

The Effects of Teacher's Salary on Learning Outcome

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Abstract

The correlation between teachers' salaries and student achievements is often debated. Many factors might impact students' learning outcomes, but this paper only focuses on analyzing learning outcomes related to teachers' performance, which also relates to teachers' salaries. Data in this study is collected and analyzed by using a quantitative approach. Secondary data of PISA study results and teacher salaries in 2018 in selected thirty countries is obtained from OECD and GTSI. The investigation of this research, which entails looking into the many different nations that were picked for investigation, gives us an understanding of the connections between those nations. This research aimed to examine the teacher's salary effects on learning outcomes. Statistical tools such as simple percentage, mean, and linear regression were employed to reach the research outcome. Using the result from the data analysis, we found that 86.7 percent of countries share a parallel correlation between the teacher's salary and learning outcomes. In comparison, the remaining 13.3 percent is explained by other explanations outside the variable used in this study. The findings revealed a strong positive correlation (*Pearson correlation result = 0.637* between teacher salary and learning students' learning outcomes. The prediction of learning outcomes showed by the linear regression equation of learning outcome = $- 65830.681 + 204 * \text{teachers' salary}$. The findings suggest that the teacher salary may be further improved to enhance their students' learning outcomes.

Keywords: Learning Outcome, Teacher's Salary, Teacher Performance

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Introduction

A salary is an amount paid for the job, regardless of the number of hours worked per month (Torrington, 2005). In this sense, teachers' salaries must be set high enough to motivate and attract good employees. They must also be fair because pay must accurately reflect the value of the work performed. Student achievement is defined either broadly or narrowly. In a narrow definition, students' achievement is measured by a standardized test. The broad definition of learning outcome refers to social skills and personal growth, which under this definition cannot be measured by standardized tests (Ballafkih, 2019). Hence, this paper analyzes the students' achievement merely narrowly defined by analyzing students' learning outcomes according to PISA studies in 2018.

It also has been argued that school factors are not the strongest predictor of achievement. Indeed, a student's social-class background and neighborhood attributes matter more (Coleman, 1990). The social capital frame illuminates the local actors and shapes children's success in school as well. Checci (2006) also argues that the proportion of children from poor families with the level of highest-level schooling depends on their ability if it exceeds the threshold (p.117).

Therefore, school plays an especially key role in student achievements. School helping student to be success. A teacher is one of essential elements in school. High quality of school associated with the quality of teaching and learning process.

There are some factors that can give effect on teacher performance. The implementation of rewards and punishment-based system improve the employee performance to be more motivated (Zulita, et al. 2021), which would improve the learning outcome as well. Standard for teachers also outline specific knowledge and help to understand learners' needs, how to choose effective way for learners, and assist their development and growth (Egeberg, et al. 2016).

Education is often highlighted as a powerful for overcoming the crisis, but on the other hand investments in education are not satisfying for teachers. Society who has faith on human capital believe that student will success mere by their own affects to teacher's salary, hence teachers' salary was lower rather than another field. Those who are responsible for teacher's salary, that teacher's salary should not be higher, do not know that increasing the salary may affects the educational achievements of students' learning outcome indirectly.

To provide the decent quality of education, schools must retain the effective teachers. A good environment and adequate compensation are better for attracting and retaining good teachers and motivating them to do their best. Sampson's research (2019) shows that fringe benefit had statistically significant and positive effect on teachers' job performance. Similarly, Munandar's (2019) research found that teacher professionalism is 96.3% influenced by the well-being and motivation of each individual. While Suharmoko's research (2021) indicate that teacher professionalism has a positive and significant effects by 64.3% on student's achievement.

Decreasing teacher's salary will affect teachers as well as students' learning. A study by Lyimo (2014) found that inadequate teacher salaries lead teacher to engage in other economic activities and disrupt student learning. In addition, many teachers have left school for better-paying professions. Therefore, the teacher shortage affects student learning. Similarly,

Katete's (2020) study shows that delayed teacher payment leads to poor classroom preparation, poor student performance on exams, lack of hands-on learning, poor classroom attendance, poor practices, and poor classroom management. While Bonney's research (2015) shows the opposite, that although the teacher professionalism qualification in Ghana was high, it did not reflect much in the performance of the students.

Ree, et al. (2012) stated that increasing the teacher's salary does encourage teachers' motivation and helped them to teach better and effectively. But it not shown yet that improvements in teachers' motivation and effectively necessarily increase the student' achievement. Ree, et al. (2018) also show that paying teacher high salaries did not improve learning outcomes. A good governance system with conditional payments in the distribution of teacher salaries is an effective policy option to increase productivity.

Teachers are one of the most important resources that determine the quality of students' education. If teachers are not paid on time, they will not be able to teach regularly and will tend to be work elsewhere. The purpose of this study was to address the problem of teachers' salaries and benefit to determine the impact on teaching and learning. According to Nyangarika, et al. (2020), most research has focused on student motivation, but little has been done on teacher motivation.

This phenomenon makes sense not because teachers do not work by willingness, but because teachers' welfare itself not fulfilled yet. Maslow's theory of hierarchy of need suggest human to fulfill the survival need before able to follow the being needs such as becoming a teacher (Woolfolk, 2016). When the teachers do not fulfill their basic needed yet, it would be difficult for them to achieve into their higher needs.

Rand's research (2006) conclude that better average learning outcomes associated with higher salaries of a teacher, because higher salary attracted more effective teacher (p.26). Research by Paolini's (2015) argue that to have a competent community of learners, required well prepared and well experienced instructors, because good instructors will stimulate students' interest through active learning, they set high expectation to student and show concern for their students' learning and growth (p.32).

It has been argued that teacher's salary giving effects on learning outcome, and in some case, learning outcome does not improve when the teacher's salary improved. Therefore, this paper aimed to clarify this phenomenon using analysis on PISA 2018 results and to see on what extent does the teacher's salary effects on learning outcome, which are related to student performance in Indonesia. Is teacher's salary does effect on student learning outcomes? If it does, to what extent that it has impact?

Method

1. Instrument

Data is obtained by collecting and analyzing the documentation on student achievements and teacher's salary, which in this case measured by the analyzing the results of the data from PISA's 2018 result (source: OECD) to represent the learning outcome. Apart from PISA's 2018 results, Global Teacher Status Index data on teacher salaries in 2018 are used to examine the relationship between the level of teacher salaries and learning outcome in thirty

countries that participated in PISA 2018. The thirty selected countries were considered as data because it has both data of PISA score and teacher's salary.

2. Procedures

The data were sorted in two ways, first was descending the PISA's score 2018 and second was descending to the amount of teacher's salary, then the descended data was grouped and analyzed. Statistical tools such as simple percentage, mean, and linear regression were employed to reach the research outcome.

A simple percentage used for analyzing the demographic characteristics of the learning outcome, then linear regression was used to examine the effect of teacher salary on students' learning outcome.

3. Research Design

Descriptive analysis was utilized based on sorting, grouping, and calculating percentage on the data of PISA score 2018 (OECD, 2018) and teachers' salary 2018 (GTSL, 2018). Then, the software SPSS version 22 was used to give prediction of teachers' salary toward learning outcomes.

This paper will elaborate the connection between teachers' salary and students' learning outcomes, as well as the phenomenon which might be seen in result analysis. The study of this research in selected countries gives us an insight into their interrelationship.

Result and Discussion

Average teacher salaries in selected countries when arranged descending by using PISA 2018 scores are shown in the table below.

Table 1: Teacher's income sorted by PISA's score 2018 with selected countries

No	Country	Reading	Math	Science	Mean PISA Score	Teacher's salary Per year (USD)	Salary average
1	B-S-J-Z China	555	591	590	579	40,821	41,396 USD
2	Singapore	549	569	551	556	50,249	
3	Japan	504	527	529	520	31,461	
4	Korea	514	526	519	520	33,141	
5	Canada	520	512	518	517	43,715	
6	Finland	520	507	522	516	40,491	
7	UK	504	502	505	504	31,845	
8	New Zealand	506	494	508	503	33,099	
9	Netherlands	485	519	503	502	43,743	
10	Germany	498	500	503	500	65,396	
11	Switzerland	484	515	495	498	77,491	33,561 USD
12	Czech	490	499	497	495	18,859	
13	US	505	478	502	495	44,229	
14	France	493	495	493	494	33,675	
15	Portugal	492	492	492	492	35,519	
16	Spain	486	481	483	483	47,864	
17	Russia	479	488	478	482	5,923	
18	Hungary	476	481	481	479	16,241	
19	Italy	476	487	468	477	33,630	
20	Israel	470	463	462	465	22,175	
21	Turkey	466	454	468	463	30,303	17,585 USD
22	Greece	457	451	452	453	21,481	
23	Chile	452	417	444	438	20,890	
24	Malaysia	415	440	438	431	18,120	
25	Colombia	412	391	413	405	18,806	
26	Peru	401	400	404	402	12,478	
27	Brazil	413	384	404	400	12,993	
28	Argentina	402	379	404	395	10,371	
29	Indonesia	371	379	396	382	14,408	
30	Panama	377	353	365	365	16,000	
Average					474	30,847	30,847

Source: from OECD PISA 2018 (<https://doi.org/10.1787/b5fd1b8f-en>) and GTSI 2018 (<https://www.varkeyfoundation.org/what-we-do/research/global-teacher-status-index-2018/>)

Percentage of countries according to their teachers' salary and teacher's average salary are shown in the table below.

Table 2: Teacher's salary sorted PISA 2018 score in selected countries

No	Country	Teacher's salary Per year (USD)	Percentage	PISA Score (2018)
1	Switzerland	77,491	53.3% countries are above-average salary	498
2	Germany	65,396		500
3	Singapore	50,249		556
4	Spain	47,864		483
5	US	44,229		495
6	Netherlands	43,743		502
7	Canada	43,715		517
8	B-S-J-Z China	40,821		579
9	Finland	40,491		516
10	Portugal	35,519		492
11	France	33,675		494
12	Italy	33,630		477
13	Korea	33,141		520
14	New Zealand	33,099		503
15	UK	31,845		504
16	Japan	31,461		520
17	Turkey	30,303	46.7% countries are below-average salary	463
18	Israel	22,175		465
19	Greece	21,481		453
20	Chile	20,890		438
21	Czech Republic	18,859		495
22	Colombia	18,806		405
23	Malaysia	18,120		431
24	Hungary	16,241		479
25	Panama	16,000		365
26	Indonesia	14,408		382
27	Brazil	12,993		400
28	Peru	12,478		402
29	Argentina	10,371		395
30	Russia	5,923		482

Teacher's salary of 10 top countries in PISA 2018 score were above average

Teacher's salary of 10 bottom countries in PISA 2018 score were below average

Source: from OECD PISA 2018 (<https://doi.org/10.1787/b5fd1b8f-en>) and GTSI 2018 (<https://www.varkeyfoundation.org/what-we-do/research/global-teacher-status-index-2018/>)

Selected countries can be classified into two groups based on their PISA 2018 score. The first group consists of countries that achieved score above 474 (the average) and second were whose achieved score below average results, 474.

According to table 1., top ten countries in PISA's 2018 score have the highest average salaries. 100% of top ten countries have salary above the average salaries (with average on 41,396 USD) from other countries, which is average on 30,847 USD. Followed by the teachers in the middle range of PISA's 2018 score, their average salaries are 33,561 USD, above from the average salary from all countries. It also found that student in ten countries with the lowest PISA's scores in 2018, have teacher with salary below the average salary.

100% of bottom ten countries were receiving salary below average of all countries with average only by 17,585 USD in average.

From table 2, teacher from 53.3% countries received salary above average, while teacher from 47.7% were received salary below the average. This observation has shown that low on teacher's salary has correlation with learning outcome. Which, lowest PISA's 2018 score were on countries with teacher who has not paid properly (under the average of teacher's salary) and the highest PISA's 2018 score were on countries with teacher whose received salary above average.

However, the percentage of the teacher with salary above average in middle range of PISA score 2018 were only 60% with four countries that have below average salary. They are Czech, Russia, Hungary, and Israel. The author also found two phenomena in this middle range. There are two countries that have the lowest teacher's salaries as well as the highest teacher's salaries of all the countries selected for this study. The lowest salaries are found in Russia, with amount only 5,923 USD per year of teacher's salary, but gain score up to 482 based on PISA 2018 result test. The highest salary of teacher's salary are found in this middle range as well, where Switzerland pay teacher with 77,491 USD per year, which is double from average salary for teacher, but the score were 498, different by 16 points with Russian.

From this finding, 26 out of 30 countries (86.7%) show the linear correlation between the teacher's salary and learning outcome. Which means that from this observation, we can say that the teacher's salary effects on students' learning outcome. However, from the phenomena by Russia and Switzerland learning outcome, we also know that countries with the highest teacher salaries do not necessarily have the highest PISA's 2018 scores, and similarly, countries with the lowest teacher salaries do not necessarily have the lowest PISA scores.



Figure 1: Correlation between teacher salary and students' learning outcome

The scatterplot and the value of correlation coefficient (r) was measured and found 0.637 which shows a strongly positive correlation between teacher salary and students' learning outcome in 30 selected countries.

ANOVA ^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3202093232.832	1	3202093232.832	19.078	.000 ^b
	Residual	4699658442.534	28	167844944.376		
	Total	7901751675.367	29			

a. Dependent Variable: salary

b. Predictors: (Constant), Avg

Figure 2: The effect of teachers' salaries on students' learning outcomes

The average of the salary statistically significantly predicted learning outcomes. $F(1,28) = 19.078, p < 0.001$

Model Summary ^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.637 ^a	.405	.384	12955.499	2.329

a. Predictors: (Constant), Avg

b. Dependent Variable: salary

Figure 3: Model Summary

63.7% of the variation on students' learning outcomes is explained by the teachers' salary.

Coefficient ^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-65830.681	22260.255		-2.957	.006	-111428.747	-20232.615		
	Avg	204.091	46.726	.637	4.368	.000	108.377	299.805	1.000	1.000

a. Dependent Variable: salary

Figure 4: Regression analysis result

Students' learning outcomes = $-65830.681 + 204 \times \text{teachers' salary}$. Thus, the students' learning outcomes results can be predicted using the linear equation.

Increasing teacher salary unconditionally such as doubling of base teacher salaries would not lead to better education quality, because unconditional pay increases did not necessarily increase the worker productivity (Ree, et al. 2018). This may help to explain why Switzerland who pay highest for the teachers don't get the highest PISA score in parallel.

Teacher is the human capital that needs to be continuously multiplied, and teacher competence and motivation has shown the positive meaning for improving the teacher performance (Madjida, et al. 2020). We believe that the phenomena that we found in Russia can be explained by this theory.

Conclusion

From this research, it concludes that teacher salary does effect on learning outcome. Countries with above average teacher salary have students with high learning outcome, and so do the countries with below average teacher salary, they have lowest learning outcome based on PISA score 2018. Despite of some phenomenon in middle range learning outcome, decent salary is needed for teachers to reach the expected learning outcome. However, author believe that the financial arrangements in the teacher recruitment system is deemed necessary for researchers to continue the realization of the expectations of this research. Therefore, further research that can provide valid explanation of the phenomenon that found in four countries, especially Russia that were found totally contrary with the finding is needed.

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