

# Mediation Effect of Self-Regulation in Relationship between Attention Span and Motivation in Online Learning during COVID-19 Pandemic among Undergraduate Students in The Faculty of Human Ecology, Universiti Putra Malaysia

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## Abstract

This study aims to determine the mediation effect of self-regulation in the relationship between attention span and motivation in online learning among undergraduate students in the Faculty of Human Ecology, Universiti Putra Malaysia during the COVID-19 pandemic. By using a stratified random sampling method, 235 respondents from the faculty were surveyed. The result showed that attention and motivation are correlated positively at a highly significant level ( $\beta = 0.758$ ,  $p < 0.01$ ). The relationship between attention and self-regulation and the relationship between self-regulation and motivation also show positive correlations, respectively, with the value of  $\beta = 0.830$ ,  $p < 0.01$ , and  $\beta = 0.700$ ,  $p < 0.01$ . Causal step and Sobel test, simultaneously multiple regression analysis were used to analyze the effect of the mediator variable on the relationship between the dependent and independent variables. The results show that self-regulation has a significant mediator effect (value  $Z = 9.697$ ). This study concludes that undergraduate students' level of attention and motivation is essential in online learning. At the same time, self-regulation is important to increase students' concentration in online lectures and indirectly increase their interest in learning.

**Keywords:** Attention Span, Motivation, Self-Regulation, Online Learning, Undergraduate Students

## Introduction

Online learning is a new and widely used alternative learning method when COVID-19 hits the world. With the help of online technology, students can learn without having to meet at the place of education physically. This way of teaching and learning at home requires the teachers and students to face adaptation issues regarding the atmosphere and mastery of online technology. In addition, student's focus and motivation are also affected due to the difference between physical and online learning. Teaching and learning at home which practices online learning requires higher motivation than conventional learning (Vallerand et al., 1992; Harnett,

2012; Redzuan et al., 2014). According to Vallerand & Ratelle (2002), motivation consists of two types, namely, intrinsic and extrinsic motivation. Both of these incentives are important to regulate student behavior in learning, especially in times of crisis, such as teaching and learning at home. This is because motivation will attract the attention of students. The more a student is motivated, the higher the level of attention in learning (Horvath et al., 2017).

In addition to motivation, student's attention is also one of the factors that influences student engagement in the virtual classroom. According to Keller (1987), attention is one of the critical components in increasing student motivation. Therefore, the attention span becomes the primary focus for every teaching staff to ensure that all students receive the information, and knowledge that is taught. Attention can be seen in a person's time in giving focus and interest to something. It is also referred to as an impulse that causes a person to change his attitude, interests, or activities (Crow & Elias, 1983).

Students need attention when learning because it is the first process before learning begins. However, a report from Microsoft found that the average level of human attention was only 12 seconds in 2000, and it decreased from 12 seconds to 8 seconds in 2013. This is due to the increasing influence of technology on humans (Microsoft, 2015). Therefore, the high use of technology increasingly affects the learning process and student attention. Thus, the problem related to students' level of attention during learning at home is a challenge that needs to be focused on.

Because students study in teaching and learning at home conditions, they are not monitored by the instructor physically, so students need a high level of self-regulation. Furthermore, students need to maintain a high and good level of motivation and attention to achieve excellent results. In other words, students need a high level of self-regulation to adapt to online learning effectively. In Taura's (2014) study, the failure of students' self-regulation resulted in students not being enthusiastic about learning and starting to procrastinate on homework. So, a high level of self-regulation is essential to avoid procrastination and increase student motivation. Therefore, this paper aims to see the effect of self-regulation as a mediator in the relationship between student attention and student motivation in online learning during the pandemic.

### **Literature Review**

#### *Online learning during the COVID-19 pandemic*

Online learning has become significant when blended learning becomes increasingly popular in education. It can be termed a tool that can make the teaching-learning process more student-centered, innovative, and flexible. Learning became extremely important when the major parts of the world were in quarantine due to the severe outbreak of this global COVID-19 pandemic. Its effects can be seen in schools, colleges, and universities. The Corona Virus has made institutions go from offline mode to online mode of pedagogy. This crisis makes the institutions that were earlier reluctant to change to accept modern technology (Dhawan, 2020).

In observing the change, many studies were conducted to understand the challenges or problems faced in the change of the mode of learning, i.e., online learning. For instance, Adnan and Anwar (2020) have examined Pakistani higher education students' attitudes towards

compulsory digital and distance learning university courses during the COVID-19 pandemic. They found that online learning failed to produce desired results in underdeveloped countries like Pakistan, where a considerable majority of students cannot access the internet due to technical and financial issues. In addition, the lack of face-to-face interaction with the instructor, response time, and absence of traditional classroom socialization was among some other issues highlighted by higher education students.

Fauzi and Khusuma (2020) view the challenges of online learning in COVID-19 from elementary school teachers' perspectives. Their findings show that various problems occurred in implementing online learning. Issues like availability of facilities, network and internet usage, planning implementation, evaluation of learning, and collaboration with parents were critical problems that caused dissatisfaction among the teachers. Like the studies by Adnan and Anwar (2020); Fauzi and Khusuma (2020), Nambiar's study regarding teacher's and student's perceptions and experiences related to online classes in an Indian university identified that areas like quality and timely interaction between students and teacher, technical support availability, structured online class modules, and modifications to accommodate conduction of practical classes, affect the level of satisfaction of students and teachers (Nambiar, 2020).

#### *Learning Motivation and Self-regulation*

In a study by Adnan et al (2009) at the International Islamic University of Malaysia (UIAM). They have studied the factors that influence the academic achievement of IIUM Foundation students. In their analysis, there is a moderately significant correlation between intrinsic motivation and self-regulation ( $r = 0.536$ ,  $p < 0.01$ ). Self-efficacy with self-regulation is also moderately correlated ( $r = 0.331$ ,  $p < 0.01$ ). Another research done by Hashemyolia (2015) at Universiti Putra Malaysia about the success factors of PutraLMS, motivation, and self-regulation learning strategies. This study found that by using the Motivated Strategies for Learning Questionnaire (MSLQ) which has a Cronbach value ( $\alpha = 0.818$ ) as a measure of motivation, there is a positive correlation in the self-efficacy motivation item with self-regulation ( $r = 0.31$ ,  $p < 0.01$ ) and the intrinsic motivation item with self-regulation ( $r = 0.32$ ,  $p < 0.01$ ).

Chiou (2015) at Universiti Putra Malaysia studied student's motivation and self-regulation as predictors in online learning. The study involved 314 students from various faculties. The study found a significant positive correlation between motivation and online learning experience ( $r = 0.589$ ,  $p = 0.0001$ ). In addition, Chiou's study (2015) found that the relationship between self-regulation and online learning experience has a significant positive relationship with a value of  $r = 0.632$ ,  $p = 0.0001$ . This study collected respondent data by using the Online Self-regulated Learning Questionnaire, which has a Cronbach value ( $\alpha = 0.908$ ) to study self-regulation, and the Situational Motivation Scale (SIMS) with a Cronbach value ( $\alpha = 0.839$ ). The findings of Chiou's study (2015) concluded that students with high motivation could adapt to online learning. In addition, students with high self-regulation will not easily lose motivation and can adapt to online learning.

A study by Peck et al (2018) regarding the relationship between self-regulation and motivation towards student involvement in learning outside the classroom found that all variables are dynamically related. According to Peck et al (2018), 347 out of 509 student samples remained in continuing learning outside the classroom. The 347 students found that extrinsic motivation

is one of the reasons why they are still involved in continuing learning outside of class. Furthermore, the students also think that student involvement factors such as the value of their work also affects self-regulation when they continue learning outside the physical classroom. Through the study of Peck et al (2018), student motivation has a significant correlation to student retention with a correlation value of ( $r = 0.241$ ,  $p = 0.010$ ). as well as the correlation between self-regulation and student retention with a value of ( $r = 0.198$ ,  $p = 0.036$ ). In conclusion, self-regulation and motivation can be considered as factors in student's involvement in online learning activities, however, the influences are not strong.

There is a study conducted by Susanna et al (2021) regarding the effect of self-regulation and motivation on outcomes learning using a blended learning approach in basic physics courses during the COVID-19 pandemic. The research concluded that motivation and self-regulation positively affect student learning outcomes after using the blended learning approach in learning basic physics. The research also suggested that the development of the teaching and learning process using the blended learning approach is necessary to increase student motivation and self-regulation so that it can directly affect learning outcomes.

#### *Attention, Learning Motivation and Self-regulation*

A student's attention to learning helps indicate that a student is motivated to learn. In the ARCS (Attention, Relevance, Confidence, and Satisfaction) motivation model developed by Keller (1997) to increase student motivation in learning, the level of student attention is an essential factor to be considered as a way to increase student motivation (Keller, 2009). In a study conducted by Balan & Montemayor (2020) about how the level of attention affects the readiness for online learning and student motivation, they found a correlation with a value of 0.1871 and a value of  $p = 0.03$  between the level of attention and motivation. However, the correlation value between the two variables, namely motivation, and level of attention, is not at a high level of magnitude.

In the study of Wei et al (2012) about the use of smartphones and its effect on the level of continuous attention and self-regulation, they found that continuous attention has a positive relationship with students' self-regulation with a Pearson correlation reading  $r = 0.65$ ,  $p = 0.001$ . Therefore, Wei found that students who are weak in focusing due to playing on smartphones during class have less self-regulation or self-control. As a result, students are weak in absorbing the information they learn.

According to observations, the effect of the level of attention on student motivation can be studied by considering self-regulation as a mediator between the two variables. This is because several studies show a significant correlation between the level of attention on self-regulation and the relationship between self-regulation and motivation. For example, a study by Barton et al (2021) about the effect of social media on the level of attention, motivation, and performance of students found that there is no significant relationship between the level of attention and student performance if self-regulation factors are considered. Therefore, in studying the relationship between students' attention and motivation levels, students' self-regulation should be considered a mediating factor.

Very few studies have been carried out to observe motivation and self-regulation in online learning during the COVID-19 pandemic. Wang & Li (2022) conducted a meta-analysis of

massive open online courses (MOOCs)-based education and see its impact on students' achievement, engagement, motivation, and self-regulation during the COVID-19 pandemic. The study concluded that MOOC-based education could significantly improve academic achievement and motivation rather than self-regulation and engagement compared to the non-MOOCs-based approach.

The study by Balan and Montemayor (2020) on the relationship between motivation, level of attention, and students' readiness in online learning classes states that only a few studies examined the relationship between the level of attention and motivation. Therefore, the use of online mediums is indeed able to give advantages, especially during the Covid-19 situation. However, the level of student attention and motivation may differ between physical and online learning. Therefore, in attempting to improve the learning experience positively, researchers need to find and discuss the factors that affect student engagement and motivation in online learning. Therefore, the relationship between the two factors, such as student attention and motivation, may be able to answer the question of student challenges in online learning. With this, a study was conducted to understand students' attention and motivation through Keller's ARCS model and use self-regulation as a mediator for these two relationships. Besides, the Self-regulated Learning Model (SLR) from Pintrich (2000) and the Current Cycle Phase model from Zimmerman and Moylan (2009) were also used as the primary references of the study. This study aims to understand more on students' problems in online learning during the pandemic.

### **Methodology**

The design of the study is in a quantitative form. The population of this study consists of students from five programs offered at the Faculty of Human Ecology, Universiti Putra Malaysia, namely Bachelor of Human Development Science, Bachelor of Human Development Science with Management, Bachelor of Human Development Science with Information Technology, Bachelor of Consumer Studies, and Bachelor of Music. The population of this study also follows a specific year of study consisting of students who were in year two, year three, and year four in the 2021/2022 academic session. First-year students were excluded from this study because they still needed to register and start their studies on campus when the research was conducted. Therefore, the official number of students from year two to year four of the five programs studied was 603. Of 603 students, 235 were selected using stratified random sampling and Krejcie and Morgan's table (1970) was used to determine the sample size. In the selection, the population was grouped into specific subgroups based on their study program and year of study. Then random selection was made according to the subgroup. Finally, students were selected using a simple random technique from each subgroup, where each student had the same probability of being selected as a sample.

The instruments used are existing instruments, namely the Mindfulness Attention Awareness Scale (MAAS), Motivated Self-learning Strategy (MSLQ), and Online Self-regulated Learning Questionnaire (OSLQ) instruments. The researchers conducted an online survey to collect the data. The instruments were transformed into a Google Form and distributed to students. This study hypothesizes that self-regulation has a mediating effect on the relationship between the level of student attention and student motivation.

For data analysis, simple regression analysis and multiple regression analysis were used to determine the relationship between independent variables, mediators, and dependent variables. In looking for this mediator relationship, the Causal step method from Baron and Kenny (1986) and the Sobel test were used to conduct a mediation analysis to examine the indirect relationship between the level of attention and motivation through self-regulation as a mediator. Besides, the standardized coefficient value was also studied to see the effect of self-regulation on the relationship between student attention and student motivation.

### Finding and Discussion

The purpose of this research paper is to discuss how the variable of self-regulation acts as a mediator of the relationship between the level of student attention and student motivation in online learning. The Causal step from Baron and Kenny (1986) and Sobel's test from Sobel (1983) were used for mediation analysis to find direct and indirect mediation effects. In looking for a direct mediating effect of self-regulation on the relationship between the level of students' attention and motivation, this study has analysed standardized coefficients for the relationship between dependent and independent variables.

Table 1

*Hypothetical path for multiple regression analysis*

Hypothetical path	Standardized coefficient $\beta$	beta	Sig. Value	Results for Hypotheses
c: AL $\rightarrow$ ML	0.758		0.000	Significant
a: AL $\rightarrow$ SrL	0.700		0.000	Significant
b: SrL $\rightarrow$ ML	0.830		0.000	Significant
c': AL $\rightarrow$ SrL $\rightarrow$ ML	0.347		0.000	Significant

Note: AL - Attention Level, SrL - Self-regulations Level, ML - Motivation Level.

Table 1 refers to the hypothesized path for the multiple regression analysis. Based on the value of the standardized beta coefficient  $\beta$  of equation (c), it shows that there is a significant positive relationship between the level of student attention and the level of student motivation among the undergraduate in the Faculty of Human Ecology, the  $\beta$  reading is, as much as 0.758 with sig. 0.000, which is considered a high correlation (0.71-0.90). This indicates that if the students pay more attention to online learning, they are more motivated to learn online. The result proves that in Keller's ARCS model, it is true that teachers need to focus their energy on increasing the level of student attention to increase student motivation (Keller, 1979). Compared to Balan & Montemayor's (2020) research, this study shows that the relationship between attention and motivation is much stronger among undergraduate students. This may show that motivation for online learning among the undergraduates in the faculty is highly contingent upon their attention to learning. This requires a higher level of cognitive effort among the undergraduates and the ability of the instructor or lecturer in the faculty to help the student to focus their attention throughout the online class (Cicekci & Sadik, 2019; Deng & Wu, 2018).

In the table, the equation (a) 's standardized coefficient value shows that there is also a significant positive influence on the level of student attention and student self-regulation, as

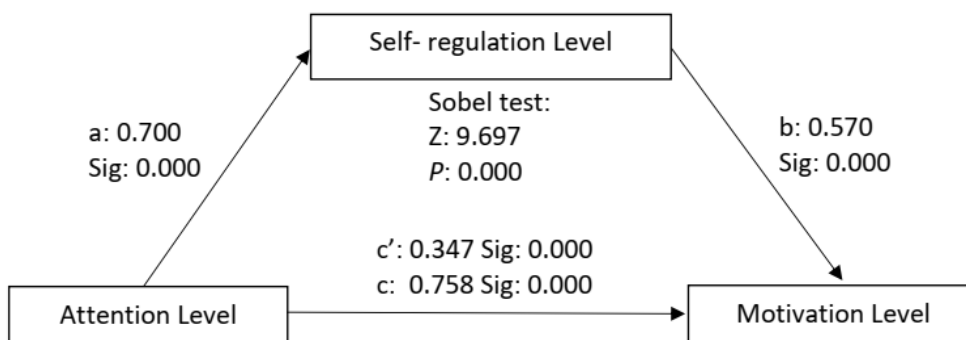


much as 0.700 with sig. 0.000. As mentioned in Wei et al (2012) 's study, during online learning, the ability to self-regulation from the distraction from the devices such as smartphones and laptop determines the learning attention of the student. This study also proved a similar situation among the Faculty of Human Ecology undergraduates. Therefore, undergraduate students' attention determines their ability to regulate themselves during online learning. At the same time, equation (b)'s result indicates that self-regulation plays a vital role in determining the motivation of the undergraduate to learn in online classes. The standardized coefficient value  $\beta$  shows 0.830 with sig. 0.000, which is considered a strong relationship (0.71-0.90). Compared to Peck et al.'s study in 2018, undergraduate students in the Faculty of Human Ecology show that self-regulation is essential to sustain their motivation to continue learning in a non-traditional way.

Finally, the standardized coefficient value of the equation (c') in the table shows a positive influence on student attention and motivation when the variable of student self-regulation is included. The standardized coefficient value of as much as 0.347 with sig. of 0.000 shows that the level of self-regulation mediates the relationship between student attention and student motivation. This result proves that the relationship between student attention and student motivation is more significant when the level of self-regulation is considered among the Faculty of Human Ecology undergraduate students.

Figure 1

Beta coefficient values and Sobel test values for the effect of student self-regulation on the relationship between attention and motivation levels



As a result of both analyses, which are the Causal step analysis from Baron and Kenny (1986) and the Sobel test from Sobel (1983), the self-regulation variable has a significant effect on the relationship between the level of student attention and student learning motivation. The test from the Causal step found that the beta value (c) of the direct relationship between the level of attention and motivation of students is higher than the relationship between the level of attention and motivation of students when the mediating effect of beta (c') of self-regulation is involved. As shown in Figure 1, the result is further strengthened by the Sobel test, where the Z score value is 9.697. This result exceeds the significance level of 1.96 to make self-regulation a variable that significantly affects the relationship between the two variables.

Students who have experience for one year in online learning may have been comfortable and able to adapt to this new learning. As a result, students now have high self-regulation, which affects the study results. As a result, students now have high self-regulation, which affects the study results. The study by Ning and Downing (2012) supports this statement with the results

of their study that there is a significant mediating effect of learning experience on the relationship between self-regulation and student motivation. The result of this study also echoes Bandura's concept of self-efficacy in his social cognitive theory, which refers to people's beliefs in their capabilities to exercise control over their own functioning and over events that affect their lives. Students' self-regulation as a mediator between attention and motivation enable them to continue to learn in a new environment (Bandura, 2002). The results of this study further strengthen Keller's (2009) study, which states that the ARCS model can be used in online learning when this study proves that online learning also requires a high level of attention. In addition, this study provides a new perspective on the ARCS model by linking self-regulation as the mediator influencing student motivation.

This study suggests that students and teachers prioritize the attention level in online learning. The level of student attention is vital to cultivate because the level of student attention affects learning motivation. When students' attention levels are low, students will be less motivated, ignore all learning activities, and quickly become complacent with the environment and distractions. Therefore, students who have a disruptive environment should have high self-regulation. This study found that self-regulation is helpful as a catalyst for student attention and motivation. Because, in virtual learning, students do not experience high supervision from the teaching staff. When the level of supervision is low, students are exposed to laziness and procrastination in work and assignments. Therefore, self-regulation ensures that students are always focused and enthusiastic about learning.

### **Conclusion**

During the COVID19 pandemic, the students in the Universiti Putra Malaysia changed their learning method from traditional one to online learning. This research studied the mediation effect of self-regulation in relationship between attention span and motivation in online learning among the undergraduate students in the Faculty of Human Ecology. 235 undergraduate students were selected as samples for a survey in this study.

The findings demonstrated a significant positive correlation between attention and motivation—the association between attention and self-regulation and the relationship between self-regulation and motivation exhibit positive correlations. The two correlations demonstrate how self-regulation regulates the relationship between students' attentiveness and their level of motivation. The mediation test demonstrated this mediation, which combined the Causal step and the Sobel test. It was used in conjunction with multiple regression analysis to examine the impact of the mediator variable on the connection between the dependent and independent variables. The findings demonstrate that self-regulation has a significant mediator effect.

This study concludes that undergraduate students' degree of attention and motivation is crucial for online learning. The idea that self-regulation can improve attention in online lectures and thus raise interest in learning is also conveyed to students through recognizing the role of self-regulation as a mediator of the relationship between students' level of attention and motivation.

In the future, it is hoped to add more suitable variables in finding factors that affect the motivation of online learning. For reference, the ARCS model from Keller (1987) states that four factors can increase student motivation, and this study only examines the attention



factor. As a suggestion, researchers in the future are expected to study the other three factors in Keller's (1987) ARCS model.

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