

*A Multi-level Modeling Approach to Predict Teaching Quality, Student's Satisfaction,
School Climate on Student Achievement in Thailand*

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Abstract

This study explores theoretical and empirical research concerning school effectiveness and school improvement, in particular, improving student achievement through school process as dependent variable on changing teaching quality, school climate and students' satisfaction. A multi-level model of school practice consisting of student grade point average (GPA, dependent variable), teaching quality, students' satisfaction, and school climate (independent variables) was implemented. The relationship between dependent variable and independent variables were examined by multilevel regression analysis of data from 1,852 students studied in ninth-grade secondary schools in Bangkok and Nonthaburi Provinces, Thailand. A questionnaire was used to ask students about their demographics, GPA, teaching quality, students' satisfaction, and school climate. The study found that school educational climate and student's satisfaction were important to relate directly to student achievement. However, of note is that teaching quality was not found to be significant to student learning, so it may be recommended that the educators, policy-makers and administrators in Thailand realize and assist renewal of secondary schools with the intention of improving learning outcome in classroom.

Keywords: teaching quality, student's satisfaction, school climate, student achievement, multi-level modeling

Introduction

How to improve the educational quality is a much-talked-about concern in many countries and to this Thailand is no exception. As the Education Ministry of Thailand is considering a reform of the curriculum to make teaching performance and school practice for enhancing school effectiveness to be the same as in the developed countries, education reform in Thailand focusing on teaching quality seems to be an significant first step towards achieving a higher student outcome, because the instructional techniques produce student achievement higher than other factors (Wallin, 2003). School effectiveness research has flourished since 1979, and has drawn considerable political support both in Thailand and internationally. This kind of research seeks to indentify the factors that contribute to education effectiveness and especially those that schools can implement (Creemers & Reezigt, 2005). The research on school effectiveness pinpoints those characteristics or factors that are important for effectiveness at difference levels of the system (Papanastasiou, 2008), such as student learning, teaching quality and school climate. The previous school effectiveness research found that sustainable school improvement requires a school and classroom culture to have elements such as teaching quality that focuses on child centered instruction, incorporation of student beliefs, attitude, and the satisfaction level of both teachers and students, (Cavanagh & Waugh, 2004). If we know the special factors of an effective school, then we will be in a position to improve underperforming schools by encouraging them to adopt the factors of effective schools (Luyten et al., 2005).

Although a number of studies have been conducted to examine of student satisfaction on GPAs, school climate on student achievement, and teaching quality on student performance, there are only few studies that have examined the effect of students' satisfaction, teaching quality and school climate on GPA together. Because of varying statistical methodological procedures, difference was found in the countries examined, whose findings were therefore inconsistent. The purpose of this study is to investigate the influence of students' satisfaction, teaching quality and school climate on student achievement by using multi-level regression modeling and a database of students in Thailand.

Considering this, there are questions to answer before implementing any kind of reform, and one of these is the way the social place of school behaves in Thailand, and how it can change. How do students and teachers interact in this place? This paper focuses on the issues that create a positive school environment, most often referred to as "School Climate." I will first outline the literature concerning the meeting point of different variables involved in creating a positive School Climate, and then compare how these studies understand how teachers and students interact in different classroom settings. Then, I will consider how student achievement is affected by different variables, as well as how learning outcome can be predicted by the initiation of different variables. I will follow this with a presentation of the findings, which show how the variables interact. This will help us to answer the question: what is the point of connection between school climate, teacher attitude and student performance.

Literature Review

In trying to improve overall achievement and decrease the achievement gap, an education reform proposed has been to evaluate and analyze the teaching quality of instructors (Porter, 2005). Other studies using value-added methods linking teacher quality to student outcomes in schools suggest that the effects of teachers may be quite substantial (Rowan et al., 2002; Wright et al., 1997). Most of the research on teaching quality to student outcome found positive associations with student achievement (Fetler, 1999; Murnane & Phillips, 1981; Rowan, et al., 2002). However, studies of the relationship between teaching certification and student performance show a negative correlation (Fetler, 1999). Goldhaber & Brewer (2000) found a difference in the mathematics achievement to regularly teaching quality for high school, yet the variance in these findings from the others are likely due in part to the fact that certification is operationalized quite differently across states and countries.

One such factor that affects student achievement is students' satisfaction with the school experience (Tessema, et al. 2012). Student satisfaction is a significant part of the effort to successfully higher education (Hermans, et al., 2009). For this study, the researcher selected student satisfaction as a variable, because it is an important facet of successfully higher education. If students are viewed as consumers of higher education, their satisfaction is crucial (Moro-Egido & Panades, 2008). One way through which school quality are measured is by student outcomes, such as GPAs, dropout rates and graduation rates. One such factor that affects student achievement is students' satisfaction with the school experience. Therefore, student satisfaction is of compelling interest to schools and colleges as they seek to continually improve the learning environment for students, meet the expectations of their constituent groups and legislative bodies, and show their school effectiveness (Tessema, et al., 2012; Moro-Egido & Panades, 2008; Russell, et al., 2009).

Freiberg and Stein (1999) described school climate as the heart and soul of the school, also and the essence of the school that draws teacher and students to love the school and to want to be a part of it. "School Climate" refers to the quality and character of school life, and School Climate is based on patterns of students, parents and school personal's experience of school life and reflects norm, goals, value, interpersonal relationships, teaching and learning, and organizational structures (Dary & Pickeral, 2013). Samdall, et al. (1998) and DiStefano (2008) mentioned school climate as a factor to increase student achievement, and it has been receiving increased attention in the school improvement literature. The studies by Greenberg (2004), Furlong, et al. (2004), and Sebring, et al. (2006), and Secker & Lissitz (1997) have demonstrated that the dimensional nature of school climate and its relationship to achievement.

Research questions

The two research questions for this study are:

1. Is student achievement associated with three groups of independent variables: group teaching quality; group student's satisfaction; and group school climate?

2. How are inferences about the association between and strength and direction four groups of independent variables and learning outcome (GPA: grade point average)?

Identification of Variables

This study examined variations among schools using hierarchical linear models (HLM) to test whether school practices such as teaching quality, school climate and students' satisfaction affect student achievement. Multilevel models allowed this researcher to analyze on two-levels, when five students' satisfaction indicators have been taken into account in regression model at the student-level, and then school level variables were considered. School level factors consisted of average School Climate per school, and mean teaching quality per school were studied for in this study. All independent variables were measured by a questionnaire with a five-point Likert scale ranging from 1, "Very disagreed or very dissatisfied," to 5, "Very agreed or very satisfied".

Dependent variable specification

Grade Point Average: The student's GPA was defined as a calculation of the average of all of a student's grades for all semesters and courses completed up to a given academic term depended on a scale from 1.00 to 4.00. Each course grade was changed to a number A = 4, B = 3, C = 2, D = 1 and an average was taken for all the course the student has completed to date. For this study the students' GPA were calculated based on all the courses the student completed 4 semesters in their high school by asking 9th-grade students about their 8th-grade GPAs average. Although the student academic achievement has been evaluated using number for 200 years (Metz, 2011), GPAs may be calculated differently among schools and countries. However, GPAs may be recorded differently when they are used for class ranking, or for university admission in Thailand, as sometimes this is a way to distinguish the students' success in education and to evaluate school performance. They are also used to predict achievement. For example, Metz (2011) makes a prediction of secondary students' achievement and satisfaction in online course based on the GPA. Another study by Desimone & Long (2010) examined teacher effects and the achievement gap, asking: does teacher and teaching quality influence the achievement gap between black and white, and high and low, SES students in the early grades? The study revealed that types of instruction and teacher quality variables were not related to achievement growth.

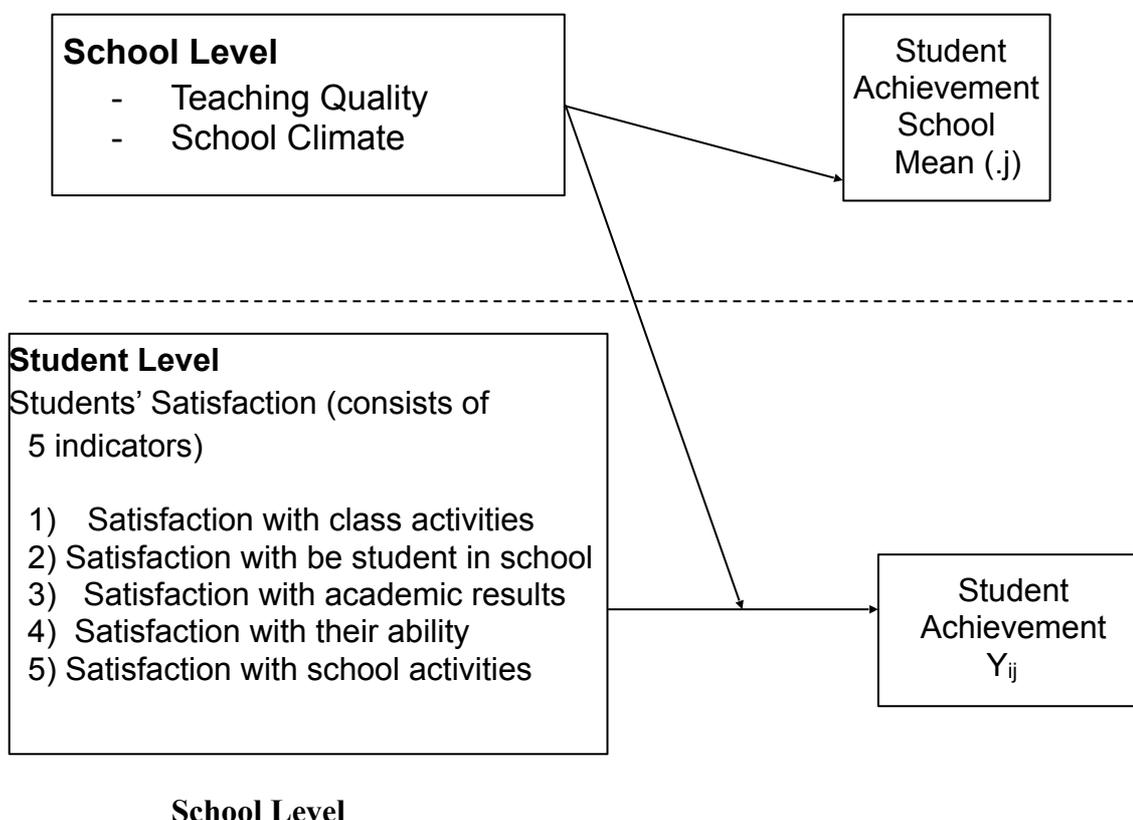
Independent variable specification

Students' satisfaction: There are 27 items on students' satisfaction survey. The dimensions of the students' Satisfaction were measured with assessment using a 5-point Likert scale, with items such as: satisfaction with class activities; satisfaction with student in school; satisfaction with academic results; satisfaction with their ability; and satisfaction with school activities. Other questions directly addressed student attitude, such as: Class rarely respond promptly to students' needs; I am satisfied to be student in this school; and the behavior of school usually instills confidence in me. I used constructs similar to the line of questioning made by Similar

to Keavene and Young (1997), Kara (2004), and Metz (2011) to measure the hypothesized effects in the study.

Teaching Quality: There are 17 items on teaching quality in the survey. Overall teaching quality was obtained from the teaching quality literature from Department of Education Science and Training, Australian Government (2004); Scheerens (2000); Desimone & Long (2010); and Hattie (2003). The dimensions of the teaching quality were measured with assessment using a 5-point Likert scale, having items such as: Teachers present information or skill clearly and enthusiastically; Teachers keep lessons task oriented; Teachers have expectations for students to achieve, and Teachers provide positive feedback.

School Climate: There are 10 items on the school climate survey. School Climate, as a factor to increase student achievement, has received increased attention recently. Information on overall school climate was obtained from the school climate literature, for example from the papers written by the Department of Education Science and Training, Australian Government (2004), Secker. & Lissitz (1997), Scheerens (2000), and DiStefano, et al. (2008). The dimensions of the school climate were measured with assessment using a 5-point Likert, having questions such as: The classroom and school environment are conducive to learning; The school community has a shared vision for the school; There is meaningful and positive leadership; The school is a place of learning for all; and There is a strong focus on teaching and learning. Details of all predictors and dependent variable are presented in this conceptual framework (Figure 1):



Student

Level

Figure1: A Conceptual Framework for Analysis

Where Y_{ij} is grade point average for student i in school j
 $\bar{Y}_{.j}$ is mean grade point average for school j

Methodology

Sample

Data for this study were drawn from Pheunpha (2012) to develop value-added models for measuring school effectiveness in Thailand. A two-staged random sampling was used to select one classroom from each of 50 schools, in five academic areas in secondary schools in Bangkok and Nonthaburi Provinces, Thailand. However, only 49 schools have data completed for analysis. In order to use data file in HLM, the research had to delete cases that were missing data on any of the variables. When accounted for good data from students, the working database was reduced to 1,852 cases from 2,000 students. All students studied in the third Mutthayomsuksa (equal to ninth-grade in the United States, $n = 1,852$) in the first semester in 2010. There were 21 to 54 students per classroom. The average number of students per school was 38. The sample was 54.8% female and 45.2% male. 22 (42.9%) of the 49 schools were private schools and 27 (57.1%) were public schools.

Instrument

A questionnaire was used in this study collect information from students about grade point average (GPA), teaching quality in each school, student's satisfaction, and school climate. These ordinal 5 scales were developed in this study. Analysis of the data obtained from a sample of 1,852 students in two sector secondary schools (public and private schools) was used to develop the original instrument. As applied in the study, the questionnaire was considered to involve a dependent variable and three dependent variable groups. Independent variables were organized according to the three elements of schoolwork in the theoretical model. Items were answered on a five-point Likert scale with the items Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree (scored from 5 to 1, respectively). So as to make the questionnaire reliable and valid, the researcher reviewed previous research and theory (primarily as outlined in the *Literature Review* section) that related research variables and reviewed the definition, after then made the first draft questionnaire. Since the purpose and structure of this questionnaire are important, as is the wording of the questions, 10 scholars in the fields of education research, assessment, Thai language and psychology were consulted, and from them I was directed to the Item Objective Congruence (IOC) of Rovinelli & Hambleton (1977) to use as a template in creating the questionnaire.. Content experts evaluated each item by giving the item a rating of 1 (for clearly measuring), -1 (clearly not measuring), or 0 (degree to which it measures the content area is unclear) for each independent variable indicators. If IOC of each factor is ≥ 0.5 , that factor will be accepted to use in this research and it send out as a test to pilot study 34 students. The Cronbach Alpha reliability of the questionnaire was 0.86.

Data Analysis

The data analysis of this study was as an example of what Fraenkel and Wallen (2001) describe as ‘correlation research’. This research describes a phenomenon by examining relationship between variables, without manipulating any variables. The components of the theoretical model (Figure1) were treated as either dependent or independent variables. A survey-type instrument was administered to provide ordinal data on all 7 groups of the independent variables. The multilevel regression analysis was applied to test hypothesized relationships between the dependent and independent variables.

The first step was to run a model without independent variables, which the research called the “unconditional model.” It was fitted to provide estimates of the variance components at each level using a hierarchical linear model, and to present useful preliminary information about how much variation in the outcome lies within and between schools and to offer the reliability of each school’s sample mean as an estimate of its true population mean (Raudenbush and Bryk, 2002). The unconditional model for student and school levels can be stated in the equations as follows:

Level-1 model

$$Y_{ij} = B_{0j} + R_{ij}$$

Level-2 model

$$B_{0j} = G_{00} + U_{0j}$$

Where: Y_{ij} is the grade point average of student i in school j ; B_{0j} is the mean score in school j ; and R_{ij} is the deviation of each student score from the mean score in the school (the random student effect). At the school-level model (level-2), school means are a function of a grand mean for all schools in the samples (G_{00}), and a random effect specific to each school (U_{0j}). The mixed unconditional model is this:

$$Y_{ij} = G_{00} + U_{0j} + R_{ij} \quad \text{where: } U_{0j} \text{ and } R_{ij} \text{ are assumed normally}$$

distributed.

The second step undertaken was to estimate effects in which independent variables were added to the level-1 and level-2 equation in the unconditional model. At this stage, a step-up approach was followed to examine which of the seven independent variables was significantly influenced by GPA (at $p \leq 0.05$). The seven variables of Satis1, Satis2, Satis3, Satis4, Satis5, teaching quality and school climate were also found to be important and significant in previous studies. Therefore, I included them at this stage. A set of equations we call the “Hypothetical Model” is as the same as one-way ANCOVA with random effects in Hierarchical Linear Models of Raudenbush and Bryk (2002).

Descriptive Statistics Results

The un-standardized means, standard deviations, minimum, and maximum values of all variables in the two levels (student and school levels) are included in Table 1. Coefficients for these variables can be interpreted as the change in student achievement expected for 1 unit (1 unit = 1 standard deviation) change in the variable. Among the 1,852 students in this study, the average GPA is 3.04, standard deviation is 0.74, ranging from 0.21 to 4.00. The average Satisfaction Indicator-1 is 3.40, standard deviation is 0.68, the average Satisfaction Indicator-2 is 3.66, standard deviation is 0.62, The average Satisfaction Indicator-3 is 3.55, standard deviation is 0.53, The average Satisfaction Indicator-4 is 3.40, standard deviation is 0.62, and The average Satisfaction Indicator-5 is 3.55, standard deviation is 0.22 respectively, ranging from 1.00 to 5.00. At school level variables, the average teaching quality is 3.41; standard deviation is 0.24 and the average school climate is 3.61, standard deviation is 0.26. Descriptive statistics for contributory variables both student and school levels are shown in Table 1.

Table 1: Descriptive statistics for contributory variables in Hierarchical Linear Model

Variables	Number	Mean	S. D.	Min	Max
STUDENT LEVEL					
Satis1_Class Activi	1852	3.40	0.68	1.00	5.00
Satis2_Be Student	1852	3.66	0.62	1.00	5.00
Satis3_Achievemet	1852	3.55	0.53	1.00	5.00
Satis4_Ability	1852	3.40	0.62	1.00	5.00
Satis5_School Activi	1852	3.53	0.55	1.00	5.00
GPA (output)	1852	3.04	0.74	0.21	4.00
SCHOOL LEVEL					
TQ (teaching quality)	49	3.74	0.24	3.06	4.31
SC (School Climate)	49	3.61	0.26	2.88	4.11

Correlations between predictor variables and student achievement (GPA) are present in Table 2. The highest association is GPA and the second indicator of students' satisfaction. The next strongest relationships when ranking with correlation magnitude are GPA and the third students' satisfaction indicator, the fifth satisfaction indicators, the fourth satisfaction indicators, school climate, and teaching quality, respectively. For associations among predictors, all correlation magnitudes are moderate association at significant 0.01, so they do not have multicollinearity issue ($r > 0.80$) between independent variables.

Table 2: Correlations between predictor variables and GPA

Variables	GPA	Satis1	Satis2	Satis3	Satis4	Satis5	TQuality	SClimate
GPA	1.00							
Satis1	0.13**	1.00						
Satis2	0.23**	0.49**	1.00					
Satis3	0.22**	0.54**	0.48**	1.00				
Satis4	0.14**	0.41**	0.48**	0.47**	1.00			
Satis5	0.16**	0.52**	0.40**	0.58**	0.47**	1.00		
TQuality	0.02**	0.57**	0.46**	0.44**	0.38**	0.39**	1.00	
SClimate	0.07**	0.54**	0.47**	0.54**	0.47**	0.50**	0.64**	1.00

* Correlation is significant at the 0.05 level, ** Correlation is significant at the 0.01 level.

Research Results

Analysis results of unconditional model

The first step was to analyze the data using a combination of statistical methods that has no adjusting predictors. This model is equivalent to the one-way ANOVA with random effects. In the fixed Effect, from Table 3 below, the grand-mean GPA across 49 schools is 3.009. This has a standard error of 0.074 and yields a 95% confident interval of $3.009 \pm 1.96() = (2.496, 3.522)$. The t-test in unconditional model is 40.886, $p < 0.01$, which indicates that the grand mean, γ_{00} , is not null. Table 3 also lists restricted maximum likelihood estimates of the variance components. At the student level, $(r_{ij}) = 0.287$. At the school level, $\tau_{00} = 0.263$, which is the variance of the true school means, β_{0j} , around the grand mean, γ_{00} . One of the purposes of estimating this unconditional model is to assess the degree of GPA variances between schools. A common metric for these variances is the Intra-Class Correlation (ICC), which measures the proportion of the variance in GPA between schools. The ICC can be computed as follows: $ICC = \tau_{00}/(\tau_{00}+\sigma^2) = 0.263/(0.263+0.287) = 0.4781$, indicating that there is about 47.81% variance student achievement (GPA) between schools and about 51.83% between students. For the unconditional model output, $\rho = 0.97$, indicating that the sample means tend to be quite reliable as indicators of the true school means (Raudenbush & Bryk, 2002). The value of chi-square (χ^2) is 1701.5 with 48 degrees of freedom. The null hypothesis is implausible ($p < 0.01$) which is indicating significant variation does exist among schools in their achievement (GPA). Why do schools differ, then? I then modified the model by adding Level 1 and Level

2 variables to hypothetical model.

Table 3: Final estimation of fixed effects and random effects for the unconditional model

Fixed Effect	Coefficient	Standard Error	T-ratio	d.f.	p-value	
Intercept GPA,G00	3.009	0.074	40.886	48	0.000	
Random effect	Standard Deviation	Variance Component	Total variance	df	Chi-square	P-value
INTERCEPT, U0	0.513	0.263	0.550	48	1701.484	0.000
Level-1, R _{ij}	0.536	0.287				

The outcome variable is Grade Point Average.

Analysis results of the hypothetical model

The second step was to estimate effects when seven independent variables were added to unconditional model. I added students' satisfaction indicator of 1 to 5, with the variables of teaching quality and school climate to the unconditional model and called the new model the "Hypothetical Model." This is equivalent to the means-as-outcomes regression sub models of Raudenbush and Bryk (2002). For the results shown in Table 5 below, the chi-square statistics reported are based the on 49 schools that had sufficient data for computation. Fixed Effects, as can be seen here, are a robust measure of GPA, whose mean value is 3.008, $t = 44.051$, and with a $p < 0.01$, which indicates that the grand mean, γ_{00} , is not null. School climate is the best indicator, which is positively related to school mean GPA, $\beta_2 = 0.983$, $t = 2.656$. On average, an increase in student GPA of 0.983 points is expected when school climate improved increase 1 unit (1 unit = 1 standard deviation). Students' satisfaction with their academic results (satisfaction indicator 3) is the second variable that is strongly associated with GPA: on average, an increase in student GPA of 0.188 point is expected when student s' satisfaction indicator 3 increase by 1 unit. Students' satisfaction with be student (indicator 2) is also strongly associated with GPA: on average, a decrease in student GPA of 0.07 point is expected when Students happy to be student in their school increases 1 unit, next students' satisfaction with their ability (satisfaction indicator 4) is the third variable that is strongly associated with GPA: on average, an increase in student GPA of 0.052 point is expected when student s' satisfaction indicator 4 increase by 1 unit, and the last variable associated with GPA is students' satisfaction with classroom activity and classmate (satisfaction indicator 1) is strongly associated with GPA: on average, an increase in student GPA of 0.049 point is expected when student s' satisfaction indicator 1 increase by 1 unit.

The school-level effect is presented in the random effect part in Table 4 below. The residual between schools, $\sigma_{00} = 0.235$, is substantially smaller than the unconditional model, $\sigma_{00} = 0.263$. The researcher found a new B_{0j} value, which is an average 3.008 GPA then when we use a 95% confidence interval as shown below, we discovered that

95% of the students with the aforementioned variables will fall into a GPA range of (2.50, 3.52). This data shows strongly that these independent variables affect the students' GPA values. $\gamma_{00} \pm 1.96 = 3.008 \pm 1.96() = (2.50, 3.52)$.

Table 4: Final estimation of fixed effects and random effects for the hypothetical model

(with robust standard errors)

Fixed Effect	Coefficient	Standard error	t-ratio	df	p-value	
GPA -intercept, G00	3.008**	0.068	44.051	46	0.000	
Teaching Quality, G01	-0.362	0.351	-1.031	46	0.308	
School Climate, G02	0.983*	0.370	2.656	46	0.011	
Satis Indicator1, G10	0.049*	0.023	2.123	1844	0.034	
Satis Indicator2, G20	0.070**	0.026	2.685	1844	0.008	
Satis Indicator3, G30	0.188**	0.036	5.235	1844	0.000	
Satis Indicator4, G40	0.052*	0.024	2.190	1844	0.029	
Satis Indicator5, G50	-0.15	0.026	-0.585	1844	0.558	
Random Effect	Standard Deviation	Variance Component	total observed variance	df	χ^2	p-value
GPA-intercept, U_{0j}	0.486	0.235	0.506	46	1564.521	0.000
Level-1, R_{ij}	0.521	0.272				

The schools' mean GPAs varied significantly after adding seven independent variables. If these variables had no effect on school achievement, we would expect $\sigma_0 = 0$, where σ_0 is residual variance. However, the statistics has produced a value of 1564.521, $p < 0.001$, indicating that the null hypothesis is rejected and some variance between mean schools GPA remains to be explained.

From Table 5 below, the reliability of the GPA intercept (ρ) is 0.969, indicating that the mean of this sample tends to be reliable predictors of the true school means. When we compared the amount of variance around each parameter in the unconditional model with the remaining unexplained variance in the hypothetical model, we discovered that 10.6% of the school variance in GPA could be explained by students' satisfaction, teaching quality, and school climate. Given the 96.9% reliability of the hypothetical model, these seven predictor variables appear to account for 10.2% of the total variance in the model (see Table 5). Before adding for seven independent variables, the correlation between an individual student's GPA and the mean GPA of his/her school was 0.4781. After these independent variables were accounted for, this correlation was reduced to 0.464. In other words, the relationship between student achievement and school achievement was dropped by around 3 %.

Table 5: Reliability and variance for the hypothetical model

Hypothetical Model	Y _{ij} is GPA (grade point average of 9 th grade students)		
Reliability (R _{xx'}) (Parameter Variance./Total Variance)	B0	0.969	
Proportions Parameter Variance Explained (R ²) = (σ _{00 (uncon)} - σ _{00 (hypo)}) / σ _{00 (uncon)}	Tau U0	0.106	(0.263 - 0.235) / 0.263
Total Variance Explained by Model (R _{xx'} *R ²)	Tau U0	0.102	(0.957*0.106)
ICC = τ ₀₀ / (τ ₀₀ +σ ²)	0.23 / (0.235+0.272) = 0.464		

Conclusions and Recommendation for Further Research

Based on the empirical finding in this study, it can be concluded that students' satisfaction with academic results in school (Satis3), students' satisfaction being a student (Satis2), students' satisfaction with their ability (Satis4), students' satisfaction with class activity (Satis1), and school climate have a significant effect on student achievement, despite the size effect of these variables on student achievement being small. But they have been shown to be important for student achievement. The study results demonstrate that students' satisfaction and school climate be meaningful and positive association with student academic achievement. Understanding students' satisfaction and school climate can benefit students by promoting achievement, reducing dropout rates, and increasing positive attitudes.

One surprising result of the study was that teaching quality does not have an important effect on GPAs. At first, this might seem to contradict conventional wisdom for example Joyce et al (1988); Creemers et al (1994) and Hill et al. (1996), These study found that the quality of teaching is foremost in effective schooling, it has been shown that student learning is enhanced when teachers can use appropriate teaching strategies and understand of differences in students' learning styles, Teachers are the heart of education. Determine the quality of the students and the quality of the population in the society. where it is thought that better teachers equals better teaching. how can teaching quality actually benefit students? In Thailand, since the Act of 2004, teachers must enhance their career by doing research. This is the main criterion to pursue their job. However, in order to do good research, they have to practice and work hard. They do not have much time to prepare and create class activities. This causes serious morale reduction of teachers, and takes away focus from their primary duty of instructing students. This may be the reason why teaching quality does not benefit students and promote achievement in Thailand. Therefore, the educators, policy-makers and administrators in Thailand should realize and assist reform of secondary schools, with the intention of improving learning outcome in classroom.

However, this research is only seven independent variables to student achievement and sample is small (49 schools). Samples are also only from Bangkok and Nonthaburi Provinces which in the central region in Thailand. Further research should focus on the non-school variables and have a larger sample that includes all school regions in Thailand. That is, additional research is needed to examine the robustness of the results and generalizations. Moreover, including an in-depth interview of teachers also may reveal data that strengthens the findings of this study.

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