experience with ICT courses.

Table 2 Regression Test Result

Regression Test	t	p	r ^r	Interpretation
TKSE	6.98	<0.001	0.1540	Positive Correlation

The findings from this additional analysis revealed that there were no significant differences in the mean values of the variables based on gender or ICT course experience. However, notable differences were observed concerning grades and the type of class attended. Specifically, students in grade 10 demonstrated higher levels of technological knowledge and greater student engagement compared to other grades. Additionally, students enrolled in online classes exhibited superior technological knowledge, whereas those in hybrid classes displayed higher emotional engagement.

Table 3 Comparison Test

Regression Test	Criteria			
	Gender	Grades	Online/Hybrid	ICT Course Experience
Technological Knowledge	X	V	V	X
Student Engagement	X	V	V	X

5. CONCLUSION

The research findings underscore the impact of technological knowledge on student engagement, revealing that effective integration of technology into classroom learning can significantly enhance students' involvement in educational activities. Students who are accustomed to using technology in their learning processes tend to engage more readily with digital learning environments. Their familiarity with digital tools, user interfaces, and navigation facilitates their active participation and ongoing engagement.

Nonetheless, the study faces notable limitations. The sample size was relatively small and confined to a single educational setting, which limits the extent to which the results can be generalized. To address this, future research should expand the sample size and include participants from diverse educational contexts to gain a more comprehensive understanding of the relationship between technological knowledge and student engagement.

The study provides several theoretical and practical recommendations. Theoretically, it suggests exploring additional factors that might influence student engagement, such as learning motivation, self-regulated learning, social support, and parental involvement. Practically, it recommends integrating technology-focused education or ICT subjects into school curricula and extracurricular programs. Schools should also enhance their use of digital tools by incorporating digital lessons and leveraging technology to support learning.

In conclusion, the research highlights the critical role of technological knowledge in fostering student engagement, but further research is needed to validate these findings across broader and more varied educational settings.

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