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Fostering Learning Engagement in Online Learning: The Effect of Collaborative Learning and Personal Perseverance

Nopriadi Saputra[a,*], Retnowati WD Tuti[b], Okta Prihatma Bayu Putra[c]

[a,c]BINUS Business School, Bina Nusantara University, Indonesia
[b]Magister Ilmu Administrasi, Universitas Muhammadyah Jakarta, Indonesia

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ABSTRACT

COVID-19 has been transforming education into technology-based and distance learning mode which requires the changing paradigm about learning delivery in higher education. This article aims to explicate learning engagement of students in higher education during online learning and to verify the impact of collaborative learning and personal perseverance on learning engagement statistically. Which of both two factors is more influential? Is collaborative learning more influential than personal perseverance or vice versa? A survey with causal analysis was applied for supporting arguments of this article. Data collection was conducted by distributing Google Form based questionnaires. It has involved about 642 students from a prominent private higher education institution in Indonesia as the respondents. For testing the twelve hypotheses, this article utilizes SmartPLS version 3.3 as statistical analysis tool. The result reveals that learning engagement that is reflected into cognitive, emotional, and behavioral engagement is more influenced by collaborative learning rather than personal perseverance. Collaborative learning which is reflected into cognitive skill and collaborative skill is essential factor in online learning. Emotional engagement is critical aspect of online learning which is not influence either by collaborative learning or personal perseverance. For engaging the student during online learning, higher educational institution should develop collaborative learning as a choice for pedagogical strategy in maintaining learning effectiveness during online learning.

Keywords: *Learning Engagement, Collaborative Learning, Perseverance*

**Corresponding author's E-mail address:* nopriadisaputra@gmail.com https://doi.org/10.32038/sem.2022.11.03

Introduction

COVID-19 as world-wide pandemic has impacted disruptively on higher education globally. Because of the absence of effective medicine, social distancing has been chosen as a main non-pharmaceutical action to restrain the spread of Coronavirus (WHO, 2020a). According to the declaration of World Health Organization on March 11th, 2020 (WHO, 2020b), on-site learning activities in university campuses around the world must be stopped to mind measures of social distancing. Migrating on-site into online learning activities became the only available alternative to continue education operation during the pandemic. Such a dramatic, global shift from on-site to online learning brought an disruptive challenge to higher education (Cranfield et al., 2021).

A comparative and quantitative study in South Africa, Wales, and Hungary found perception of higher education students about online learning during the COVID-19 concerned on four aspects: home learning environment, learning engagement, participation preference, and impact on learning skills (Cranfieldet al., 2021). Learning engagement in higher education during online learning becomes crucial factor in determining learning effectiveness, outcome, and satisfaction (Tsang et al., 2021).

A meta-analysis from 69 independent studies with almost 200.000 participants has made conclusion that there is a moderately significant and positive association between learning engagement and academic performance (Bond et al., 2020; Lei et al., 2018). The retention and persistence of online learning has been affected by learning engagement significantly (Aparicio et al., 2021; Chiu, 2021; Heo et al., 2021). On the other side, learning disengagement affects cognitive growth and academic outcomes negatively (Ma et al., 2015). Learning engagement plays as predictor of student dropout in higher education (Finn & Zimmer, 2012).

Based on systematic literature reviews, Bond (2020) developed conceptual framework about microsystem as a set of influential factors on learning engagement. The microsystem consists of six factors, such as: student, lecturer, curriculum, peers, family, and technology. In line with the framework of Bond (2020); Tsang al. (2021) proposed COVID-19 online learning or CoOL system in system thinking perspective. CoOL as a system has inputs, processes, and output. The main output of CoOL system is learning satisfaction. The process of CoOL system comprises into three type of learning - collaborative, cognitive, and facilitated learning. The inputs of CoOL system are student-student dialog, student-instructor dialog, course design, and university support (Tsanget al., 2021). Considering both conceptual frameworks (Bond, 2020; Tsang et al., 2021), this article is interested to examine the impact of influential factors - curriculum or course design and student factor. Collaborative learning represents curriculum or course design factor and grit or personal perseverance represents student factor. Collaborative learning and personal perseverance are supposed to be influential factors on learning engagement. By testing the impact of two factors statistically, the result will help to answer: "which of the two factors is more influential? Is collaborative learning more influential than personal perseverance on learning engagement?".

Literature review

Learning engagement

Previous studies usually use the term of learning engagement interchangeably with student engagement (Bond, 2020; Finn & Zimmer, 2012; Ma et al., 2015; Lei et al., 2018). Learning engagement is a complex or multifaceted construct (Aparicio et al., 2021; Schaufeliet al., 2002; Wang & Hofkens, 2020). Some scholars have even called it as a 'meta-construct' (Bowden et al., 2021; Fredricks et al., 2004; Kahu & Nelson, 2018).

Study on engagement at first time came from occupational or business context (Kahn, 1990; Buckingham & Coffman, 1999; Maslach et al., 2001; Schaufeli et al., 2002). In the occupational or business context, engagement is explicated as a positive psychological state which is associated with well-being at work (Schaufeliet al. 2002). Then, in the later years, engagement has also been discussed in education context (Christie, 2005; Hakanenet al., 2006) and higher education (Coates, 2005; Fredrickset al., 2004; Kuh, 2001).

Learning engagement is conceptualized as personal expression of learner's motivation which indicates how much energy and effort the learner put into the learning process for reaching the desired outcome of learning (Aparicio et al., 2021; Bond, 2020; Lei et al., 2018; Tsang et al., 2021; Wang & Hofkens, 2020). For leveraging and maintaining learning engagement, the higher education institution should consider the microsystem which is comprised by student, lecturer, activity or curriculum, peers, family, and technology (Bond, 2020). Learning engagement is a predictor of learning outcome in personal and social scope, for short-term and long term (Bond, 2020).

This article reflects learning engagement into three dimensions: (1) behavioral engagement which refers to participation of the students in various learning activity such as asking questions and completing assignments, (2) emotional engagement which relates to feelings, emotions, or affective reactions of student toward learning, peers, and teachers. This type of engagement includes interest, boredom, happiness, sadness, and anxiety during taking a course; (3) cognitive engagement which is a psychological investment in mastering the knowledge or understanding of the student on the subject content being taught (Bond, 2020; Kahu & Nelson, 2018; Lan & Hew, 2020; Lei et al., 2018).

Collaborative learning

In previous studies, collaborative learning was associated with several terms, such as: learning together (Johnson & Johnson, 1975), team games tournaments (DeVries & Edwards, 1974), student teams achievement divisions (Slavin, 1978); academic controversy (Johnson & Johnson, 1979), jigsaw II (Slavin, 1986), team assisted individualization (Slavin et al., 1986), cooperative integrated reading and composition (Stevens et al., 1987), think-pair-share (Kagan, 1989), group discussion (West, 1990), group investigation (Sharan & Sharan,1990), or peer learning (O'Donnell & King, 1999).

Collaborative learning is a learning strategy by dividing the learners with different knowledge levels into mixed-ability teams to learn and support each other by handling controversy or solving

a problem for aiming common learning goals (Fu & Hwang, 2018, Le et al., 2018). This pedagogical approach encourages and supports a learner to be more initiative and interactive during learning process. According to the previous studies, collaborative learning has been recognized as an effective pedagogical approach in higher education (Dumford & Miller, 2018; Er et al., 2021; Herrera-Pavo, 2021; Meijeret al., 2020). Collaborative learning has brought positive impact significantly on academic performance (Ceylan & Kesici, 2017; Chan et al., 2019); personal persistence (Loes et al., 2017), openness to diversity (Loes, Culver, & Trolian, 2018); and the ability to generate creative solutions (Loes & Pascarella, 2017).

The main objective of collaborative learning is to co-construct knowledge together with other learners under supporting learning climate for developing cognitive skill (e.g., problem-solving, critical thinking, creative solution) and collaboration skills (e.g., effective communication, teamwork, conflict resolution) simultaneously. Because of that argument this article reflects collaborative into two dimensions: cognitive skills and collaborative skills.

Empirical study with involving 323 students at University Teknologi Malaysia has proved that social media based collaborative learning has strong effect positively on learning engagement (Al-Rahmi et al., 2015). Other study with 398 respondents has revealed that active collaborative learning affect student engagement and performance positively (Qureshi et al., 2021). Based those empirical evidence, this article postulate hypothesis that all dimensions of collaborative learning (cognitive and collaborative skill) affect all dimensions of learning engagement (cognitive, emotional, and behavioral engagement)

H1a: Cognitive skill impacts on cognitive engagement
H1b: Cognitive skill impacts on emotional engagement
H1c: Cognitive skill impacts on behavioral engagement
H2a: Collaborative skill impacts on cognitive engagement
H2b: Collaborative skill impacts on emotional engagement
H2c: Collaborative skill impacts on behavioral engagement

Personal perseverance

Perseverance and passion are becoming an increasingly influential factor for reaching academic and life success. People who possess perseverance to study and work extensively through various adversity are likely to experience higher growth compared to others who lack of it (Huéscar Hernández et al., 2020). Perseverance is more frequently elaborated as an outcome or consequence rather than as an antecedent or predictor. (Duckworth & Quinn, 2009). The blend of perseverance and passion in the trait-level for achieving long-term goals is defined as grit. It was proposed as theoretical construct by Duckworth et al. (2007).

From previous studies found that grit has been proved as a predictor of achievement in many challenging situations, such as in performance of medical student (Miller-Matero et al., 2018); in outcome of educational, professional, and personal success (Fernández-Martínet al., 2020); in the retention at military, workplace, school, and marriage (Eskreis-Winkler et al., 2014); in

entrepreneurship and self-employment (Arco-Tirado et al., 2019); in overcoming job insecurity (McGinley & Mattila, 2020).

For measuring grit, the Grit Scale was constructed as a self-report questionnaire to capture two dimensions in achieving long-term goals: (1) consistency of interest as the traits of passion which is described as the ability to hold the same interests for long period and (2) persistence of effort as trait of perseverance which is explicated as the ability to work hard consistently towards a goal, even when experiencing setbacks. There are two version of Grit Scale: Grit-O and Grit-S. As the original version of the scale, Grit-O is using 12 indicators. Meanwhile, Grit-S as shorter version of grit scale is comprising 8 indicators (Direito et al., 2021).

A study which involved 121 students in a flipped classroom found that learning engagement played as mediator in the relationship between grit and perceived achievement. Grit is a predictor of learning engagement (Yoon et al., 2020). Other study in Australia with involved 395 university students as the respondents revealed that there is a positive relationship between grit, engagement, and academic productivity (Hodge et al., 2018). Based on those empirical evidence, this article attempts to examine the impact of grit in both dimensions (e.g., consistence of interest; persistence of effort) on whole dimensions of learning engagement (e.g., behavioral, emotional, and cognitive engagement).

H3a: Consistence of interest impacts on cognitive engagement
H3b: Consistence of interest impacts on emotional engagement
H3c: Consistence of interest impacts on behavioral engagement
H4a: Persistence of effort impacts on cognitive engagement
H4b: Persistence of effort impacts on emotional engagement
H4c: Persistence of effort impacts on behavioral engagement

Methodology

For answering research question and testing the hypothesizes, this article has conducted a survey based quantitative research with descriptive and causal analysis. This cross-sectional study has involved about 642 students at Bina Nusantara University as the respondents. Convenience and snowballing approach were applied as non-probabilistic sampling method. An online questionnaire by using Google Form was utilized for collecting data.

For measuring learning engagement, this article adopted nine indicators at the highest validity scores from previous study (Ma et al., 2017). Learning engagement is displayed into three dimensions separately: BEHAE (behavioral engagement), EMOTE (emotional engagement), and COGNE (cognitive engagement). Each dimension is measured by three indicators. For measuring collaborative learning, this article development six-items instruments by. For measuring collaborative learning, this article has adopted the instrument which was developed in the previous study (Le et al., 2018). The instrument has 6 indicators, three indicators for consistence of interest (CONOI) and three others as indicators of persistence of effect (PEROE). Meanwhile, personal perseverance is measured by Grit-S scales (Duckworth & Quinn, 2009). This article has used tree

indicators for measuring each dimension. Based on hypothesis development, this article develops research model which is display in Figure 1.

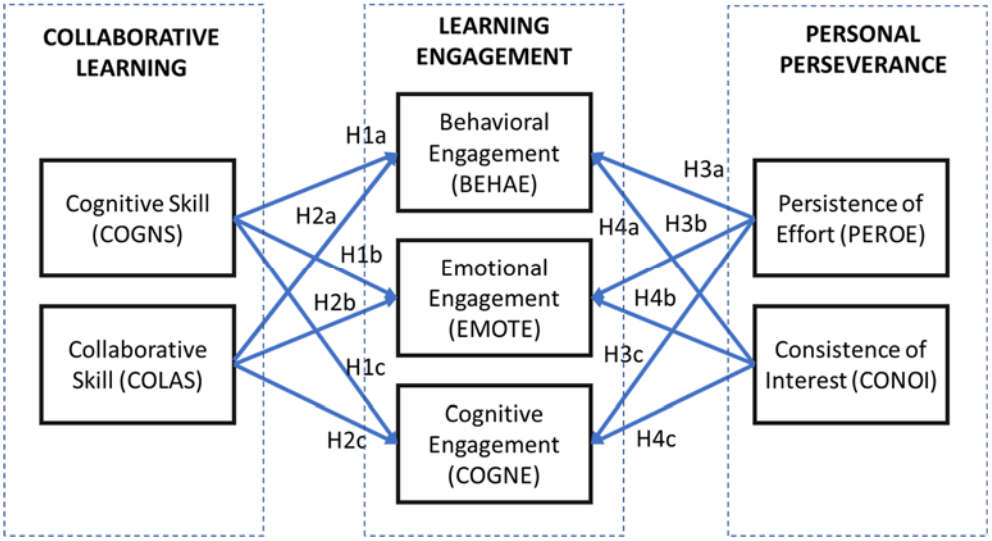

Figure 1. Proposed Research Model

Table 1 demonstrates the composition of respondents. The respondents are undergraduate students at Bina Nusantara University. There are about 642 students which were involved in the study. Women (57%) are more than men (43%). Most of them has age below 24 years old (83%). They were studying in Management or Computer Science study at first, second, and third year (81%).

Table 1. Profile of Respondents (n=642)

Gender	Male	43%	Program Study	Management	59%
	Female	57%		Computer Science	24%
Age	Less than 19 years old	4%		Industrial Engineering	15%
	19 years old	18%		Social Science	2%
	20 years old	22%	Years of study	First year	31%
	21 years old	25%		Second year	28%
	22 years old	14%		Third year	22%
	23 years old	8%		Fourth year	13%
	24 years old	6%		Others	6%
	More than 24 years old	3%	N= 642		

Table 2 displays the result of validity and reliability analysis. OL or outer loading scores were used for indicating the validity of an indicator. Meanwhile, for detecting validity of a dimension, this article used average variance extracted or AVE score. Only indicator with OL score higher than 0.6 is kept in the research model. Indicator with OL score lower than 0.6 is excluded from the research model. Those excluded indicators are LE02, CR04, CR06, GR01, and GR04. All

dimensions - BEHAE, EMOTE, COGNE, COGNS, COLAS, CONOI, and PEROE are valid, because they have AVE scores more than 0.5. The validity of dimensions is strengthened with result of discriminant validity in Table 3. All diagonal scores (square root of AVE) are more than 0.7 and/or become the highest score in each column. It indicates that all dimensions are discriminant valid.

Table 3. Validity and Reliability Analysis

Dimension	Item	OL	AVE	CA	CR
Learning Engagement					
Behavioural Engagement (BEHAE)	LE01	0.83	0.63	**0.41**	0.77
	LE03	0.75			
Emotional Engagement (EMOTE)	LE04	0.60	0.56	**0.68**	0.79
	LE05	0.71			
	LE06	0.89			
Cognitive Engagement (COGNE)	LE07	0.75	0.63	0.71	0.84
	LE08	0.76			
	LE09	0.86			
Collaborative Learning					
Cognitive Skill (COGNS)	CL01	0.74	0.63	0.71	0.84
	CL02	0.82			
	CL03	0.83			
Collaboration Skill (COLAS)	CL05	1.00	1.00	1.00	1.00
Personal Perseverance					
Consistence of Interest (CONOI)	GR02	0.74	0.62	**0.39**	0.77
	GR03	0.84			
Persistence of Effort (POROE)	GR05	0.73	0.62	**0.40**	0.77
	GR06	0.84			

Note: OL = Outer Loading, AVE = Average Variance Extracted, CA = Cronbach's Alpha; CR = Composite Reliability

For reliability analysis, Cronbach's alpha (CA) or composite reliability (CR) scores are used. Dimension with CR or CA score more than 0.7 are reliable. Although, there are several indicators with CA score lower than 0.70; but all of CR scores are more than 0.70. It indicates that all dimensions are reliable. Based on validity and reliability analysis, all indicators and dimensions are valid and reliable for being used in testing hypothesizes.

Table 3. Discriminant Validity

Dimensions	**1**	**2**	**3**	**4**	**5**	**6**	**7**
[1] Behavioural Engagement (BEHAE)	**0.79**						
[2] Cognitive Engagement (COGNE)	0.47	**0.79**					
[3] Cognitive Skill (COGNS)	0.33	0.38	**0.80**				
[4] Collaboration Skill (COLAS)	0.29	0.33	0.51	**1.00**			
[5] Consistence of Interest (CONOI)	0.12	0.16	0.09	0.13	**0.79**		
[6] Emotional Engagement (EMOTE)	0.48	0.61	0.31	0.20	0.08	**0.75**	
[7] Persistence of Effort (PEROE)	0.18	0.12	0.18	0.18	0.25	0.08	**0.79**

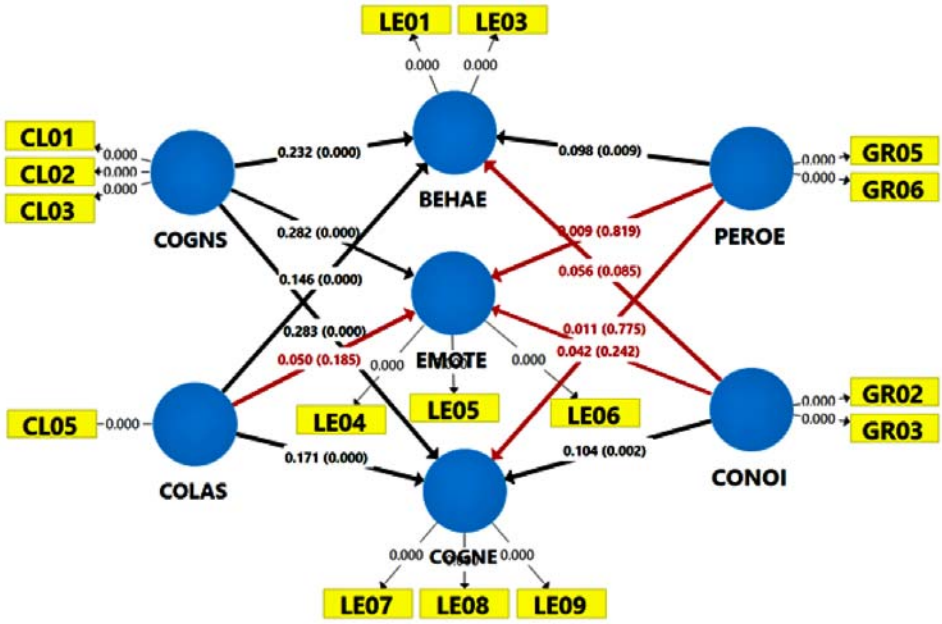

Figure 3. Bootstrapping Analysis

Although personal perseverance has positive and direct impact on learning engagement; but this article has proven empirically that collaborative learning has a bigger impact rather than personal perseverance. Collaborative learning affects all dimensions of learning engagement, but personal perseverance only affects behavioral and cognitive engagement and has no effect on emotional engagement. COVID-19 has indeed brought fundamental changes in delivering education in universities. It requires perseverance from students, faculty, and institutions to adapt the changes. But perseverance alone is not enough, the utilizing collaborative learning as a learning strategy in online learning will bring more impact on learning engagement. Because collaborative learning develops cognitive skill and collaboration skills simultaneously. Through collaborative learning, students in higher education may experience online learning more engagingly. It means that online learning only engaged behaviorally and cognitively, but also emotionally engaged.

The results of this analysis provide empirical evidence for the concepts of the microsystem (Bond, 2020) and the CoOL System (Tsang et.al., 2021). In the concept of the microsystem, Bond (2020) argues that learning engagement is influenced by a set of influential factors. The results of this analysis prove the two elements of the microsystem, collaborative learning (curriculum facto) and personal perseverance (student factor) impact positively and significantly. Meanwhile, CoOL system explains that the outputs of the online learning are learning effectiveness, outcome, and satisfaction. Those outputs are relevant with learning engagement which make the student or learner being behaviorally engaged (learning effectiveness), cognitively engaged (learning outcome), and emotional engaged (learning satisfaction).

Results and discussions

By using SmartPLS version 3.3, the statistical analysis was conducted. There are two processes of calculation. First process is PLS Algorithm analysis. The analysis was conducted for making sure that research model is structured by valid and reliable indicators, dimensions, and variables. Figure 2 display the verified research model as the result of PLS algorithm analysis.

By the existences of COGN, COLAS, CONOI, and PEROE as the antecedents; COGNE is impacted about 18.2%; BEHAE is affected about 14.3%; and EMOTE is impacted about 10.2%. Collaborative learning, which is reflected into COGNS and COLAS as well as personal perseverance is described into CONOI and PEROE contribute about 10% until 18% on learning agility which is explained into BEHAE, EMOTE, and COGNE. There are about 82% until 90% impacts comes from other influential variables which are not elaborated yet in this article. Collaborative learning and personal perseverance have a highest impact on cognitive engagement (18.2%) and the lowest impact on emotional engagement (10.2%).

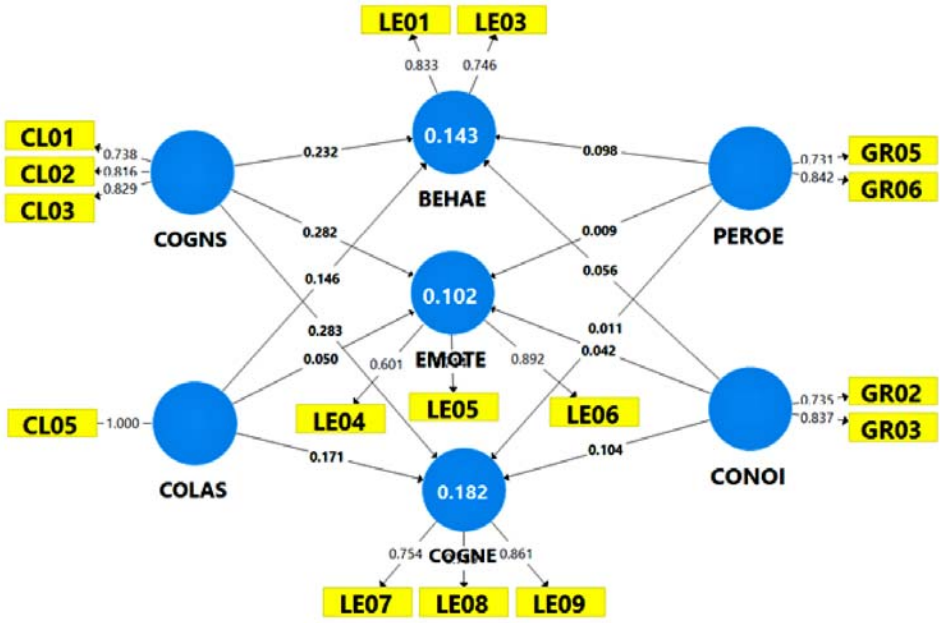

Figure 2. PLS Algorithm Analysis

The second process of calculation is bootstrapping analysis. The calculation is used for testing hypothesizes. Table 4 displays the result of bootstrapping analysis. From twelve hypothesizes, seven hypothesizes are accepted, because those accepted hypothesizes have beta with t-Statistics score more than 1.98 or p-Values lower than 0.05. It indicates that learning agility or personal perseverance impact on learning engagement significantly. Those accepted hypothesizes are H1a, H1b, H1c, H2a, H2c, H3a, and H4c. Meanwhile, the other hypothesizes - H2b, H3b, H3c, H4a, and H4b are rejected.

Table 4. Hypothesis Testing

	Hypothesizes	Beta	*t*-Statistics	*p*-Value	Remark
H1a	Cognitive Skill ==> Cognitive Engagement	0.28	7,971	0.00	Accepted
H1b	Cognitive Skill ==> Emotional Engagement	0.28	8,380	0.01	Accepted
H1c	Cognitive Skill ==> Behavioural Engagement	0.23	5,645	0.02	Accepted
H2a	Collaborative Skill ==> Cognitive Engagement	0.17	4,239	0.03	Accepted
H2b	Collaborative Skill ==> Emotional Engagement	0.05	**1,216**	**0.22**	**Rejected**
H2c	Collaborative Skill ==> Behavioural Engagement	0.15	3,604	0.00	Accepted
H3a	Consistence of Interest ==> Cognitive Engagement	0.10	2,977	0.02	Accepted
H3b	Consistence of Interest ==> Emotional Engagement	0.04	**1,107**	**0.27**	**Rejected**
H3c	Consistence of Interest ==> Behavioural Engagement	0.06	**1,720**	**0.09**	**Rejected**
H4a	Persistence of Effort ==> Cognitive Engagement	0.04	**0,278**	**0.24**	**Rejected**
H4b	Persistence of Effort ==> Emotional Engagement	0.01	**0,223**	**0.82**	**Rejected**
H4c	Persistence of Effort ==> Behavioural Engagement	0.10	2,646	0.01	Accepted

The result of bootstrapping calculation is demonstrated too in Figure 3. The red line indicates that the rejected hypothesis and the black one indicates the accepted one. From the figure, this article tries to make a generalized conclusion that collaborative learning is more influential rather than personal perseverance. Because from six hypothesizes about impact of collaborative learning on learning engagement, only one hypothesis is rejected (H2b). On the other side, from six hypothesizes about impact of personal perseverance on learning engagement, only two hypothesizes are accepted (H3a H4c)

Figure 3 shows that COGNS as dimension of collaborative learning affects all dimensions of learning engagement - BEHAE, EMOTE, and COGNE. In addition, COLAS as other dimension of collaborative learning affects two dimensions of learning engagement - BEHAE and COGNE. Meanwhile, personal perseverance - either CONOI or PEROE affects partially on learning engagement. CONOI as dimension of personal perseverance affects only COGNE but does not affect significantly on BEHAE and EMOTE. Other dimension of personal perseverance (PEROE) affects only BEHAE but does not impact significantly on EMOTE and COGNE. Personal perseverance - either PEROW or CONOI do not affect significantly on EMOTE

Conclusion

Learning engagement becomes strategic issue in delivering online learning during COVID-19. This article has proven empirically that learning engagement is influenced by personal perseverance of the student and collaborative learning as a pedagogical learning strategy. Although personal perseverance is an influential factor, but collaborative learning has higher impact on learning engagement. For leveraging and maintaining learning engagement in online learning, the higher education institution is recommended to apply collaborative learning. This pedagogical strategy is effective for developing cognitive and collaboration skill simultaneously.

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