

TEACHER'S EFFICACY AS PREDICTOR OF STUDENTS' ACADEMIC ACHIEVEMENTS

Qazi Shahab Uddin, Department of Education, City University of Science and Information Technology, Peshawar, Justshahab@gmail.com

Muhammad Younes, Department of Education, City University of Science and Information Technology, Peshawar, Hodedu@cusit.edu.pk

Anwar Fazil Chishti, Department of Economics, City University of Science and Information Technology, Peshawar, Prof.Dr.Anwarchishti@cusit.edu.pk

Abstract. *The research objective was to assess the impact of the teachers' efficacy on students' academic achievement. Two scales, Teacher Sense of Efficacy Scale (TSES) and Students' Academic Achievements scale were adopted for the purpose of data collection from teachers and students of 10th class in district Peshawar. The findings of One-sample t test revealed that all the respondents are in favor of the existence of all four variables. The finding of independent sample t-test for all four variables revealed that teachers and students are significantly differed to assign mean values to three variables. The finding of the regression analysis found that student engagement and classroom management significantly contributed towards the academic achievement of the students whereas instructional strategies does not contribute, being insignificant. The study found through the incorporation of differential slope dummies and differential intercept that teachers and students behave differently.*

Keywords: Teachers' Efficacy, TSES, Academic Achievement, Regression, JEL classification: I20, C40

Introduction

Teachers' Efficacy and Students' Academic Achievements

Berman et al. (1977) defined teacher's efficacy as the firm beliefs of a teacher in his abilities to positively shape the motivation and performance of his students. Teachers' efficacy highly affects the learning of both type of students either weak or upsetting students or

bright students (Guskey & Passaro, 1994). Tournaki & Podell (2005) stated that students' motivation and academic success is greatly influenced by a particular teacher's attitude and beliefs. According to Parsley & Corcoran (2003), the teachers were encouraged by the researchers and educationists to positively affect the students' academic performance by examining various ways.

There are significant factors that affect students' academic success; teachers' efficacy greatly influences a student's learning experiences and involvement (Stronge, 2007). Guo, Justice, Sawyer, & Tompkins (2011) explained that the most important predictor of student academic achievement was teachers' efficacy. According to Uzun, Ozkilib, & Senturk (2010), teachers' efficacy and students' academic achievements have positive relationship. The study of Caprara et al, (2006) suggested that student academic achievement was greatly influenced by teachers' efficacy.

Aims of the study

The research objective was to assess whether various proportions of teachers' efficacy exist in teaching community and whether or not there exists a relationship between teachers' efficacy and students' academic achievements, specifically in secondary schools of Peshawar area of Khyber Pakhtunkhwa (KP). This study uses the well referred Teachers' Sense of Efficacy Scale (TSES), developed by Tschannen-Moran & Hoy (2001); TSES includes three subscales for the three dimensions of Teachers' Efficacy, namely Efficacy to Student Engagement, Efficacy to Instructional Strategies and Efficacy to Classroom Management. For Students' Academic Achievements, the scale provided for purpose in the Multidimensional Motivational Instrument (MMI), developed by Uguroglu et al. (1981), is adopted.

More specifically, the following three hypotheses are set to be statistically tested for this study.

Hypothesis H₁:

Both teachers and students agree with the existence of the three aspects of Teachers' Efficacy, namely Teacher Efficacy to Instructional Strategies, Teacher Efficacy to Student Engagement, Teacher Efficacy to Classroom Management and the Students' Academic Achievements.

Hypothesis H₂:

Both teachers and students give equal weights to the related measuring variables, including Instructional Strategies, Student Engagement, Classroom Management and Students Academic Achievements.

Hypothesis H₃:

Both teachers and students agree that the three components of Teacher Efficacy (Instructional Strategies, Student's Engagement and Classroom Management) positively contribute towards Students' Academic Achievements.

Delimitation of the study

The study was delimited to teachers of English and Mathematics subjects of high schools and students of 10th class of district Peshawar.

Research methodology

Population and Sample

All students and teachers of English and Mathematics subjects in public and private sector secondary schools in district Peshawar comprise the population of this study. A total of 150 teachers and 150 students were randomly selected, from whom 98 teachers and 112 students returned the self-administered questionnaires. Hence, sample of this study includes 98

teachers and 112 students, resulting in 210 respondents, in total. Random sampling technique was used to select the sample.

Research Design and Data Collection Instrument

As already mentioned, the three dimensions [Efficacy to Student Engagement (ESE), Efficacy to Instructional Strategies (EIS) and Efficacy to Classroom Management (ECM)] of the well referred Teacher Sense of Efficacy Scale (TSES), developed by Tschannen -Moran & Hoy (2001) along with scale of Students' academic achievements (SAA), developed by Uguroglu, Schiller and Walberg (1981) provide the basic theoretical framework for this study.

The stated scales/subscales have been adapted to collect data on the three dimensions of Teachers Efficacy (ESE, EIS and ECM) and Students' Academic Achievements (SAA), from both teachers and students. Though the ultimate purpose has been to quantify a relationship, if there is any, between Teachers' Efficacy and Students' Academic Achievements, the existence of the variables involved have been additionally checked through use of One-sample t test. Independent-samples t test has been used to compare the opinions of the two types of respondents, teachers and students.

Teachers and students' perceptions have been modeled together in one and the same econometric model, while incorporating the differences of the two types of respondents through differential intercept and differential slope dummies.

Empirical Results

The data so collected was analyzed using Statistical Package for Social Sciences (SPSS) with the help of Frequency Analysis, Reliability Analysis, One Sample t Test, Independent Sample t Test and Multiple Regression.

Frequency Analysis

In order to determine the frequency of teachers and students in the present research, the researcher applied frequency analysis. The result of the test was as follows.

Table 1: One-Sample Statistics for Teachers Respondents

	Frequency	Percent%	Valid Percent%	Cumulative Percent%
Students	112	53.3	53.3	53.3
Teachers	98	46.7	46.7	100.0
Total	210	100.0	100.0	

The total numbers of student respondents were 112 with 53.3 percentages and the numbers of teacher respondents was 98 with 46.7 percentages.

One-sample t test for testing H_1

In order to evaluate whether teacher and student respondents of this study agree with the existence of variables [Teacher Efficacy to Instructional Strategies (EIS), Teacher Efficacy to Student Engagement (ESE), teacher and student respondents of this study agree with the existence of variables [Teacher Efficacy to Instructional Strategies (EIS), Teacher Efficacy to Student Engagement (ESE),

One-sample t test

In order to evaluate whether teacher and student respondents of this study agree with the existence of variables [Teacher Efficacy to Instructional Strategies (EIS), Teacher Efficacy to Student Engagement (ESE), Teacher Efficacy to Classroom Management (ECM) and Students Academic Achievements (SAA)] involved, One-sample t test is applied. The results of this test, in case of both teacher and student surveys, are respectively provided in table 2 and 3.

Table 2 (a): One-Sample Statistics for Teachers Respondents

	N	Mean	Std.Dev	Std. Er. Mean
ESE	98	3.7793	.64186	.06484
EIS	98	3.8329	.70527	.07124
ECM	98	3.9694	.64867	.06553
SA	98	4.0551	.69980	.07069

Table 2 (b): One-Sample Test for Teachers Respondents

	Test Value = 3					
	T	Df	Sig.(2-tailed)	Mean difference	95% confidence interval of the difference	
					Lower	Upper
ESE	12.020	97	.000	.77934	.6507	.9080
EIS	11.691	97	.000	.83291	.6915	.9743
ECM	14.794	97	.000	.96939	.8393	1.0994
SAA	14.926	97	.000	1.05510	.9148	1.1954

In case of teachers-respondents [Table 2 (a & b)], the mean values of variables ESE(3.78), EIS (3.83), ECM (3.97) and SAA (4.06) happen to be statistically significantly (all $p < 0.01$) higher than the midpoint value = 3.00 (at Likert scale), and results therefore reveal that teachers' respondents in majority express their agreement with the existence of the variables involved.

Table 3 (a): One-Sample Statistics for Students Respondents

	N	Mean	Std.Dev	Std. Er. Mean
ESE	112	4.2734	.52781	.04987
EIS	112	4.1217	.63305	.05982
ECM	112	3.9665	.63427	.05993
SAA	112	4.3964	.51569	.04873

Table 3 (b): One-Sample Test for Students Respondents

	Test Value = 3					
	T	Df	Sig. (2-tailed)	Mean Difference	95% confidence interval of the difference	
					Lower	Upper
ESE	25.53	111	.000	1.27344	1.1746	1.3723
EIS	18.75	111	.000	1.12165	1.0031	1.2402
ECM	16.12	111	.000	.96652	.8478	1.0853
SAA	28.65	111	.000	1.39643	1.2999	1.4930

In case of students-respondents [(Table 3 (a & b)], the mean values of variables ESE (4.27), EIS (4.12), ECM (3.97) and SAA (4.40) happen to be statistically significantly (all at $p < 0.01$) higher than the midpoint value = 3.00, and therefore reveal that student-respondents in majority express their agreement with the existence of the variables involved.

Hence, Hypothesis 1, which states that both teachers and students agree with the existence of variables (Teacher Efficacy to Instructional Strategies, Teacher Efficacy to Student Engagement, Teacher Efficacy to Classroom Management and Students Academic Achievements) involved, is accepted.

Independent-samples t test for testing H_2

Independent-samples t test is carried out to assess whether or not the responses of teachers and students are about the same or differ from each other; results are provided in table 4 (a & b).

Table 4 (a): Independent-samples t test: Group Statistics

	Desig_Dummy	N	Mean	Std.Dev	Std. Er. Mean
ESE	1(Teachers)	98	3.7793	.64186	.06484
	0 (Students)	112	4.2734	.52781	.04987
EIS	1(Teachers)	98	3.8329	.70527	.07124
	0(Students)	112	4.1217	.63305	.05982
ECM	1(Teachers)	98	3.9694	.64867	.06553
	0(Students)	112	3.9665	.63427	.05993
SA	1(Teachers)	98	4.0551	.69980	.07069
	0(Students)	112	4.3964	.51569	.04873

Panel (a) of Table 4 provides a comparison of the mean responses across teacher and student. It visually appears that, with the exception of only one variable (ECM), the students' mean-responses in all other three variables are higher relative to that of teachers, while mean-values of variable ECM appear to be equal.

Table 4 (b): Independent Samples Test

		Levene's Test for Equal Variances		t-test for Equal Means				
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Er. Difference
ESE	Eq. variances assumed	5.117	.025	-6.119	208	.000	-.49410	.08075
	Eq. variances not assumed			-6.040	188.175	.000	-.49410	.08180
EIS	Eq. variances assumed	.690	.407	-3.126	208	.002	-.28874	.09236
	Eq. variances not assumed			-3.104	196.592	.002	-.28874	.09303
ECM	Eq. variances assumed	2.299	.131	.032	208	.974	.00287	.08867
	Eq. variances not assumed			.032	203.019	.974	.00287	.08880
SAA	Eq. variances assumed	20.118	.000	-4.055	208	.000	-.34133	.08417
	Eq. variances not assumed			-3.976	176.297	.000	-.34133	.08586

Panel (b) of table 4 gives results of Levene's F test, suggesting that in case of two variables namely EIS and ECM, the variances of the two-sample groups (teacher and student) are equal (F is insignificant at $p > 0.10$), hence the results of the t test given in the first line are relevant; while results of Levene's F in case of other two variables ESE and SAA are significant (at $p < 0.5$), hence variances are not equal, so t test results given in the second line would be considered.

The relevant t tests of three variables (ESE, EIS and SAA) are statistically significant at $p < 0.01$, suggesting that the two types of respondents, students and teachers, differ in their mean responses on these three variables. Coupled with the earlier results of panel (a) of the table 3, it can be said that student-respondents give statistically significantly greater values to the three variables, namely Teacher Efficacy to Instructional Strategies (EIS), Teacher Efficacy to Student Engagement (ESE) and Students Academic Achievements (SAA) compared to the teacher-respondents; while the two types of respondents (students and teachers) did not differ in expressing their opinion on variable Teacher Efficacy to Classroom Management (ECM).

Hence, Hypothesis 2, which states that both teachers and students give equal weight to the variables (Teacher Efficacy to Instructional Strategies, Teacher Efficacy to Student Engagement, Teacher Efficacy to Classroom Management and Students Academic Achievements) involved, is partially rejected in case of three variables (Teacher Efficacy to Instructional Strategies, Teacher Efficacy to Student Engagement, and Students Academic Achievements) and accepted in case of only one variable (Teacher Efficacy to Classroom Management).

Regression Analysis for Testing H₃

In order to assess whether or not the three components of teachers' efficacy [(Instructional Strategies (EIS), Student Engagement (ESE) and Classroom Management (ECM)] affect Students Academic Achievements (SAA), the last variable is regressed over the former three components of teachers' efficacy, through the application of the following estimated

econometrics model. Since data on all four variables have been obtained from both teachers and students, the model incorporates the difference of opinion of the two types of respondents through inclusion of both differential intercept (D) and differential slope (ESE x D = ESED, EIS x D = EISD and ECM x D = ECMD) dummies (following Gujarati 2007, pp. 304-343).

Putting the result in regular econometric format:

$$\begin{aligned}
 \text{SAA} = & 1.703 - 0.990D + 0.225\text{ESE} + 0.131\text{EIS} + 0.300\text{ECM} - 0.343\text{ESED} \\
 & (5.174) \quad (-2.333) \quad (2.338) \quad (1.410) \quad (2.880) \quad (-2.355) \\
 & (0.000) \quad (0.0210) \quad (0.020) \quad (0.160) \quad (0.004) \quad (0.0190) \\
 & + 0.128\text{EISD} + 0.403\text{ECMD} \\
 & (2.510) \quad (0.826) \\
 & (0.013) \quad (0.410)
 \end{aligned}$$

$$R = 0.777$$

$$R^2 = 0.603$$

$$R^2_{\text{adjusted}} = 0.590$$

$$F = 43.886 \text{ (p-value= 0.000)}$$

$$N = 210$$

$$(1)$$

(Figures in the first and second parentheses respectively are t-statistic and p-values)

The estimated Model 1 as a whole gives a good fit to the data (F-statistic is significant at $p < 0.01$). R^2 indicates that around 60 percent variation in dependent variable has been explained by total variations in explanatory variables. Two dimensions of teachers' efficacy [Student Engagement (ESE) and Classroom Management (ECM)] appear to carry positive signs and are statistically significant, suggesting that, in accordance with perception of both teachers and students, these two referred variables positively contribute towards students' academic achievements.

However, differential intercept dummy appears to be statistically significant at $p < 0.05$, indicating that the two types of respondents, teachers and students, give different weight to opinion regarding contribution of teachers' efficacy. The two slope dummies relating to the two variables found positively and statistically contributing are statistically significant,

indicating that the two types of respondents though agree upon their contribution but differ on the weight they are assigning for their importance. Interestingly, both types of respondents agree that the third component of teacher's efficacy (Instructional Strategies) does not work (variable is statistically insignificant), they also do not differ in granting weight to their decision (relevant slope differential dummy is insignificant).

Hence, Hypothesis 3, which states that both teachers and students agree that the three components of Teacher Efficacy (Instructional Strategies, Student Engagement and Classroom Management) positively contribute towards Students Academic Achievements, is partially accepted in case of two components (Student Engagement and Classroom Management) and partially rejected in case of one variable (Instructional Strategies). Teachers and students agree that the stated two components of teachers' efficacy work but they differ in assigning equal weight to these two variables in their opinion which bound the researcher to partially accept the third hypothesis.

Discussion and Recommendations

Discussions

The mean values of all the three proportions of Teachers' Efficacy, namely Teacher Efficacy to Instructional Strategies, Teacher Efficacy to Student Engagement and Teacher Efficacy to Classroom Management as well as the mean value of Students Academic Achievements variable, of the data collected from both types of participants, teachers and students, have been found statistically significantly greater than their respective midpoint value = 3, on 5-point Likert-scale, in One-sample t test; hence, results suggest that both types of respondents, teachers and students, agree that all variables statistically significantly exist, in practice.

Though, both teachers and students have been found agreed on the existence of all the four variables involved, the two types of respondents have been found differed significantly in assigning mean-values to three variables (Instructional Strategies, Sstudents Engagement and Students Academic Achievements), compared to the variable Classroom

Management wherein the mean-differences of the two types of respondents are found insignificant, as per results of the Independent-samples t test.

The above two types of results (existence of the variables involved in practice and founding of differences among respondents' mean-values in majority cases) are further reinforced in regression, wherein all the respondents collectively agree that two components of Teachers' Efficacy (Student Engagement and Classroom Management) out of three contribute significantly towards the Academic Achievements of the students, and Instructional Strategies insignificantly; and the two types of respondents differently behave, as found out through differential intercept as well as 2 out of 3 differential slope dummies.

Conclusion and Recommendations

First, two widely referred scales, based on well accepted theories, have been used and logically acceptable results have been achieved, so results may be generalized. However, same/similar research studies should be replicated in other areas of Pakistan to further reveal the facts and figures found out in this study.

Second, one dimension of Teachers' Efficacy, namely Instructional strategies has been found weak in determining Students Academic Achievements; administrators, policymakers, experts in the area of education and concerned teachers should take notice of this fact and carry out remedial measures.

Third, similar studies should be carried out in other areas, at all primary, secondary, college-undergraduate and University-graduate levels, as well as public and private educational institutions.

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