# A Statistical Analysis of Teacher Effectiveness Dimensions on Students Satisfaction in Kenyan Public Schools

***Joseph M. Malechwanzi,***
***Susan W. Murage,***
Pwani University, Kenya

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**Abstract**

This study aims to investigate the differential effects of teaching practices on students' satisfaction. Their level of satisfaction based primarily on data collected through six principles of 21st century effective teaching and learning using questionnaire method randomly submitted to 600 Form Four students in Voi sub-county, Kenya. The differential effects of the six teaching practices on students' satisfaction were analyzed using the multiple regression model technique. The results show that students' satisfaction was positive and statistically influenced by subject mastery, innovative learning environment, commitment to teach, communicating high standards and professional development. The mean score results demonstrate that subject mastery was the most effective teaching practice while non-cognitive issues was the least effective teaching practice. The study provides very useful information to help policymakers in secondary school administration to evaluate the level of teacher quality dimensions in their institutions and the 21st century effective teacher practices on students' satisfaction. Furthermore, the conceptual relationships model can give deeper understanding of the effective teaching practices that needs prioritization by school management. Social change implications are that teachers may begin to use practices that more effectively engage learners, leading to greater satisfaction and a likely increase in the students' success.

**Keywords:** 5C-TEP; multiple regression; school success; teacher practices

## Introduction

Persistent declining trends have been observed in Taita-Taveta County; however, it was not clear why poor performance continued to kill hopes of thousands of form four candidates in the county year after year (Taita-Taveta Task Force Report, 2013). Despite an improvement in terms of the

number of teachers employed in public secondary schools in Kenya, there has been tenacious wanting teacher work output as reflected by poor students' performance in national exams (Wanjala & Wanjala, 2017). As school populations are becoming increasingly diverse, public secondary schools in Taita-Taveta must find ways to meet needs of their non-traditional students. In progressive education, effective teaching is one of the most thought-provoking tasks for secondary school teachers. The search for teaching excellence in this field extends beyond basic cognitive issues to address non-cognitive needs of students also.

Teacher effective practices are indices used to measure quality teacher besides other variables. Teacher effective practices are all-inclusive and developmental in nature leaning towards character, skills and knowledge that corresponds with workplace realities marked by creativity and innovativeness rather than transmission of knowledge. Until today, questions about the teacher effectiveness practices that promote student learning have consistently raised considerable interest in the thematic field of educational research (Ganyaupfu, 2013). Moreover, research on teaching and learning constantly endeavour to examine the extent to which different practices enhance growth in student learning. Quite remarkably, teachers to impact knowledge to learners fundamentally link regular poor academic performance by the majority students to application of ineffective teaching practices (Adunola, 2011). Substantial research suggest paradigm shift from existing practice to re-align to the basic skills of 21st century best teaching practices.

Research findings of general principles of effective practice in teaching offer a strong foundation in the search for teaching excellence in developmental education (Smittle, 2003). Perhaps the most widely used teaching guidelines relative to general principles of effective practice in teaching are the six principles for effective teaching (Smittle, 2003). However, Hightower et al. (2011) suggest that the single most vital factor in affecting multiple aspects of student growth and satisfaction is the classroom experience. Therefore, the purpose of this research is to determine student satisfaction on the dimensions of commitment to teach, subject mastery, non-cognitive issues, innovative learning environment, communicate high standards and professional development. This study provides important directions for administrators and educators in secondary schools in Kenya; it also assists educators to understand their student's needs. Thus, institutions may find the principles helpful as they employ and train teachers to build successful developmental and mainstream education programs.

Objectives of the study

a) To identify the critical dimensions of teacher effectiveness and develop a model of academic excellence.

b) To empirically establish a relationship between teacher effectiveness and students' satisfaction.
c) To find the significant predictors of students' satisfaction.

**Review of Literature**

National reports globally have indicated the need for highly qualified teachers who are licensed by the state and have competence in the subject matter they will teach (Kingsley & Romine, 2014). More recently, a study on "Access and quality in the Kenya education system" called for introduction of programs that combine both change in pedagogy and change in inputs (Glennerster, Kremer, Mbiti & Takavarasha, 2011). The Teacher Service Commission and Quality Assurance and Standards office also look for evidence that teacher education programs produce highly qualified teachers, and colleges of education are continuously looking to demonstrate their effectiveness. Students in classrooms with "effective" teachers benefit significantly (Gordon, Kane & Staiger, 2006), a trend largely independent of national boundaries (Akiba, LeTendre & Scribner, 2007).

While policymakers and educators generally agree on the importance of instilling ideas of teaching best practice in pre-service teachers during the internship experience, options for measuring associated outcomes are limited. Self-assessments and student reports which draw upon various frameworks for best practice, have been developed and utilized (Burnett & Meacham, 2002). Given the amount of evidence available to support the notion that the quality of the teacher is the most influential determinant of student achievement (Rowe, 2003); it becomes imperative to identify key characteristics of quality teachers. According to Ayeni (2011), teaching is a continuous process that involves bringing about desirable changes in learners through use of appropriate teaching practices.

Teaching effectiveness has been accepted as a multidimensional construct since it measures a variety of different aspects of teaching such as; subject mastery, effective communication, lesson preparation and presentation (Akiri & Ugborugbo, 2009). The above studies suggest that effective teaching is a significant predictor of students' satisfaction. Elliott and Shin (2002) state that student satisfaction being shaped continually by various outcomes and their experiences in schools. Likewise, Smittle (2003) uses various dimensions to measure quality learning environment as proxies for student satisfaction. These include student commitment to teach, subject mastery, non-cognitive issues, innovative learning environment, communicate high standards and professional development.

While a number of empirical studies examined the relationships between teachers' teaching effectiveness and students' satisfaction in middle schools (Akiri & Ugborugbo, 2009). There is continued debate regarding what

constitutes highly effective teachers, and how to measure effectiveness (Kingsley & Romine, 2014).). Unlike the prior research, this study used different approaches when assessing the relationships. Particularly, this study adopted more wide-ranging approach by assessing the relationships that exist among teacher effective dimensions in middle schools. Using multiple regression technique, this study validated teachers' teaching effectiveness in public secondary schools and, simultaneously, investigating the relationships that lie within the model. Pearson correlation will assess how teaching effectiveness correlated with students' satisfaction. The results will give deeper understanding of effective teaching practices in public secondary schools that significantly promote student satisfaction.

**Conceptualization of the Variables**

Smittle (2003) stated the definition of teacher effective model as an integrated system of principles, methods and best practices that extends beyond basic cognitive issues to address non-cognitive needs of students. The preliminary teacher effectiveness dimensions in this research were constructed based on the six principles of effective teaching (Smittle, 2003). The use of the six principles in particular was because Smittle's model was primarily based on a literature search from scholars in developed countries. This model consists of six dimensions that also have been used by several previous studies, i.e.:

1. Commit to teach. Unfortunately, some teachers teach students for reasons that are not in the best interest of students (Smittle, 2003). The literature is full of cautions to select teachers who are interested and desire to teach students (Long, 2003). Because teacher attitudes are probably related to student achievement and therefore uninterested teachers cannot be expected to motivate students who are typically characterized by a lack of motivation (Smittle, 2003).
2. Subject mastery. Effective teachers must be able to present the subject matter in different ways, requiring teachers to have in-depth knowledge of the concepts and skills they are teaching as well as higher-level content knowledge in the field (Smittle, 2003). When selecting teachers, it is important to follow the credential standards set forth by the college's accrediting agent for all teachers. The ability to convey that knowledge to students who lack the subject matter foundation is the major challenge (Cross, 2000).
3. Non-cognitive issues. Effective teacher must develop the whole student rather than solely deal with cognitive skill deficits (Smittle, 2003). It is the responsibility of the teacher to help students set both short and long-term goals; at this point professional teamwork is vital, and the teacher may need to call on the advisors to help (Adebayo,

2012). Young-Jones et al. (2013) reported that students who have clear goals are more likely to be retained. An effective teacher helps each student create a vision and see how the course and everyday activities help to achieve that goal, a first step that should be repeated throughout the student's academic career.

4. Innovative learning environment. Students who are most likely to drop out of school are students who are not connected with the people and events of at school (Cross, 2000). Students can be electronic via email or chat rooms, telephone calls, or letters, but humans need some way to feel that they belong (Smittle, 2003). Students connected to classroom and school are less likely to drop out. School outcome is enhanced when contact between students and teachers are extended beyond the formal classroom to informal non-classroom settings (Pascarella & Terenzini, 2005).
5. Communicate high standards. Academic standards need to be established in cooperation with school curriculum to which students will advance (Cross, 2000). Maintaining high performance standards for students help them take responsibility for their own actions and learning (Wambach, Brothen & Dikel, 2000). Teachers should create a good learning environment for the entire class; they should not allow disrespectful behaviour to disrupt this environment (Smittle, 2003).
6. Professional development. Teacher improvement is usually achieved through professional development activities that include reading professional journals, writing professional articles, taking courses, and attending professional workshops and conferences (Smittle, 2003). These activities are time-consuming, but effective teachers make this a part of their continuing education. Professional development is the key to helping effective teachers manage change that is inherent in the 21st century (Buskist et al., 2013).

Developing Teacher Effective Model of Academic Excellence:

Based on the six quality variables identified in this study, the present authors have developed a model shown in Figure 1, 6C TEP Model "The 21st Century Teacher Effectiveness Practices". This model establishes a link between the six teacher effective construct variables (C1, C2, C3, C4, C5 and C6) and students' satisfaction of academic performance. While developing this model, it is postulated that if higher teacher effectiveness, greater will be the level of students' satisfaction. Hence, the following hypothesis:

- The six teacher effective construct variables: commit to teach, subject mastery, non-cognitive issues, innovative learning environment, communicate high standards, and professional development together

predict students' satisfaction of academic performance in public secondary schools in Voi, Kenya.

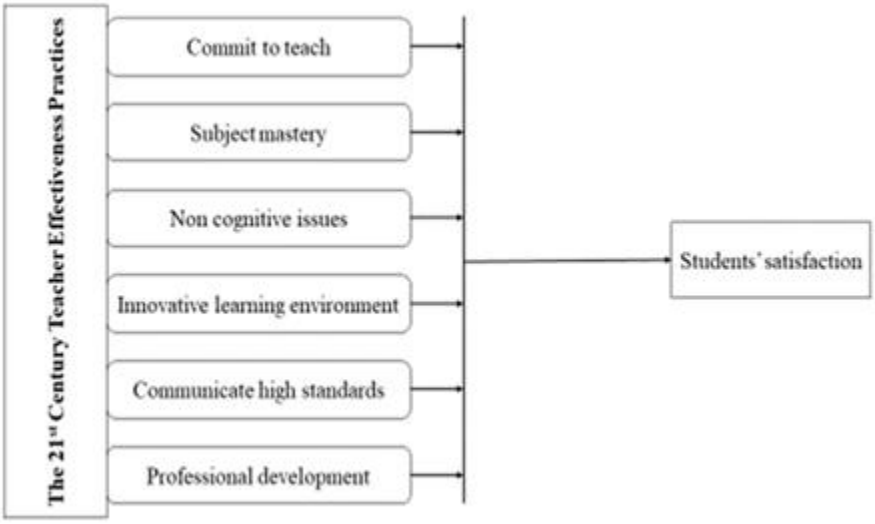


**Figure 1.** 6C-TEP model

## Methodology

Six dimensions have been culled from the vast literature reviewed and a model of teacher effectiveness was developed. Fifty operating items under these six dimensions have been developed through the variegated personal experiences and critical thinking of the present authors, supported by review of literature (see table 1). These items were used for developing a self-explanatory survey questionnaire (on a four-point likert scale ranging from strongly disagree, disagree, agree and strongly agree) to collect data from students. Creating, phrasing, refining and finalizing of these items were done through pilot-study with students as well as discussions with various faculty members and quality experts. The survey was conducted among form four students of public secondary schools (2-extra county, 2-county and 2-mixed sub county) found in Voi Sub County of Taita-Taveta in Kenya. The population was selected owing to its experience with secondary education system in general and, in particular, their own schools. Non-probabilistic convenience and judgment sampling techniques was used to select these schools and respondents within the schools through stratified random sampling.

Out of the 600 questionnaires distributed to the respondents (100 per school), only 511 questionnaires were found complete and valid for analysis. Since the response rate was high (85.2 percent), the non-responses were

dismissed as of no consequence (Malechwanzi & Hongde, 2018). What's more, Hair et al. (2010) stated that most studies require 100 to 150 samples to run steadily. Salaheldin (2009) also suggested a minimum of five respondents per constructed variable. Since this study used 50 variables, the minimum 250 samples were achieved. As a result, the sample size in this research was appropriate to ensure stable estimates. Statistical analyses were performed using statistical package for social sciences (SPSS). Tests for validity and reliability were done. Multiple regression analysis was used to investigate the effects of teacher effective variables on students' satisfaction of academic performance. Demographic variables (such as gender, school category) have been used as control variables in the study. Students' age has not been used as a control factor as all the respondents were found to fall within the age group of 17-19 years.

**Table 1.** Teacher effective dimensions

| Dimensions | Items | Source |
|---|---|---|
| Commit to teach | 9 | (Long, 2003; Smittle, 2003) |
| Subject mastery | 7 | (Cross, 2000; Smittle, 2003) |
| Non cognitive issues | 8 | (Smittle, 2003; Young-Jones, 2013) |
| Innovative learning environment | 7 | (Pascarella & Terenzini, 2005) |
| Communicate high standards | 8 | (Cross, 2000; Wambach et al., 2000) |
| Professional development | 6 | (Buskist et al., 2013; Smittle, 2003) |
| Student satisfaction | 5 | (Gruber et al., 2010) |

**Scale refinement and validation**

Scale evaluation:

The validity of an instrument is commonly assessed using three characteristics: content, construct and criterion-related validity (Sakthivel, Rajendran & Raju, 2005). A measure has a content validity, if there is a consensus among researchers that the instrument includes items that cover all aspects of the variables being measured (Sakthivel, Rajendran & Raju, 2005). Since all the operating items under the six constructs used in this study were included after thorough literature survey and detailed discussion with the experts in the relevant field, these items are said to have a content validity.

Scale construction:

Scale construction is an important and useful application only if it is statistically reliable and valid; the most commonly used technique for scale construction is factor analysis. The identified six quality constructs have been treated as independent variables and unifactorial analysis has been used to structure these factors. The principle component method of factor analysis has been used. A basic prerequisite for construct validity checking is the Unidimensionality of the measure. The factor loadings of the 50 operating

items (spread under the six variables) varied between 0.477 and 0.804 showing sufficiently high values confirming the construct validity. In addition, the Kaiser-Meyer Olkin (KMO) measure is used to assess the suitability of the sample for each unifactorial determination. The KMO coefficients for the six constructs ranging between 0.799 and 0.948 ensured sampling adequacy and supported the appropriateness of the data for each unifactorial determination.

Reliability assessment:

After finding out the Unidimensionality of scales, internal consistency has been estimated using a reliability coefficient such as Cronbach α (Ardi, Hidayatno & Zagloel, 2012) on the given set of quality constructs using the "reliability analysis" procedure of SPSS. The "alpha" model for determining internal consistency is derived for all the six individual constructs. The Cronbach α value for these six constructs ranges between 0.8268 and 0.8963. All the values are above the threshold value of 0.70 (Sakthivel, Rajendran & Raju, 2005) and demonstrate that the scales are consistent and reliable.

Criterion-related validity:

The basic idea of criterion-related validity is to check the performance of the measure against some criterion. Traditionally, criterion-related validity is evaluated by examining the correlations of the different constructs with one or more measures of quality performance (Sakthivel, Rajendran & Raju, 2005). In the present study, the students' satisfaction of academic performance is the outcome of the six teacher effective constructs. The correlation analysis of these six quality variables with outcome, students' satisfaction is given in Table 3. It should be noted that all the variables have significant positive correlations with students' satisfaction, thus establishing a criterion-related validity.

**Results and Discussion**

Descriptive Statistics:

There was minimal gender parity (valid responses from male=252; female=259). As per school category, the valid responses were as follows: extra county=176, county=171 and sub county=164. More information on demographic details is provided in figure 2. Independent sample t-test and one-way Anova test was conducted on respondents' demographic factors: gender and school category respectively. Homogeneity and Post-Hoc tests established that these demographic factors: gender (0.432; 0.103) and school category (0.065; 0.053) were statistically not significant (p-value > 0.05). Technically, these factors were not considered a determinant factor since the homogeneity of variance assumption is reasonably satisfied.

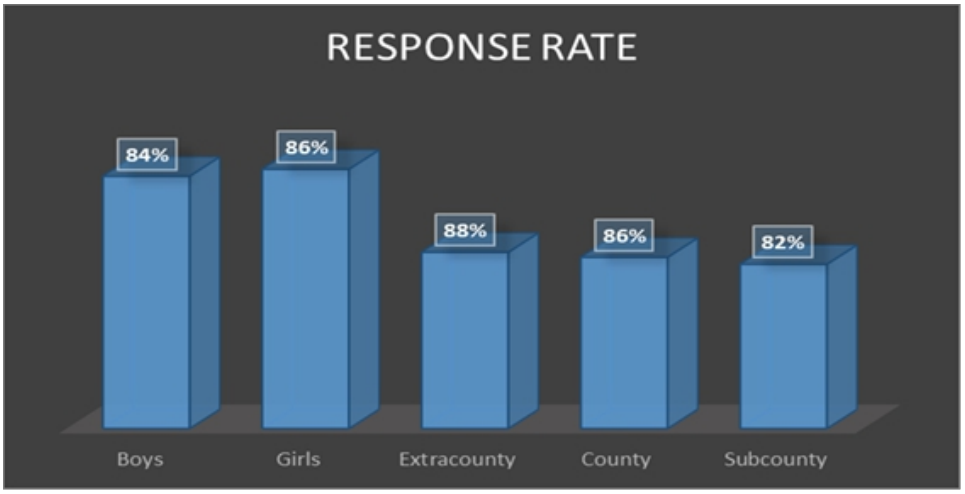


**Figure 2.** Demographic details of respondents

Table 2 reported the results of descriptive statistics. The mean values for all the dimensions varied from the lowest 3.549 to the highest 3.918. The skewness and kurtosis values were within acceptable range. The mean values indicated general agreement of respondents with the dimensions of the study.

**Table 2.** Descriptive Statistics

| Dimension | Mean | St.dev | Skewness | Kurtosis |
|---|---|---|---|---|
| Commit to teach | 3.687 | .616 | -.488 | .743 |
| Subject mastery | 3.899 | .602 | -.305 | .496 |
| Non cognitive issues | 3.549 | .619 | -.767 | .512 |
| Innovative learning environment | 3.727 | .645 | -.694 | 1.05 |
| Communicate high standards | 3.619 | .634 | -.400 | 1.14 |
| Professional development | 3.688 | .830 | -.502 | .613 |
| Student satisfaction | 3.918 | .716 | -.672 | .371 |

Correlation Analysis:

Correlation analysis was implemented to determine the intercorrelation among dimensions. The results indicated in Table 3 show that all dimensions had positive correlation greater than 0.5 and was statistically significant at $p < 0.05$ except for the dimension of non-cognitive issues. The coefficient for non-cognitive issues was 0.344.

**Table 3.** Correlation between teacher effectiveness

| Teacher effectiveness constructs | Correlation coefficients with satisfaction |
|---|---|
| Commit to teach (C1) | 0.626** |
| Subject mastery (C2) | 0.848** |
| Non cognitive issues (C3) | 0.344 |
| Innovative learning environment (C4) | 0.772** |
| Communicate high standards (C5) | 0.588** |
| Professional development (C6) | 0.501* |

Note: **Correlation is significant at the 0.01 level (2 – tailed)
*Correlation is significant at the 0.05 level (2 – tailed)

Regression Analysis:

A multiple regression analysis was used to examine whether independent variables statistically significance to dependent variable. Student satisfaction is used as dependent variable. The six dimensions of teacher effectiveness are used as independent variables. The regression analysis was performed to determine the effect of independent variables such as commit to teach, subject mastery, non-cognitive issues, innovative learning environment, communicate high standards, and professional development on student satisfaction. This study used backward elimination method. This process was repeated until all remaining independent variables reach at least 10% level of significance. The first and the second model for the multiple regressions were reported in Table 4.

**Table 4.** Multiple regression of independent variables on students' satisfaction

| Model | Constructs | Standardized Beta | t | Sig. | $R^2$ | F | Sig. |
|---|---|---|---|---|---|---|---|
| | C1 | .285 | 2.672 | .008 | | | |
| | C2 | .426 | 4.270 | .000 | | | |
| 1 | C3 | -.128 | -1.496 | .137 | .590 | 30.710 | .000[b] |
| | C4 | .327 | 2.920 | .004 | | | |
| | C5 | .218 | 2.376 | .019 | | | |
| | C6 | .197 | 1.830 | .021 | | | |
| | C1 | .265 | 2.495 | .014 | | | |
| | C2 | .418 | 4.178 | .000 | | | |
| 2 | C4 | .301 | 2.712 | .007 | .583 | 37.538 | .000[c] |
| | C5 | .185 | 2.072 | .040 | | | |
| | C6 | .117 | 1.903 | .047 | | | |

Model 1 on Table 4 shows that the value of R2 is 0.590. 5 out of the 6 dimensions showed statistical significance to student satisfaction namely commit to teach (t=2.672, p=.008), subject mastery (t=4.270, p=.000), innovative learning environment (t=2.920, p=.004), communicate high standards (t=2.376, p=.019), and professional development (t=1.830, p=.021). Backward elimination method automatically removed the dimension of non-cognitive issues since it was insignificant (t=-1.496, p = 0.137). In the second model, the value of R2 is 0.583; these dimensions successfully explain the indicator of student satisfaction. It is considered a good model to explain student satisfaction. The number of dimensions was reduced to 5 namely commit to teach (t=2.495, p = 0.014), subject mastery (t=4.178, p=0.000), innovative learning environment (t=2.712, p = 0.007), communicate high standards (t=2.072, p = 0.040), and professional development (t=1,903, p=0.047).

The results of regression analysis indicate that the model is fit and exhibits positive and statistically significant relationship through F statistics.

The R2 indicates that various dimensions explain 58.3% of variance in determining student satisfaction. This indicated that 58.3% of the variation on student satisfaction was explained by the variation of commit to teach, subject mastery, innovative learning environment, communicate high standards, and professional development. The dimension of subject mastery is the most important aspect with coefficient (Beta = .418) followed by innovative learning environment (Beta = .301), commit to teach (Beta = .265), communicate high standards (Beta = .185), and professional development (Beta = .117) respectively.

Research Hypotheses:

Table 5 shows that commit to teach, subject mastery, innovative learning environment, communicate high standards, and professional development has significant positive effect on student satisfaction. Therefore, hypothesis H3 was rejected.

**Table 5.** Results Summary

| Research Hypotheses | Results |
|---|---|
| $H_1$: Commit to teach has significant effect on student satisfaction | Accepted |
| $H_2$: Subject mastery has significant effect on student satisfaction | Accepted |
| $H_3$: Non cognitive issues has significant effect on student satisfaction | Rejected |
| $H_4$: Innovative learning environment has significant effect on student satisfaction | Accepted |
| $H_5$: Communicate high standards has significant effect on student satisfaction | Accepted |
| $H_6$: Professional development has significant effect on student satisfaction | Accepted |

This study provides a useful insight into the importance of teacher effective practices that improve quality education thus students satisfaction. Seng and Ling (2013) state that focusing on student satisfaction will enable schools adapt to student needs and continuously monitoring the delivery of services as a way of increasing student satisfaction. This study concurred with a few findings in previous studies. The results revealed that student satisfaction was a multidimensional construct. The level of satisfaction was influenced by the commit to teach, subject mastery, innovative learning environment, communicate high standards, and professional development, accounting for 58% of the variance in student satisfaction. Subject mastery was the most important aspect that influenced students' satisfaction. This finding was reflected in previous study done by Ghazi (2013) which indicated that teacher's professional competencies in knowledge of subject matter play important role in students' achievement.

Multiple regression analysis revealed that commitment to teach, innovative learning environment and communicating high standards had similar importance explanatory power towards student satisfaction. This was not surprising that communicating with students and getting close to them,

discovery of new teaching tools, and use of digital resources were considered as most effective teaching methods and a strong predictor of student satisfaction. This result sustained the earlier studies done by Chen et al. (2007) which revealed that student-teacher interaction and teaching quality contributes to better learning experiences and positively influence student satisfaction. Nadiri (2011), O'Driscoll (2012) all state that teachers and teaching methods are critical influence of student satisfaction.

The professional development factor accrued as the least influence on student satisfaction. This was rather influenced by personal factor such as reading professional journals, writing professional articles, taking courses, and attending professional workshops than the service provided by schools. However, this area needs to be investigated further in the future. Buskist et al. (2013) believe that professional development has significant impact on student satisfaction. An interesting finding for this study related to non-cognitive issues. Non-cognitive issues were a primary dimension extracted from the previous studies (Smittle, 2003) was insignificant predictor of student satisfaction. Cunha and Hechman (2008), Garcia (2013) reported that cognitive skills lead to non-cognitive skills, which consequently influence student satisfaction. This implies that non-cognitive issues play an indirect role on students' satisfaction.

**Conclusion**

The goal of teacher effectiveness in schools is to impart quality education so as to ensure students' satisfaction. In this study, students' satisfaction is satisfaction with teacher commitment, subject mastery, innovative learning environment, setting high standards, professional development. Students' satisfaction will be seen as students' assessments of the teacher effectiveness practices in schools. Student satisfaction surveys could serve two purposes in the years to come. First, as a more comprehensive tool for improving secondary education and enhancing the student learning experience. Second, as a managerial instrument for adjusting and adapting secondary schools to a changing and tougher economic reality. Student learning, the ultimate measure of academic quality, would improve if students feel more secure about teacher effectiveness in schools.

The results of the empirical study produced interesting fact that the most important dimension of teacher effectiveness is the subject mastery. The study would like to impress upon the importance of school leadership; this term should be synonymous with commitment to quality teaching and successful translation of ideals into practice. School management should put in place a system where top teachers who excelled academically are recruited. The study further concludes that the three constructs, commit to teach, innovative learning environment, and communicating high standards, which

though not strong predictors are significant predictors. The responsibility of providing effective teaching with a student focus, dedication and creating congenial atmosphere for academic success rests wholly with teachers. The study has clearly established a relationship amid teachers' effective practices and students' satisfaction of academics, as depicted in the present model 2. Therefore, the study recommends that this model should be effectively implemented in public secondary schools in Kenya.

**Practical implications**

In the present context of competitive educational environment, it is recommended that the teacher effective model of academic excellence designed in this study should serve as a guiding principle for public secondary schools when implementing best teaching practices in their respective schools. If the level of effective teaching practices implementation is improved through application of this model, the satisfaction of students will substantially be increased. The unique 5C TEP model of school success developed in this study is to measure the level of teacher effective practice in public secondary schools. Therefore, institutions can individually compute Teacher Effective Index (TEI) with respect to each quality variable. Educationalists can keep these indices as reference points upon which progress efforts can be targeted.

**Limitations and future research**

The study was based on student satisfaction of teacher effective practices covering six dimensions. Student satisfaction might not reflect the teacher effective practices in schools as a whole. Future studies may include other new dimensions that affect student satisfaction. As this study involved 511 students from Voi Sub County, the results could not be generalized to all the students in Kenya. In order to obtain more reliable results, this study should be conducted with a larger sample. Conduct a qualitative research study to identify student satisfaction that may not be captured by using a quantitative approach.

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