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The Effect of Student Engagement on Boarding School Students Online Learning Achievement

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Abstract

Boarding school students must participate in online learning due to the COVID-19 pandemic. Student engagement is an important aspect that must be considered in online learning. This study aims to determine: (1) the level of student engagement of boarding school students, (2) to investigate the effect of simultaneous behavioral engagement, emotional engagement, and cognitive engagement on learning achievement, and (3) to determine the relationship between behavioral, emotional and cognitive engagement with learning achievement, (4) to measure the relative and effective contribution of behavioral, emotional and cognitive engagement on learning achievement. This research is quantitative research with an ex post facto type. 182 boarding school students participated in this study. The data collection instrument used is the engagement scale from Fredricks & McCloskey. Data processing using descriptive and inferential statistics. The inferential test used is multiple linear regression and Pearson correlation. This study's results indicate a significant influence between behavioral, emotional, and cognitive engagement on the learning achievement. The influence of these three variables on learning achievement is 46.7%. While the results of the correlation test showed that there is a significant relationship between the variables of behavioral, emotional, and cognitive engagement in learning achievement.

Keywords: student engagement, online learning, boarding school student

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INTRODUCTION

The COVID-19 epidemic, which has affected approximately 1.6 billion students in more than 200 nations, has caused the biggest disruption of educational systems in human history. More than 94 percent of students worldwide have been harmed by school, institution, and other learning facility closures (Pokhrel & Chhetri, 2021). The COVID-19 pandemic has also impacted boarding schools. Due to school closures, students must participate in online learning from their own homes (Omika, 2022).

One challenging aspect of online learning is maintaining student engagement (Dembereldorj, 2021). Getting students engaged in a class might be difficult, especially in online classes (Martin & Bolliger, 2018; T Baloran et al., 2021). Student engagement is essential to maintain students' interest in the material and learning progress (Lu, 2020). It is now known that a significant factor in fostering students' learning and accomplishment is their level of school engagement (Wonglorsaichon et al., 2014). Learning requires student engagement, and student

engagement significantly impacts online learning. Ensuring student engagement is essential to excellent online education (Rajabalee et al., 2020). Therefore, it is important to examine how students engage with online learning (Peng, 2017).

According to the earlier studies, there have been both some successes and significant difficulties in getting students to engage in online learning. The difficulties include a lack of human interactions with students and confusion with online technologies (Ali et al., 2021).

Compared to COVID, students were more actively engaged in their learning during pre-COVID. Students' eagerness for going back to offline classes was driven by their academic and social needs, but this enthusiasm was tempered by health issues associated with COVID-19 (S. Senthil et al., 2021). The results of previous studies showed that there was a decrease in the level of student engagement caused by online learning during the COVID-19 pandemic (Hajedris, 2022; Whiting, 2022).

Several attempts to increase student engagement in online learning have been carried out by previous researchers, including (1) using tools for education such as learning management systems (LMS) (Bedenlier et al., 2020; Pokhrel & Chhetri, 2021; Teng & Wang, 2021), for students to be more engaged in class, technology integration in instruction must be done well (Gunuc, 2014); (2) facilitating interaction between students and teachers, students and lesson content, as well as interactions between students (Collaço, 2017; Deschaine & Whale, 2017) such as using asynchronous discussion forums (Zhe (Victor), 2017); (3) creating authentic activities that encouraged problem-solving, applied theory to actual situations, and improved students' sense of support (Sugden et al., 2021); (4) using group-based learning with students of all ages and gender identities to improve the learning environment by taking into account each student's emotional, psychological, and cognitive development (Munnr et al., 2017); (5) using social media such as twitter and facebook (Dragseth, 2020), web-conferencing software, blogs, wikis, and digital games (Schindler et al., 2017).

The majority of scholars have maintained that student engagement positively predicts academic achievement, hence it is crucial to undertake a study on this topic (Collaço, 2017; Lei et al., 2018; Munnr et al., 2017). Positive learning outcomes are correlated with student engagement (Casuso-Holgado et al., 2013; Glapaththi et al., 2019). Engagement in behavioral, emotional, and cognitive activities is associated well with students' academic achievement (Delfino, 2019; Lei et al., 2018). Student engagement has a substantial positive link with student performances in addition to academic achievement (Rajabalee et al., 2020).

Behavioral engagement could be observed in students' participation in academic events and efforts to complete academic assignments, which outwardly indicates that they are interested in what they are studying (Fredricks et al., 2004; Suárez-Orozco et al., 2009). Students' positive emotional reactions to learning, such as enjoyment, excitement, and curiosity, are called emotional engagement. While emotional engagement suggests a want to learn, cognitive engagement requires effort (Henrie et al., 2018). Cognitive engagement includes more internal indicators, such as self-regulation, the value of education, objectivity, self-sufficiency, the ability to solve problems, the propensity to test work, and demonstrating some adaptable aptitudes (Munnr et al., 2017).

Most research on student engagement is conducted at the level of higher education (Bond et al., 2020; Casuso-Holgado et al., 2013; Collaço, 2017; Delfino, 2019; Dembereldorj, 2021; Dumford & Miller, 2018; Gardner et al., 2020; Glapaththi et al., 2019; Gunuc, 2014; Hajedris, 2022; Lu, 2020; Moubayed et al., 2020; Payne, 2019; Ribeiro et al., 2019; Shah & Cheng, 2019; T Baloran et al., 2021; Whiting, 2022; Wilson et al., 2021). Only a few studies examine student engagement at the high or middle school level (Lee, 2014; Virtanen et al., 2018; Wonglorsaichon et al., 2014). Therefore, this research seeks to fill the gaps in student engagement research by examining student engagement of boarding school students. Boarding school students are forced to take part in online learning, due to the COVID-19 pandemic. Students of a boarding school who are most involved in online learning are class XII students. Therefore, the subject of this study is students of class XII.

Based on the information above, the goals of this study are (1) to determine the level of student engagement among boarding school students participating in online learning during the pandemic era; (2) to investigate the impact of behavioral engagement, emotional engagement, and cognitive engagement simultaneously on boarding school students' learning achievement; (3) to investigate the relation of behavioral engagement, emotional engagement, and cognitive engagement separately on boarding school students' learning achievement (4) to measure the relative and effective contribution of behavioral engagement, emotional engagement and cognitive engagement to learning achievement.

METHODS

This research uses a quantitative approach with ex post facto type. The variables studied were behavioral engagement (X_1), emotional engagement (X_2), cognitive engagement (X_3) as the independent variable, and academic achievement (Y) as the dependent variable. Instrument creation, instrument validation, and sampling are the first steps in the research process. Total 339 students Titian Teras H. Abdurrahman Sayoeti Senior High School from class XII for the academic year 2021–2022, grouped into 8 study groups, make up the population of this research. A simple random sample is the method of sampling that is employed. 182 students were chosen as a sample using the Slovin formula.

The data collection instruments used were questionnaires and documentation. The questionnaire that was filled out by students who became the research sample was Fredricks & McCloskey engagement scale questionnaire with the domains: 1) behavioral engagement; 2) emotional engagement, and 3) cognitive engagement (Fredricks & McColskey, 2012). The grid of the questionnaire is presented in table1.

Table 1. Grid of Questionnaire

No	Domain	Indicator	Question
1	Behavioral engagement	Obedience	1
		Online learning difficulties	2
		Learning attitude	3
		Attention	4

		Doing homework	5
2	Emotional engagement	Feeling toward online class	6,8,11
		Feeling toward homework	7,9
		Feeling towards learning	10
3	Cognitive engagement	Check assignments	12
		Study at home	13,15,18
		Searching for information	14,16,17
		Discuss with others	20

The questionnaire validity was tested using product-moment correlation. The results of the validity test prove that the 19-question items are valid. The questionnaire's internal consistency was tested using Cronbach Alpha, as shown in table 2.

Table 2. Cronbach's Alpha Result

Subscale	No. of Items	Cronbach's Alpha	Internal Consistency
Student Engagement	19	0.903	Excellent

Data on student questionnaire answers scores were grouped using a Likert scale consisting of four answer options, namely strongly agree (SA) with a score of 4, agree (A) with a score of 3, disagree (D) with a score of 2, strongly disagree (SD) with a score of 1. Student engagement level is classified into five categories using ideal mean (Mi) and deviation standard (SDi) with rules where Mi = ½ (highest score + lowest score) and SDi = 1/3 (Mi). The criteria are presented in Table 3.

Table 3. Student Engagement Level Categories

No	Score Interval	Category
1	$X \geq Mi + 1.8\ SDi$	Very High
2	$Mi + 0.6\ SDi \leq X < Mi + 1.8\ SDi$	High
3	$Mi - 0.6\ SDi \leq X < Mi + 0.6\ SDi$	Moderate
4	$Mi - 1.8\ SDi \leq X < Mi - 0.6\ SDi$	Low
5	$X \leq Mi - 1.8\ Sbi$	Very Low

Behavioral engagement score (X_1) in this measurement uses the ideal high score = 5 x 4 = 20, the ideal lowest score = 5 x 1 = 5, Mi = ½ (20 + 5) = 12,5 and SDi = 1/3 (12,5) = 4,17. Emotional engagement score (X_2) in this measurement uses the ideal high score = 6 x 4 = 24, the ideal lowest score = 6 x 1 = 6, Mi = ½ (24 + 6) = 15 and Sdi = 1/3 (15) = 5. Cognitive engagement score (X_3) in this measurement uses the ideal high score = 8 x 4 = 32, the ideal lowest score = 8 x 1 = 8, Mi = ½ (32 + 8) = 20 and SDi = 1/3 (20) = 6,67.

The data analysis technique used in this research is descriptive and inferential analysis. Descriptive analysis to thoroughly describe student engagement and student learning achievement during the pandemic in terms of the minimum (Min) and maximum (Max) scores, average score (X), and standard deviation (SD). The inferential analysis is a research activity carried out intended to conclude. The data for this case is taken from some members of the population and then analyzed and the conclusions drawn are applied to the population. Multiple linear regression and pearson correlation analysis is an inferential analysis used in this study.

RESULTS & DISCUSSION

The results of the descriptive analysis obtained for each variable are the minimum value, maximum value, average score, and standard deviation. The results of the descriptive analysis can describe the characteristics of students as research samples based on student engagement variables and academic achievement in table 4.

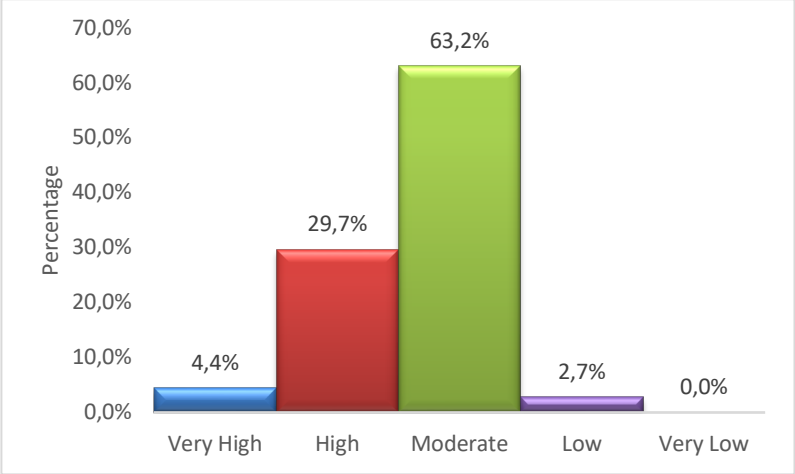
Table 4. Descriptive statistics

Variable	*Min*	*Max*	*Mean*	SD
X_1	8	20	13.97	2.45
X_2	7	24	15.95	3.68
X_3	14	32	24.41	3.58
Y	29	92	65.16	8.25

Based on the data in table 4, it is known that the lowest score for the behavioral engagement variable is 8 while the highest score is 20 with an average of 13.97 and a standard deviation of 2.45. For the emotional engagement variable, the lowest score is 7, the highest score is 24, the average is 24.41 and the standard deviation is 3.58. For the cognitive engagement variable, the lowest score is 14, the highest score is 32, the average is 24.41 and the standard deviation is 3.58. For the learning achievement variable, the minimum score is 29, the maximum score is 92, the average is 65.16 and the standard deviation is 8.25.

The results of the classification of students' behavioral engagement data according to the categories are presented in chart 1.

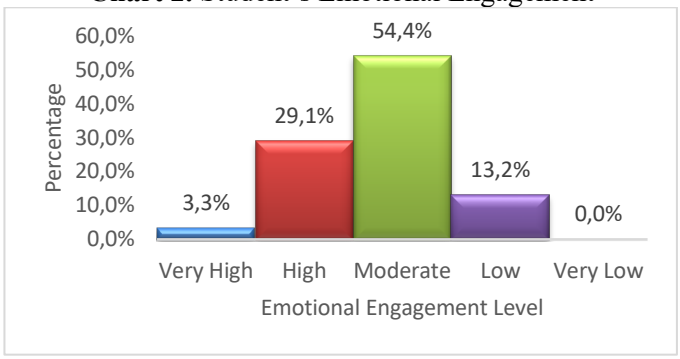
Chart 1. Student's Behavioral Engagement



Based on the data in chart 1, it is known that the highest level of behavioral engagement classification is the moderate level, namely 63.2%, the next high level is 29.7%, then the very high level is% and in the last order, the low level is 2.7%.

The results of the classification of students' emotional engagement data according to the categories are presented in chart 2.

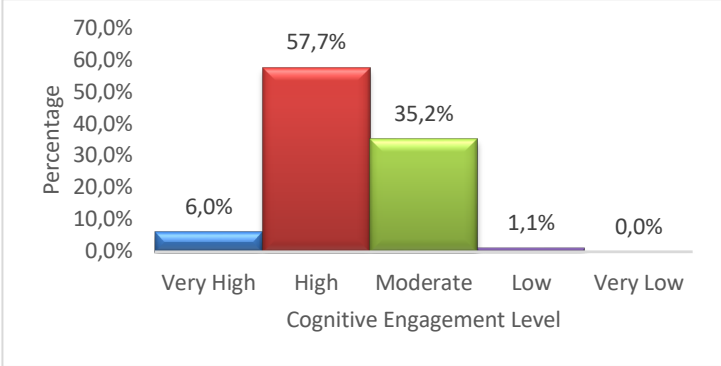
Chart 2. Student's Emotional Engagement



Almost the same as the classification of behavioral engagement, based on the data in chart 2, it is known that the highest level of student emotional engagement is at a moderate level of 54.4%, followed by a high level of 29.1%, then a low level of 13.2%, and finally a very high level of 3.35%.

The results of the classification of students' cognitive engagement data according to the categories are presented in chart 3.

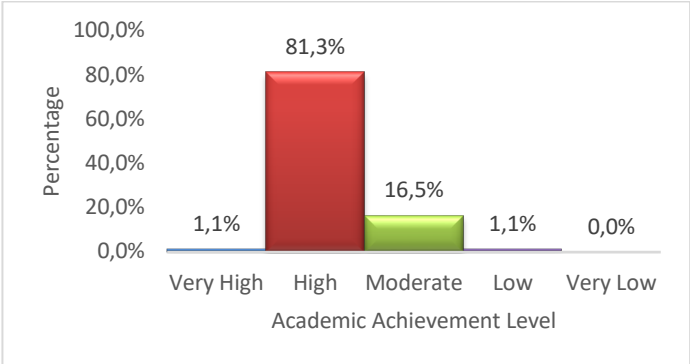
Chart 3. Student's Cognitive Engagement



Different from behavioral and emotional engagement, based on the data in chart 3, it is known that the classification of the level of cognitive engagement of most students is at a high level of 57.7%, followed by a moderate level of 35.2%, then a very high level of 6.0% and a low level of 1.1%.

The results of the classification of students' academic achievement data according to the categories are presented in chart 4.

Chart 4. Student's Academic Achievement



Based on the data in chart 4, it is known that the majority of students' academic achievements are at a high level, namely 81.3%. These results indicate that despite participating in online learning, student achievement is not so affected by these conditions. Thus, student learning performance remains good as evidenced by high learning achievement.

The results of the classical assumption test which includes normality, linearity, and heteroscedasticity are presented in table 5. The test was carried out as a prerequisite before the simple linear regression test was performed.

Table 5. The results of the classical assumption test of research data

Classic assumption test	Test used	Results
Normality	*Kolmogorov-Smirnov Test*	*Sig*= 0.191
Linearity	*Test of Linearity*	*Sig deviation from linearity*= 0.065
Multicollinearity	*VIF and Tolerance Value*	*Tolerance value behavioral engagement*= 0.540 *Tolerance value emotional engagement*= 0.792 *Tolerance value cognitive engagement*= 0.537
Heteroscedasticity	*Glejser Test*	*Sig behavioral engagement*= 0.495 *Sig emotional engagement*= 0.148 *Sig cognitive engagement*= 0.924

The data from the classical assumption test results showed that the results of the normality test using the Kolmogorov-Smirnov test obtained a value of sig = 0.191 > 0.05, which means that the data is normally distributed. Furthermore, the linearity test obtained a value of sig – 0.065 > 0.05 which means that there is a linear relationship. The multicollinearity test using the VIF and Tolerance values produces a tolerance value for the behavioral engagement variable = 0.540 > 0.10, for the emotional engagement variable = 0.792 > 0.10 and for the cognitive engagement variable = 0.527 > 0.10, which means that there are no multicollinearity symptoms. Meanwhile, the results of the Glejser test to measure heteroscedasticity obtained a sig behavioral engagement value = 0.495 > 0.05, a sig emotional engagement value = 0.148 > 0.05 and a sig cognitive engagement value = 0.924 > 0.05, which means there are no symptoms of heteroscedasticity.

The results of statistical tests using multiple regression analysis are presented in table 6.

Table 6. Multiple Regression Analysis

Variable	Regression Coefficient	t	Sig.
Constant	27.291		
X_1	1.325	5.290	.000
X_2	.540	3.918	.000
X_3	.439	2.557	.011
F	= 51.891		
Sig.	= 0.00[a]		
R-Square	= .467		

To prove the first hypothesis, there is a simultaneous influence between behavioral engagement (X1), emotional engagement (X2), and cognitive

engagement (X3) on learning achievement. So based on the results of the multiple regression test presented in table 6, obtained the value of sig. 0.00 < 0.05 which means that behavioral engagement (X1), emotional engagement (X2), and cognitive engagement (X3) simultaneously affect learning achievement.

The results of the correlation analysis between behavioral engagement (X1), emotional engagement (X2), and cognitive engagement (X3) variables partially on learning achievement are shown in table 7 below.

Table 7. Correlation Analysis

		Learning Achievement (Y)
Behavioral Engagement (X_1)	Perasong Correlation	620**
	Sig. (2-tailed)	.000
Emotional Engagement (X_2)	Perasong Correlation	.484**
	Sig. (2-tailed)	.000
Cognitive Engagement (X_3)	Perasong Correlation	.552**
	Sig. (2-tailed)	.000

The magnitude of the influence of the behavioral engagement (X1), emotional engagement (X2), and cognitive engagement (X3) variables simultaneously on the learning achievement variable (Y) is 46.7%. While the remaining 53.3% is influenced by other variables such as support from a parent, teacher, and classmate (Ansong et al., 2017; Wonglorsaichon et al., 2014), these variables were not examined in this study.

From table 7, it is known the value of sig. (2-tailed) between behavioral engagement (X1) and learning achievement (Y) is 0.000 < 0.05, which means that there is a significant correlation between the behavioral engagement variable and the learning achievement variable. Furthermore, the relationship between emotional engagement (X2) and learning achievement (Y) has a value of Sig. (2-tailed) of 0.000 <0.05, which means that there is a significant correlation between the emotional engagement variable and the learning achievement variable. Furthermore, the relationship between cognitive engagement (X3) and learning achievement (Y) has a Sig value. (2-tailed) of 0.000 <0.05, which means that there is a significant correlation between the cognitive engagement variable and the learning achievement variable. These results are in line with the findings of previous studies that behavioral, emotional, and cognitive engagements were positively correlated to the academic performance of the students (Casuso-Holgado et al., 2013; Delfino, 2019; Kuzminykh et al., 2021; Lei et al., 2018). The findings of this study further strengthen the study of the positive relationship between behavioral engagement, emotional engagement, and cognitive engagement with academic achievement.

Table 8 displays a summary of the findings from the multiple regression and correlation analyses.

Table 8. Summary Correlation and Regression Analyses.

Variable	Regression Coefficient (Beta)	Correlation Coefficient (r)	R-square
Behavioral Engagement (X_1)	0.394	0.62	0.467
Emotional Engagement (X_2)	0.241	0.484	
Cognitive Engagement (X_3)	0.191	0.552	

Table 8 presents a summary of the results of the multiple regression test and correlation test. The data from the two statistical test results are used to determine the relative and effective contribution of each variable. Effective contribution is a measure of the contribution of a predictor variable or independent variable to the dependent variable in regression analysis. While the relative contribution is a measure that shows the contribution of a predictor variable to the number of regression squares. Data on the relative and effective contribution of each variable are presented in table 9.

The following table presented the relative and effective contributions of behavioral engagement, emotional engagement, and cognitive engagement variables.

Table 9. Relative and Effective Contributions

Variable	Effective Contribution	Relative Contribution
Behavioral Engagement (X_1)	24.43%	52.31%
Emotional Engagement (X_2)	11.66%	24.98%
Cognitive Engagement (X_3)	10.54%	22.58%

Based on the data in Table 9, it is known that the highest effective contribution to the learning achievement variable is from the behavioral engagement variable (X1), which is 24.43%. This is followed by the emotional engagement variable (X2), with an effective contribution of 11.6%. Meanwhile, the effective contribution of the cognitive engagement variable (X3) is in third place with a contribution of 10.54%. The same order is also generated in the relative contribution, where the highest relative contribution of the behavioral engagement variable is 52.31%, followed by emotional engagement at 24.98%, and finally, cognitive engagement at 22.58%.

Discussion

The results of this study prove that there is a significant relationship between behavioral, emotional and cognitive engagement with learning achievement. This finding further strengthens the theory that has been proven by previous research that student engagement significantly affects academic achievement (Gunuc, 2014; Huang & Wang, 2023; Lee, 2014; Wonglorsaichon et al., 2014). This research enriches the study of self-engagement because this research was conducted in the context of high school education with a boarding school system while the previous research was conducted at the higher education level.

The important role of behavioral engagement has been proven by previous researchers. Students who are emotionally invested in their education maintain sustained attention on a single task for extended periods of time. They are driven to look for fresh learning opportunities in order to expand their knowledge. All student ought to have access to stimulating learning environments in schools (Perry, 2022).

The concept of student engagement can be thought of as a complex and intricately linked collection of behavioral, cognitive, and emotional elements of active participation in diverse learning activities. The main focus of behavioral engagement is on students' effort, focus, and attentiveness throughout learning activities. Students' emotional reactions to teachers, peers, and learning activities

are referred to as being emotionally engaged. It also refers to the presence of emotions that make it easier to complete tasks. Goal-setting, self-control, and self-monitoring are a few examples of meta-cognitive strategies that can help students grasp the material they are studying. Cognitive engagement also refers to the level of students' mental commitment in learning activities and intellectual efforts (Fredricks et al., 2004; Huang & Wang, 2023; Kahu, 2013).

Measurement of the effective contribution and the relative contribution shows that the most important variable of student engagement is behavioral and emotional engagement. These results further confirm the findings of previous researchers. According to the results of a previous study, teachers were thought to play a role in determining students' behavioral and emotional engagement because it was their responsibility to make them desire to attend class and have positive feelings about their teachers and the school (Fredricks et al., 2004; Wonglorsaichon et al., 2014).

The high student saturation level is one of the issues with education in institutions that use a boarding school system. All students who attend schools that operate on a boarding school system must reside on campus in dorms. Comparing this situation to regular schools without a boarding system, the level of student saturation is higher. Due to the COVID 10 pandemic, there is also difficulty with student participation among boarding school students when learning is done online. Student engagement in online learning is a behavioral indicator of how hard students work to succeed in the course and a psychological indicator of their emotional and cognitive activity (Huang & Wang, 2023).

Online learning is very different from traditional classroom learning in several ways, including the fact that students interact with teachers, peers, and content while being physically and geographically isolated; that they self-regulate and self-manage their learning process and learning activities in a self-paced environment, giving them more autonomy to move at their own pace; and that they can rely on rich sources of easily accessible information (Butz & Stupnisky, 2016; de Barba et al., 2016).

Students at the boarding school experienced the same thing. Typically, tight rules are always in place for boarding school students. They all adhere to the regular timetable that the school has established. A plan of learning activities from morning to night has been prepared, especially in the learning component. This schedule is always enforced for students attending residential institutions. Students who participate in online learning confront circumstances that are considerably dissimilar from those they typically experience while living in the dorm.

The quick switch to the internet during the COVID-19 pandemic made student studying incredibly difficult and unpleasant. The previous study revealed that when the regular rhythms of on-site learning and everyday life were entirely disrupted, students felt a sense of isolation, loneliness, worry, and stress. Many students find the abrupt emergence of online learning—which began during the pandemic—unfavorable. Students have faced additional difficulties and obstacles when learning online, in particular when the environments in which they are housed are less ideal, more likely to enclose them physically and psychologically, or impair their ability to learn and perform (Adedoyin & Soykan, 2023; Zapata-Cuervo et al., 2023).

The results of this study prove that students who have succeeded in overcoming problems in online learning which are characterized by high levels of behavioral, emotional and cognitive engagement have succeeded in achieving high learning achievements.

CONCLUSION

The results of this study indicate that there is a significant influence between behavioral engagement, emotional engagement and cognitive engagement on the learning achievement of high school students with the boarding school system. The influence of these three variables on learning achievement is 46.7%. While the results of the correlation test show that there is a significant relationship between the variables of behavioral engagement, emotional engagement and cognitive engagement on learning achievement. The relative contribution of each variable from the highest to the lowest order is behavioral engagement 24.43%, emotional engagement 11.6% and cognitive engagement 10.54%.

This research is limited to the study of the effect of student engagement on student learning outcomes in online learning. This study examines in detail the forms of student engagement which consist of behavioral, emotional, and cognitive engagement. However, the variable that is affected is learning outcomes discussed in general, namely in terms of the average learning outcomes. So further research is needed to examine the effect of student engagement on certain subjects such as English, mathematics, and so forth. Further research is also needed to examine learning models that can increase student engagement in online learning.

CONFLICT OF INTEREST

Concerning the research, authorship, and publication of this paper, the author(s) reported no potential conflicts of interest.

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