

Do School Climate and Subjective Well-Being Affect Students' Achievement in Indonesia? A Linear Regression Analysis

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Abstract: Do school climate and subjective well-being affect student achievement in Indonesia? A linear regression analysis. Objectives: The purpose of this study is divided into two parts. First, to investigate whether school climate and subjective well-being influence student achievement. Second, to determine whether school size moderates this association, especially the teacher support and student achievement. **Methods:** This research uses a quantitative approach with multiple linear regression analysis techniques. Data were obtained from the Program for International Student Assessment (PISA) in 2018. The number of respondents is 12089 students from 397 schools in Indonesia. **Findings:** The results showed that: 1) the level of parental education influences student achievement; 2) School climate positively impacts student achievement; 3) School size moderates the association between teacher support and student achievement in Indonesia. **Conclusion:** School climate is an important factor for student achievement. We suggest that improvements in the school climate should be implemented to improve student achievement in Indonesia.

Keywords: school climate, school size, subjective well-being, student achievement.

Abstrak: Apakah iklim sekolah dan kesejahteraan subjektif berpengaruh terhadap prestasi belajar siswa di Indonesia? Suatu analisis regresi linear. Tujuan: Tujuan penelitian ini dibagi menjadi dua bagian. Pertama, untuk mengetahui pengaruh iklim sekolah dan kesejahteraan subjektif terhadap prestasi siswa. Kedua, untuk mengetahui apakah ukuran sekolah memoderasi efek iklim sekolah, khususnya dukungan guru terhadap prestasi siswa. **Metode:** Penelitian ini menggunakan pendekatan kuantitatif dengan teknik analisis regresi linier berganda. Data diperoleh dari Program Penilaian Siswa Internasional (PISA) pada tahun 2018. Jumlah sampel 12089 siswa dari 397 sekolah di Indonesia. **Hasil:** Hasil penelitian menunjukkan: 1) tingkat pendidikan orang tua berpengaruh terhadap prestasi siswa; 2) Iklim sekolah berdampak positif terhadap prestasi siswa; 3) Ukuran sekolah memoderasi pengaruh dukungan guru terhadap prestasi belajar siswa di Indonesia. **Kesimpulan:** Iklim sekolah adalah faktor penting terhadap prestasi siswa. Kami menyarankan agar perbaikan dalam iklim sekolah harus diterapkan untuk meningkatkan prestasi siswa di Indonesia.

Kata kunci: iklim sekolah, ukuran sekolah, kesejahteraan subkektif, prestasi siswa

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■ INTRODUCTION

Although not all experts agree that the measurement of student achievement is based on literacy, mathematical and scientific abilities, the results of the Program for International Student Assessment (PISA) report have been made insights into educational policies in each country (Pratiwi, 2019; Trinidad, 2020). Based on the unavailability of educational assessments in developing countries, the results of the PISA analysis can be used as a benchmark for the development of a country's education compared to other countries. The magnitude of the impact given from 2000 – 2018 by PISA claimed that 78 countries had participated in the program (OECD, 2019).

Since it was first held in 2000, Indonesia has provided space for PISA to evaluate education in Indonesia. Pratiwi (2019) explained that the results of Indonesia's participation had many positive impacts on Indonesia, especially the adjustment of the curriculum to the demands of the global market. In fact, the results of the 2018 PISA release show that Indonesia's reading scores ranked 72 out of 77 countries, then math scores ranked 72 out of 78 countries, and science scores ranked 70 out of 78 countries. This shows that there are systematic problems that have not been solved until now. The big question that might be asked is, why did this happen? Based on the advice of Huang, Hochbein, & Simons (2020), we suspect that the lack of research on the influence of contextual factors such as school climate, well-being, and school size that are rarely done results in the problem of declining student achievement in Indonesia being unresolved.

School climate is defined as the perception of students or staff members towards the school, including four dimensions: the relationship between students and staff/teachers, security, teaching, and learning, and the school environment. In addition, Huang et al., (2020) explained that the school climate can be measured

by the attitudes and involvement of teachers, parents, and students. In developed countries how to create a positive school climate is much discussed. This follows evidence that the school climate Affects student achievement. For example, the results of Maxwell, Reynolds, Lee, Subasic, & Bromhead (2017) research show that students' perceptions of school climate significantly explain writing and numeracy achievement. Furthermore, the results of Bostwick, Collie, Martin, & Durksen (2020) research also show that if a mathematics teacher can increase classroom involvement, student achievement increases.

In addition to the school climate, there are other factors that significantly influence student achievement, namely well-being. According to Diener (2009), Subjective well-being is defined as subjective evaluation consisting of three dimensions. First, positive emotions are interpreted as evaluations of pleasant feelings including happy and cheerful feelings. Second, negative emotions, namely the evaluation of unpleasant feelings such as fear, sadness, and avoidance. Finally, life satisfaction is a comprehensive evaluation of life. Previous studies have shown that there are equally strong and conflicting research results. On the first hand, using hierarchical linear regression analysis, Shoshani, Steinmetz, & Kanat-Maymon (2016) shows that emotions positively influence the average grade point score. On the other hand, Kryza, Elise, & Sarah (2018) found that subjective welfare studies were not related to academic achievement.

Furthermore, several other studies have shown that school size might influence student achievement. There is conflicting evidence, however. For example, the results of Hu, Gong, Lai, & Leung (2018) indicated that the ratio of computer to school size was associated with better student performance. In contrast, the results of the study by Luu & Freeman (2011) showed no

correlation between the ratio of computer to school size and student literacy skills in Canada and Australia. Several studies may differ in defining school size, however. Some defined the school size as school infrastructure to support student achievement while others explained it as the number of students enrolled in the school (Maxwell et al., 2017)

Although research shows that school climate, subjective wellbeing, and school size affect student achievement, theoretical possibilities may be limited. Most research is focused only on developed countries. This is certainly detrimental to the development of the education system in developing countries such as Indonesia. In addition, the researcher considers that the scarcity of research might be caused by the availability of data on objective student academic outcomes and various aspects such as the relationship of students to teachers, students' perceptions of schools, and school security that is not representative.

Using data released by PISA, it provides an opportunity to patch the rock gap left by previous researchers. The PISA report shows that the opportunity to find out various factors related to student achievement measured objectively through reading, science, and mathematics tests can be done. In addition, with representative data, the results of this study will be more comprehensive compared to previous studies.

Based on a brief description of the conditions above, two contributions to the literature will be made in this study. First, providing in-depth information that focuses on school climate, this study will explain the relationship between school climate and student achievement. The restriction of these variables follows empirical evidence that school climate influences student achievement. Second, this study will add the school size variable as a moderator in the relationship between school climate and student achievement in Indonesia. This is to answer

whether school size moderates the relationship between school climate and student achievement.

■ METHODS

Research Design

This research uses a quantitative approach. The research data was taken from PISA 2018 obtained through a dataset from the Organization for Economic Co-operation and Development (2018). The sample of this study was 12089 15-year-old high school students from Indonesia, consisting of 5858 (48%) boys and 6250 (52%) girls, who were part of 399 public and private schools that were randomly selected and represented the state school system.

Data Collection Technique

Data collection techniques used in this study were test and non-test instruments. The test instrument is used to measure student achievement. Instrument test, following previous research using the average of grades in mathematics, we use the average achievement of mathematics students in Indonesia. Furthermore, to estimate school climate we use non-test instruments. Following previous research from Piccolo, Merz, & Noble (2019) that school climate is defined in four combined variables: (1) learning experience including teacher support, where adapted from the PISA instrument (e.g., "teacher shows an interest in every student's learning, gives extra help when needed, or continues teaching until all the students understand the subject") (Govorova, Benítez, & Muñiz, 2020); (2) school environment including engagement (e.g., "part of the enjoyment I get from doing things is when I improve on my past performance."), truancy (e.g., "i skipped some classes.") (Rijavec & Miljkovic, 2015) and competing; (e.g., "students seem to value competition.") (Govorova et al., 2020); (3) relationships including family support (e.g., "i feel like I belong at school.") and peer support (e.g.,

“i feel like I belong at school.”) (Midgley et al., 2000); and last (4) safety including attitude (e.g., “It is a wrong thing to join in bullying”) and bullying behavior (e.g., “I got hit or pushed around by other students.”) (Smith, Pepler, & Rigby, 2004). Each item has four answer choices: 1 = Strongly disagree; 4 = Strongly agree.

Furthermore, to measure school size, we followed previous studies from Maxwell et al., (2017) who used the number of students enrolled in the school. Finally, to measure happiness, we followed Diener’s theory (2009) that subjective wellbeing is measured through three dimensions: positive affect, negative affect, and life satisfaction. The three main variables are added other covariates such as gender (dummy variable female = 1; male = 0), parental education level (1 = IECED level 4; and 4 = IECED level 6). The aim is to control them as potential confounders of the relationship between school climate and subjective wellbeing and student achievement.

Data Analysis

The collected data were then analyzed using

linear regression with Rstudio. Rstudio is an extension of the open-source software R. Rstudio was chosen because it is more user-compliant than the original version of R. Rstudio also allows analysis with many datasets. Rstudio also has many packages to make it easier for researchers to explain data such as “lm, ggplot, and foreign”.

The analysis process is carried out in three stages. First, multiple linear regression analysis was chosen to check the relationship between covariate variables such as parental education level on student achievement (model 1). Second, we also use multiple linear regression analyses to examine the role of school climate and subjective well-being in affecting student achievement in Indonesia (model 2). Third, we include the school size as a moderator of this relationship (model 3).

RESULTS AND DISCUSSION

The results of the study and discussion of the influence of the school climate, subjective wellbeing, and achievement are as follows:

Table 1. Multivariate linear regression

Variable	Model 1 Coeff.(s.e)	Model 2 Coeff.(s.e)	Model 3 Coeff.(s.e)
Intercept	309.22(2.51)***	228.96(10.74)***	242.56(14.60)***
Control variable			
Female	13.5827(1.47)***	1.34(1.56)***	1.23(1.63)
Mother Education level	9.8559(0.7)***	7.54(0.72)***	6.05(0.76)***
Father Education level	12.7494(0.71)***	11.21(0.74)***	8.61(0.78)***
School Climate (safety)			
Attitude		5.20(0.22)***	4.84(0.23)***
Bullying Non-Verbal		-5.34(0.72)***	-5.27(0.76)***
Bullying Mental		-7.21(0.79)***	-6.96(0.85)***
Bullying Verbal		2.11(0.72)**	2.54(0.74)***
School Climate (teaching-learning)			
Teaching support		1.11(0.22)***	-0.04(0.58)
School Climate (school environment)			
Student Engagement		3.20(0.39)***	3.10(0.40)***

Truancy	-2.47(0.52)***	-2.30(0.55)***
Competing	0.62(0.3)*	0.54(0.31)
School Climate (social support)		
Family support	2.58(0.37)***	2.34(0.38)***
Peer support	4.28(0.50)***	4.03(0.52)***
Subjective wellbeing		
PA	-8.75(1.71)***	-9.63(1.79)***
NA	0.47(1.52)	0.55(1.59)
Life satisfaction	-1.83(0.34)	-1.71(0.35)***
School size		4.04(3.56)
Teaching support*School size		0.41(0.19)*

*) * $p < 0.05$; ** $p < 0.01$; *** $p < 0.00$

Table 1. presents the results of the multiple linear regression analysis to investigate how school climate and subjective well-being affect student achievement in Indonesia. Model 1 describes the influence of covariate variables on student achievement in Indonesia. The results showed that there is a significant association of females ($\hat{\alpha} = 13.58$, $\hat{\alpha} < 0.01$) on student achievement in Indonesia. It means the performance of girls was better than the performance of boys. This is in line with previous studies that female students have better achievement than male students. Fennema, Wolleat, Pedro, & Devaney (1981) found that female students have more positive perceptions and attitudes towards mathematics than male students. Her emotional attitude which is more dominant compared to her physical abilities has put women in a very good position (Hidayat, 2011; Nuryoto, 1998). Furthermore, research results show that parental education levels, mother's education level ($\hat{\alpha} = 9.85$, $\hat{\alpha} < 0.01$), and father's education level ($\hat{\alpha} = 12.74$, $\hat{\alpha} < 0.01$) affect student achievement. These results are consistent with previous studies that the education of parents influences student achievement (Li & Qiu, 2018; Whitney, Prewett, Wang, & Chen, 2018). Because families with

different levels of parental education can create different learning environments.

Model 2 describes the role of school climate and subjective well-being in affecting student achievement in Indonesia without taking into account the moderating variable (school size). The results showed that there is a positive significant association of Attitudes ($\hat{\alpha} = 5.20$, $\hat{\alpha} < 0.01$), Teaching support ($\hat{\alpha} = 1.11$, $\hat{\alpha} < 0.01$), Student Engagement ($\hat{\alpha} = 3.20$, $\hat{\alpha} < 0.01$), competing ($\hat{\alpha} = 0.62$, $\hat{\alpha} < 0.01$), family support ($\hat{\alpha} = 2.58$, $\hat{\alpha} < 0.01$), and peer support ($\hat{\alpha} = 4.28$, $\hat{\alpha} < 0.01$) with student achievement. Conversely, there is also a negative significant association of non-verbal bullying ($\hat{\alpha} = -5.27$, $\hat{\alpha} < 0.01$), mental bullying ($\hat{\alpha} = -7.21$, $\hat{\alpha} < 0.01$), and Truancy ($\hat{\alpha} = -2.30$, $\hat{\alpha} < 0.01$) with student achievement in Indonesia. These findings are in line with previous studies that the school climate impacts student achievement (Hamlin, 2020; Lei, Cui, & Chiu, 2018; Trinidad, 2020). This means that the higher the school's security, social support, the school environment, and the learning system, the higher the student's achievement.

School safety is an important element in maintaining student development from risk behaviors such as vandalism and alcoholism (Cornell & Mayer, 2010; Osher, Dwyer,

Jimerson, & Brown, 2015). Based on these results, schools can improve school safety so that student development can be maintained. In addition, based on the results of this study indicate that peer support is an important element in improving student achievement in Indonesia. Smith et al., (2004) explain that peer support will improve the learning atmosphere for the better.

Furthermore, based on the results of this study also showed that the involvement of students in school significantly related to student achievement. This is in line with the research of Sharrock & Rubenstein (2019) that the higher the involvement of students in schools such as following lessons well or enjoying the teaching and learning process, the higher the achievement. Conversely, the lower the involvement of students, the lower the student achievement. For schools that have problems with student involvement, we recommend conducting intervention programs such as Problem Based Learning (PBL) (Muniroh, Sudana, Hitipeuw, & Hidayah, 2016), Teacher-Focused Intervention (Reeve, Cheon, & Jang, 2019), and Student-Centered Practices (Sharrock & Rubenstein, 2019).

Although the results of this study found that school climate is significantly related to student achievement, Safaria (2016) explained that the majority (80%) of the students in Indonesia reported experiencing cyber victimization occasionally to almost every day. Furthermore, the issue of curriculum replacement along with the change of leadership in the Indonesian Ministry of Education and Culture is also a crucial issue of education in Indonesia (Julaeha, 2019). The development of education must be interconnected so that an increase in educational achievement in a country can be realized (Julaeha, 2019; Sofyan, 2019). On the other hand, the support of teachers who use the old-fashioned way, not applying information technology information adds to the difficulty of achieving the

expected student achievement (Hu et al., 2018; Lase, 2019; Lou & Noels, 2019). Based on this explanation, the problems that occur in the school climate such as teacher support, bullying in schools, and curriculum problems that are used may be able to improve the achievement and rating of Indonesia compared to other countries.

Interestingly, we find two things. First, verbal bullying ($\hat{\alpha} = 2.11$, $\hat{\alpha} < 0.01$) is positively and significantly related to student achievement. Although these results contradict previous studies (see: Hamlin, 2020), the positive relationship between verbal bullying and achievement may be due to the assertiveness of the victim and the perception that verbal bullying is common in Indonesian culture (Azis, 2015). In addition, several other studies also explain that bullying also seems to be influenced by more core factors, namely genetic and personality factors (Book, Volk, & Hosker, 2012; Volk, Camilleri, Dane, & Marini, 2012). Second, positive affect ($\hat{\alpha} = -0.08$, $\hat{\alpha} < 0.01$) has a significant negative relationship with student achievement. According to Ayriza, Setiawati, Nurhayati, Gumelar, & Sholeha (2019), dimensions of wellbeing such as positive affect and life satisfaction negatively affect student achievement. During the experience of positive affect and life satisfaction, students may not be aware of that and thus don't derive any academic benefits from that.

Model 3 explains whether school size moderates the relationship of teacher support with student achievement. The analysis showed that the school size ($\hat{\alpha} = 0.41$, $\hat{\alpha} < 0.05$) moderates significantly this relationship. This is in line with previous research by Hu et al., (2018) that school size has an impact on the learning process. Schools in urban areas have better facilities compared to rural areas. This provides students better learning experiences from teachers than students in rural areas. These results implicitly also indicate that, in Indonesia, there is a gap between teacher support in urban areas and rural areas (Muttaqin,

2018; Syafii, 2018). Miller, Ramirez, & Murdock (2017) explained that teacher support is an important factor in student achievement. The results showed the better the teacher's support the higher the student's achievement. Based on this explanation, teacher distribution and improvement of teacher competency must be carried out in a balanced way between rural areas and urban areas. If the equitable distribution of teacher quality can be increased equally, it will improve the performance of Indonesian students.

This study makes important empirical contributions to the literature. Some previous studies have examined the relationship between school climate and student achievement. However, these results have limitations. Previous research only focused on developed countries. The analysis of this study overcomes this limitation by researching the issue in a developing country, namely Indonesia. The results show the same association with previous studies. Among the four school climate measures investigated, teacher support appears to have a weak relationship if moderated by school size.

In addition to this contribution, this study explains better about the school climate in Indonesia. Estimates are shown from four dimensions of school climate following the advice of previous researchers (see: Hamlin, 2020; Maxwell et al., 2017; Piccolo et al., 2019). The number of results provided is not limited to the school climate, but also the size of the school and the level of education of parents is also one of the advantages of this study. The lack of research results in developing countries on school climate and student achievement makes these results very helpful.

■ CONCLUSIONS

This study showed three main results: 1) the level of parental education has an association with student performance; 2) School climate

positively impacts student achievement; 3) School size moderates the association between teacher support and student achievement. The outcomes of this research suggest that school climate has a significant effect on student achievement. Improvements should be made on school climate, especially through four dimensions namely teacher support for students, increasing school safety from risk behaviors such as bullying and risky behaviors such as truancy, improving group learning in students, and improving student attitude. This is important because a positive school climate can lead to increased student achievement.

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