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The Role of Stress as a Mediator Variable in the Influence of Learning Environment and Sleep Quality on Academic Motivation of Students in Makassar City

Sultan Wahyu, Muh Harizah Ananta B, Jilaninuri Sumardin, Muh Fahrizan Asy Syakuur, Romansyah Sahabuddin, Fakhirah Husain.

Management, Faculty of Economics and Business, Universitas Negeri Makassar, Makassar, Indonesia
** Corresponding author e-mail: sultanwahyu785@gmail.com*

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Abstract

The Objectives – This study aims to examine and analyze the role of stress as a mediator variable in the influence of the learning environment and sleep quality on the academic motivation of students in Makassar City.

The Methods – This research uses a quantitative approach with SEM. Data was collected from 250 respondents through an online questionnaire distributed through social media. The sampling technique used simple random sampling method. Each variable was measured using a Likert scale of 1-5.

The Results – The results showed that stress acts as a significant mediator between learning environment and sleep quality on students' academic motivation. Although there is an inverse relationship between learning environment conditions and academic motivation, good sleep quality contributes to increased motivation. These findings emphasize the importance of stress management and learning environment improvement to support the academic achievement of university students in Makassar City.

The Research Implications – The implications of this study suggest that stress serves as a mediator between learning environment and sleep quality on students' academic motivation. Therefore, it is important to develop stress management programs, improve the quality of the learning environment, and pay attention to students' sleep quality. This integrated approach is expected to improve the motivation and academic achievement of university students in Makassar City.

Keywords: Learning Environment, Sleep Quality, Stress, Academic Motivation

1. Introduction

Higher education is a crucial phase in individual development, where students are expected to achieve maximum academic performance. In this context, learning motivation becomes one of the important elements that influence academic success. However, there are various factors that can affect students' learning motivation, including the learning environment and sleep quality. A supportive

learning environment, which includes adequate educational facilities, social support, and a positive atmosphere, is essential for the learning process. Additionally, good sleep quality also has a significant impact on students' cognitive abilities and concentration. Research shows that lack of sleep can lead to a decline in academic performance and learning motivation.

In Makassar, which is one of the educational centers in Indonesia, many students face difficulties in achieving high academic motivation. Variations in the learning environment, ranging from educational facilities to social interactions, as well as sleep quality issues that are often overlooked, can affect students' academic performance. The stress experienced by students, whether due to academic pressure, social demands, or other external factors, further exacerbates this situation. Therefore, it is important to understand how stress can affect students' learning motivation, especially in a high-pressure environment like Makassar.

Based on data from the Central Statistics Agency (BPS) and local surveys, about 60% of students in Makassar report experiencing significant stress, which impacts their sleep quality. Previous research has shown that students with poor sleep quality tend to have lower learning motivation.

This indicates a complex relationship between the learning environment, sleep quality, stress, and academic motivation. Although many studies have discussed the influence of the learning environment and sleep quality on academic motivation, few have examined the role of stress as a mediator in this context. Therefore, it is important to investigate how stress can mediate the relationship between the learning environment and sleep quality on students' academic motivation in Makassar.

Most previous research has focused more on the direct relationships between these variables without considering the role of stress as a mediator. This study aims to fill that gap by providing a deeper understanding of how stress affects academic motivation through the learning environment and sleep quality. By understanding the role of stress as a mediator, educational institutions can design more effective interventions to improve the quality of the learning environment and students' sleep, as well as reduce stress levels.

This, the results of this study are expected to contribute to the development of educational policies and student welfare in Makassar. This research is also expected to serve as a reference for future studies that wish to explore more deeply the factors influencing students' learning motivation, as well as provide practical recommendations for relevant parties in improving the quality of education in Indonesia.

In the context of higher education, students' academic motivation is influenced by various factors, both from within themselves and from their surrounding environment. Two external factors that play a significant role are the learning environment (X1) and sleep quality (X2). A conducive learning environment, such as a quiet, organized, and distraction-free study space, can help students focus and be more productive. Similarly, good sleep quality allows for

physical and mental recovery, enabling students to engage in academic activities with optimal enthusiasm and concentration.

According to, the learning environment is defined as the overall physical, social, and emotional conditions that affect students' learning processes. A good learning environment is characterized by adequate facilities, positive social interactions, and support from instructors, all of which contribute to a supportive learning atmosphere. Good facilities, such as comfortable classrooms and access to technology, can enhance comfort and efficiency in the learning process. Additionally, positive social interactions between students and instructors build trusting relationships, allowing students to feel supported and motivated to actively participate in learning activities. However, when the learning environment is not supportive or when students experience sleep disturbances, this can potentially lead to stress. High levels of stress (Z) can diminish students' capacity to manage their time, understand material, and maintain emotional balance. In this model, stress is positioned as a mediator variable that bridges the influence of the learning environment and sleep quality on academic motivation (Y). This means that poor environmental conditions and sleep can trigger stress, which ultimately decreases students' motivation to study and achieve academic success.

Thus, the role of stress becomes important to consider in this causal relationship. A positive learning environment and maintained sleep quality not only have a direct impact on academic motivation but can also reduce the level of stress experienced by students. Therefore, strategies to enhance academic motivation among students, particularly in Makassar City, need to consider stress management as part of a comprehensive approach to creating a healthy and productive learning atmosphere. According to, sleep quality is defined as a condition that includes sufficient duration, depth, and continuity of sleep, as well as feeling refreshed and rejuvenated upon waking. Having good sleep quality is crucial for physical and mental health, as well as for overall quality of life. Optimal sleep not only provides the necessary rest for the body but also supports better cognitive functions, such as memory, learning ability, and effective decision-making. On the other hand, poor sleep can lead to various issues, such as mood disturbances, increased stress, and decreased productivity during the day. Furthermore, poor sleep quality may also be associated with long-term health risks, including metabolic disorders and chronic diseases.

According to the Ministry of Health of the Republic of Indonesia (2022), stress is defined as the physical and emotional reaction that occurs when an individual faces pressure or challenges in life. This reaction can vary, ranging from feelings of anxiety, anger, or frustration to physical symptoms such as headaches, fatigue, and sleep disturbances. Stress can be caused by various factors, including work-related issues, interpersonal relationships, or difficult life situations. If not managed properly, stress can negatively impact mental and physical health, making it important to recognize the signs of stress and implement effective management strategies, such as relaxation, exercise, and social support.

According to, academic motivation is defined as the reasons that drive learners to engage in learning activities. This motivation can come from within the

individual, known as intrinsic motivation, such as curiosity, interest, or satisfaction derived from the learning process itself. On the other hand, there is also extrinsic motivation, which arises from external factors, such as rewards, recognition, or pressure from the social environment. By understanding these two types of motivation, we can better support the learning process and help learners find strong reasons to continue their education

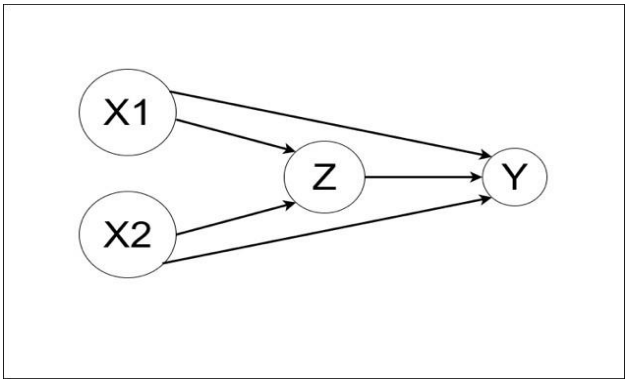

Figure 1 Theoretical Thinking framework

Hypothesis

The hypothesis is a temporary statement proposed by the researcher as an answer to the research problem at hand. Hypotheses serve as guidelines in research to direct researchers in collecting and analyzing data. Hypotheses are usually stated in the form of sentences that can be tested for truth through the chosen research method. The hypothesis of this study is as follows:

H1 : The learning environment has a significant effect on the academic motivation of students in Makassar City.

H2 : Sleep quality has a significant effect on the academic motivation of students in Makassar City.

H3 : Stress acts as a mediator in the influence of the learning environment on the academic motivation of students in Makassar City.

H4 : Stress acts as a mediator in the influence of sleep quality on the academic motivation of students in Makassar City.

2. Methodology

This research employs a quantitative approach using a survey type. This approach focuses on the collection and analysis of numerical data to test hypotheses and analyze relationships between variables. The type of research applied is a survey. According to, the survey method in quantitative research is an approach that uses questionnaires to collect data from respondents. This method aims to obtain information that can be generalized to a larger population, focusing on measuring attitudes, opinions, and behaviors through structured questions.

The subjects of the study consist of 250 students as the research sample. The sampling technique used is simple random sampling. which, according to, is a

sampling method where each member of the population has an equal chance of being selected as a sample. This process is conducted randomly, so the results can be considered representative of the larger population.

The operational definition of the variables was divided into three, the independent variables (X), the mediator variable (Z), and the dependent variable (Y). Learning environment (X1) and sleep quality (X2) are the independent variables (X), stress is the mediator variable (Z), and academic motivation is the dependent variable (Y).

The research instrument used in this study is a questionnaire designed to measure several key variables, namely learning environment, sleep quality, stress, and academic motivation using a 1-5 Likert scale questionnaire. Data analysis technique used in this study is Structural Equation Modeling (SEM), t-value test, and Standardized Solution test using LISREL 8.50 software.

3. Result and Discussion

This study was conducted on 250 university and college students in Makassar City. The main purpose of this description is to illustrate how the learning environment and sleep quality can impact their academic motivation, taking into account the role of stress.

T-Value Test Result

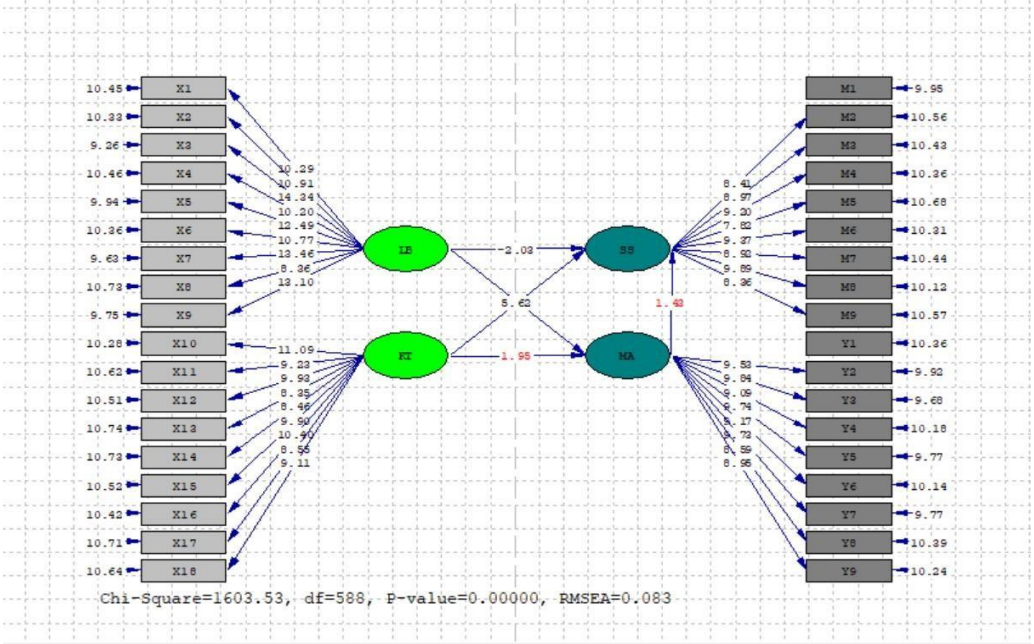

Figure 2 Full Path Diagram (T-Value)

The results of the analysis using Structural Equation Modeling (SEM) with the help of LISREL software provide an overview of the relationship between Learning Environment (LB), Sleep Quality (KT), Stress (SS), Academic Motivation (MA). This

model aims to understand how learning environment and sleep quality can affect academic motivation, with stress as a mediator variable.

1) The Effect of Learning Environment on Student Academic Motivation

The analysis using Structural Equation Modeling (SEM) shows that the Learning Environment (LE) variable is significantly related to a decrease in Academic Motivation (AM), with a coefficient value of -2.02. This indicates an inverse relationship between the conditions of the learning environment and academic motivation, where factors in the learning environment such as teaching quality, facilities, and social interactions can contribute to a decline in students' academic motivation.

Students often face pressure due to high standards in the learning environment, which can negatively impact their academic motivation. Rigid and non-interactive teaching methods also contribute to a decrease in students' interest in learning, making them feel less engaged with the material. Additionally, an unconducive environment, such as distracting noise or lack of access to learning resources, can impair concentration and the overall learning experience. All these factors interact, creating challenges that students must face to achieve the expected academic performance.

2) The Influence of Sleep Quality on Students' Academic Motivation

The analysis using Structural Equation Modeling (SEM) shows that the Learning Environment (LE) variable is significantly related to a decrease in Academic Motivation (AM), with a coefficient value of -2.02. This indicates an inverse relationship between the conditions of the learning environment and academic motivation, where factors in the learning environment such as teaching quality, facilities, and social interactions can contribute to a decline in students' academic motivation.

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3) The Role of Stress as a Mediator

Stress (S) in this model acts as a mediating variable that connects the Learning Environment (LE) and Sleep Quality (SQ) to Academic Motivation (AM). The analysis results show that the influence of LE on S has a significant value of 5.62. This indicates that a positive learning environment can help reduce the stress experienced by students. Several contributing factors include social support from peers and instructors, adequate learning facilities, and a pleasant

classroom atmosphere. These three factors play a significant role in directly influencing students' stress levels. By creating a conducive learning environment, we can enhance students' mental well-being and support their learning process more effectively.

Meanwhile, the influence of SQ on S has a significant value of 1.95. This indicates that although this influence is lower compared to the learning environment, good sleep quality still contributes to reducing stress. Poor sleep quality can increase feelings of anxiety and tension, adversely affecting students' psychological well-being. Stress also acts as a mediator between sleep quality and students' academic motivation, where high stress tends to reduce learning motivation. A positive learning environment, combined with good sleep patterns, helps students manage stress more efficiently.

4) Combination of Learning Environment and Sleep Quality in Relation to Stress Levels

Further analysis shows that the combination of the learning environment and sleep quality yields varying results depending on stress levels. In a positive context, environmental factors can increase stress, such as academic pressure that drives individuals to perform, while on the negative side, these factors can reduce stress, for example, through a supportive and comfortable learning atmosphere. Sleep quality also plays a crucial role in stress management, with several studies indicating that good sleep directly contributes to reducing stress levels.

Moreover, the interaction between the learning environment and sleep quality can create a synergistic effect, where both factors work together to reduce stress in certain situations. However, there is also the potential for conflict when these two aspects are not aligned, which can lead to increased stress levels. Given this situation, it is important to understand how the combination of learning environment factors and sleep quality affects stress levels, so that more effective stress management strategies can be implemented in the learning environment, considering that such conditions are dynamic and can vary according to individual experiences.

5) Model Fit and Practical Implications

The RMSEA value of 0.082 indicates that the model has a reasonably good fit. In this study, the good model fit provides a strong basis for the validity of the obtained results. This means that not only is this model theoretically justifiable, but it also has real practical applications in understanding how stress mediates the influence of the learning environment and sleep quality on students' academic motivation.

By considering the factors identified in the model, this research can serve as a reference for further studies in similar contexts. Researchers and practitioners in the field of education can use these findings to design more effective interventions and strategies to achieve optimal outcomes in their implementation in the field. Thus, this research highlights the importance of

addressing stress as a key factor in enhancing students' academic motivation, which can ultimately have a positive impact on their academic performance.

Standardized Solution Test Result

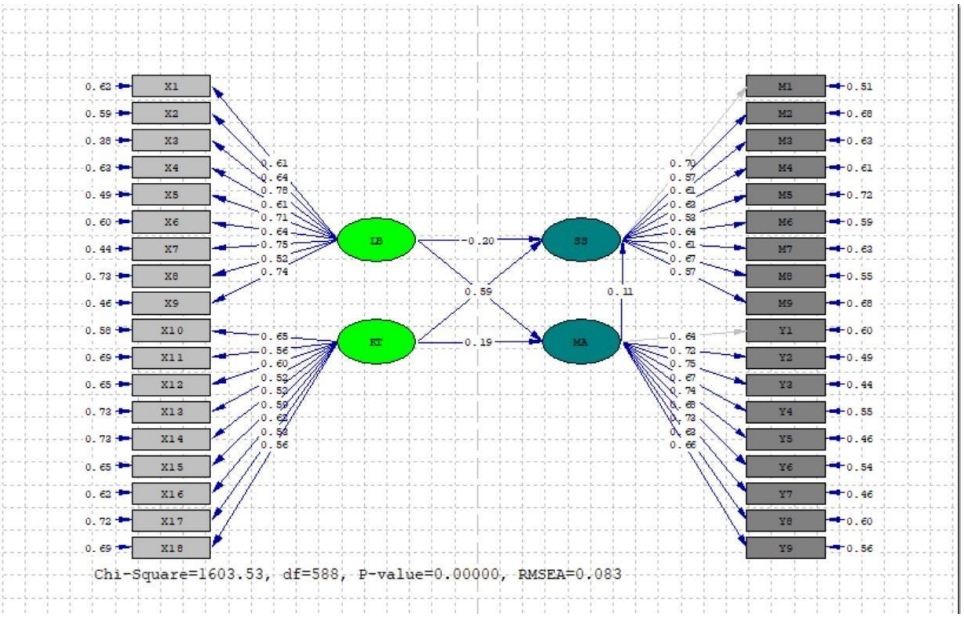

Figure 3 Standardized Solution

1) Measurement Model of Exogenous Latent Variables

The exogenous latent variables in this model consist of LE (Learning Environment) and SQ (Sleep Quality). Both constructs are measured through indicators X1 to X18. These indicators are connected to the constructs through standardized loading values, which reflect how well the indicators represent the measured constructs. For LE, most indicators such as X5 (0.78) and X7 (0.75) have high loading values, indicating that these indicators are valid and representative of the LE construct.

In contrast, the indicators for the SQ construct show considerable variation. Some indicators, such as X10 and X14, have adequate loading values, while others, like X11 and X13, have low values of only 0.50. This indicates that some indicators within the SQ construct are less optimal in measuring the construct. Therefore, some items may need to be reevaluated or modified to strengthen the SQ construct and ensure statistical consistency.

2) **Measurement Model of Endogenous Latent Variables**

The endogenous latent variables in this model are S (Stress) and AM (Academic Motivation). S is measured by indicators M1 to M9, and AM is measured by Y1 to Y9. Some indicators of S show strong loading values, such as M4 and M5 (both 0.72), indicating that these indicators adequately represent the construct. However, other indicators like M1 (0.51) and M8 (0.55) show weak relationships with the construct, necessitating further evaluation.

For the AM construct, the distribution of loading values also varies. Indicators such as Y4 (0.74) show a strong contribution to the construct, but many other indicators have values below the standard, such as Y2 (0.49), Y3 (0.44), and Y5 (0.46). This indicates that the AM construct is not consistently measured by all its indicators. Revising or removing weak indicators could enhance the reliability and validity of the AM construct in the model.

3) Causal Relationships Between Latent Constructs

The relationships between constructs in this model are indicated by arrows between the latent variables along with their path coefficient values. From the model results, it is evident that SQ has the strongest influence on AM with a coefficient value of 0.59. This indicates that an increase in the SQ construct will directly enhance the value of the AM construct, making SQ a key variable in this model. On the other hand, the relationships from LE to S and from LE to AM are only 0.20 and 0.19, respectively, indicating that the influence of LE is relatively weak on the other variables.

Meanwhile, the relationship from S to AM is also very weak, at only 0.11. This suggests that the contribution of S to AM in this model is minimal and may not be practically significant. These findings suggest that the role of S as a mediator or explanatory variable for AM is not strong within the established structure. Researchers may consider revisiting the theory or strengthening this relationship in future model development.

4) Model Fit Evaluation (Goodness of Fit)

The evaluation of model fit is conducted through several statistical indicators, one of which is the Chi-Square value of 1603.53 with 588 degrees of freedom (df), and a p-value of 0.00000. This value indicates that the model significantly differs from the empirical data, meaning the model is not a perfect fit. However, it is important to note that the Chi-Square test is highly sensitive to sample size and is almost always significant in large samples.

Therefore, alternative measures such as RMSEA (Root Mean Square Error of Approximation) become important references. In this model, the RMSEA is 0.083, which is still in the acceptable category, although not ideal (ideally < 0.05). This value indicates that overall, the model can be considered fairly good and still usable for further analysis. Nevertheless, improvements in several aspects of the model are still needed to achieve a more optimal model fit.

5) Preliminary Conclusions from Model Results

Overall, this model indicates that SQ is the most significant and influential variable in explaining variations in AM. Meanwhile, the constructs LE and S show weak influences, both directly and indirectly. This suggests that intervention or program development should focus more on enhancing SQ if the goal is to improve AM.

On the other hand, there are still several indicators in S and AM that have low loading values, indicating weaknesses in measurement aspects.

Additionally, the overall model fit is not yet fully ideal. Therefore, it is recommended to revise the model by improving weak indicators and reevaluating the relationships between constructs based on stronger theories, so that the model becomes more valid and reliable in the future.

4. Conclusion

This study concluded that stress acts as a significant mediator variable between the learning environment and sleep quality on students' academic motivation. Although there is an inverse relationship between learning environment conditions and academic motivation, where factors in the learning environment such as teaching quality, facilities, and social interaction. However, all these factors interact with each other, creating challenges that must be faced by students to achieve the expected academic performance. In addition, good sleep quality also contributes to increasing students' academic motivation. Students who get enough sleep tend to have higher motivation to study. These findings indicate a complex relationship between the three variables, highlighting the importance of stress management in the academic context. Thus, this can be used to formulate interventions or programs that aim to increase academic motivation through stress management, strengthening the learning environment, and improving sleep quality. This integrated approach is expected to positively impact students in achieving their academic goals.

The results of the analysis show that the combination of the three variables, namely learning environment, sleep quality, and stress, provides a complex and interrelated influence on students' academic motivation. The RMSEA value of 0.082 indicates that this research model is good enough. Therefore, this model can be used as a reference for further research in the same context, where good model balance plays an important role in increasing the validity of research results. This allows researchers and practitioners to use the factors identified in the model as a basis for creating relevant and impactful solutions, thereby increasing the effectiveness of efforts in related fields.

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