

MENTAL HEALTH AND LEARNING ACHIEVEMENT DURING THE COVID-19 OUTBREAK: A LESSON FROM ONLINE LEARNING AMONG INDONESIAN COLLEGE STUDENTS

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Abstract. *Introduction.* All educational institutions have to adjust the learning format, from face-to-face to online learning, due to the COVID-19 outbreak. The sudden shifting of the learning format raised several problems for the students and led to mental health issues.

Aim. This study aimed to examine the effect of mental health on students' learning achievement during online learning in the COVID-19 outbreak.

Methodology and research methods. This study used partial least square structural equation modeling (PLS-SEM) to examine the research model on a random sample of 518 respondents.

Results. The online learning activities during the COVID-19 outbreak have developed mental health issues, such as anxiety and depression. Furthermore, the results indicated that mental health negatively predicted the students' learning achievement.

Scientific novelty. This study reveals certain situations and conditions that could be affected to the student's mental health and learning achievement.

Practical significance. This study can be useful to the government as policymakers and administrators of the university as current research provides a critical understanding of the online learning influence on mental health and learning achievements of students. The government and administrators of the university should consider the right policy for learning activities during the COVID-19 outbreak. The government and administrators of the university also should provide student services to minimise the mental health issues among college students during online learning activities.

Keywords: mental health, learning achievement, online learning, COVID-19 outbreak.

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ПСИХИЧЕСКОЕ ЗДОРОВЬЕ И УСПЕВАЕМОСТЬ ВО ВРЕМЯ ВСПЫШКИ COVID-19: ОПЫТ ОНЛАЙН-ОБУЧЕНИЯ СРЕДИ СТУДЕНТОВ ИНДОНЕЗИЙСКИХ КОЛЛЕДЖЕЙ

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Аннотация. *Введение.* Всем учебным заведениям приходится корректировать формат обучения, начиная с очного и заканчивая онлайн-обучением, из-за вспышки COVID-19. Это внезапное изменение привело к проблемам психического здоровья студентов.

Цель. Исследование было направлено на изучение влияния психического здоровья на успеваемость студентов во время онлайн-обучения при вспышке COVID-19.

Методология и методы исследования. В этом исследовании использовалось моделирование структурного уравнения с частичным наименьшим квадратом (PLS-SEM) для изучения исследовательской модели на случайной выборке из 518 респондентов.

Результаты. Онлайн-обучение во время вспышки COVID-19 развило проблемы психического здоровья, такие как беспокойство и депрессия. Кроме того, результаты исследования показали, что нарушение психического здоровья негативно влияло на успеваемость учащихся.

Научная новизна. В исследовании показаны определенные ситуации и условия, которые могут повлиять на психическое здоровье и успеваемость студента.

Практическая значимость. Это исследование может быть полезно директивным органам и руководителям университетов, так как дает критическое понимание влияния онлайн-обучения на психическое здоровье и достижения студентов в обучении. Руководители университетов должны использовать правильную стратегию обучения во время вспышки COVID-19. Они также должны предоставлять поддержку для минимизации проблем психического здоровья среди студентов колледжа во время онлайн-обучения.

Ключевые слова: психическое здоровье, успеваемость, онлайн-обучение, вспышка COVID-19.

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SALUD MENTAL Y RENDIMIENTO DURANTE EL BROTE DE LA COVID-19: EXPERIENCIA DEL APRENDIZAJE EN LÍNEA ENTRE LOS ESTUDIANTES UNIVERSITARIOS DE INDONESIA

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Abstracto. Introducción. Todas las instituciones educativas tienen que ajustar el formato de educación, desde el aprendizaje presencial al aprendizaje en línea, debido al brote de la COVID-19. Este cambio repentino provocó problemas de salud mental en los estudiantes.

Objetivo. El estudio tuvo como objetivo investigar el impacto de la salud mental en el rendimiento de los estudiantes durante el aprendizaje en línea ante el brote de la COVID-19.

Metodología, métodos y procesos de investigación. Para este estudio se utilizaron modelos de ecuaciones estructurales de mínimos cuadrados parciales (PLS-SEM) para examinar un modelo exploratorio en una muestra aleatoria de 518 encuestados.

Resultados. El aprendizaje en línea durante el brote de COVID-19 ha desarrollado problemas de salud mental como lo son la ansiedad y la depresión. Además, los resultados del estudio mostraron que los trastornos de salud mental tenían un impacto negativo en el rendimiento de los estudiantes.

Novedad científica. El estudio refleja ciertas situaciones y condiciones que pueden afectar la salud mental y el rendimiento académico del estudiante.

Significado práctico. Este estudio puede ser útil para los órganos directivos y para las administraciones de las universidades, ya que proporciona una comprensión crítica del impacto del aprendizaje en línea en la salud mental y el rendimiento académico de los estudiantes. Las administraciones de las universidades deben utilizar la estrategia de aprendizaje adecuada durante el brote de COVID-19. También deben brindar apoyo para minimizar los problemas de salud mental entre los estudiantes universitarios durante el aprendizaje en línea.

Palabras claves: Salud mental, rendimiento, aprendizaje en línea, brote de la COVID-19.

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Introduction

The outbreak of COVID-19 has affected all the sectors, including the education sector in Indonesia. Since mid-March 2020, the situation has forced all the educational institutions in Indonesia to adjust offline learning into online learning. The policy to implement an online learning format encourages all the educational sector parties, such as the university, schools, students, and lecture, to adopt the technology in the learning activities.

The utilisation of technology in learning activities has been increasing quickly, even before the outbreak of the COVID-19 [1, 2]. Many educational institutions have been integrating the blended learning concept, combining face-to-face and online learning in the learning activities [3, 4]. However, the sudden movement, from face-to-face to online learning due to the COVID-19 pandemic, led the teacher and student to face some challenges such as lack of time to prepare comprehensive online courses and lack of online learning experience [1, 5]. These challenges also initial online learning problems, which were affected by several factors such as lack of online learning infrastructures, lack of faculty capability to deal with the current technology, gap information between teacher and student, and an uncondusive home environment [2, 6, 7]. In addition, some students or teachers cannot find conducive spaces for online learning activities or are distracted by lack of hardware and unstable internet connection [8].

The pivot from face-to-face learning activities to online learning format led students to the mental health issue. During online learning activities, students have to spend a lot of time on screen time. Those activities led the students to fatigue both physically and emotionally. The previous finding reported that most college students in the U.S. had an academic concern related to the difficulties in adapting to distance learning, which led to increased stress/anxiety [9, 10]. Furthermore, another survey showed that online learning impacted students' psychology, such as declining motivation and losing interest in going to higher education after graduating [11].

The previous research has proved the psychological impact of the COVID-19 outbreak for the students. The students were more likely to face anxiety, fear, worry, and depression during the COVID-19 pandemic [7, 12–16]. During the COVID-19 outbreak, the students were passive, anxious, and depressed while increasing phone usage and decreasing physical activity [1, 17]. In addition, students are prone to mental health risks due to social isolation during the COVID-19 outbreak [1, 18]. Another finding by Lee J. reveals that more likely to experience mental health problems due to the closed of school [19].

Moreover, mental health problems impact many things, especially student learning achievement. For a couple of years, the scholars have highlighted the close relationship between mental health and the learning achievement of students [20–25]. The students, who experience mental health problems, have difficulties to complete assignments [22], to pass the course [26, 27]; they are less likely to achieve higher or good grades [28], and they are more likely to drop out [27, 29].

This study provides four main contributions. First, the study of mental health issues among the students during the COVID-19 pandemic has been highlighted in the various country such as in China [12, 13, 30], the United States [9, 10], Spain [31], Saudi Arabia [15], Pakistan [16], and Jordan [32]. However, the study of mental health among Indonesian students has less attention from scholars. Furthermore, this study will help uncover the crucial areas, student mental health, which researchers have not revealed, especially among Indonesian students. Second, the previous study of mental health mostly focused on the impact of the COVID-19 outbreak on student mental health. The other study looked for the relationship between mental health and students' learning achievement. In comparison, this study explores how the outbreak situation affected students' mental health and learning achievement due to the shifting of learning format. Third, this study provides education stakeholders' basic understanding of how the sudden learning shifting could impact students' mental health and learning achievement. Therefore, the policymakers have the scientific foundation to consider the right policy for learning activities during the COVID-19 outbreak. Last, this study will contribute to the existing body of literature, especially how certain situations can affect the student's mental health and learning achievement.

Literature Review/Theoretical Framework

1. Mental health during online learning in the COVID-19 outbreak

Since the COVID-19 outbreak in early 2020, numerous countries have restricted public activities to prevent the COVID-19 spread. To ensure continuing learning activities, most educational institutions in the world suddenly pivot their learning activities to the distance learning format. The majority utilised the learning management system (LMS) to optimise online learning [1, 2, 6].

On the one hand, this policy, shifting the face-to-face to online learning, ensures the continuing learning activities during the closures of educational institutions and prevents the spread of COVID-19. On the other hand, the sudden pivot from face-to-face to online learning has raised unforeseen issues [1, 6]. One of the issues is the psychological impact on the student's mental health. With the online learning format, the students have to spend many hours in screen time during learning activities. Previous findings revealed the relationship between screen time and depression. Madhav K. C., Sherchand S. P., Sherchan S. noted that moderate to severe depression level is closely related to the higher screen times, more than 6 hours per day [33]. In addition, spending more than 4 hours per day on screen time makes more likely to experience anxiety and depression [34, 35].

Related to the shifting in the learning activities format, Son C. et al. & Wang X. et al. reported that many students face difficulties adapting to distance learning activities [9, 10]. Furthermore, another survey by Stringer H. showed that online learning impacted declining motivation and lost interest in going to higher

education after graduating [11]. Many students experienced big challenges related to the shifting of the syllabus, learning format, and technical problems with the online application. The students also worried about the progression of research or project due to the lack of teacher-student or student-student interactions, increased course workload, and uncertainty about when the online learning activities will end. This situation put the students at a higher risk of developing stress and anxiety during the online learning activities [9, 10]

Therefore, we assume that online learning during the COVID-19 outbreak has an impact on student mental health. As reported in the previous findings, the sudden shifting from face-to-face to online learning has raised unforeseen issues. These issues led students to a higher risk of stress, anxiety, and depression. Furthermore, distance learning, using the online learning format, puts the student in sedentary behavior. The students spend many hours in seated positions with less physical activity. The previous findings reported that sedentary behaviour is associated with anxiety and depressive disorders [33–37].

In addition, students spend many hours on screen time with fewer social activities during the social activities restriction, leading to mental health issues. Hefner J., Eisenberg D. explained that social isolation makes developing mental health issues [38]. Besides, during online learning, students are forced to be more independent. According to Hefner J., Eisenberg D., students with low perceived support quality were more likely to experience mental health issues [38]. This situation makes students more vulnerable to experiencing mental health issues.

2. Mental health and learning achievement

Traditionally, mental health refers to psychological ill-health, such as anxiety or depression symptoms [39]. Moreover, according to the World Health Organization (WHO), mental health refers to “a state of well-being in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community” [40]. Hence, mental health issues could be described as the presence of anxiety or depression symptoms.

In the last decades, student mental health in higher education has become a concern among scholars. The mental health issue has risen and is becoming serious among college students [38]. According to the WHO survey and Eisenberg D. et al., the first mental illness symptoms among students appear in their mid 20s [41], and the peak is between 18 and 25 ages [29]. Student anxiety and depression have increased after college entry [42]. Therefore, college students are in a vulnerable age range to thriving mental illness. As the previous findings reveal, there is a close relationship between mental health and students' learning achievement [20–25]. Then mental health becomes one of the crucial determinants for student success in higher education.

Students with mental health issues are vulnerable to experiencing difficulties during schooling. The research by Malecki C. K., Elliot S. N. shows that students

with strong mental health show better academic achievement than students with weak mental health [22]. Furthermore, students with strong mental health show good social skills with peers and teachers [43], enhanced social behaviours, and good academic achievement [22, 44]. The other findings show the students with a mental health problem have difficulties to complete assignments [22], to pass the course [26, 27]; they are less likely to achieve higher or good grades [28], and they are more likely to drop out [27, 29].

The effect of mental health on student learning achievement in two ways: 1) school remain decision, 2) academic performance or productivity [28]. First, according to the schooling attainment model by Eisenberg D. et al., poor mental health reduces the interest to remain in school and leads people to drop out of school. In addition, poor mental health also reduces the willingness to make schooling investments. The second, academic performance was affected not only the cognitive skills but also the non-cognitive skills [45]. Non-cognitive skills refer to socio-emotional skills such as persistence, consistency, self-esteem, motivation, self-control, self-discipline, and interpersonal behaviour. The mental health issues affected academics through non-cognitive skills. The mental health symptoms decreased the interest or pleasure of academic activities, difficulty to focus, reduced energy, and sleep disturbances [46]. Therefore, according to Eisenberg D. et al., Cunha F. & Heckman J. J., Sadock B. J et al., we assume that mental health is closely related and becoming the crucial determinant of student learning achievement, especially for higher education students [28, 45, 46].

Methods

1. Participants

The survey was conducted randomly on 550 students from 19 universities in 5 major islands in Indonesia: Sumatra, Java, Kalimantan, Sulawesi, and Papua. All the participants must meet the criteria, coming from the universities that implemented the distance learning policy caused by the spread of COVID-19 and following the learning process from home using the learning management system (LMS) or other equivalent media. Among the selected sample, 32 respondents were dropped because they did not meet the sample criteria, e.g. the respondents did not fill all the questionnaire items and the GPA. We utilised an online questionnaire to reach all the research participants through email. We explained the research objectives, the significance of the study, and the variables to be investigated. All data were confidential and not disclosed except for study purposes. The survey was conducted from September until October 2021 were all the colleges in Indonesia still implemented the distance learning policy during the COVID-19 outbreak. The respondents' characteristics of this study are presented in Table 1.

Table 1

Respondents' characteristics (N = 518)

Characteristics		Σ	%
Gender	Female	385	74.32%
	Male	133	25.68%
Academic year	First-year student	162	31.27%
	Second-year student	176	33.98%
	Third-year student	143	27.61%
	Fourth-year student	37	7.14%
Discipline	Economics, business, management & accounting	166	32.05%
	Law	55	10.62%
	Engineering	72	13.90%
	Arts & humanities	46	8.88%
	Education	98	18.92%
	Others	81	15.64%

2. Instruments

We measured students' mental health through two dimensions, anxiety and depression. We adopted the Generalised Anxiety Disorder Scale (GAD-7) for anxiety due to its validity, reliability, and widely used for both clinical and research [47–50]. Moreover, the GAD-7 has been recommended by the American Psychiatric Association to measure general anxiety disorder [51]. For depression, we adopted the Patient Health Questionnaire Scale (PHQ-9). The scale has been validated and shows good sensitivity and specificity for depression screener [52–54].

The GAD-7 and PHQ-9 were available in Indonesian translations and free access¹. The GAD-7 and PHQ-9 assess the frequency of people, who have suffered from core anxiety and depression symptoms within the last two weeks. In addition, the scales using 4-option Likert scale from 0 (not at all) to 3 (almost every day). For the GAD-7 scale, the total score represents the level of anxiety. Less than five is considered as normal, 5–9 is mild anxiety, 10–14 is moderate, and ≥ 15 is severe [48]. In addition, for the PHQ-9 scale, the total score less than five is considered as normal, 5–9 is mild depression, 10–14 is moderate, 15–19 is moderately severe, and ≥ 20 is severe [52].

Last, we used the grade point average (GPA) during the online learning policy in the last two semesters, December 2020 and June 2021, to measure student learning achievement.

¹ www.phqscreeners.com

3. Data analysis

We used partial least square structural equation modelling (PLS-SEM) with SmartPLS software. We conducted three steps to analyse the research model: 1) model specification, 2) outer model evaluation, and 3) inner model evaluation [55].

Model specification

First, we specified the research model shown in Figure 1 based on the literature. Mental health as an exogenous variable consists of two dimensions, anxiety and depression, with reflective indicators. Meanwhile, learning achievement plays an endogenous variable with formative indicators, grade point average (GPA). Therefore, we used second-order or high order to examine the research model.

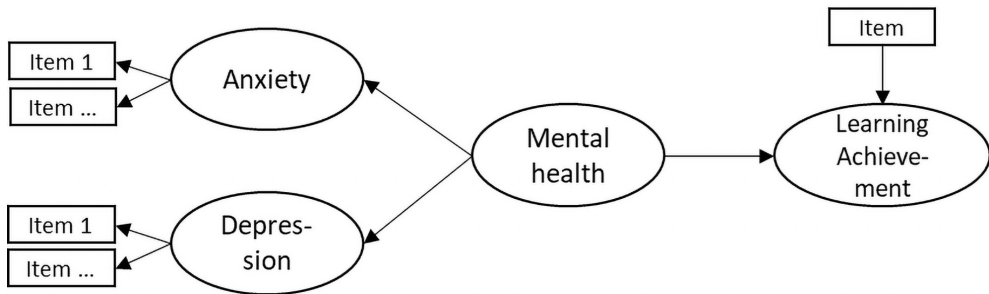


Fig. 1. Model specification

Outer model evaluation

We evaluated the internal consistency reliability of the construct using Cronbach's α . The result shows Cronbach's α of this research is 0.918, 0.959, 0.957, and 1.000 for anxiety, depression, mental health, and learning achievement, respectively. We also examined construct validity using convergent and discriminant validity. For convergent validity, we looked at the outer loading (loading factor) that shows above 0.7 for all the items. Furthermore, the average variance extracted (AVE) shows 0.673, 0.754, 0.612, and 1.000 for anxiety, depression, mental health, and learning achievement, respectively. For discriminant validity, we used the cross-loading of the indicators. The result shows that the loading factors of each construct are higher than the other constructs. In sum, the reliability and validity of the outer model in this research are established.

Inner model evaluation

We evaluated the model's quality of the research based on the ability of exogenous construct, mental health, to predict the endogenous construct, learning achievement. We used the coefficient of determination (R^2) and cross-validated redundancy (Q^2) to measure the predictive accuracy and predictive relevance of the research model. The results show 0.166 and 0.164 for the R^2 and Q^2 . It means the predictive accuracy of the research model is weak (< 0.25), while the predictive relevance is moderate (> 0.15) [55]. We also examined the effect size (f^2) of the

model. The result shows 0.199 for the f^2 , which means the exogenous construct has a large effect size to explain the endogenous construct [56]. In other words, mental health strongly contributes to explaining learning achievement.

Last, we estimated the path coefficients and the p-value of the research model to examine our research hypothesis. The result (Figure 2) shows that mental health affected learning achievement with β -0.407 (p-value 0.000). Its means mental health has a significant negative effect on learning achievement.

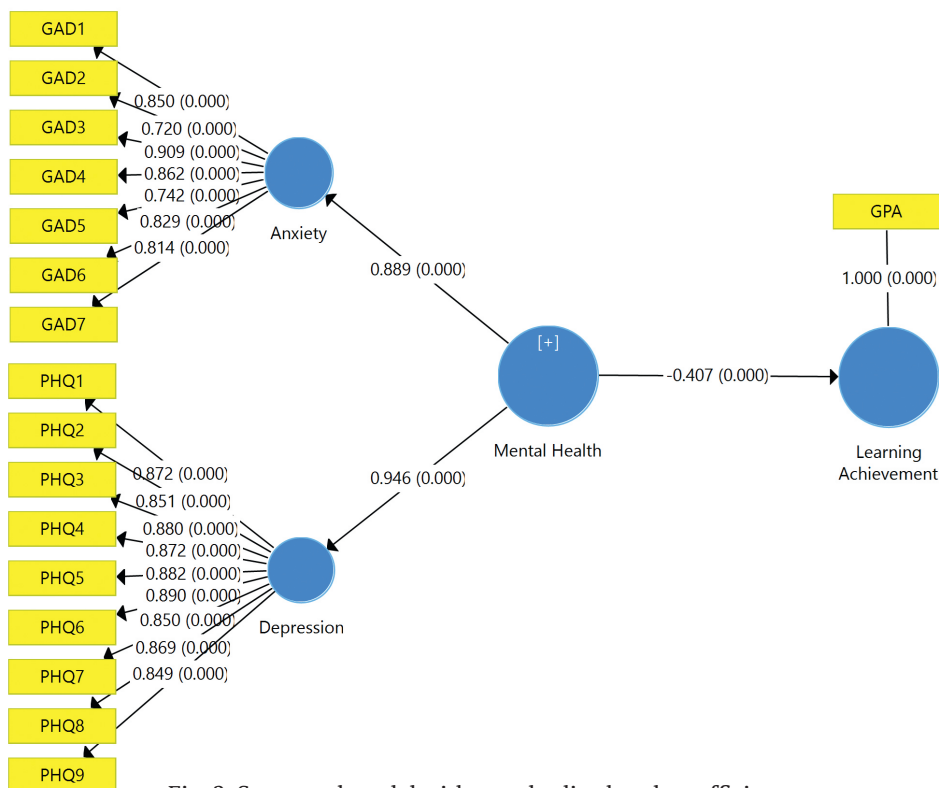


Fig. 2. Structural model with standardised path coefficient

Table 2

Respondents' performance on anxiety and depression scale (GAD-7 and PHQ-9)

Categories	Anxiety		Depression	
	Count	Percentage	Count	Percentage
Normal	36	6,95%	96	18,53%
Mild	193	37,26%	218	42,08%
Moderate	164	31,66%	27	5,21%
Moderately severe	NA	NA	123	23,75%
Severe	125	24,13%	54	10,42%
	518	100,00%	518	100,00%

Results and Discussion

The research findings show mental health significantly affected students' learning achievement (Figure 2). As predicted, students with mental health issues are related to lower learning achievement and vice versa. This finding strengthens the previous research that reveals mental health issues closely related to students learning achievement [20–25]. In other words, mental health is one of the predictors of learning achievement.

In more detail, this research also reveals that the learning situation could affect the students' mental health. Since the COVID-19 outbreak in March 2020, all educational institutions in Indonesia have been closed and have adjusted the learning activities into online learning due to Indonesian government policy. As a result, students have to face the sudden shifting from face-to-face to online learning. This situation led students to deal with many difficulties during online learning, such as an uncondusive environment, lack of hardware, and unstable internet connection. Students also have difficulties to understand the learning material when the courses are conducted in the asynchronous method. Students reported there is a gap in information due to delayed communication during online learning. Students also noted that the course workload increased during the online learning and led to delayed on completing and submitting the course assignment. In addition, online learning forces the students to spend many hours on screen time. This activity makes students fatigue both physically and emotionally.

Students' difficulties in learning activities during the COVID-19 outbreak are due to the online learning policy. Indonesian students must adjust their learning activities from face-to-face to online learning suddenly. Those situations led students to higher risk of mental health issues such as anxiety and depression. As reported by the students, after spending many hours in screen times during online learning, they reported experiencing physical and emotional fatigue. The situation makes students prone to experience mental health issues. This finding is in line with the previous studies, students with higher screen times are more likely to experience anxiety and depression students with higher screen times are more likely to experience anxiety and depression [33–35].

The students also reported the COVID-19 outbreak has changed many things regarding the learning activities. It is not only about the learning method but also the syllabus and interaction between student-lecturer and student-student. The changes force students to adapt quickly. Nevertheless, many students fail to adapt to the new learning method. This situation led students to feel worried and anxious about the new learning format, online learning. The current finding was in line with the previous, lack of adapting in the distance learning led to increased anxiety [9, 10]. Online learning also puts the student in a sedentary situation with less physical activity. This situation led the student to be more vulnerable to experience stress. As revealed by the previous studies, sedentary behaviour is associated with anxiety and depressive disorders [33–37].

Moreover, the student also felt suffered due to social activities restriction during the COVID-19 outbreak. Students were prohibited from doing outdoor activities to prevent virus transmission. During the online learning policy, the student was forced to be more independent in studying learning material. As explained by Hefner J, Eisenberg D., social isolation and low perceived support led students more likely to experience mental health issues, such as anxiety and depression [38]. In sum, the online learning situation caused by the COVID-19 outbreak has been developing mental health issues among the students. The sudden shifting in the learning format, from face-to-face to online learning, raised several problems for the students and led to the developing mental health issues such as anxiety and depression.

This research shows that mental health has a significant negative effect on learning achievement. As explained, online learning situation has been developing mental health issues such as anxiety and depression due to the problems and difficulties faced by students. For example, during online learning situations, many students reported they did not complete course assignments in time, lacked learning motivation, and failed to pass or get good grades in some courses. These findings strengthen the previous research that scholars have highlighted; there is a close relationship between mental health and students' learning achievement [20–25].

The mental health issues have been affected students learning achievement through non-cognitive aspect. The problems and difficulties that faced by students during online learning have been developed anxiety and depression symptoms. Besides the technical problems of online learning such as unconducive environment, unstable internet connections, and gap information due to delayed communication, online learning also reduces the pleasure of academic activities. Before the COVID-19 outbreak, the students could go to school, conduct more physical activities, discuss directly with peers and teachers, work practical exercises in the laboratory, etc. Furthermore, the previous studies explained that spending many hours on-screen times makes students physically and emotionally tired and leads to mental health issues. This situation will decrease the learning motivations of students. As a result, learning achievement will be affected.

Mental health issues that arise during online learning policy should be a concern for all the stakeholders. Since this issue is becoming serious among college student, mental health symptoms (anxiety and depression) have increased after college entry [42], and the peak is between 18 and 25 ages [29]. The situation was exacerbated by the online learning situation that raised many difficulties and challenges for students. The policymakers, especially in Indonesia, should undertake the right policy and prevention activities to minimise the mental health issues among the college students during the online learning policy. The government and universities may invest more in the support service for mental health issues to minimise the negative effect.

Barr B. provided some of the recommended practices to deal with mental health issues for online students, such as 1) pre-enrollment services, 2) mental health

education, 3) crisis services, 4) self-help services, and 5) counselling services [57]. First, pre-enrollment services could be the website explaining all the information about online programmes and courses, including the self-assessment to evaluate students' readiness for online programmes. The pre-enrollment services can be minimising problems after admission and enrollment. Second, mental health education provides information or articles on college students' common issues such as stress, depression, anxiety, and exhaustion. Mental health education ensures that students obtain sufficient information related to the problems that college students may face. Third, universities provide phone numbers for crises or emergencies available for students at short notice (crisis services). Fourth, the universities also provide college students with the tools for self-evaluation and information on coping or dealing with common mental health issues (self-help services). Last, universities should provide counselling services to help students with mental health issues. The counselling services are available for offline counselling and distance students through phone calls or online video meetings.

Conclusion

In sum, the COVID-19 outbreak makes educational institutions in Indonesia adjust the learning activities format, from face-to-face to online learning. The sudden shifting of learning format raised several issues for the students, such as lack of adapting to the new learning format, lack of hardware and internet connection, hard to understand the learning material due to the changes of the syllabus, delayed communication with lecturers and peers, and feels raised the course workload. The situation has been developing the anxiety and depression of students and led to declining learning achievement. This study provides a basic understanding of the mental health issues among college students during the COVID-19 pandemic, especially during the changes of learning format. Therefore, the policymakers have to consider the right policy for learning activities during the COVID-19 outbreak. Furthermore, to reduce the mental health issues among college students during online learning activities, the universities should provide services for students such as mental health education, counseling services, crisis services, etc. Last, the universities also need to keep students informed about the student services availability.

Limitation

First, the current study used college students as a participant. As explained by the previous research, the age range of college students is more vulnerable to experience mental health issues. Therefore, the current result cannot be generalised to other education levels, such as elementary and middle schools. Second, this study used the online learning situation as an anchor to discuss mental health issues and learning achievement of students.

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