

# **Abrupt Transformation in Pedagogy: How Do Students Engage Academically in the Face-to-Face Online Learning Environment?**

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*Use of technology is beneficial in pedagogical transformation, but student engagement is essential throughout the process. Because the number of studies investigating how students' academic involvement during the pandemic is still limited, this research is necessary to close this gap in the literature. The research goal is to determine the contribution of students' cognitive and affective engagement to their academic activities by utilizing an intrinsic motivation approach in the context of pedagogical transformation. We discuss the interplay factors between students' cognitive and affective engagement and how students become engaged in academics. This research applied cross-sectional study. The research findings demonstrate the composition of cognitive and affective engagement and the interplay factors between them, enabling students to participate in academic activities in a virtual face-to-face learning environment. One thing to highlight is that evaluating learning progress elicits pleasant emotions, whereas monitoring comprehension and setting learning goals elicits persistence. Higher education educators are recommended to create captivating face-to-face online learning experiences in order to optimize their students' engagement in academic activities.*

*Keywords: academic engagement, affective engagement, cognitive engagement, internal motivation, online learning*

## **INTRODUCTION**

The worldwide COVID-19 pandemic was the impetus for a greater emphasis on technology in education. Many scholars have tested the effectiveness of using technology-assisted learning, including evaluating programs and developing sustainable use of technology-assisted learning, due to the enormous potential of technology-assisted learning (Pan, 2020; Valantinaitė & Sederevičiūtė-Pačiauskienė, 2020).

Face to face online learning during the pandemic appears limited to separating the dimensions of space between lecturers and students, because real-time learning interaction can still be conducted through technology media (Almenara & Valencia, 2020). Due to the separate dimension of space, lecturers retain the authority to regulate the learning process, whether acting as a facilitator, coach, mentor, manager, or other role based on learning needs. Through various features on the digital platform, students can continue interacting with one another in academic and non-academic dialogues while maintaining control over their interactions.

Depending on the students' learning needs, online learning can be conducted in monologue or dialogue. Even communication between lecturers and students appears to be facilitated solely through the use of technological media. Owing to the rising pedagogical transformation in education (Honarзад & Rassaei, 2019), one of the tangible manifestations is that the lecturer's role as a facilitator is no longer limited to simply creating a lesson plan but also facilitating the learning process to accommodate students' needs (Itow, 2020). According to the current state of affairs, technology has successfully allowed students to study in virtual classes in a structured manner; additionally, it has successfully met the learning needs of students at any time and from any location (Raes, Vanneste, Pieters, Windey, Van Den Noortgate, & Depaepe, 2020). However, the number of studies looking into ways to engage students academically remains restricted in this context.

As every lecturer recognizes, face to face online learning is a learning activity that can only monitor and record the front half of the student body, directly in front of the active camera. The camera angle position restricts lecturers' ability to see all aspects of the online learning process from a single perspective. The lecturer's vision is further limited to students' kinesthetic gestures and psychomotor expressions. They are difficult to discern in online learning environments. Student physical and non-physical activities should be triggered as a natural reaction to the online learning process, demonstrating their involvement in developing the learning experience, even if they are not always focused. Because various activities that are generally centered on campus are shifted through online media, online learning impacts the lack of intensity of interaction between students (Longhurst, Stone, Dulohery, Scully, Campbell, & Smith, 2020). It is even possible that online learning causes lecturers' attention to wane, if not vanish entirely. This is intriguing because technology is now an unavoidable part of student academic life, requiring them to learn independently while still communicating and interacting with one another (Honarзад & Rassaei 2019). At the same time, it is crucial to ensure that students' involvement in an academic activity is consistent (Hamm, Perry, Chipperfield, Parker, & Heckhausen, 2019). It can serve as a counterweight to the continuity of the online learning process in general. Ensuring students' affective involvement alone is insufficient to ensure that students are actively involved in academic activities. In this context, the cognitive dimension of students serves as the foundation for all academic activities, with affective fluctuations occurring in response to each student's emotional states and interests (Ryan & Deci, 2020). This is the impact of basic needs satisfaction on student engagement and academic performance levels (Skinner, Saxton, Currie, & Shusterman, 2017).

Currently, amid the COVID-19 pandemic, the implementation of online education is focused on meeting the needs of students to learn autonomously while also ensuring mastery of their competencies, which means that it must ensure the connection between learning activities and the learning needs of those students (Ryan & Deci, 2020). Automatically student satisfaction in online learning will be achieved if students believe that their needs have been met, ultimately leading to them becoming more actively involved in the online learning process (Raes, et al., 2020). Students who are intrinsically motivated to participate in their learning benefit from the online learning environment the most (Beerline, 2020). Without a motivational boost to become an independent, autonomous, and consistent learner, so the student's proactive attitude will not automatically emerge (Ryan & Deci, 2020). In addition, students' active participation in the online learning process is affected by their intrinsic motivation (Lazarides & Raufelder, 2017). They believe that online learning met their basic psychological needs for autonomy, competence, and relatedness (Adams, Little, & Ryan, 2017; Alley, 2019).

Moreover, Froiland and Worrell (2016) found that when students are intrinsically motivated, they are more likely to participate in online learning and achieve higher levels of academic success and more

consistent learning results. Beerline (2020) also stated that intrinsic motivation correlates with the level of academic engagement among students positively, on the other hand intrinsic motivation may not be sufficient in and of itself to encourage persistence in an online environment. Thus, to answer how students can be actively involved in the online learning process, it will be necessary to encourage various intrinsic factors to determine student academic engagement.

Using an intrinsic motivation approach in the context of pedagogical transformation, the purpose of this study is to examine the contribution of students' cognitive and affective engagement to their academic activities. Benita (2020) revealed that in studies related to motivation, goals play a role in determining student behavior and the reasons. Moreover, they encourage students to participate in an activity, concluding that goals and reasons serve different roles in predicting which behavior motivates students. In this context, goals can be considered the orientation of motivation, whereas reason can be thought of as the cornerstone of motivation, influenced by basic psychological needs. Goals depending on personal reasons related to encouragement based on choice, will, and psychological freedom are just a few examples of what can be accomplished (Benita, Benish-Weisman, Matos, & Torres, 2020). It is the point at which emotions are voluntarily expressed (Benita, 2020). Autonomy is a crucial component in self-determination theory (SDT). It is associated with a sense of initiative and ownership in line with individual interests (Ryan & Deci, 2020). Autonomy is also self-regulation (Arvanitis, 2017), which develops from emotion regulation (Roth, Vansteenkiste & Ryan, 2019), so emotions play an essential role in goal-related behavior (Benita, 2020). As a result, we investigated the effect of students' interests and emotions on their academic engagement. A further advantage of intrinsic goals such as personal growth is meeting basic psychological needs (Adams, et al., 2017). They are also associated with integrative emotion regulation (Benita, et al., 2020). Moreover, students' autonomous behavior in self-regulation, such as self-orientation, was predicted by their integrative emotion regulation.

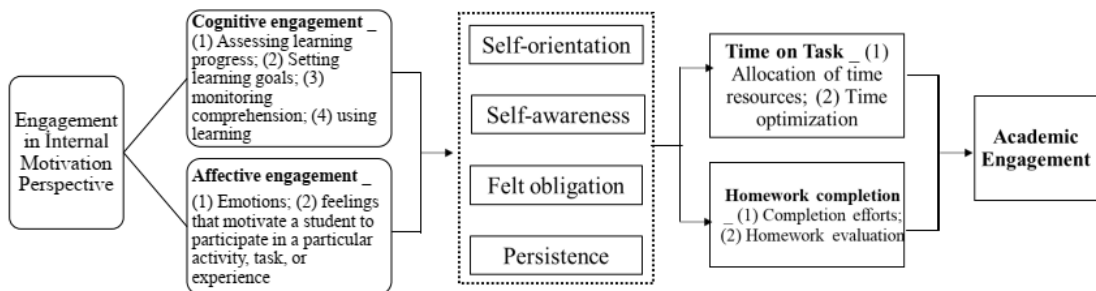
Autonomous learners internalize and believe that they are the gatekeepers and deciders of what learning activities they must participate in (Benita, 2020). It also necessitates students' ability to predict how much active participation they should have in academics and what process of a set of cognitive skills they should go through (Lazarides & Raufelder, 2017). Furthermore, according to Fong, et al. (2018), students' needs and motivation impact their courage and involvement in the learning process. One particularly intriguing finding by Smit, de Brabander, Boekaerts, and Martens (2017) is that goal orientation is also associated with higher levels of persistence and performance. As a result, students will likely exert more effort (Benita, 2020), as a form of students' investment level, which determines their cognitive engagement (Alley, 2019). Moreover, according to Roth, et al. (2019), the development of autonomous learners occurs due to the learners' emotional involvement, intrinsic motivation, and stimulation and encouragement obtained by the learners' impact on their consciousness. Indeed, SDT emphasized the importance of students' awareness of and ability to carry out the learning process in an integrative manner.

Benita (2020) also asserts that students' expressions are components of their awareness and learning autonomy, both of which are described as "awareness and learning autonomy." It is also an interrelated process that reflects their ability to regulate their emotions in an integrated manner. According to Gillet, Gagné, Sauvagère, & Fouquereau (2013), one of the most critical processes in developing a positive relationship between perceived support and favorable outcomes is the feeling of obligation. In education, students' obligation stems from their commitment as members of the professional learning community and is accompanied by a sense of moral authority (Lee, 2012). It was also discovered by Malhotra, Ashill, Lages, and Homayounfard (2020) that students' sense of obligation is a critical factor in effectively stimulating their commitment. The researchers assert in this study that self-orientation, self-awareness, felt-obligation, and persistence are intrinsic motivation approach factors that also affect student engagement academically. Thus, we assumed that these variables would positively affect students' motivation to engage well academically.

## METHOD

Due to the pandemic situation, this study was conducted to examine the transformation of learning in an environment where the vast majority of education is delivered online. The transformation and shift of the learning paradigm to online learning have provided each student with new experiences, knowledge, and abilities that may differ depending on subjectivity. Each student's experience manifests the interaction between interpersonal characteristics and contextual factors, which results in student involvement differing according to individual differences and characteristics (Moreira, Inman, Cloninger, & Cloninger, 2021). Student involvement varies due to their ability to adapt after being exposed to new or different circumstances. Adaptability refers to an individual's ability to modify cognitive abilities, affective abilities, and behaviors that are carried out in a constructive manner (Zhang, Wu, Xu, Cao, Goetz, & Parks-Stamm, 2021). Then, student engagement in new learning modes links academic activities that should be more intensive and conceptualized as construction in three dimensions: behavioral, affective, and cognitive elements (Steen-Utheim & Foldnes, 2018).

**FIGURE 1**  
**RESEARCH FRAMEWORK**



### Engagement in Internal Motivation Perspective

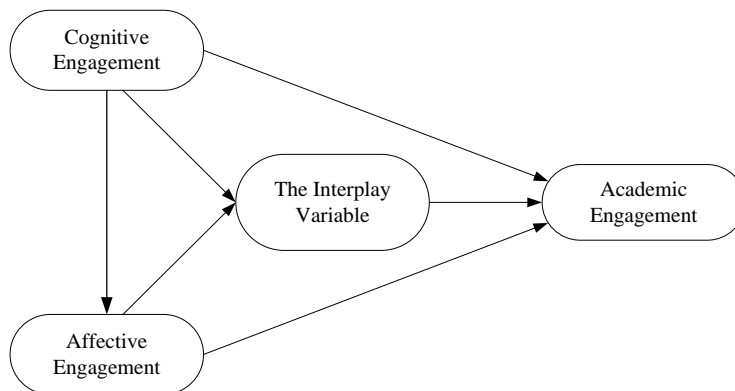
The term engagement is frequently associated with the components of psychological investment, energy, dedication, vigor, absorption, students' participation, commitment, investment, identification with schooling, and participation in school-related activities (Alrashidi, Phan, & Ngu, 2016). In an academic setting, student engagement refers to the degree to which students are involved (Montano, 2021). The context inside and outside of school influences students' engagement in the learning process, such as managing the time required to be actively involved in learning and how much effort they put into homework completion (Reschly, Pohl, & Christenson, 2020; Truta, Parv, & Topala, 2018). The amount of effort students put in and how they make the most of their time is far more essential than the amount of time they spend in class. This is since time is only a quantitative factor and thus does not always reflect the level of effort and dedication of students (Abun, Magallanes, & Incarnacion, 2019). As a result, the dimensions of student academic engagement used in this study are as follows: (1) time on task and (2) homework completion.

Time-on-task referred to the amount of time that each learner spent on completing the tasks (Nakamura, Phung, & Reinders, 2021). Following this quote and several other references, this study categorizes two survey statement themes to measure the time-on-task dimension as follows: (1) allocation of time resources; (2) time optimization. Meanwhile, another component of academic engagement, namely the completion of homework assignments, has emerged as a reliable indicator of students' overall academic commitment to their schooling (Piñeiro, Estévez, Freire, de Caso, Souto, & González-Sanmamed, 2019; Reschly, et al., 2020). The indicators for homework completion used in the second-order model of academic engagement are (1) completion efforts and (2) homework evaluation (Regueiro, Núñez, Valle, Piñeiro, Rodríguez, &

Rosário, 2018). This is in keeping with the previous message that engagement is not being discussed quantitatively.

According to the findings of the Abun, et al. (2019) study, students' cognitive and affective attitudes toward higher education are significantly correlated with their level of academic engagement. Based on these findings and the fact that human attitudes are formed by combining their thoughts (brains) and feelings (hearts), it is inevitable that students' feelings and thoughts also influence their academic engagement. Student engagement in academics is related to how they participate and identify in the learning process, which is driven by their adjustment to the learning situation on both a cognitive and an affective level (Zhang, et al., 2021). The adjustments made by students involve both cognitive and affective abilities, and the result is that students can adjust to the changing conditions that they have been exposed to recently. Although contextual factors are the primary driving force behind change, students' personality characteristics still influence their engagement (Moreira, et al., 2021). During the pandemic, student academic activities rely on students' cognitive dimensions, with a consistent affective dimension serving as a counterweight (Hamm, et al., 2019). Figure 1 depicts the research model developed following the preceding explanation.

**FIGURE 2  
RESEARCH MODEL**



### **Cognitive and Affective Engagement**

Cognitive engagement is constructed by the motivation literature (psychological investment) and learning literature (self-regulatory behaviors and cognitive processes) (Moreira, et al., 2021) in presenting students' performance, goals, and feelings of control (Maguire, Egan, Hyland, & Maguire, 2017). Furthermore, cognitive engagement is indicated by perception, control over schoolwork completion, aspirations, future goals, intrinsic motivation, and the ability to cope with failure. These are the key factors for assessing the cognitive model of engagement. In this study, the following were identified as necessary: (1) assessing learning progress, (2) setting learning goals, (3) monitoring comprehension, and (4) using learning strategies (Min & Foon, 2019). When it comes to affective engagement, it can be defined as (1) emotions and (2) feelings that motivate a student to participate in a particular activity, task, or experience (Reschly, et al., 2020). Feelings of belonging and connectedness characterize affective engagement (Maguire, et al., 2017). Affective engagement is students' emotional response to the school context (Yulia, Sulisty, & Cahyono, 2020). It can manifest in negative or positive emotions that lead to students' actions (Johnston, 2018). In addition, affective engagement is also a feeling of identification and belonging (Moreira, et al., 2021), such as interest in expressing enthusiasm and employing curiosity (Di Leo, Muis, Singh, & Psaradellis, 2019).

## **The Interplay Variable**

Academic engagement of students in the learning process continues to be a requirement, although changes in learning modes are increasingly dominated by online learning. The student's academic engagement in question includes participation in academic activities and participation in feelings, actions, and reasoning (Maguire, et al., 2017). That students' cognitive and affective engagement are both representative internal and subjective experiences, and when they are together in the subjective internal area, it impacts behavior; with the interplay between them is complex (Reschly, et al., 2020). In other words, the interplay between cognitive and affective engagement determines the behavior of students who are entangled in academic activities. This study also identifies the role of the interplay of the four factors, namely self-orientation, self-awareness, felt obligation, and persistence.

## **Self-Awareness**

Student engagement in the learning process is primarily based on self-awareness and emotional regulation (Blakemore & Agllias, 2019), which encourages a person to take on more expansive responsibilities (Reschly, et al., 2020). In addition, Sutton (2016) discovered that increased self-awareness is associated with increased proactive behavior. Awareness plays a role in developing autonomic regulation in this section, which is related to emotional regulation, impulse control, and intrinsic motivation (Roth, et al., 2019). When it comes to environmental changes following online learning conditions, emotions serve as a scoring system (Benita, 2020). This is reflected in reading one's own emotions to recognize their significance and generate interest. In other words, awareness will begin with self-evaluation (internal reflection), including monitoring comprehension and piquing the individual's interest, leading to them taking the initiative. As a situational self-awareness, reflection aims to improve interpersonal skills and evaluate the situation to be open to objectivity. As defined by Sutton (2016), the automatic process of situational self-awareness occurs when students compare their actions with the standards they have established for themselves. A role is also played by self-awareness, which guides decisions about what students like or dislike and what makes students interested in certain situations and conditions based on intuition and their ability to make decisions about what they like or dislike.

## **Self-Orientation**

In order to complete their orientation requirements (Xhomara, 2018), students must participate in academic activities because they must meet specific criteria that have been established through awareness, self-recognition, and self-evaluation (Johnstone, Cohen, Bryant, Glass, & Christ, 2015). Self-orientation can be summarized as follows: (1) a picture of a person's expectations that focuses solely on himself; (2) a general tendency to view oneself and the social world in specific ways; and (3) intrinsic goals and standards set by the individual (Olton-Weber, Hess, & Ritchotte, 2020). The three definitions refer to self-concept orientations (Shafaat, Qureshi, Hajazi, Khan, & Azeemi, 2013), self-help intervention (Antoine, Congard, Andreotti, Dauvier, Illy, & Poinot, 2018), and goal orientations (Smit, et al., 2017). Self-orientation is based on the self-concept and the orientation of the self-concept, which is unique to each individual (Shafaat, et al., 2013). When a person believes he is competent enough to complete a task, his self-assessment improves his well-being (Sutton, 2016). Someone with a strong sense of self-importance can be domineering and unresponsive to the needs of those around him. He is only concerned with himself and does not require the assistance of others, including not relying on the work of others. On the other hand, self-orientation is also associated with depression (Liu, Fu, Li, Liu, & Chen, 2018). This was recognized in the Olton-Weber, et al. (2020) study on gifted and talented youth in which mindfulness intervention was used to reduce self-orientation, which significantly affected personal motives.

## **Felt Obligation**

The degree to which students participate in the learning process determines whether or not learning goals are met. If student participation is low, it is possible that learning goals will not be achieved or that ability will not be increased. The intensity to which students are actively involved in their learning is closely related to their level of enthusiasm for learning (Mohsin, Salleh, Ishak, & Isa, 2021). This is carried out

with a sense of obligation, with the primary priority being to complete the tasks assigned as soon as possible (Piñeiro, et al., 2019). Students who have a strong sense of obligation, on the other hand, are more likely to be committed to improving the quality of their affective performance continuously (Malhotra, et al., 2020).

Moreover, they tend to engage in change-oriented behavior (Zhu & Akhtar, 2019) and keep themselves busy to provide benefits for others because they have a strong attachment to the commitments they make (Mohsin, et al., 2021). Therefore, when the goals that have been set are not achieved, the role of felt obligation is to recuperate to return to being involved in academic activities more intensively by further increasing performance efforts (Malhotra, et al., 2020). Students who have a strong sense of obligation will be more persistent in adapting to changing circumstances because they understand that they will be less likely to achieve their personal goals if they do not improve their performance. It is the willingness to react and do whatever is necessary to achieve a goal that is measured by felt obligation (Mohsin, et al., 2021) and the commitment to developing novelty and correcting problems that are measured by felt obligation (Zhu & Akhtar, 2019). According to the findings of a study conducted by Malhotra, et al. (2020), felt obligation is a critical factor that influences affective commitment.

### **Persistence**

The low engagement of students is frequently the most significant risk factor for lack of persistence in work-related activities (Maguire, et al., 2017), resilience when faced with difficulties, and dedication when a high level of identification is required (Truta, et al., 2018). Persistence refers to the level of involvement students have in a process from when they begin to when they finish. Persistence is also the result of participation in a series of commitments oriented toward one's motives and objectives (Luciano-Wong & Crowe, 2019). Engagement and perseverance are mutually beneficial (Kimbark, Peters, & Richardson, 2017). The two combinations have a significant impact on student achievement. Despite their stress, students' reflection and attention help them remain focused on the task at hand (Sutton, 2016). In the epidemic era of online learning, intrinsic motivation may not be sufficient to ensure long-term success (Beerline, 2020). Persistence and adaptability are intertwined (Collie, Holliman, & Martin, 2017). Students who are easily adaptable to new environments are more likely to react positively and be more engaged in consistently solving new challenges. Persistence impacts whether students remain engaged or drop out (Luciano-Wong & Crowe, 2019). The intention to re-engage is a predictor of student persistence (Kimbark, et al., 2017). Persistence is a representation of re-engagement (Vollet & Kindermann, 2020). It is also defined as long-term efforts to overcome obstacles (Collie, et al., 2017).

### **Research Participants**

The researchers received a total of 208 responses. Participants were recruited to take part in the study because they expressed an interest in doing so. They are currently enrolled as undergraduate students. They ranged in age from 18 to 25. They were classified as male (N = 65) or female (N = 143) based on their gender. Finally, 55.77% of participants were from rural areas, while 44.23% were from urban areas. Researchers also discovered that 3.3% of participants used a computer PC as an online learning device, 45.7% used laptops, and the remaining 51% used a smartphone. Furthermore, 47% of participants preferred Google Meet as a digital platform for online learning, 30% preferred WhatsApp, 22% preferred Zoom, and 1% preferred another digital platform.

### **Data Collection and Analysis**

An online survey, which included the administration of questionnaires as an act of questioning, was used in this study to gather information on how students perceive their participation in online learning. The online survey was distributed using survey administration software to reach a larger number of students at a private educational institution in Indonesia. A survey gathers information by administering questionnaires or conducting interviews with a sample of people chosen to represent a larger population so that the information gathered can be applied to a larger population (Gall, Gall, & Borg, 2007).

Data collection surveys gather information from Indonesian students about their engagement in online learning, which includes Academic Engagement or AcE (Appleton, Christenson, Kim, & Reschly, 2006;

Henrie, Halverson, & Graham, 2015), Affective Engagement or AfE (Piñeiro, et al., 2019), and Cognitive Engagement or CE (Fredricks & McColskey, 2012). The instruments used for the interplay variable is (1) the self-awareness model, which adapts the Self-Awareness Outcomes Questionnaire (SAOQ) by Sutton (2016) with the constructs, (a) internal reflection and (b) self-concept; (2) the self-orientation model with the constructs, (a) personal motives and (b) mindfulness interventions (Liu, Fu, et al., 2018; Olton-Weber, et al., 2020); (3) the felt obligation model with the constructs, (a) intention to stay, (b) recovery performance, and (c) affective commitment (Malhotra, et al., 2020); and (4) the persistence model with the constructs, (a) personal commitment, (b) resilience, and (c) adaptability (Vollet & Kindermann, 2020).

The online questionnaire also included background questions on socio-demographics, such as gender, age, preferred digital platforms used, and other information. An online survey was created using 41 affirmative statements. The scale used is an interval of 0 to 4, which corresponds to the nature of the interval scale. During the data collection process, the researcher provided instructions for filling out a survey that included information that research participants were given the freedom to determine a score between 0 and 4 for a statement item, including giving a score using decimal numbers. In addition, the researcher divided the statements into several categories based on indicators for data analysis purposes.

Responses from participants are data that is analyzed using the statistics of mean and standard deviation for each indicator of the CE, AfE, and AcE models, as well as factors of the interplay model. Checking the suitability of the reflective indicator model is carried out by (1) checking the composite reliability, which must be higher than 0.7, (2) comparing between outer loading value and cross-loading, (3) checking convergent validity at the limit of Average Variance Extracted (AVE) value which is not less than 0.5, (4) evaluating discriminant validity with the Fornell-Larcker criterion to compare between the square root value of AVE and the value of the relationship between the other constructs.

When there are results of the analysis of the reflective indicator model that do not meet the evaluation criteria, such as if the external loading is not more than or equal to 0.7, then this study refers to what was conveyed by Hair Jr, Hult, Ringle, & Sarstedt (2021) to maintain reflective indicators. Meanwhile, assessing structural model results is done by (1) assessing Variable Importance in the Projection (VIP) values for collinearity issues at the recommended limit, which must be more than 0.20 and less than 5; and (2) assessing the significance and relevance of the structural model relationships.

## RESEARCH RESULT

This study investigates (1) the academic engagement (AcE), affective engagement (AfE), and cognitive engagement (CE) models in which all elements were loaded into a single latent; (2) two-factors of AcE model included in each time-on-task and homework completion, and two-factors of AfE model included in each positive emotional and interest factors; (3) the interplay variable model included in each self-awareness, self-orientation, felt obligation, and persistence factors. Table 1 is the result of descriptive statistical analysis for the indicators of these model.

**TABLE 1**  
**THE RESULT OF DESCRIPTIVE STATISTICS ANALYSIS**

Variable	Mean (Standard Deviation) of Indicators			
	1	2	3	4
CE	3.082 (.558)	3.254 (.536)	3.145 (.586)	3.128 (.596)
Evaluation progress	3.057 (.644)	3.106 (.570)		
Set learning goal	3.153 (.631)	3.355 (.578)		
Monitor comprehension	3.190 (.644)	3.100 (.641)		
Using learning strategies	3.075 (.671)	3.182 (.629)		
AfE	3.016 (.660)	3.261 (.552)	-	-
Positive emotions	2.996 (.765)	3.036 (.731)	-	-
Interest	3.395 (.590)	3.127 (.625)	-	-



The Interplay Variable	3.022 (.542)	3.122 (.520)	3.209 (.512)	3.361 (.471)
Self-awareness	3.049 (.555)	2.996 (.619)	-	-
Self-orientation	3.047 (.606)	3.198 (.587)	-	-
Felt obligation	3.260 (.599)	3.214 (.607)	3.153 (.609)	-
Persistence	3.187 (.653)	3.278 (.598)	3.618 (.474)	-
AcE	2.924 (.622)	3.302 (.478)	-	-
Time-on-task	3.307 (.601)	2.542 (.950)	-	-
Homework completion	3.536 (.562)	3.068 (.620)	-	-

Note: Each variable has several indicators; the number for the mean of an indicator is not in parentheses; the number for the standard deviation of an indicator is in parentheses.

As shown in Table 4, the evaluation results of the indicator model then reveal that all composite reliability values are more significant than 0.7. All AVE values ranging from 0.759 to 0.805 exceeded the recommended level of 0.5; (CE = 0.793, AfE = 0.790, AcE = 0.759, the interplay variable = 0.805, evaluation progress = 0.844, set learning goal = 0.786, monitoring comprehension = 0.833, using learning strategies = 0.839, time-on-task = 0.622, homework completion = 0.650, positive emotion = 0.775, interest = 0.824, self-awareness = 0.851, self-orientation = 0.759, felt obligation = 0.714, persistence = 0.663). All outer loading values of the construct for the second-order AcE, AfE, the interplay variable, and CE models were greater than 0.7 and greater than the cross-loading values. All of the construct's outer loading values for the second-order AcE (time-on-task and homework completion), AE (evaluation learning progress, setting learning goals, monitoring comprehension, and using learning strategies), and AfE (positive emotion and interest) models were more significant than 0.7 and greater than the cross-loadings values. Then, in the second-order interplay variable model, all outer loading values (self-awareness, self-orientation, felt obligation, and persistence) were more significant than the cross-loadings values.

AVE has a square root value of the second-order model, 0.890 for the CE, 0.889 for the AfE, 0.897 for the interplay variable, and 0.871 for the AcE. This is greater than the value of the relationship between the other constructs. The square root value of AVE for the second-order model of four-factors CE (evaluation learning progress = 0.919, set learning goal = 0.887, monitoring comprehension = 0.913, using learning strategies = 0.916), two-factors AfE (positive emotion = 0.880 and interest = 0.908), and two-factors AcE (time-on-task = 0.789 and homework completion = 0.806), more than the value of the relationship between the other constructs. The square root value of AVE for the second-order of interplay variable model (self-awareness = 0.922, self-orientation = 0.871, felt obligation = 0.845, and persistence = 0.814) more than the value of the relationship between the other constructs. While the analysis results for collinearity evaluation, all VIP values are consistent with the main criterion for evaluating structural models, when each value must be more than 0.20 and less than 5, respectively.

This research is expected to positively prove the correlation of CE, AfE, and the interplay variable model with factors from the AcE model. Therefore, data analysis will examine the effect of factors from the CE, AfE models, and the interplay variable models on the factors of AcE. The data analysis results are presented in Table 2.

**TABLE 2**  
**EFFECTS OF THE INDEPENDENT VARIABLES IN THE HYPOTHESIZED MEDIATION MODEL IN THE FIRST-ORDER**

Independent Variable	Dependent Variable					
	Affective engagement		The interplay variable		Academic engagement	
	<i>B</i>	<i>CI</i>	<i>B</i>	<i>CI</i>	<i>B</i>	<i>CI</i>
Cognitive engagement	.694***	.587 - .781	.792***	.724 - .863	.413***	.219 - .614
Affective engagement	-	-	.179***	.094 - .258	.235**	.093 - .365
The interplay variable					0.229*	.028 - .424
<i>R</i> <sup>2</sup>	.482	-	.856	-	.665	-

Based on Table 2, the direct effect of the AfE was significant on the AcE ( $\beta_{\text{direct}} = 0.235, p < 0.01$ ) and the interplay variable ( $\beta_{\text{direct}} = 0.179, p < 0.001$ ). Then the direct effect of the CE was significant on the AfE ( $\beta_{\text{direct}} = 0.694, p < 0.001$ ), it was also significant on the interplay variable ( $\beta_{\text{direct}} = 0.792, p < 0.001$ ) and the AcE ( $\beta_{\text{direct}} = 0.413, p < 0.001$ ). The indirect effect of the CE was significant on the interplay variable ( $\beta_{\text{indirect}} = 0.125, p < 0.001$ ) and on the AcE ( $\beta_{\text{indirect}} = 0.373, p < 0.001$ ), with the total effect also significant ( $\beta_{\text{total}} = 0.786, p < 0.001$ ). Then the indirect effect of the AfE was not significant on the AcE ( $\beta_{\text{indirect}} = 0.041, p > 0.05$ ). Effects were calculated via the bootstrapping procedure (with bias-corrected standard errors) using 5000 random draws. The analysis results reveal that the intrinsic factor has a statistically significant impact on the AfE variable, whether acting directly or indirectly as a mediator. Moreover, it becomes the basis for further investigation into how students' intrinsic factors, as measured by the AfE variable, influence their ability to participate academically in online learning.

### Formative Factors for the Interplay Variable

Furthermore, the second-order CE and AfE models, which serve as formative factors, are examined in this study concerning the second-order of the interplay variable model. The structural analysis results of the interplay model's formative factor show that all convergent validity values are more significant than 0.7, and all outer weight and outer loading values are significant. Furthermore, no critical collinearity levels exist because all *VIP* values are less than 5 ( $1.304 \leq VIP \leq 1.969$ ). Table 3 also displays the results of the significance analysis of the formative factors for the interplay variable.

**TABLE 3**  
**EFFECTS OF THE SECOND-ORDER CE AND AFE MODEL TOWARD THE SECOND-ORDER INTERPLAY FACTOR MODEL**

Independent Variable	Dependent Variable							
	Self-awareness		Self-orientation		Felt obligation		Persistence	
	B	CI	B	CI	B	CI	B	CI
Positive emotion	.119	.008 - .249	-.027	-.121 - .067	.101	-.011 - .208	.043	-.117 - .180
Interest	.143*	.003 - .257	.112*	.005 - .223	.132*	.025 - .237	.038	-.133 - .225
Evaluation learning progress	.462***	.277 - .64	.257**	.104 - .422	.258***	.117 - .386	.248**	.096 - .415
Set learning goal	.128	-.043 - .303	.213**	.084 - .346	.266***	.141 - .411	.320***	.159 - .482
Monitoring comprehension	.105	-.116 - .373	.096	-.092 - .264	-.058	-.196 - .106	.252	-.089 - .509
Using learning strategies	-.041	-.318 - .231	.346***	.159 - .530	.329***	.170 - .458	.045	-.160 - .279
R <sup>2</sup>	.352		.474		.432		.679	

Based on Table 3, the formative factors are as follows, (1) self awareness are evaluation learning progress ( $\beta_{\text{direct}} = 0.462, p < 0.001$ ) and interest ( $\beta_{\text{direct}} = 0.143, p < 0.05$ ); (2) self-orientation are evaluation of learning progress ( $\beta_{\text{direct}} = 0.257, p < 0.01$ ), set learning goals ( $\beta_{\text{direct}} = 0.213, p < 0.01$ ), using learning strategies ( $\beta_{\text{direct}} = 0.346, p < 0.001$ ), and interest ( $\beta_{\text{direct}} = 0.112, p < 0.05$ ); (3) felt obligation are evaluation of learning progress ( $\beta_{\text{direct}} = 0.258, p < 0.001$ ), set learning goals ( $\beta_{\text{direct}} = 0.266, p < 0.001$ ), using learning strategies ( $\beta_{\text{direct}} = 0.329, p < 0.001$ ), and interest ( $\beta_{\text{direct}} = 0.132, p < 0.05$ ); and (4) persistence are evaluation of learning progress ( $\beta_{\text{direct}} = 0.248, p < 0.01$ ) and set learning goals ( $\beta_{\text{direct}} = 0.320, p < 0.001$ ). The monitoring comprehension factor of the cognitive engagement model and positive emotion factor of the affective engagement model has no impact on the four interplay factors. The cognitive and affective engagement

model does not seem to have found the way to play to establish persistence, but what is interesting is that this factor is formed by the evaluation of learning progress and set learning goals. Moreover, Table 4 is the result of the analysis of the effect of the AfE model based on the second-order factors and the second-order of the interplay variable between CE and AfE on the second-order CE model.

As shown in Table 4, the effects of the second-order factor of AfE toward the AcE are, (1) the effect of positive emotion is significant on the time-on-task ( $\beta_{\text{direct}} = 0.287, p < 0.01$ ); (2) the effect of the positive emotion was significant on the homework completion ( $\beta_{\text{direct}} = 0.227, p < 0.01$ ); (3) the effect of the interest is not significant on the time-on-task ( $\beta_{\text{direct}} = 0.009, p > 0.05$ ); and (4) the influence of the interest is not significant on the homework completion ( $\beta_{\text{direct}} = 0.014, p > 0.05$ ).

**TABLE 4**  
**EFFECTS OF THE SECOND-ORDER OF CE, AFE MODEL, AND THE INTERPLAY**  
**VARIABLE TOWARD THE SECOND-ORDER OF ACE MODEL**

Independent Variable	Dependent Variable							
	Positive emotion		Interest		Time-on-task		Homework completion	
	B	CI	B	CI	B	CI	B	CI
Positive emotion	-	-	-	-	.287**	.121 – .455	.227**	.083 – .353
Interest	-	-	-	-	.009	-.205 – .251	.014	-.140 – .178
Evaluation learning progress	.395***	.199 – .578	.233*	.049 – .397	-.140	-.343 – .068	.080	-.115 – .288
Set learning goal	.181	-.030 – .395	.310**	.123 – .488	.277**	.089 – .472	.416***	.277 – .568
Monitoring comprehension	.083	-.236 – .366	.147	-.120 – .441	.235	-.109 – .546	.247*	-.032 – .456
Using learning strategies	-.016	-.296 – .297	.091	-.157 – .329	.116	-.139 – .376	-.008	-.193 – .198
R <sup>2</sup>	.352		.474		.432		.679	
Self-awareness	-	-	-	-	.046	-.162 – .286	.172	-.02 – .380
Self-orientation	-	-	-	-	.210	-.049 – .457	.245	.003 – .498
Felt obligation	-	-	-	-	.092	-.241 – .429	.039	-.158 – .255
Persistence	-	-	-	-	.262	-.032 – .553	.460***	.258 – .629
R <sup>2</sup>	-	-	-	-	.309	-	.685	-

The effects of the second-order of CE toward the AfE show that: (1) the influence of the evaluation learning progress is significant on the positive emotion ( $\beta_{\text{direct}} = 0.395, p < 0.001$ ); (2) the influence of the evaluation learning progress was significant on the interest ( $\beta_{\text{direct}} = 0.233, p < 0.05$ ); (3) the effect of the learning goal set was not significant on the positive emotion ( $\beta_{\text{direct}} = 0.181, p > 0.05$ ); (4) the influence of the learning goal set is significant on the interest ( $\beta_{\text{direct}} = 0.310, p < 0.01$ ); (5) the effect of the comprehension monitoring was not significant on the positive emotion ( $\beta_{\text{direct}} = 0.083, p > 0.05$ ); (6) the effect of the monitoring comprehension was not significant on the interest ( $\beta_{\text{direct}} = 0.147, p > 0.05$ ); (7) the effect of using learning strategies is significant on the positive emotion ( $\beta_{\text{direct}} = -0.016, p > 0.05$ ); (8) the effect of using learning strategies is significant on the interest ( $\beta_{\text{direct}} = 0.091, p > 0.05$ ).

Moreover, when the second-order model of CE is applied to the ACE, it is found that, (1) the influence of the evaluation learning progress is not significant on the time-on-task ( $\beta_{\text{direct}} = -0.140, p > 0.05$ ) and the total effect remained insignificant ( $\beta_{\text{total}} = -0.024, p > 0.05$ ) although the indirect effect through positive emotion was significant ( $\beta_{\text{indirect}} = 0.114, p < 0.05$ ); (2) the influence of the evaluation learning progress was not significant on the homework completion ( $\beta_{\text{direct}} = 0.080, p > 0.05$ ) and the total effect remained insignificant ( $\beta_{\text{total}} = 0.173, p > 0.05$ ) although the indirect effect through positive emotion was significant ( $\beta_{\text{indirect}} = 0.090, p < 0.01$ ); (3) the effect of the learning goal set is significant on the time-on-task ( $\beta_{\text{direct}} = 0.277, \beta_{\text{total}} = 0.331, p < 0.01$ ); (4) the effect of the set learning goal is significant on the homework completion ( $\beta_{\text{direct}} = 0.416, \beta_{\text{total}} = 0.462, p < 0.001$ ); (5) the effect of the comprehension monitoring was not significant on the time-on-task ( $\beta_{\text{direct}} = 0.235, p > 0.05$ ); (6) the effect of the comprehension monitoring was significant on the homework completion ( $\beta_{\text{direct}} = 0.247, p < 0.05$ ) and the total effect was also significant ( $\beta_{\text{total}} = 0.268, p < 0.05$ ); (7) the effect of the using learning strategies was not significant on the time-on-task ( $\beta_{\text{direct}} = 0.116, p > 0.05$ ); (8) the effect of the using learning strategies was not significant on the homework completion ( $\beta_{\text{direct}} = -0.008, p > 0.05$ ).

Then, the effects of the second-order model of the interplay variable toward the second-order model of CE show that, (1) the effect of the self-awareness is not significant on the time-on-task ( $\beta_{\text{direct}} = 0.046, p > 0.05$ ); (2) the effect of the self-awareness was not significant on the homework completion ( $\beta_{\text{direct}} = 0.172, p > 0.05$ ); (3) the effect of the self-orientation is not significant on the time-on-task ( $\beta_{\text{direct}} = 0.210, p > 0.05$ ); (4) the influence of the self-orientation is not significant on the homework completion ( $\beta_{\text{direct}} = 0.245, p > 0.05$ ); (5) the effect of the felt obligation is not significant on the time-on-task ( $\beta_{\text{direct}} = 0.092, p > 0.05$ ); (6) the effect of the felt obligation is not significant on the homework completion ( $\beta_{\text{direct}} = 0.039, p > 0.05$ ); (7) the effect of persistence is not significant to the time-on-task ( $\beta_{\text{direct}} = 0.262, p > 0.05$ ); (8) the persistence has a significant effect on the homework completion ( $\beta_{\text{direct}} = 0.460, p < 0.001$ ).

## DISCUSSION

Based on the analysis results, it was found that the average level of student involvement in the time optimization factor (2,542 or around 63.55%) of academic engagement was the lowest value. The level of involvement here is the level of "intensity" to be involved in the learning process. The average level of student involvement in optimizing their time is 63.55%. In other words, from 100 times students are involved in academic activities, only about 64 times they are optimally involved. This percentage shows the intensity of student involvement in their academic activities. The lack of maximum intensity of student involvement can indeed be a concern. However, if viewed positively, it could be because the level of intensity can also be caused by the homogeneity between the subjects studied by students (Wilson, Wright, & Summers, 2021). According to Piñeiro, et al. (2019). When they learn by using deep learning strategies, and it turns out that they are not optimal, it can impact the level of achievement and quality of their learning outcomes. It is evident that the student's learning process is remains unaffected because they have no difficulty understanding the learning material provided. They also do not have concentration problems, and it could be because they are motivated. What must be understood is that the ability to optimize time is one of time management skills.

The persistence factor, which is defined by the average value of one of the three variables, namely adaptability, is, on the other hand, the component with the most outstanding level of importance (3,618 or about 90.45 percent). As seen in the second-order of the academic engagement model, this component is associated with intensity of completion efforts (3,536 or about 88.40 percent) of the homework completion model. This is relevant information as to why persistence is so important in the completion of assignments. According to Collie, et al. (2017), persistence is about making persistent attempts to alter reactions both cognitively and affectively to handle tasks or manage new circumstances and events that arise as a result of change and uncertainty in one's surroundings. Some of the claims made by Wang, Liu, Ying, and Lin (2021) concerning the relationship between adaptability and academic engagement can be explained by the findings of this study.

Furthermore, according to the findings of the Colthorpe, Sharifirad, Ainscough, Anderson, & Zimbardi (2018) study, most students who can adapt may prepare ahead of time and manage their time efficiently, allowing them to enhance their performance greatly. This is demonstrated in this study by the degree of persistence in the allocation of time resources factor (3,307 or about 82.67 percent), which is quite high in the top five places of the greatest value following expressions of enthusiasm and established learning goals. Consequently, the findings of this study back up the findings of Wolters and Hussain (2015), who discovered that effort consistently predicts many independent learning indicators such as time management techniques among students. As a result, it is possible to conclude that students demonstrate the ability to adjust to changing situations, have reasonably excellent time management abilities, and can exert substantial effort. This demonstrates that they have not encountered any substantial obstacles in their academic pursuits. The findings of the Vollet & Kindermann (2020) study, which suggest that persistence or re-engagement can overcome academic problems, corroborate this viewpoint. This viewpoint is also natural because when students do not experience difficulties, the time allotted to each assignment does not necessarily need to be maximized. Yang, Baldwin, and Snelson (2017) said that when students are persistent and proficient at maximizing time to facilitate their academic pursuits, they may be active in a variety of activities. They are, nevertheless, steadfast in the pursuit of their particular objectives.

The significance analysis in this study discovered that persistence influenced several components of student academic engagement, specifically the homework completion factor. Time spent on task, on the other hand, was shown to be negligible. According to the data, tenacity is a precondition for completion and a determinant in students' success in finishing their academic tasks (Xu, 2021). According to the findings of this study, Luciano-Wong and Crowe (2019) found a link between persistence and student engagement in the context of commitment, which is viewed as an attempt to achieve positive outcomes in the learning process. It was also stated that persistent students were thus because they had goals to achieve (Kimbark, et al., 2017), which were accompanied by internal motivation (Wang, Shim, & Wolters, 2017), and they recognized that the activities they do are useful and beneficial (Yang, et al., 2017). The findings of this study contradict the findings of (Xu, 2021). They discovered that student interest in the online learning environment influences persistence because the results of data analysis in this study show that persistence is formed by the evaluation learning progress factor and the learning goal set factor.

Both of these factors, evaluation of learning progress and learning goal set factors, impact interest, such as perceptions of high scores and high control predicting more significant student curiosity (Di Leo, et al., 2019). However, their interest does not form persistence and does not affect homework completion. That there appears to be a broken relationship between interest and persistence is demonstrated in this study, and it becomes one of the recommendations for future study. It turned out that the curious and enthusiastic students lacked the necessary strength to make them robust, let alone to deal with challenging situations when they arrived. Curiousness is a result of the requirement of continuously accompanying a commitment oriented toward motivations and aims (Vollet & Kindermann, 2020). Then there are variations in the role of interest vs. persistence in promoting student academic engagement in the learning process. On the contrary, learning techniques are employed as elements in one area, the purpose of which is to foster self-orientation and feel an obligation. Thus, fluctuations in students' self-orientation and sense of duty tend to occur in tandem with their levels of interest and perseverance and their use of learning techniques.

In this study, the evaluation of cognitive engagement learning progress acts as the critical shaping element since it contributes to the interplay variable, including self-awareness. These essential elements generate interest and, when combined, create awareness. Furthermore, when this main factor influences positive emotion and positive emotion towards academic engagement, the findings of this study are consistent with Blakemore and Agllias (2019). They claim that student engagement in the learning process is based on self-awareness and emotional regulation. Students' self-awareness enables them to discover what piques their attention in particular settings and conditions. Benita (2020) claimed that emotions serve as a condition evaluation system in online learning. A SWOT analysis analogy may also be used to demonstrate self-awareness (AlMarwani, 2020). They analyze their strengths and flaws without even recognizing them. They also recognize possibilities, as well as threats, and know what to do. It is clear that, in the end, students will be able to govern themselves. Professional self-awareness is a necessary condition

for university students' self-development and self-improvement. But, personal and professional self-development is conditioned by students' capacity to reflect on and realize their personal and professional traits (Blakemore & Agllias, 2019), which will positively influence them in the end (Galiakberova, Khakimova, Khusnutdinova, & Gao, 2020). This is positive selfishness because they are self-aware and feel responsible (felt obligation) for reaching an individual objective or aim, not because of likes or interests, but because specific demands or incentives must be satisfied. Here, persistence, self-orientation, and felt obligation are manifestations of self-awareness.

Moreover, the findings indicate that the self-oriented component is associated with evaluating learning progress, setting learning goals, identifying interests, and using learning strategies. All of these components must be present in order for there to be felt-obligation. There will appear some parallels between the components of self-awareness and persistence if they are examined closely. According to Johnstone, et al. (2015), students who have high levels of self-awareness are more likely to be self-oriented in their learning methods, such as selecting which learning strategies to utilize. In the case of AlMarwani (2020), an appropriate strategy is an intervention based on students' reflection on their needs, talents, and limits. This intervention is named as a consequence of an analogy with a SWOT analysis. This implies that self-awareness is a type of acknowledgment of one's surroundings (Johnstone, et al., 2015).

Furthermore, self-awareness relieves psychological tension and reduces the possibility of inconsistency (Sutton, 2016), allowing the self-concept to align with the intended point of self-orientation (Shafaat, et al., 2013). As a result, self-awareness has an essential impact on performance. However, it is associated with processes that may create stress and interpersonal issues, and it is accompanied by reflection and attention to promote students' tenacity in task performance (Sutton, 2016). Accordingly, Blakemore and Agllias (2019) should say that self-awareness is crucial in fostering engagement. When students engage in reflection and attention, it works as a motivation for their persistence, which, in conjunction with self-awareness, also contributes to reaching the point of self-orientation. In this case, self-orientation comes from self-awareness which directs students to achieve their measurable goals. It will then be done persistently by adapting to the needs of the conditions, which will ultimately lead to a sense of responsibility for students to remain committed to maintaining their intentions and attitudes to achieve goals. This also explains why the self-oriented component and the felt-obligation component have similarities.

Self-oriented students have interests geared to personal motives, and their performance is assured via rigorous evaluation to evaluate the progress of achievement, which is ultimately oriented to the desired goals to design learning strategies that deliberately meet their requirements. Self-oriented students emphasize and focus on self-interest, which is crucial since it helps to reduce academic burnout (Liu, He, Ding, Fan, Hwang, & Zhang, 2021). Moreover, students who feel an obligation have a better sense of self-awareness, which helps them be more self-oriented when picking appropriate learning strategies, which will ultimately help them accomplish their learning objectives. This is noteworthy because, despite the change in the learning environment, the transition in the learning paradigm from offline to online still motivates students to stay and be actively engaged in the learning process. They realize that the difference between offline and online learning is simply in how the learning is carried out and that the learning objectives remain the same. The move to online education produced a "need to know" regarding distance education (Kaiser & McKenna, 2021). It translates into students' need to expand and experiment with their learning strategies while dealing with online learning settings. The abrupt shift to remote instruction and the increased pressure on educators and students to be adaptive, innovative, and skilled in integrating digital materials and technologies into their pedagogical practices exacerbated existing tensions while also exposing new opportunities for pandemic co-constructed partnerships (Richmond, Cho, Gallagher, He, & Bartell, 2021). While students who believe they felt an obligation to remain will still intend to do so, they will be more concerned with finding ways to adapt to the demands of a shifting paradigm of learning patterns.

Self-awareness is frequently triggered by students' pursuit of interests that serve as a backdrop to their learning objectives. They guarantee that they progress toward their goals by remaining persistent, which includes deciding what type of learning strategy is most appropriate for them. As a result of learning, students recognize this and carry out learning activities as part of recovery performance with affective

commitment, which ultimately leads to the achievement of learning objectives. Students' awareness demonstrates an affective commitment to continue fulfilling their responsibilities as students, not just to avoid obligations but also because they have a solid relationship to the learning process as a whole. There is a connection established between their requirements and the learning process. It depicts students' emotional attachments to school organizations in which highly dedicated students engage, identify with, and enjoy participating in specific school organizations. Students with a higher level of emotional commitment are highly driven and have a strong desire to contribute, perform, and participate in the learning process. Tactic information sharing requires affective commitment. Similarly, it may motivate learners to study, share, and exchange knowledge (Khandakar & Pangil, 2021).

Students who are already aware of the learning objectives are more likely to make the most of the time they have available, including completing assignments and meeting learning objectives. According to Smit, et al. (2017), having a clear objective results in more remarkable persistence and overall performance. This becomes fascinating because students that have a goal orientation will work hard to attain their objectives and will be able to demonstrate this through their performance. This might be seen as evidence that students require self-actualization (Xu, Ran, & Zhou, 2021). The result of a decision, or the result of pressures to attain goals that may arise from motivations, are all possible outcomes of the situation. Students are made to feel a sense of duty internally (by focusing on personal objectives) and externally (by their surroundings). Moreover, the learning goals are self-oriented and felt-obligation in nature. Self-orientation comprises two components: setting goals and developing plans (He & Zhong, 2019). They influence interest and the two elements of academic engagement, time spent on tasks, and homework completion, among other things. Individually student-oriented values give engagement opportunities for students to explore their unique personal traits and increase their agency, which may foster a sense of contribution to function and ownership (Liu, Fu, et al., 2018).

Students who keep track of their content comprehension are more likely to complete their assignments. They are conscious of their confusion and thoughts. Furthermore, they apply their prior knowledge to identify when something is new, what questions they have, and what inferences they are drawing. They sift through what they believe is vital to pay attention to and observe how it all fits together to form huge concepts. Due to the demanding nature of distance learning and the necessity to stay on track with the pace of distance learning (Semington, Owens, & Kerns, 2020), these findings support the notion that monitoring comprehension-focused overviews can assist students in fully comprehending the breadth of assignments. Furthermore, the factor of cognitive engagement that affects the two factors of academic engagement is the set of learning goals. Meanwhile, monitoring comprehension only significantly affects the homework completion factor. On the other hand, when affective engagement is mediated, evaluation of learning progress is the only factor of cognitive engagement that significantly affects both academic engagement factors, with positive emotion as a mediator.

The element of affective engagement that has the most significant impact on academic engagement is a positive emotion, whereas interest has no significant effect. Positive emotion affects both academic engagement criteria, namely time on task and homework completion. It is anticipated and proved that when teachers engage students in pleasurable learning, they allow their students to gain a strong comprehension of topics and the discipline, increasing confidence and supporting continuous involvement. It is also well known for enhancing engagement during learning (Volet, Seghezzi, & Ritchie, 2019). Moreover, positive emotions stimulate motivation, meta-cognition, cognition, thereby positively influencing learning behavior (Efklides, Schwartz, & Brown, 2018). Thus, because effort and performance evaluation mirror the time necessary, time on task is no longer viewed as a quantity that optimally engages students in their academic endeavors. Positive emotions, monitoring comprehension, and persistence all contribute to students' academic engagement. This is the composition of cognitive and affective engagement, as well as the interplay element between them, for students to engage in academic tasks in a virtual face-to-face learning environment. However, it should be noted that pleasant emotions are elicited by evaluating learning progress, whereas persistence is elicited by reviewing learning progress and setting learning goals.

## CONCLUSION

Students' academic engagement is influenced by various factors which are the interplay elements between them that are required for students to engage in academic work in a virtual face-to-face learning environment. However, it should be emphasized that evaluating learning progress elicits pleasant emotions, whereas reviewing learning progress and setting learning objectives elicits persistence, indicating that evaluating learning progress and setting learning goals are complementary activities.

Higher education educators are the intended audience for this research, which is meant to assist them in constructing captivating face-to-face online learning experiences in order to maximize their students' academic activity. However, this study's respondents were limited to students who had participated in face-to-face online learning and had an experience with it. In addition, due to the abrupt transformation in pedagogy, they were asked to complete a questionnaire from the perspective of face-to-face online learning. As a result, the study's findings and conclusions may not always be generalizable to all learning modes. Furthermore, this study solely considers cognitive, affective, and academic engagement, with no mention of agentic or behavioral interactions in the context of learning. Although other indicators based on other experts may be used, this study solely employs the engagement indicators provided in the methodology section.

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