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Investment in Improvement Strategies and Academic Achievement: The Case of Secondary Schools in Kenya

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Abstract: Secondary schools have adopted various strategies in an effort to improve performance. Collaboration and benchmarking are two such strategies. However, schools still continue to post poor grades in national examinations, an indicator that most of the students fail to meet the university cut off mark and thus fail to join university. This raises the question of whether such investment is really justified. This study sought to investigate whether investment in these two practices translated into improved education outcomes as measured by mean scores in the Kenya Certificate of Secondary Education. The study adopted correlation research design. From a target of 103 schools in the region involved in collaboration and benchmarking, 31schools were randomly selected. The sample comprised all 31 Directors of Studies and 31principals from the sampled schools. Data were collected using questionnaires with closed and open ended items, and document analysis. Data were analyzed inferentially (PPMCC and Multiple linear regression) using the Predictive Analytical Software (PASW) Version 19.0. The data on open ended items were coded using open coding, categorized and reported verbatim. Findings indicated that, investment in the two strategies significantly improved academic achievement ($r=0.822$; $r^2=0.676$; adjusted $r^2=0.603$). However, considered independently, investment in collaboration had a much higher impact on academic achievement ($r=0.843$, $r^2=0.711$; adjusted $r^2=0.697$), compared to investment in benchmarking ($r=0.510$, $r^2=0.260$; adjusted $r^2=0.219$). It is recommended that, schools should generously and uniformly invest in both collaboration and benchmarking in order to boost academic achievement. In addition, well endowed schools should be encouraged to share their resources.

Keywords: A*cademic achievement; collaboration; benchmarking; Investment.*

Introduction

Worldwide, countries are keen on improving their education standards and subsequently, the learning outcomes of their students. As a result, they are constantly exploring new techniques that can positively increase education achievement. Collaboration and benchmarking are two practices which have been adopted by schools in various parts of the world because they are instrumental in enhancing academic achievement. Collaboration alludes to working together to solve a common problem or achieve a common goal. It clearly fosters the ethic of sharing as observed by Bernis and Biederman (1997) that, significant interventions in the 20th century were produced by collaborative effort. In literature, the terms collaboration, collegiality, cooperation, partnerships and professional learning communities are used interchangeably to describe how teachers work together (Weindling, 2005). Collaboration provides an atmosphere as well an avenue for sharing information and ideas. Bouchamma et al. (2012) reported that, collaboration benefitted students as well as teachers and the school as a whole as collaboration between teachers enabled them to achieve academic goals.

Benchmarking was a term used by cobblers to measure a person's feet for shoes. Someone's foot would be placed on a bench and then the pattern would be marked out. This pattern would be used to fashion a shoe. Moriaty (2008) disclosed how later, this term was used in relation to surveying or the geological practice of making marks in the ground to ensure that, this formed the basis of subsequent placements and measurements. This term has more recently been associated with businesses where it denotes comparing

a company's performance to that of another to determine which inputs, processes, output systems and functions were significantly different from those of their competitors (Amunga et al., 2013). Ruby (2013) reiterates that, benchmarking has a clear focus on improvement and this explains why educational institutions have also adopted the use of the term as well as the practice. Today, educational institutions are big business houses engaged in stiff competition but at the same time striving for continuous improvement and excellence. Demand for accountability during the release of national examination results has put schools on high alert. It is this pressure that has seen schools come up with a plethora of activities that are expected to improve academic achievement key of which are collaboration and benchmarking.

Collaboration and benchmarking are strategies that are used hand in hand in the continuous improvement model. These practices require the investment of time, human and financial resources. A review of literature by Atkinson et al. (2007) on inter school collaboration revealed that, collaboration was hindered by lack of time. It was reported that working in a collaborative way required sufficient time for discussions and meetings and this was not available. When schools that should be involved in the collaboration exercise were far removed from each other, this had a time and cost implication which make it difficult work to collaboratively (Woods et al., 2006; Lindsay et al., 2005). In Northern Ireland, it was difficult to establish sustainable collaborative relations because schools had different ways of preparing their time tables. It also meant that, schools had to incur the costs of transporting children from one school to another. These, coupled with financial constraints, school cultural differences and problems of trust (School of Education, 2008) are factors that easily worked against collaboration. This therefore means that, collaboration required sufficient time and enough financial resources if it was to be successful. Adequate time was also an important requirement for thorough planning and early identification of potential problems (Turner, 2005). In another report by Woods et al. (2006), some schools reported as many as 400-500 hours per term but on average, teachers were devoting 200 hours on collaborative activities.

Darling-Hammond et al. (2009) found that, sustained and intensive collaborative learning was correlative to achievement gains. However, in many schools, time was still a problem because there were so many programmes and activities in which teachers were involved such that, there was no time left for professional collaboration (Dillion, 2005). A similar survey of the views of the Association of Teachers and Lecturers (ATL) on teachers as collaborative professionals working collaboratively with teachers from other schools revealed that this was an uncommon practice because of time logistics. Although teachers felt working collaboratively would help improve their teaching and pupils learning, they complained of lack of time for collaborative work. In addition, 90% of the teachers said that, to do their work effectively, they needed to work closely with teachers from other schools but this was not happening (Weindling, 2005). Aiston et al. (2002) noted that, there were constraints of time and resource working against effective collaboration. Although collaboration was regarded as a vehicle for achieving shared goals, there were still problems and inconveniences borne by those involved.

Collaboration has in some countries benefitted from heavy funding. According to (Armstrong, 2015), in England, there was an initiative to create a network of Maths hubs. This resulted in the creation of 32 hubs across the country with a financial implication of £11million. The creation of these hubs was meant to tap the expertise and knowledge across the country and eventually share the good practices (DfE, 2014a).There were reports that, schools were banding together to assist each other through willing distribution of professional knowledge and sharing of resources (Armstrong, 2015; Hargreaves, 2010). For instance, a project that was designed to increase collaboration between Independent and state schools saw the project get a funding of £176, 288 in 2014 (Armstrong, 2015). Although it was reported that, in Norway, there was an industry-education collaboration which saw companies contribute to schools financially (Rustena & Hermelinb, 2017), the exact amount spent on this collaborative effort is not clear. Similarly, a study by Schenke et al. (2016) revealed that, 12 Research &Development projects in secondary schools in Netherlands received funding from the Dutch Council for secondary Education, but again, the amount was not specified. It is worth noting that, these studies and reports detail the element of how much it cost to carry out collaborative activities but they are silent on whether this translated into any improvement in learning outcomes for the students and schools involved. Loveland, Miyakawa and Hirayama (2004) presented an account of the Japan-Florida Teens Meet Project involving collaboration with Yumegakuen High School and Ridgewood High School in an electronic environment. The two teleconferences held between the schools cost $400. A collaboration aimed at increasing the number of specialist schools and raising standards throughout secondary education cost £2,133, 150 (Woods et al., 2006). This investment led to an improvement in the overall GCSE results.

Where collaboration activities were funded centrally by the government, sustainability was a problem when this funding ended (Turner, 2004, Woods et al., 2010). This means as collaborations are established, there should be clear funding modalities as well as mechanisms for sustainability so that, the initial aim of collaboration does not necessarily end with the withdrawal of funding. When this happens it is a sure way of eroding the gains realized.

While literature dwells on financial and time requirements for collaboration, this practice also requires human resource investment. In a review of literature on inter school collaboration, Atkinson, et al. (2007) found that, of the collaborations reviewed, some involved a small number of staff but others involved the governing body, large numbers of teachers and auxiliary staff. Occasionally, students and parents were involved (Department for Education and Skills, 2007e).

Benchmarking at the school level most often involves looking to better performing schools for practices that contribute to their sterling performance. This means educators getting out of their comfort zones and physically traveling to top performing schools for first hand information and experience. If best practices are adopted by educational institutions that benchmark, an improvement in academic achievement is likely to be realized. However, for such trips to be effective in turning performance around there is need for institutions to commit time, financial and human resources among other things (Montoyer, 2008). According to Ruby (2013), benchmarking has been

criticized for being relatively expensive both in terms of the finances required and the time. There were visit costs which included payment for hotel rooms, travel expenses and meals. There was also the issue of lost labour time. When such time was lost, in some cases, extra labour had to be hired or colleagues had to cover for each other or compensate for lost time where possible (*ibid*). Although financial resources were likely to be limited for benchmarking exercises conducted by the institutions' staff than when using an external consultant, it was still considered a worthwhile investment that would be necessary at some level.

In Australia, Universities participated in the NACUBO benchmarking studies. Participating institutions paid $15,000 per annum (Massaro, 1998). In England, it is reported that, mounting one benchmarking study cost $50,000-$100,000. Participating institutions did not pay direct costs but it cost approximately four peoples' day input (Lund, 1998). In England, benchmarking in higher education is part of Higher Education Funding Council for England (HEFCE) funded benchmarking project whose aim is to improve processes and efficiency within universities and colleges (Universities UK, 2011). Most of the literature reviewed focuses on higher education. There is hardly much literature on benchmarking at the secondary school level. This is an indication that, this is a practice popular at the higher education level hence the need for this investigation.

In Kenya, inter-school collaboration and benchmarking are two of the improvement techniques which have been adopted by schools in order to boost performance and move the majority of the students to the C+ and above bracket, which is the minimum university entry requirement. Hence, the adoption of these two strategies meant to improve performance echoes the trend on the international sphere where the efforts of collaboration and benchmarking are meant to maximize the capabilities of participants, and enhance the quality of the products and outcomes. The aim of this study was to establish whether investment in these two practices was justified or misdirected.

Research Objective

1. To investigate the relationship between investment in collaboration and benchmarking, and academic achievement.

Research Hypotheses

1. H_{O1}: There is no significant relationship between investment in collaboration and benchmarking, and academic achievement.

Methods

Participants

The sampling frame comprised schools previously classified as provincial secondary schools while target population were the103 secondary schools identified as being involved in collaboration and benchmarking. Of these, 31 schools (30%) were then used in the study (Gay, 1983; O'Connor, 2011). A total of 62 participants comprised of all the 31 principals and 31 Directors of studies (DOSs) from the sampled schools formed the study sample. Principals were chosen as respondents in this study as they represented the administrative authority in schools and their consent was needed to access school data. They also initiated and determined the success of collaboration and benchmarking activities. The study required information on financial investment in collaboration and benchmarking which only the principals could provide because they authorized the funding of these activities. Directors of studies were in charge of the schools' academic records. They were included to provide information on academic achievement.

Instrument

Questionnaires with open and closed ended items were used to collect information from the Principals and Directors of Studies.Principals provided information on the amount of money they had spent on collaboration and benchmarking and the number of days utilized for the activities, while the Directors of Studies provided information on academic achievement in their schools as measured by a national examination index (the mean score). Both the principals and Directors of Studies indicated members from their schools who participated in collaboration and benchmarking activities. Sincedocuments are an important source of data in many areas of investigation (Mutai, 2000), results analysis sheets kept in the education office were used for corroboration of the information obtained from schools on academic achievement.

Data Analysis

Information on the duration (days) spent on collaboration was summarised and presented on pie chart because the data was categorical and set on the ordinal scale. Information on the staff (human resource) involved was summarised and tabulated. The relationship between investment in collaboration and benchmarking, and academic achievement was presented on scatter plots because the data was continuous and set on the interval scale. Inferential statistics were used to establish the nature of relationship between financial investment in collaboration and benchmarking. To begin with, the Pearson Product Moment Correlation Coefficient (PPMCC) was determined, and then multiple linear regression was used to establish the strength of relationship and identify the most significant predictor of academic achievement.

Results

Financial Investment

Information on investment in collaboration and benchmarking was obtained from the principals of sampled schools which were involved in these activities. They were requested to indicate the amount of money they spent on all their collaboration and benchmarking activities. This information was correlated with information on school mean scores received from the Directors of Studies. To establish if there was any linear relationship between financial investment in collaboration and academic achievement; and financial investment in benchmarking and academic achievement, the data in each case was presented on a scatter plot.

Figure 1 shows the relationship between the expenditure (in Kenya shillings) on collaboration and academic achievement (represented by mean scores), while figure 2 shows relationship between the expenditure (in Kenya shillings) on benchmarking and academic achievement (represented by mean scores).

Figure 1

Investment in collaboration

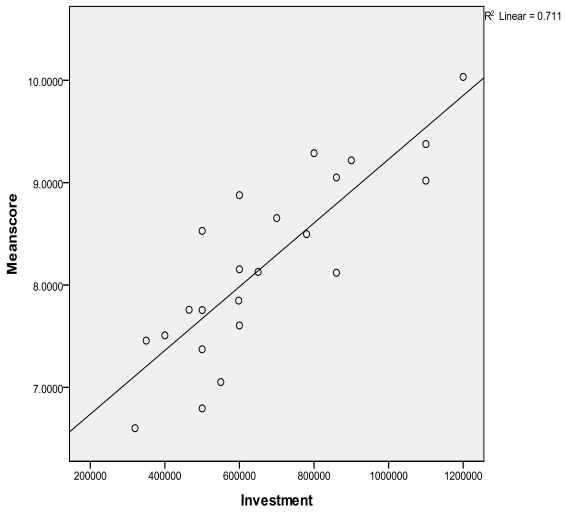

Figure 2

Investment in benchmarking

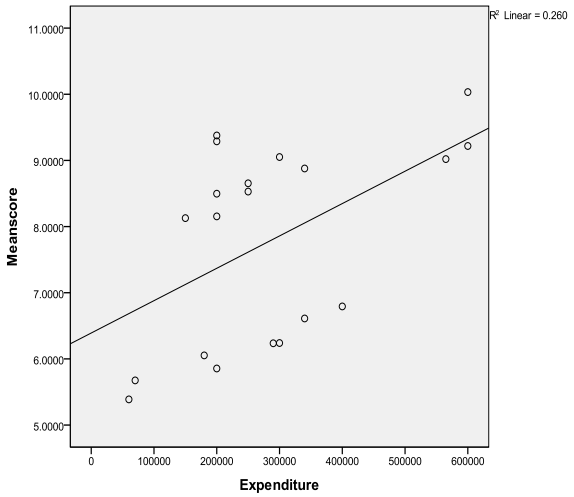

Figure 1 shows that, there was a positive linear relationship between financial investment in collaboration and academic achievement. This was further reinforced by the Pearson Product Moment Correlation Coefficient value of r=0.843 which indicated a very strong linear relationship, the coefficient of determination, r^2=0.711 and the adjusted r^2=0.697. The adjusted r^2=0.697 implied that, 69.7% of the variance in achievement was related to level of financial expenditure on collaboration.

Figure 2 shows that there was an average positive linear relationship between financial investment in benchmarking and academic achievement. The Pearson Product Moment Correlation Coefficient (r=0.510) indicated a moderate linear relationship. In addition, the coefficient of determination, r^2=0.260 and the adjusted r^2=0.219 also meant that, 21.9% of the variance in achievement was related to level of investment in benchmarking.

Information presented on the scatter plots showed that, although there was a linear relationship between investment in both practices and academic achievement, there was a much stronger relationship between investment in collaboration and achievement compared to that of investment in benchmarking and achievement. The implication was that, financial investment in collaboration was higher and consequently, it had better academic achievement returns compared to investment in benchmarking which was lower and consequently had low academic achievement returns. This prompted further statistical analysis using multiple linear regression. Since there were only two predictors, the standard multiple regression method that involved simultaneous regression was considered the best method to use. The two independent variables were entered at the same time. The summary table for the overall fit (Table 1) gives the R values for assessing the fit of the model.

Table 1

Summary table for overall fit

Model	R	R-square	Adjusted R-square
1	.822	.676	.603

The summary table for the overall fit shows that, the multiple correlation coefficient (r) using both predictors simultaneously was r=0.822 (r^2 =0.676) while the adjusted r^2 was 0.603. This implied that, 60.3% of the variance in academic achievement (schools' mean scores) could be attributed to investment in both practices. Generally, the high R square value of 0.676 was an acceptable value for a good model fit. The test for the overall multiple regression for the model is presented in the ANOVA table (Table 2).

Table 2

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	2.239	2	1.119	9.371	.006
Residual	1.075	9	.119		
Total	3.314	11			

The above test was used to determine whether a significant relationship existed between the dependent variable and the set of independent variables. The results, F=9.371 (p=0.006) indicated that, there was a significant relationship. This again meant that, the combination of the two factors (collaboration and benchmarking) significantly predicted academic achievement.

Table 3shows the values of the coefficients in the regression equation and measures the probability that, a linear relationship existed between each explanatory variable and the criterion variable.

Table 3

Coefficients

Model	Unstandardized coefficients		Standardized coefficients	t	Sig	Collinearity Statistics	
	B	Std Error	Beta			Tolerance	VIF
Constant	7.338	.394		18.634	.000		
Investment in collaboration	1.628E-6	.000	.665	2.792	.021	.635	1.576
Investment in benchmarking	7.343E-7	.000	.226	.948	.368	.635	1.576

The table of coefficients showed that, financial investment in collaboration had influence on academic achievement far above that of benchmarking. Multiple regression showed that, investment in collaboration (p=0.021) was a more powerful predictor of academic achievement compared to investment in benchmarking (p=0.368). From the table of coefficients, assessment of collinearity in the data showed that, the Independent Variables (IVs) had a tolerance of 0.635 (greater than 0.2) and a Variance Inflation Factor (VIF) value of 1.567 (Less than 5) showing that there was no multi-collinearity. The table of coefficients further showed that, for every unit investment in collaboration and benchmarking, there was 7.338 times unit improvement in academic achievement as shown by the B-coefficient for the linear model.

$$Y=7.338+0.000001628X_1+0.0000007343X_2$$

Where Y is the performance mean score and X_1 is the financial investment in collaboration while X_2 is financial investment in benchmarking. An increase in the level of financial investment in collaboration and benchmarking resulted in better mean scores. Therefore the null hypothesis, "There is no significant relationship between investment in collaboration and benchmarking; and secondary schools' academic achievement," was rejected.

The Investment of Time

Collaboration and benchmarking are improvement techniques that also require the investment of time. Principals were asked to indicate the number of days they utilized per term for these activities. The general picture of time spent on these activities is shown in figure 3.

From Figure 3, most schools spent 10-20 days per term on collaboration and benchmarking activities. These activities involved visitations as well as joint activities hence the need for the so many days that were utilized.

Human Resource Investment

The information used to establish the members of the school communities involved in collaboration and benchmarking activities was sourced from both the Principals and DOSs for corroboration. The percentage is given to one decimal place in brackets. Table 4 summarizes the findings.

Figure 3

Number of days spent on collaboration and benchmarking

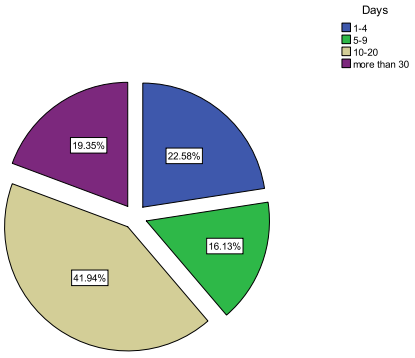

Table 4

Members involved in collaboration and benchmarking activities

Respondent	All HODs	Teacher Examiners	Any Teacher	Students	Total %
Principal	12(19.4)	0 (0.0)	14(22.7)	5(8.1)	31(50)
DOS	12(19.4)	2(3.2)	13(21.0)	4(6.5)	31(50)
Total	24(38.8)	2(3.2)	27(43.6)	9(14.5)	62(100)

The findings revealed that, although the majority of the respondents (27; 43.6%), said collaboration and benchmarking practices were open to any teacher, a significant number (24; 38.8%) reported that this was carried out by all heads of departments. This meant in the majority of schools, all the teachers participated in collaboration and benchmarking. This element of human resource investment also meant that, whenever some teachers were engaged in collaboration and benchmarking activities, their workloads had to be shouldered by colleagues or that teachers had to assign work to their classes.

All the participants were asked to respond to an open ended question on the questionnaire on whether they thought investment in these practices had been useful for their respective schools. One of the Principals explained that:

> *Collaboration encourages good relations between teachers and learners, enhances early syllabus coverage and enables schools to*

> *jointly produce examinations. This is usually done by having teachers from collaborating schools team up and prepare standard examinations. This actually saves on time and encourages resource sharing by participating schools.*

For some schools, collaboration led to the acquisition of the best manpower, made schools restructure their programmes to accommodate all the needs of collaboration in advance, improved pedagogy and fostered sharing of knowledge and ideas. The shared instructional practices had led to improved performance.

The positive observations notwithstanding, there were respondents who felt collaboration had been useful but it was quite expensive, time consuming and sometimes difficult to sustain. A Director of studies remarked:

> *The biggest challenge is that, some schools withdraw from the collaboration once they feel that they have benefitted enough. In the process some of the collaboration teams break up and schools have to realign themselves with new partners. This can be quite inconveniencing when, as a school, you have already drawn a collaboration programme indicating activities and dates to avoid disrupting your academic calendar.*

It was also reported that, some schools were too immersed in their traditional ways to change, while others felt it created confusion due to constant changing of collaboration partners.

On benchmarking, those who found it a useful investment said that, it made schools borrow and adopt best practices that resulted in improved academic performance. It was also regarded as the best mechanism in achieving success because it enhanced creativity and improvisation. One DOS stated that:

> *Benchmarking has assisted our school to continuously review targets set. We have kept on revising our targets and using the techniques we have borrowed from other schools to achieve them. This has put our school on a constant upward trend.*

However, another DOSs complained aboutlack of meaningful reports brought back to schools by the teams that went out to benchmark as well as lack of funds to implement learned strategies:

> *There is hardly improvement in performance even after benchmarking because most of the benchmarked ideas are not implemented especially those that require additional financial input. In addition, you may send out a team to benchmark, but when the members come back, they do not bother sharing the best practices they went out to benchmark.*

A principal was of the opinion that:

> *Most of what is learnt is forgotten as time goes by and in some cases; teachers have a negative attitude. There is also the problem of lack of honesty by some benchmarked schools which do not share the secrets of their academic success openly. Withholding of information leaves members who have enthusiastically set out on the benchmarking mission feeling cheated.*

Discussions

The findings of the current study showed that collaboration required financial, time, and human resource investment. The financial investment in collaboration and benchmarking activities was borne by individual participating schools. They were therefore in direct control of the collaboration activities. In the reviewed studies, collaborations faced sustainability issues because of the termination of central funding (Turner, 2004; Woods et al., 2010). This contrasts with the current study where although the funding was internal and sustainable, colloborations collapsed when schools withdrew from the partnership. Findings of this study revealed that, collaboration and benchmarking led to sharing of knowledge, resources and adoption of best practices which in turn improved academic achievement. This is in agreement with what was reported by other scholars who made similar observations (Bouchamma et al., 2012; Armstrong, 2015; Hargreaves 2010; Weindling, 2005; Ruby, 2013).

The findings of the current study which showed that investment in collaboration positively affected achievement agreed with findings of Woods, et al. (2006) who reported that, investing £2, 133, 150contributed to improved overall GCSE results. However, although most of the other reviewed studies and reports (Morris, 2007; Loveland et al., 2004; & Atkinson et al., 2007) detailed financial investment in collaborative activities, there was hardly any statistical evidence of how this affected academic achievement in schools creating a point of departure with this study because it clearly correlates financial investment in collaboration and performance.

The findings of this study on financial and human resources requirements for collaboration and benchmarking again agreed with Montoyer (2008) who reported that, there were visit costs which included payment for hotel rooms, travel expenses and meals. On investment of time, findings of the current study showed an average of 10-20 days spent per term. This agreed with the findings of Woods et al. (2006) that showed some schools reported as many as 400-500 hours per term but on average, with teachers devoting 200 hours on collaborative activities. The 200 hours therefore translated into about 17 days a term on the assumption that day time was what was fully utilized. This implied that, setting time aside for collaboration activities was important. Other authors (Atkinson et al., 2007; Woods et al., 2006 & Lindsay et al., 2005) found that collaboration was constrained by lack of adequate time, finances and distance. Similarly, respondents in the current study complained of insufficient time and logistic challenges of distance and finances that saw them change their collaboration partners.

The findings of the current study also indicated that schools invested financial and human resources in the benchmarking activities. As reported by many respondents, teachers were mostly involved in the exercise. Again, the findings of the current study on human resource investment were also similar to those of DfES (2007e) which reported participation of large numbers of teachers. However, while DfES (2007e) reported that, apart from teachers, parents and the governing body also took part, in this study, it ismainly the teachers who were involved. The difference in the finding could be attributed to the fact that, these activities in the present study were mainly geared towards academic achievement. The activities were

therefore examination oriented requiring the input of teachers in the setting, marking and revision of examinations. It is noted that, collaboration had a higher investment and consequently better returns on academic achievement because it is a practice that took place throughout the year. Setting, marking exams and revision was a continuous process during form four (final school year for students). It therefore required regular funding. Benchmarking on the other hand was a one off activity hence the minimal investment and lower returns.

Conclusions and Recommendations

The findings revealed a positive linear relationship between financial investment in collaboration and benchmarking; and academic achievement. It was therefore concluded that, since collaboration and benchmarking accounted for 60.7% of the variance in achievement, only 39.3% of the variance could be accounted for by other factors. The study also concluded that, while the two practices seemingly enhanced academic achievement, investment in collaboration was higher and consequently academic achievement was better (r^2=0.711) compared to benchmarking (r^2=0.260). Most schools seemed to have under-invested in benchmarking and probably, this was why the returns were low. On the investment of time, findings showed that, most of the schools used 10-20 per term on these activities. Most of the participants involved in collaboration and benchmarking activities were HODs and teachers. Following these conclusions, it was recommended that, schools should generously and uniformly invest in both collaboration and benchmarking in order to boost academic achievement. Secondly, the alumni of schools that are not financially endowed should be encouraged to set up a special fund meant for collaboration and benchmarking activities. School managers were advised to form memoranda of understanding with partner schools to cushion themselves against sudden collaboration withdrawal shocks. Finally, well endowed schools should be encouraged to share their resources.

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