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## **SELECTED SCHOOL BASED FACTORS' INFLUENCE ON VALUE ADDITION IN SECONDARY EDUCATION IN PUBLIC SECONDARY SCHOOLS IN RACHUONYO SOUTH SUB-COUNTY, KENYA**

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### Abstract

**Purpose:** The study sought to determine value addition in secondary education of 2013 and 2014 cohorts in public secondary schools in Rachuonyo South Sub-county and to examine selected school based factors' influence on value addition in secondary education.

**Methodology:** The study adopted a correlational design. Correlational research design was appropriate for this study since it enabled the researcher to collect independent and dependent variable data sets with a view to determine the relationship between them (Creswell, 2012). The population comprised 49 public secondary schools in Rachuonyo South Sub-County, 49 Deputy Principals and 5132 students. The researcher used Yamane's formula to compute a sample of 39 public secondary schools, from where 39 Deputy Principals and 4351 students were purposively sampled. Data were collected using document analysis guide and questionnaires and analysed using frequencies, means and regression analysis with the aid of SPSS V.25 software.

**Findings:** Findings revealed value additions of -1.563125 for 2013 cohort. Regression analysis revealed that performance appraisal accounts for 17% change in value addition in secondary education of the 2013 cohort and that teachers' professional development ( $\beta=0.325$ ,  $p=0.040$ ) has a weak significant positive relationship with value addition in secondary education of 2013 cohort. For the 2014 cohort, findings revealed value addition of -1.9363125. Regression analysis revealed that teachers' performance appraisal account for 12% change in value addition in secondary education and that teachers' performance appraisal ( $\beta=0.386$ ,  $p=0.009$ ) has a weak significant positive relationship with value addition in secondary education.

**Unique contribution to model and practice:** The study contributes to literature by providing analysis of value addition in secondary education and teacher performance appraisal contribution to value addition in the context of Kenya.

**Key terms:** Selected School Based Factors, Value Addition, Performance Appraisal

## INTRODUCTION

The concept ‘value addition’ originates from economics when referring to the difference between inputs, such as raw materials, energy and value of sales (Spours & Hodgson, 1996). In economic context, value addition applies to goods whose value and quality is increased by high levels of technology and skills in the manufacturing process. In a similar vein, Downs and Vindurampulle (2007) assert that ‘value addition’ is derived from economics where it is used in commercial settings to describe the additional value a business generates or contributes to a product or a service.

Spours & Hodgson, (1996) use input/output notion as in economics to describe ‘value addition’ in education as the difference between the state of knowledge or qualifications of a pupil on course entry and his state on exit. Similarly, Downs & Vindurampulle (2007) assert that value addition is used to describe the additional value schools bring to the learning outcomes of their students. Peng & Klieme (2014) define value addition “as a quantitative measure of the relative academic progress made by pupils in a school over a particular period of time”. Cunha and Miller (2009) define value addition as “the increase in students’ skills and knowledge over their tenure in school.” It is the difference between their attainments when they have completed their education and what they had already attained by the time they began”.

The core of value addition measures is getting to know the relative change in students’ skills depending on certain inputs such as contribution of teachers to students’ individual standardized scores (Douglas, 2011). Studies have been conducted in various countries to estimate value addition in school systems. In Australia, Downs & Vindurampulle (2007) estimate value addition based on Year 6 reading results and the corresponding Year 3 reading results of the same cohort. The study revealed a value addition of 0.6. In Chile, a study by Thiem *et al.* (2012) sought to determine value addition using Year 8 and Year 4 students’ test results in language and math. The test results in Year 8 were matched to the same students’ prior attainment in Year 4. Findings revealed a value addition of 0.4. These studies, however, focused on specific subject areas in primary education and not secondary education.

Moreover, value addition measures generally include multiple school factors or inputs and then assign them different weights depending on their importance for schools’ effectiveness. In Chile, Gaemberling, Smith & Villani (2010) measured six conditions productive of change within schools. Schools with higher value addition focus on vision, high standards, focus on assessments, accountability, cooperative culture and collaboration. According to Naseer (2011), school factors that make schools most effective in students’ academic progress are school leadership, staff interpersonal relationship, collaborative and shared school vision, material and non-material support and keeping track of students’ progress. However, these research studies do not focus on teacher performance appraisal.

The present study, therefore, contributes to literature by providing analysis of value addition in secondary education and teacher performance appraisal’s contribution to value addition in the context of Kenya.

### Problem Statement

The Kenya National Education Sector Plan (NESP, 2013-2018) underscores the Government’s commitment to enhance students’ learning outcomes by addressing a number of quality issues including use of relevant professional development programs to enhance teachers’ pedagogical skills (Republic of Kenya, 2014). In this regard, Teachers Service Commission (TSC) introduced a mandatory performance appraisal for both primary and secondary school teachers

in order to promote teachers' productivity and efficiency at work with the goal of enhancing students' academic performance (TSC, 2016).

The commission in its endeavour to achieve its objective developed a comprehensive Teacher Development Policy Framework, Teacher Performance Appraisal and Development (TPAD), that spells out seven professional teaching standards that teachers are to meet during the practice of their career. Of the seven competency areas, five have a link to students' academic achievements (TSC, 2016). A follow up study by TSC on the impacts of TPAD on teachers' professional development revealed that introduction of TPAD had seen more preparedness by teachers, less absenteeism, more cooperation and professionalism among teachers (TSC, 2018), but no improvement on students' academic achievements.

School accountability systems view schools as production units, which admit students with various intake abilities and take them through processes that transform the intake abilities to outputs at the end of an educational program. The expectation is that students make academic progress in the school process. It is on this vein that public secondary schools in Rachuonyo South Sub-County admitted 2013 and 2014 cohorts with average KCPE mean scores of 7.416 and 7.644 respectively. At the conclusion of secondary education, the two cohorts, however, graduated with below average KCSE mean scores of 4.722 and 4.091 respectively. It is the low KCSE mean scores that prompted the study to determine value addition in secondary education of the two cohorts and to examine performance appraisal's influence on value addition.

### **Purpose of the Study**

The study sought to determine value addition in secondary education of 2013 and 2014 cohorts in public secondary schools in Rachuonyo South Sub-County and to examine performance appraisal's influence on value addition in secondary education.

### **Objectives of the study:**

The study was guided by the following specific objectives:

- i. To determine value addition in secondary education of 2013 and 2014 cohorts in public secondary schools in Rachuonyo South Sub-County.
- ii. To examine performance appraisal's influence on value addition in secondary education.

### **Significance of the Study**

The study can be significant in the following ways:

- i. Schools can use value addition information as part of their self-evaluation and target setting. Moreover, education officials from The Ministry can use value addition data to assess school improvement.
- ii. Value addition measurements provides the actual contribution of schools to students' academic progress as it tracks the same students over time taking into consideration the initial achievement levels of students as they begin school to the time they leave a school program.

## LITERATURE REVIEW

### Theoretical Background

This study was guided by Cobb-Douglas production function. The latter relates a group of inputs with a series of outputs. The function calculates the returns to scale, which is the amount of output that is obtained when a certain amount of inputs is used whenever inputs change proportionally (Ospina, 2017). This represents the effectiveness that schools have regarding students' learning and progress. The Cobb-Douglas function is defined by:  $Q(K, L) = AL^\beta K^\alpha$ .

The equation indicates that a product (Q) is a function of a constant (A), an amount of labor (L) plus an amount of capital (K). Labor and Capital are raised to the power of the constant beta ( $\beta$ ) and alfa ( $\alpha$ ), which range between 0 and 1. They represent elasticity per each of the variables (the percentage change in the outcome variable whenever Labor or Capital change) (Maddala & Miller, 1991). In context, K and L represent a set of school variables or inputs and Q represents outcome or students' academic performance.

Cobb-Douglas production function is supported by education production function by Monk (1989), which describes the maximum level of school outcome possible from alternative combinations of school inputs. The theory summarizes technical relationships between and among school inputs and outcomes and provides a standard against which school practices can be evaluated on productivity grounds. Further, the theory provides an empirical evidence that school inputs such as: teacher quantity, teacher cooperation, school policy and school facilities produce maximum school outputs (Bowles, 1970).

The study used this theory to highlight the aspects of learning among students in relation to teachers' performance appraisal, which is an input in the education process. The theory was therefore applicable in the study since it relates various aspects of school inputs; in this case teacher performance appraisal to school outcomes. The theory, however, does not explain how to determine value addition in education. Further, the theory includes other teacher factors like teacher quantity and teacher cooperation, but not teacher performance appraisal. Thus, the researcher sought to fill the gap in literature by undertaking the study.

### Empirical Review

#### Performance Appraisal

Teachers are the most important inputs in schools and, consequently, improving the effectiveness of teachers through performance appraisal is an important policy target to increase students' achievement. According to Darling-Hammond (2010), the crucial factor in teacher appraisal is its link to professional development and improvement that relate to issues of teacher quality, learning and students' achievement. According to Goe (2007), teachers' competence is not attributable to academic certificates alone, teachers as professionals are expected to develop their competencies during their teaching service for continuous improvement of students' learning achievement. As a result, TSC introduced parameters that promote teachers' professional development during the appraisal process. In this study, the researcher considered four parameters including continuous professional development, classroom observation, teaching portfolio and appraisal ratings.

Continuous professional development (CPD) is a term used to describe all the activities in which teachers engage, during the course of a career, which are designed to enhance their work (Darling-Hammond, Hyler & Gardner, 2017). The rationale for CPD is that teachers keep

learning from practice and become experienced in every passing year in their careers (Kelchetermans, 2004). Therefore, CPD involves a wide range of activities and programs used to help teachers develop professionally throughout their career. For instance, SMASSE program, which aims at enhancing the teaching of mathematics and sciences in secondary schools in Kenya (Gathumbi *et al.*, 2013; JICA, 2013). Wallace (2009) examined the influence of continuous professional development on students' achievement in Tennessee and found that continuous professional development has a small, but statistically significant effect on students' achievement. Ekpoh (2013) reports that teachers who participated in staff development programs were more effective in their job performance than those who did not in terms of knowledge of subject matter, classroom management, teaching methods and evaluation of students' work in Nigeria

The most frequently utilized appraisal process remains observation based, which is widely regarded as the best, given it provides the only setting in which all aspects of teaching can be observed (Dandala (2019). Zang & Ng (2017) assert that it is through classroom observation that the evaluator can best take on an understanding of a teacher's effectiveness, as it allows physical classroom environment, students' engagement and a teacher's standards of conduct to be considered. Marshall (2009) asserts that frequent, focused classroom observations that include immediate and specific feedback to teachers is vital in teacher development, since the teacher needs feedback just like students need feedback in formative assessments. A study by Arujo *et al.* (2016) found improved learning gains among pupils of standard one of teachers exposed to multiple classroom observations in Ecuador.

Teaching portfolio is a coherent set of materials that represents teaching practice as related to students' teaching (Tucker *et al.*, 2003). According to OECD (2013), teaching portfolio can include lesson plans and teaching materials, samples of students' work and commentaries on that work, self-reported questionnaires and reflection sheets. Seldin *et al* (2010) assert teacher portfolio can stimulate reflection upon improvement. They not only provide teachers the tools for self-assessment, but also serve as tools for teachers' own professional development. The organization and construction of portfolio should be a continuous and dynamic process. As teachers improve their practice, they should reflect on current portfolio by replacing them with improved ones (Joseph & Brennan, 2013). Grenberg (2010) describes portfolios for learning as focused on process, integration, formative feedback and individual and group processes.

Appraisal rating provides a well-structured performance appraisal, where an employee's performance is rated against a scale with points that range from "poor" to "excellent" (Afriyie, 2009). The ratings are based on the ability of the employee to work as a team player, communication skills and technical competence. According to Khan (2013), appraisal ratings put employees on toes as they want to rate high and therefore work hard and raise their competencies. In the context of TPAD, appraisal rating anticipates teacher performance in five levels ranging from 'very good' to 'inadequate'. The annual rating scores are the average agreed scores between appraiser and appraised and the teachers who consistently display poor ratings are recommended for professional development programs (TSC, 2016). A study in Narok Sub-County revealed that most of the teacher ratings range from 50% to 70%. However, when the learners' scores are assessed they range from 15% to 60%. This shows that teachers' competencies are above average while that of the students are below average (Julie, 2012).

## METHODOLOGY

The research design that guided the study was correlational. Correlational research design is a non-experimental quantitative design in which the researcher applies correlational statistics to measure and describe the degree of association among variables (Creswell., 2012). Correlational research design was appropriate for this study since it enabled the researcher to collect independent variable data set and dependent variable data set, with a view to determine the relationship between them.

### Population and Sample

The population comprised 49 public secondary schools in Rachuonyo South Sub-County, 49 Deputy Principals and 5132 students. The researcher used Yamane's formula to compute a sample of 39 public secondary schools, from where 39 Deputy Principals and 4351 students were purposively sampled.

### Instrumentation

Document analysis guide was used to collect KCPE and the corresponding KCSE scores of the two cohorts. Questionnaires were developed and administered to 39 Deputy Principals to collect data on performance appraisal. Content validities of the instruments were ascertained by two university supervisors from the department, Educational Management and Foundations. Reliabilities were determined through test-retest method using Pearson's Correlations Coefficient, where reliability coefficients of 0.9 and 0.86 were obtained. According to Oluwatayo (2012), a scale is considered good if the coefficient value is 0.7 or more. The reliability coefficients of the two instruments were above 0.7, hence, the instruments were deemed reliable.

### Data Analysis

Data were analyzed at two levels. Level 1 involved determining value addition in secondary education using descriptive statistics (frequencies and means). Level 2 involved testing the relationship between performance appraisal and value addition using inferential statistics (simple linear regression analysis) with the aid of Statistical Package for Social Sciences software version 25.

$$\text{Level 1 (Student level); } y_{ij(2)} = \beta_{0j} + \beta_{1j}\{y_{ij(1)} - \bar{y}_{j(1)}\} + \varepsilon_{ij}$$

$$\text{Level 2 (School level); } \beta_0 = y_{00} + y_{0s}w_{ij} + u_{0j}$$

$$\beta_{1j} = y_{10}$$

Where;  $y_{ij(2)}$ : the current score for student  $i$  in school  $j$  (KCSE scores)

$y_{ij(1)}$ : the prior test score for student  $i$  (KCPE scores)

$\bar{y}_{j(1)}$ : the mean prior test score for school  $j$  (KCPE mean scores)

$\beta_0$ : the intercept of school  $j$  (equal to KCSE mean score for school  $j$ )

$\beta_1$ : the level-1 regression slope for KCPE scores

$\varepsilon_{ij}$ : the residual which is assumed to be normally distributed

and independent of level1 covariate.

- $w_{sj}$ : the school characteristics ( $s$ ; the number of school characteristic), teacher performance appraisal.
- $y_{00}$ : the level-2 intercept
- $y_0$ : the level-2 regression slope for school characteristics
- $u_{0j}$ : the residual, which is assumed to be normally distributed and independent of level 2 covariates.

In the model, each coefficient represents the slope for each independent variable at school  $j$ , but the meaning of the intercept ( $\beta_{0j}$ ) is determined by the location of the level-1 covariates: simple  $x_{ij}$  centering around the grand mean (the mean of the means of several sub-samples) ( $x_{ij} - \bar{x}_j$ ), centering around the group mean ( $x_{ij} - \bar{x}$ ). The resulting values are called 'mean corrected,' which are conceived as dependent variable at level 2.

## RESULTS AND DISCUSSIONS

The first objective sought to determine value addition in secondary education of 2013 and 2014 cohorts in public secondary schools in Rachuonyo South Sub-County. To achieve this, a document analysis guide was designed to collect KCPE and the corresponding KCSE scores of 2013 and 2014 cohorts in public secondary schools in Rachuonyo South Sub-County. The KCPE examinations are graded from 0 to 500 marks. The KCSE examinations are graded from A to E; where: A=12; A-(minus)=11; B+(plus)=10; B(plain)=9; B-(minus)=8; C+(plus)=7; C(plain)=6; C-(minus)=5; D+(plus)=4; D (plain)=3; D-(minus)=2 and E=1. The KCPE scores were converted to the 12-point grading index by dividing each score by 500 (maximum score in KCPE examinations), then multiplied by 12 (maximum scores in 12-point grading index) in order to match KCSE scores. Value addition was determined by subtracting KCPE mean scores from KCSE mean score at school and sub-county levels. Value additions were summarized in Table 1.



**Table 1: Value Additions for 2013 and 2014 Cohorts**

KCPE 2012 Mean Score	KCSE 2016 Mean Score	VALUE ADDED	KCPE 2013 Mean score	KCSE 2017 Mean Score	VALUE ADDED
6.18	3.22	-2.96	6.61	3.67	-2.94
6.3	3.7	-2.6	6.7	3.35	-3.34
6.7	3.9	-2.8	6.72	3.3	-3.42
5.6	4.34	-1.26	5.2	4.51	-0.69
5.04	4.35	-0.69	5.87	3.06	-2.81
5.72	3.29	-2.43	5.76	3.27	-2.49
5.32	3.9	-1.42	6.77	4.36	-2.41
6.02	7.36	1.34	6.01	5.06	-0.95
5.54	4.12	-1.42	5.9	3.58	-2.32
8.4	8.52	0.12	8.31	8.3	-0.01
6.22	6.17	-0.05	6.65	5.77	-0.88
5.8	3.37	-2.43	5.71	3.35	-2.36
5.6	4.7	-0.9	5.56	3.9	-1.62
5.97	4.18	-1.79	6.01	4.4	-1.58
5.57	5.9	0.33	6.01	4.3	-1.71
6.02	3.7	-2.32	5.55	3.5	-2.01
5.66	4.95	-0.71	6.04	4.04	-2
6.01	3.91	-2.1	5.45	3.9	-1.51
6.54	4.91	-1.63	6.77	5.28	-1.49
5.88	3.02	-2.86	5.45	3.24	-2.21
5.66	3.8	-1.86	5.87	3.36	-2.51
5.87	3.7	-2.17	6.85	4.1	-2.75
6.33	4.4	-1.93	5.87	4.45	-1.42
5.81	6.02	0.21	6.93	5.86	-1.07
5.44	4.1	-1.34	5.63	3.6	-2.03
5.56	5.2	-0.36	5.78	4.9	-0.88
5.95	3.9	-2.05	6.87	4.2	-2.67
5.34	3.7	-1.64	5.04	3.5	-1.53
5.74	3.03	-2.71	6	3.6	-2.4
5.75	3.8	-1.95	5.76	3.8	-1.93
6.77	3.77	-3	6.76	4.5	-2.23
6.66	4.02	-2.64	5.76	4.0	-1.79
		<b>-1.563125</b>			<b>-1.9363125</b>

Table 1 illustrates that two schools in the 2013 cohort had positive value addition, while 30 schools had negative value addition in secondary education. Consequently, value addition for the sub-county was -1.563125. For 2014 cohort, it was found that 32 schools had negative value addition in secondary education. Consequently, value addition for the sub-county was -1.9363125. This means that the two cohorts on average performed worse at KCSE examinations than at the corresponding KCPE examinations. Consequently, value addition was negative (-) in the secondary education of the two cohorts.

The second objective sought to examine performance appraisal's influence on value addition in secondary education of 2013 and 2014 cohorts in public secondary schools in Rachuonyo South Sub-County. To address this objective, four measurement scales were selected. Each measurement scale had five question items, which were rated on the Likert Scale: Strongly Disagree= 1; Disagree=2; Moderately Agree=3; Agree=4; Strongly Agree=5. The ratings were

analyzed in frequencies, means and standard deviation. The findings were summarized in different tables.

The first measurement scale was continuous professional development. The scale had five question items that sought Deputy Principals' opinions on continuous professional development and teachers' professional development. The findings were summarized in Table 2.

**Table 2: Continuous Professional Development and Teachers' Professional Development**

Continuous Professional Development	N=32	Rating					MEAN
		SA	A	MA	D	SD	
Teachers in my staff engage in continuous professional development activities and programs.	Frequency	8	9	4	6	5	3.28
Continuous professional development aids teachers in developing new pedagogical theories and skills in the career.	Frequency	11	14	2	2	3	3.88
Continuous professional development helps teachers enhance expertise in their work	Frequency	16	14	0	1	1	4.34
Continuous professional development enables teachers improve their quality of teaching in classroom.	Frequency	18	12	1	1	0	4.47
Continuous professional development helps teachers develop professionally throughout their career.	Frequency	20	10	0	1	1	4.47
<b>Overall</b>							<b>4.08</b>

Table 2 illustrates that: teachers engage in professional development activities and programs (mean=3.28); continuous professional development aids teachers in developing new pedagogical skills and theories in their career (mean=3.88). This finding agrees with findings in a monitoring and evaluation exercise on the effects of SMASSE program on teaching approaches to mathematics and science subjects in Kenya, which found that teachers who had attended the programs had acquired new pedagogical skills and theories and had already improved on how they conducted their lessons (Gathumbi *et al.*, 2013); continuous professional development helps teachers enhance their expertise in their work (mean=4.34); continuous professional development enables teachers improve their quality of teaching in classroom (mean=4.47). This finding agrees with findings by Ekpoh (2013) in Nigeria, which revealed that teachers who participated in staff development programs were more effective in their job performance than teachers who did not in terms of knowledge of subject, classroom management and teaching methods. Further, findings revealed that continuous professional development help teachers develop professionally throughout their career (mean=4.47). The average mean rating for Deputy Principals in continuous professional development was 4.08. This means that Deputy Principals in public secondary schools in Rachuonyo South Sub-County agreed that continuous professional development enhances teachers' professional development.

The second measurement scale was classroom observation. The scale had five question items seeking teachers' opinions on classroom observation and teachers' professional development. The findings were summarized in Table 3.

**Table 3: Classroom Observation and Teachers' Professional Development**

Classroom Observation	N=32	Rating					
		SA	A	MA	D	SD	MEAN
Teachers in my staff participate in classroom observation	Frequency	14	12	1	3	2	4.03
Classroom observation enables the appraiser to observe all aspects of a teacher's teaching.	Frequency	18	12	0	1	1	4.41
Classroom observation enables teachers identify their aspects of teaching that need improvement.	Frequency	10	16	1	2	3	3.88
Classroom observation provides immediate feedback to teachers about their performance in teaching.	Frequency	22	10	0	0	0	4.69
Classroom observation enables teachers develop professionally	Frequency	16	13	1	1	1	4.31
<b>Overall</b>							<b>4.26</b>

Table 3 illustrates that: teachers participate in classroom observation (mean=4.03); classroom observation enables the appraiser to observe all aspects of a teacher's teaching (mean=4.41). This finding agrees with earlier findings by Dandala (2019), which revealed that the most frequently utilized appraisal process remains observation based given it provides the only setting in which all the aspects of teaching can be observed. Moreover, findings revealed that classroom observation enables teachers identify their aspects of teaching that need improvement (mean=3.88); classroom observation provides immediate feedback to teachers about their teaching (mean=4.69). This finding agrees with the finding of Marshal *et al.* (2009) in USA, which revealed that classroom observation that include immediate and specific feedback to teachers is vital in teacher development since the teacher needs feedback just like students need feedback in formative assessments. Last, classroom observation enables teachers develop professionally (mean=4.31). The average mean rating for Deputy Principals' rating on classroom observation is 4.26. This means that Deputy Principals in public secondary schools in Rachuonyo South Sub-County agreed that classroom observation enhances teachers' professional growth.

The third measurement scale was teaching portfolio. The scale had five question items, which sought Deputy Principals' opinions on teaching portfolio and teachers' professional development. The findings were summarized in Table 3.

**Table 3: Teaching Portfolio and Teachers' Professional Development**

Teaching Portfolio	N=32	Rating					
		SA	A	MA	D	SD	MEAN
Teachers in my staff construct teaching portfolio.	Frequency	10	12	2	4	4	3.63
Teaching portfolio enable teachers identify teaching practices that require improvement.	Frequency	8	18	1	2	3	3.81
Teaching portfolio enable teachers do self-assessment of their teaching practices.	Frequency	10	12	2	4	4	3.63
Teaching portfolio provides immediate formative feedback to teachers about their teaching practices.	Frequency	9	16	1	3	3	3.78
Teaching portfolio enables teachers room for professional development.	Frequency	10	18	2	1	1	4.09
<b>Overall</b>							<b>3.78</b>

Table 3 illustrates that Deputy Principals indicated that: teachers construct teaching portfolio (mean=3.63); teaching portfolio enable teachers identify teaching practices that require improvement (mean=3.81); teaching portfolio enable teachers do self-assessment of their

teaching practices (mean=3.63); teaching portfolio provides immediate formative feedback to teachers about their teaching practices (mean=3.78); teaching portfolio enables teachers room for professional development (mean=4.09).

The overall mean for teaching portfolio and teacher's professional growth is 3.78. This means that Deputy Principals agreed that teaching portfolio enhance teachers' professional development in public secondary schools in Rachuonyo South Sub-County.

The fourth measurement scale was performance appraisal ratings. The measurement scale sought teachers' opinions on performance appraisal ratings on teachers' professional growth. The findings were summarized in Table 4.

**Table 4: Appraisal Rating and Teachers' Professional Development**

Appraisal Rating Rating	N=32	Rating					SD	MEAN
		SA	A	MA	D			
Teachers in my staff participate in performance appraisal.	Frequency	18	12	0	1	1	4.14	
Performance appraisal ratings help teachers identify the areas they need to improve on.	Frequency	12	16	1	2	2	4.16	
Performance appraisal ratings help teachers develop their competencies.	Frequency	13	14	1	2	2	4.06	
Performance appraisal ratings keep teachers on toes in service as they fight to meet the expected standards in teaching.	Frequency	20	8	1	2	2	4.22	
Performance appraisal ratings help teachers develop professionally	Frequency	16	11	1	2	2	4.16	
<b>Overall</b>							<b>4.2</b>	

Table 4 illustrates that: teachers participate in performance appraisal (mean=4.41); appraisal ratings help teachers identify the areas they need to improve on (mean=4.16); performance appraisal ratings help teachers develop their competencies (4.06); performance appraisal ratings keep teachers on toes in service as they fight to meet the expected standards in teaching (mean=4.22). This finding agrees with the earlier research findings by Khan (2013), which revealed that appraisal ratings put employees on toes as they want to rate high and therefore work hard and raise their competencies; performance appraisal ratings help teachers grow professionally (mean 4.16). The average Deputy Principals' mean rating in performance appraisal ratings was 4.2. This implies Deputy Principals in public secondary schools in Rachuonyo South Sub-County agreed that performance appraisal rating enhance professional growth.

### Regression Analysis

To test the relationship between the Teacher Performance Appraisal and value addition in secondary education, the researcher used simple linear regression analysis. Simple linear regression analysis is used when one is interested in predicting a continuous dependent variable from one independent variable. It shows the percentage of the variation of the dependent variable that can be explained by an independent variable and this is assessed using the coefficient of determination ( $R^2$ ), which is used for judging the explanatory power of the linear regression of dependent variable on an independent variable.  $R^2$  is a measure of the goodness of fit of the regression line to the observed sample values of dependent and independent variables (Carver *et al.*, 2009).

The  $R^2$  can range from 0.0 to 1.0, with 1.0 showing a perfect fit that indicates that each point is on the line (Carver *et al.*, 2009). Adjusted R Square ( $R^2$ ) adjusts the value of  $R^2$  when the sample size is small since the estimate of  $R^2$  obtained when the sample size is small tends to

be higher than the actual  $R^2$  in the population. The rule of thumb is to report adjusted  $R^2$  when it substantially differs from  $R^2$  (Green & Salkind, 2010). The results for the regression analysis were summarized in tables below.

The regression analysis for 2013 cohort was carried out between the overall means of the responses in the instruments addressing teacher performance appraisal's influence on value addition for 2013 cohort. The findings were summarized in the tables below.

**Table 5: Summary for Regression Analysis for 2013 Cohort**

Model	R	$R^2$	Adjusted $R^2$	Std. Error of the Estimates
1	.325 <sup>a</sup>	.245	.176	1.06478

a. Predictor: (Constant) TPAD

Table 5 revealed that adjusted  $R^2=17.6$ . This coefficient of determination (predictor indicator) reveals that every adjustment in school-based factors results in 17% change in value addition in secondary education for the 2013 cohort value added model. Thus, teacher performance appraisal accounts for 17% of the value addition in secondary education of 2013 cohort. This finding is supported by earlier research findings in Teddlie *et al.*, (2000) meta-analysis in school effect size, which revealed that between 5-18% of students' academic performance is attributed to schools.

**Table 6: Regression Analysis for 2013 Cohort**

Model	Unstandardized	Coefficients		Standardized coefficients	
	B	Std. Error	Beta	T	Sig
1 (Constant)	-11.161	5.109		-2.185	.031
TPAD	2.428	1.292	.325	1.880	.040

a. Value Addition 2013 Cohort

The beta ( $\beta$ ) values allow us to compare the relative strength of each independent variable's relationship with the dependent variable. Table 6 illustrates that TPAD ( $\beta=0.325$ ,  $p=0.040$ ) has a weak significant positive relationship with value addition in secondary education of 2013 cohort.

Thus, the prediction equation for the 2013 cohort value added model becomes:

$$Y = -11.161 + 0.325 (\text{Teacher Performance Appraisal})$$

This means that value addition in secondary education is predicted to increase by 0.325 when Teacher Performance Appraisal and Development increases by one unit.

### Multiple Regression Analysis for 2014 Cohort

The regression analysis for 2014 cohort was carried out between the overall means of the responses in the TPAD framework. The findings were summarized in the tables below.

**Table 7: Summary of Regression Analysis for 2014 Cohort**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate
1	.394	.155	.127	.732771

Predictor: (Constant) TPAD

Table 7 reveals that adjusted-R<sup>2</sup>=12.7. The coefficient of determination (predictor indicator) reveals that every adjustment in school based factors results in 12% change in value addition in secondary education for the 2014 value added model. Thus, teacher performance appraisal accounts for 12% of the value addition in the secondary education of 2014 cohort. This finding agrees with earlier research findings in school effectiveness research by (Kyriakides & Luyten, 2011; Opdenakker & Van Damme, 2000) in UK, which revealed that up to 13% of the variance in students' academic achievements is between schools.

**Table 8: Regression Analysis for 2014 Cohort**

Model	Unstandardized	Coefficients	Standardized	T	Sig
	B	Std. Error	Beta		
1 (Constant)	-10.175	3.516		-2.894	.007
TPAD	2.084	.889	.394	2.345	.026

a). Dependent variable: Value Addition 2014

The beta ( $\beta$ ) values allow us to compare the relative strength of each independent variable's relationship with the dependent variable. Table 8 illustrates that TPAD ( $\beta=0.386$ ,  $p=0.009$ ) has a weak significant relationship with value addition in public secondary schools in Rachuonyo South Sub-County.

Thus the prediction equation for 2014 cohort value addition model becomes:

$$Y = -10.175 + 0.394 (\text{Teacher Performance Appraisal})$$

This means that value addition in secondary education is predicted to increase by 0.394 when Teacher Performance Appraisal and Development increases by one unit.

## Conclusions

It was concluded that:

- i. Value addition in the secondary education of 2013 and 2014 cohorts in public secondary schools in Rachuonyo South Sub-County were negative. This means that students performed worse at the end of secondary education examination than at the end of primary education examination.
- ii. Performance appraisal that is aimed at teacher professional development has a positive significant relationship with value addition in secondary education.

## RECOMMENDATIONS

With respect to the findings of the study, the following recommendation is made: The study adopted a cross-sectional nature; consequently, direction of causality could only be inferred. The researcher recommends that a longitudinal study spanning four years of secondary education be undertaken to enable researchers determine the causal links between performance appraisal and value addition in secondary education.

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