

Exploring stress levels and physical activity patterns: A comparative analysis of blended and conventional learning methods

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ABSTRACT

Changes in learning methods cause a crucial decrease in physical education needs and time of involvement in physical activity, which can affect individual stress levels. The objective of this study was to find out the comparison of physical activity patterns and stress levels between blended versus conventional learning methods. This study used quasi-experimental with a posttest-only approach with a control group design. The total subjects were 160 sports students from Universitas Jambi, who were divided into two groups (Experiment and Control) with average age of 21.69 ± 1.33 years, weight of 55.74 ± 6.48 kg, height of 170.10 ± 5.51 cm, and BMI of 21.06 ± 2.77 kg/m². The results showed that the blended learning group had a lower level of physical activity when compared to their respective conventional groups. Furthermore, the stress level in the blended learning group had a moderate stress while the conventional group had a low-stress. Thus, the research findings have answered the question that physical activity can affect an individual's stress level, and conventional learning methods are still the best method compared to blended learning methods. This finding can be used as a reference, especially for educators, both lecturers and teachers in schools, to be able to take a spiritual approach and invite students to do activities they like, such as exercise and recreation, to trigger a sense of enthusiasm in students to continue to improve their fitness degree. Therefore, this will have an impact on mental health, which can affect student stress levels much lower.

Keywords: Physical activity; stress; blended learning; conventional

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INTRODUCTION

The change in learning methods after the Covid-19 pandemic from face-to-face to online or mixed methods resulted in students adapting to the new system, which had several challenges in its implementation. It also affects the direction of government policy, especially the Ministry of Education and Culture's efforts to change the learning system (Rusli et al., 2020), such as curriculum changes, curriculum

mergers, and credit systems that allow students to take courses in other study programs or universities. This innovation is excellent for the advancement of national education. However, on the one side, this sudden change has put pressure on students both internally and externally, thus provoking negative emotions, including stressors during learning from home and a decrease in physical activity (Eva et al., 2021). The effectiveness of online learning is still considered by many who do not have a significant impact (Darkwa & Antwi, 2021). Hence, it needs formulation steps to overcome the shortcomings of the pandemic period to get an increase in the current period, which can be said to return to the face-to-face (conventional) period.

Blended and conventional learning methods can relate to the development of students' mental health, characterized by increased stress and physical activity patterns (Camargo et al., 2020; Fan et al., 2021). Students are constantly under various stressors, such as academic performance, isolation from groups, environmental changes, irregular diet, clinical challenges, to economic problems (Huberty et al., 2019; Ratanasiripong et al., 2012; Tripathy & Sahu, 2019; Yeom & Choi, 2013). The research results conducted by Putri et al. (2020) discovered that students who had done distance learning ≥ 12 meetings tended to have higher stress levels when compared to < 12 times. Other findings also stated that students at Eritrea Institute of Technology tended to experience moderate stress by 71%, triggers of stress in these students were inadequate learning facilities (40.7%), learning difficulties for too long a period (32.5%), too many tasks and academic load (23.5%) (Yikealo et al., 2018).

Changes in learning methods after the Covid-19 Pandemic have caused a crucial decrease in physical education needs and time for involvement in physical activity; thus, challenges are experienced by all educators, both in schools and universities (Pavlovic et al., 2021). The desire of lecturers to see students move actively during lectures is hampered by excessive use of gadgets, lack of movement techniques, and minimal training age. These components are defeated by a high sense of laziness to move (Paudel, 2020; Radu et al., 2020). Consequently, students rarely do physical activities such as exercising, so they will be at risk of developing chronic diseases (Anderson & Durstine, 2019). Previous research has suggested that physical fitness can affect individual stress management. Individuals who exercise diligently can stimulate the growth and development of physical, spiritual, anatomical, and physiological structures, emotional, intellectual intelligence, and social skills in their environment (Oshima et al., 2015). The American College of Sports Medicine (ACSM), aligned with the World Health Organization (WHO), has suggested that a person minimally can do physical activity for 30 minutes and should be done as much as 3-5 times a week with moderate intensity (World Health Organization, 2020). Therefore, to prevent prolonged habit, lecturers need to initiate a new movement to raise the desire to move, sweat, and socialize more actively.

In conventional learning, sports students learn in the classroom with the help of lecturers and textbooks. The interaction between sports students and lecturers happens directly in the classroom (Kapasias et al., 2020; Mukhtar et al., 2020). On the other side, blended learning utilizes digital technologies such as computers, the internet, and mobile devices to facilitate the learning process (Johnson et al., 2023). Sports students can access learning materials online, participate in online discussions, and use various digital resources to support their understanding. Several previous studies have shown promising results related to the effectiveness of blended learning in improving the learning achievement of sports students (Yulianti et al., 2022). However, there are still flaws in our understanding of how these methods affect stress levels and sports students' overall physical activity patterns. Therefore, this study will expand our understanding of the comparison between blended learning and conventional learning in terms of sports students' learning achievement, physical activity patterns, and psychological aspects of sports students.

METHOD

A quasi-experimental method with a posttest-only approach with a control group design was employed in this study. A total of 160 students from the Department of Sport Education at Universitas Jambi were selected as study subjects using the purposive sampling technique. Furthermore, the subjects were divided into two groups (experimental and control). The experimental group was given lecture treatment with blended learning methods, while the control group was given face-to-face (conventional) lecture treatment. This research was conducted within the same period, namely in the even semester of the 2023 academic

year, with details of lecture meetings held for 14 weeks (excluding the weeks of the Midterm and Final Examinations).

Furthermore, the parameters to be measured in this study include; age, weight, height, BMI, level of physical activity, and stress level. Each of these parameters was taken after they were given learning method treatment. The research subjects were selected based on inclusion and exclusion criteria, where the inclusion criteria included male and female gender, students in semesters 2, 4, and 6 in good health, and not in drug intervention or recovery. The average age of students was 21.25 ± 0.37 years, weight 56.05 ± 5.17 kg, height 170.34 ± 7.14 cm, and BMI 21.74 ± 2.83 kg/m².

Research Measurements and Procedures

Anthropometry

Age data were collected using questionnaires distributed at the end of offline lecture meetings. Furthermore, height was measured using a GEA brand manual stature meter, which researchers directly did. Moreover, weight measurement was obtained using SECA 762 brand scales, for BMI was done using metric units, namely dividing body weight (kilograms) by height squared (meters).

Physical Activity

Physical activity data collection was measured using the Physical Activity Questionnaire for Adults (PAQ-AD). The instrument consisted of ten question items related to the type and frequency of participation in physical activity over the past seven days. Each answer was scored on a 5-point scale ranging from 1 to 5. The average value of all responses (a higher score indicates a higher level of physical activity) was calculated to calculate the physical activity index score. Physical activity recommendations were categorized based on the score of the value obtained and then classified, score (1) "very low", score (2) "low", score (3) "medium", score (4) "high", and score 5 "very high".

Blended Learning and Conventional Methods

The blended learning method given to the experimental group was in the form of 50% of the participants attending face-to-face lectures and the other 50% attending lectures online using Zoom. Meanwhile, in the control group, it was carried out fully face-to-face in the classroom. In total, the meetings of these two learning methods were carried out for 14 meetings with a duration of 90 minutes.

Stress Level

Student stress levels were collected using the Perceived Stress Scale (PSS) questionnaire. The questionnaire has been developed since 1983 and is recommended as a good questionnaire to help people understand how the situation affects their feelings and stress (Son et al., 2020). Questions on this scale asked about feelings and thoughts over the past month. In each case, you would be asked to indicate how often you feel or think a certain way. Each answer was assigned a score on a scale of 1 to 4. Although some questions were similar, there were differences between them and should treat each question as separate. The best approach was to answer quickly enough. To calculate the stress level index, namely by adding up all the scores obtained from 10 questions but for questions 4, 5, 7, and 8, the scores are changed to 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0. Individual scores on PSS can range from 0 to 40, with higher scores indicating higher perceptions of stress. A score of 0-13 was be considered low stress, 14-26 was be considered moderate stress, and a score of 27-40 was be considered high stress.

Table 1. Perceived Stress Scale Questioner

No	PSS Items				Scale (1-4)
	0 – never	1 - almost never	2 - sometimes	3 - fairly often	
1	In the last month, how often have you been upset because of something that happened unexpectedly?				4
2	In the last month, how often have you felt that you were unable to control the important things in your life?				4
3	In the last month, how often have you felt nervous and stressed?				4
4	In the last month, how often have you felt confident about your ability to handle your personal problems?				4

No	PSS Items					Scale (1-4)
	0 – never	1 - almost never	2 - sometimes	3 - fairly often	4 – very often	
5	In the last month, how often have you felt that things were going your way?					4
6	In the last month, how often have you found that you could not cope with all the things that you had to do?					4
7	In the last month, how often have you been able to control irritations in your life?					4
8	In the last month, how often have you felt that you were on top of things?					4
9	In the last month, how often have you been angered because of things that happened that were outside of your control?					4
10	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?					4
Total Score of PSS						40

Data Analysis

The data presented in this study were average values and standard deviation. Anthropometric data such as age, weight, height, and BMI were tested using one-way analysis or one-way ANOVA to compare the two groups. Questionnaires on stress levels and physical activity were analyzed using paired t-tests to test the differences between the two groups after treatment. All statistical analysis used SPSS application version 22 with a significance level of $p < 0.05$.

RESULTS AND DISCUSSION

Table 2 displays the anthropometric data of subjects in the form of average values and standard deviations. The results showed that the variables of age, weight, height, and BMI of the two groups did not indicate any significant difference.

Table 2. Anthropometric Data of the Blended Learning vs. Conventional Group

Variable	Total (N= 160)	Group		p-value
		Blended learning (n= 80)	Conventional (n= 80)	
Age (years)	21.69 ± 1.33	21.68 ± 0.84	21.71 ± 1.82	0.209
Weight (kg)	55.74 ± 6.48	56.35 ± 5.73	55.14 ± 7.23	0.337
Height (cm)	170.10 ± 5.51	169.81 ± 3.72	170.40 ± 7.31	0.102
BMI (kg/m ²)	21.06 ± 2.77	20.89 ± 1.21	21.23 ± 4.33	0.078

*significant average difference $p < 0.05$

Table 3. Physical Activity Data and Stress Levels

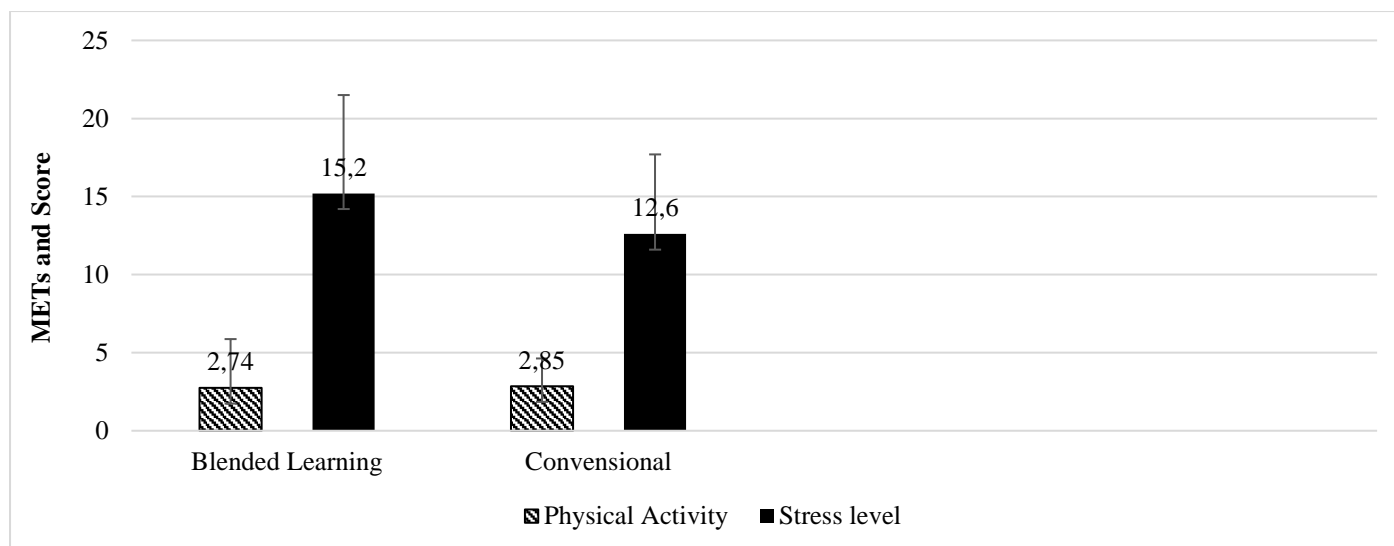
Variable	Total (N= 160)	Group		p-value
		Blended Learning (n= 80)	Conventional (n= 80)	
PA (METs)	2.83 ± 0.76	2.74 ± 3.13	2.85 ± 1.78	0.001*
PSS (Score)	13.9 ± 5.7	15.2 ± 6.3	12.6 ± 5.1	0.001*

PA = Physical Activity

PSS = Perceived Stress Scale

significant average difference $p < 0.05$

Table 3 showed that the average physical activity value and stress level between the two post-treatment groups indicated a significant difference of $p < 0.001$. The physical activity level of the blended learning group was lower when compared to the conventional group (2.74 METs vs. 2.85 METs). Furthermore, the stress level of the blended learning group was in the moderate stress category (15.2 points), while the conventional group was in the mild stress category (12.6 points), see Table 3.



Graph 1. Comparison Between Physical Activity and Stress Levels

Graph 1 shows that physical activity levels correlate with students' stress levels. Where when a student's physical activity is high, a person's stress level will decrease, and vice versa, if the physical activity level is low, a person's stress level will increase. Thus, it can be concluded that the level of physical activity is significantly related to a person's stress level.

The research results have provided evidence that the level of physical activity in the blended learning group is lower when compared to the conventional group. Meanwhile, the blended learning group experienced moderate stress levels for stress levels, while the conventional group experienced low-stress levels. These findings align with research in the United Arab Emirates that non-medical students experience increased anxiety when participating in online learning (Saddik et al., 2020). Students academic pressure, poor sleep patterns, and low physical activity contribute to psychological problems associated with students' stress and anxiety when participating in online learning (Al Saadi et al., 2017).

According to Nathania et al. (2019), stress can cause physiological changes in a person's response to stressors. When stressors activate the sympathetic and adrenocortical nervous systems, they affect homeostasis and interaction with the environment and contribute to catabolic function (Raes et al., 2020). These changes can affect a person's physiological state, such as reduced immunity and cardiovascular disorders (Janssen et al., 2017). Conventional learning methods have many benefits, such as increasing the opportunity for students to move more, explore games, and create innovations in various kinds of movements, both fundamental and specific (Besser et al., 2022; Xiao et al., 2020). For instance, breakthrough innovations that trigger healthy lifestyle models in employing physical education intermediaries. It is also useful for teachers who need to implement specific teaching strategies to cultivate and reinforce exercise habits and healthy behaviors among students (Liao et al., 2023).

Previous research suggests that physical fitness can affect a person's ability to manage individual stress, where individuals whom diligently exercise will stimulate physical, spiritual, and social growth and development related to anatomical, physiological, emotional, and intellectual intelligence and the ability to socialize in their environment (Janssen et al., 2017; Oshima et al., 2015). It can bring up feelings of pleasure, increasing psychologically healthy aspects (Apriantono et al., 2020).

The change in learning methods from conventional to blended learning raises several problems. Online lectures carried out for a long time will keep students in a static state; thus, this condition can give students less space to move, which increases the risk of stress (Camargo et al., 2020; Lestari et al., 2021). Face-to-face learning activities can lead students to focus on the impact of personal relationships with family and friends, feelings and emotions, and experiences of stress and anger that can impact mental health (Rocamora et al., 2023). Embedding socially relevant learning activities into school content, organization, and curriculum can help increase students' sense of enjoyment, participation, and achievement, which is

essential for increasing knowledge and awareness about mental health (Haycock et al., 2020; Liao et al., 2023; Rodríguez Macías et al., 2021). Hence, this finding can be used as a reference, especially for educators, both lecturers and teachers in schools, to be able to take a spiritual approach and invite students to do activities they like, such as exercise and recreation, to trigger a sense of enthusiasm in students to continue to improve their fitness degree; therefore, this will have an impact on mental health, which can affect students' stress levels much lower.

CONCLUSION

The level of students' participation and enjoyment is the main key to changing the pattern of physical education in a better direction compared to two years ago. The findings of this study provide evidence that physical activity and stress levels experience a positive trend when comparing conventional and online learning. However, it's important to note the limitations of this research, as it was exclusively conducted among university students. There is a lack of exploration at the elementary and high school levels. To address this limitation, future research should strive to encompass a more diverse group of participants, spanning all age groups of students. This comprehensive approach will enable a detailed mapping of stress levels and physical activity concerning the various learning methods commonly applied in their respective educational environments. This finding can be used as a reference, especially for educators, both lecturers and teachers in schools, to be able to take a spiritual approach and invite students to do activities they like, such as exercise and recreation, to trigger a sense of enthusiasm in students to continue to improve their fitness degree; therefore, this will have an impact on mental health, which can affect student stress levels much lower.

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CONFLICT OF INTEREST

The authors state no conflict of interest

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