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TEACHER EXPERIENCE AS DETERMINANTS OF STUDENTS' ACADEMIC PERFORMANCE IN SCIENCE SUBJECTS IN UGANDA CERTIFICATE OF EDUCATION EXAMINATIONS IN BUIKWE DISTRICT, UGANDA

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Abstract:
This study investigated Teacher Experience as determinants of students' academic performance in science subjects in Uganda certificate of education examinations in Buikwe district, Uganda. The overall performance of science subjects in Buikwe district has been below average (Uganda National Examination Board, 2018). The low achievement and dismal performance of students in the UC.E Science examinations has been a concern to stakeholders. The study was guided by Convergent parallel mixed methods design specifically a cross-sectional survey and phenomenological survey. The target population included all head teachers, head of departments, science teachers, students in public and private secondary schools, and all Secondary Science and Mathematics regional trainers in Buikwe district. Both Probability and non-probability sampling were used. Simple random sampling was used to select 110 Science teachers, 375 students were selected using cluster random sampling while 28 head teachers were selected through census purposive sampling and expert sampling was used to select regional trainers. Data was collected using questionnaires, interview, focused group discussions and document analysis guide and were subjected to both content and face validity. Cronbach alpha technique determined reliability of quantitative instruments. Quantitative data were analyzed using SPSS version 23 for descriptive and inferential statistics. Frequencies and percentages were used to summarize data while Chi-square Test for associations was used to test hypotheses. The qualitative data were subjected to thematic analysis and findings presented in narrative form. The key findings indicated that there was a significant relationship between teacher experience and students' academic performance in science subjects. The study found that science teachers who do part timing have little time for students, the infectiveness, poor teaching methodologies,

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negative attitude among students, and lack of text books and well equipped laboratories in some schools contributed to poor performance. The study recommended that MOES needs to organize seminars and equip science teachers with the required skills to teach science subjects. The government needs to abolish part time teaching and invest in building a robust school inspection system and improve teacher quality through staff development.

Keywords: teacher experience, students' academic performance, science subjects, examinations

1. Introduction

Experienced teachers have an increased depth of understanding of the content and how to teach and apply it. Additionally, experienced teachers are more effective with students due to their use of a variety of strategies that contribute insight and ideas to the teaching and learning process. Therefore, teachers' experience influences students' academic performance in science subjects. According to Murnana and Kile (1976) describe teaching experience as all activities undertaken by the teachers in this pre and post teacher training exercise. It also includes participation in professional development activities geared towards equipping the teacher for better service delivery. For Clotfelter, Ladd and Vigdor (2014) asserted that teachers' experience is consistently associated with performance and these display a form of heterogeneity across students that may help explain why the observed form of teacher-student matching persists in equilibrium.

In a similar study, the findings of Ogbonnaya (2009) showed a significant positive relationship between the academic performance of students in mathematics and teacher's years of experience especially six years of teaching and above. Student achievement increases with teacher experience, but the linkage is weak and largely reflects poor outcomes for teachers during their first year or two in the classroom (Buddin & Zamarro, 2009). Wong (2013) indicates that teacher's teaching experience matters more for reading than mathematics and science subjects. Conclusively, teacher experience beyond the initial years in the profession is of great importance.

2. Review of Related Literature

Studies have highlighted the importance of experienced teachers in schools. Researchers have also given different opinions about teaching experience and students' learning outcomes in schools (Adeyemi, 2017). Such claims are based on the idea that practice enhances teaching skills as a result of consistently practicing the skills over a period of years. Dial (2008) investigated possible effects experience has on the overall performance of students in communication and mathematics in USA. Results were evaluated from both the 2005-06 and 2006-07 school years' communication skills and mathematics portions of the Missouri Assessment Program tests.

The overall results suggested that years of experience as well as the relationship between years of experience and level of degree had an impact on student achievement in both communication arts and mathematics. However, inconclusive results indicated that the level of teacher degree alone had no influence on student achievement. The study focused on teaching experience and teacher's degree level only in relation to learners' performance in the USA while the current study focused on a number of teacher quality indicators and students' academic performance in science subjects in UCE in Buikwe district, Uganda. Furthermore, the performance considered was in communication and Mathematics and not on the performance in science subjects such as biology, chemistry, physics and mathematics.

In USA, Ladd and Sorensen (2016) carried out a longitudinal national study of 4,400 early elementary children. It explored achievement disparities and teacher credentials using value-added approaches. The report found that students who had experienced teachers for most of their early school years scored significantly higher in reading than students with less experienced teachers. Students with experienced teachers learned an average of 1.5 IRT units higher growth per year for at least 2 of the 3 grades. Teacher experience accounted for 8% of the growth in reading performance and was particularly influential in predicting growth for African American students.

The academic disparity between African American students and European American students over the early elementary grades was reduced by experienced teachers. Ladd and Sorensen study were longitudinal and done among the elementary children. The current study using mixed methods combining cross-sectional survey and phenomenology approaches was carried out among secondary schools on teacher quality indicators and students' academic performance in sciences at O-Level. This helped the researcher to get data from both qualitative and quantitative sides for better triangulation and understanding of the problem.

Students' academic performance and chances for success in examinations are greatly enhanced by having been taught by well-prepared and experienced teachers (AACTE, 2012). A correlation study carried out in Pakistan by Syed and Ather (2014) highlighted teacher experience as important in determining the student's performance in secondary schools. The study focused on teacher experience in the performance of three subjects: English, Chemistry, and Mathematics. The population of the study comprised all "public sector" secondary schools, male and female teachers, and boy and girl students.

A total number of 16 secondary schools (eight for boys and eight for girls), 114 secondary school teachers (66 males and 48 females), and 2,404 students (1,400 boys and 1,004 girls) were selected by use of purposive sampling techniques. Spearman and Pearson correlations were used to test the relationship between the variables. The results showed positive relationship between teachers' experience and learners' performance in all three subjects. This reviewed study focused on a number of subjects which are both science and arts while the current study specifically looked at student performance in only science subjects that had posted dismal scores. Similarly, a study done in India by

Mehtabul and Geeta (2014), on assessing teacher quality and student performance in private schools, asserted the importance of experienced teachers in determining the performance of the students. The study used administrative data from linked private schools from one of the districts in India that matches 8,319 pupils to their subject specific teachers at the senior secondary level. It estimated the importance of individual teachers on student outcomes in the high-stake senior secondary examinations at the end of twelfth-grade.

The study by Mehtabul and Geeta found out a considerable variability in teacher effectiveness over a two year course, a one standard deviation improvement in teacher quality adds 0.38 standard deviation points in students score. While the reviewed study used, experimental design the current study used a mixed method design. The study further dealt with only private schools which in most cases have a completely different environment from the public schools.

Like experts in other domains, experienced teachers quickly recognize patterns in what they observe, see more complexities than novices and bring to bear many sources of knowledge about how to respond to them. This resonates well with a study done in Nigeria by Temitope and Olabanji (2015), in which they investigated the influence of teachers' teaching experience on the academic performance of public secondary school students in Mathematics and English Language in Ado-Odo/Ota and Ifo Local Government Areas in Ogun State, Nigeria. Descriptive research design was adopted and the population 31 senior secondary schools in the two local government areas. For selecting samples, a simple random sampling technique was used. The method used for data collection was an inventory plan and questionnaire. The analysis of regression and t-test were used to test hypotheses at 0.05 alpha levels of significance. The findings of Temitope and Olabanji showed that the teaching experience of teachers had a significant impact on the academic performance of students in Mathematics and English. This study was carried out only in public secondary schools while the current study was in both private and public schools.

In East Africa, teacher experience is very important in ensuring good students' academic performance in science subjects. Muthoni and Wafula (2016) established the relationship between the quality of teachers and the performance of pupils in mathematics in primary six national examinations in private schools in Gasabo District, Rwanda between 2012 and 2014. The target population consisted of 1346 respondents, 75 of whom were math' teachers, 31 head teachers and 1240 primary 6 students from all 31 private primary schools in the district of Gasabo, Rwanda. Multi-stage random sampling technique was used to determine the sample size. Five attributes of teachers were studied: training of teachers, teacher experience, communication skills, teaching practice and teacher preparedness.

The study applied the correlational comparative research design. Questionnaire and interview guides were used for collecting data. It was noted that teachers with many years of teaching experience report a higher student performance as compared to less experienced teachers. The study analyzed targeted primary school pupils, while the

current study focused exclusively on secondary school students. Further the study used a correlation comparative design while the current used a convergent parallel design which allowed the researcher to collect both qualitative and quantitative data for better understanding of the phenomenon.

When researchers carefully adjust for this reality, they still find that more experienced teachers are, on average, more effective than teachers with fewer years of classroom experience (Scholar Strategy Network, 2013). In Uganda, Okello (2013) examined the influence of teachers' experience on students' numerical proficiency in solving physics problems in secondary schools in northern Uganda. Teachers of physics were chosen using purposeful sampling technique. Data collected through the Numerical Proficiency Test and teachers of Physics problem solving questionnaire. Results showed that the numerical abilities of students taught by experienced teachers were higher than those taught by less experienced teachers.

Teacher experience has a significant effect on pupil performance in primary schools and at lower and upper secondary level (Emelogu & Mpamah, 2016). This is so because experienced teachers have a wealth of experience to draw from and can add insight and ideas to the path of teaching and learning. They are open to correction and are less dictatorial in the classroom.

Therefore, teacher experience is positively associated with student academic performance as indicated in a study carried out in Central Uganda by Nyanzi (2017). It examined the effects of teachers' teaching experience on Ordinary level Secondary School students' performance in Science subjects. The survey type of research design was adopted in the study. Four hundred and fifty Ordinary level students were randomly selected from fifteen purposively selected secondary schools in Masaka region. The results showed that there was significant difference in the performance between students taught by long time experienced teachers and less experienced teachers. This study focused solely on teacher experience as a factor that determines student's academic performance while the current study looked at teacher self-efficacy, preparedness, qualification, pedagogical skills among others and how they affect students' academic performance in science subjects.

3. Research Design and Methods

The study was conducted to determine the influence teacher experience as determinants of students' academic performance in science subjects in Uganda certificate of education examinations in Buikwe district, Uganda. The study employed Convergent parallel mixed methods design. The methodology involves the collection of both quantitative and qualitative data, analysis and integration of both forms of data (Creswell, 2014). The researcher used the method to collect, analyze and integrate both quantitative and qualitative data simultaneously. From quantitative paradigm, a cross-sectional survey design was used to collect data from many informants (Mugenda, 2011). Convergent design was preferred against the other designs in mixed methods study because it

allowed each type of data to be collected and analyzed separately and independently, using the techniques traditionally associated with each data type. The target population included all head teachers, head of departments, science teachers, students in public and private secondary schools, and all Secondary Science and Mathematics regional trainers in Buikwe district. Both Probability and non-probability sampling were used. Simple random sampling was used to select 110 Science teachers, 375 students were selected using cluster random sampling while 28 head teachers were selected through census purposive sampling and expert sampling was used to select regional trainers.

Data was collected using questionnaires, interview, focused group discussions and document analysis guide and were subjected to both content and face validity. Cronbach alpha technique determined reliability of quantitative instruments. Quantitative data were analyzed using SPSS version 23 for descriptive and inferential statistics. Frequencies and percentages were used to summarize data while Chi-square Test for associations was used to test hypotheses. The qualitative data were subjected to thematic analysis and findings presented in narrative form.

4. Findings and Discussion of the Study

The students' responses on the teacher experience as an indicator that determines students' academic performance in science subjects are presented in Table 6. The items measured are connected to how teacher experience determines the students' academic performance in science subjects. The scores of the scale are: Strongly Disagree (SD) = 1 Disagree (D) = 2 Undecided (UD) =3 Agree (A) =4 and Strongly Agree (SA) =5. Scores of the scale are presented in frequency and percentages.

Table 1: Students' responses on Teacher experience as a determinant of students' academic performance in Science subjects (n= 375)

Items	SD		D		U		A		SA	
	F	%	F	%	F	%	F	%	F	%
Good performance due to experienced teachers	11	2.9	13	3.5	17	4.5	159	42.4	175	46.7
Poor performance due to less experienced teachers	187	49.9	114	30.4	28	7.5	25	6.7	21	5.6
Knowledgeable teachers enhance good learning	18	4.8	18	4.8	40	10.7	159	42.4	140	37.3
Less experienced teachers teach better than experienced teachers	112	29.9	119	31.7	56	14.9	47	12.5	41	10.9
Proper equipment maintenance due to teaching experience	95	25.3	97	25.9	60	16	79	21.1	44	11.7

According to Table 6, a majority of students; 88.7% asserted that an experienced teacher is catalyst to good performance. This is in line with Adeyemi (2017), who believed that experience strengthens teaching skills of teachers who have consistently trained over a period of years. Additionally, this concurred with a study by Ladd and Sorensen (2016)

which found that students who had experienced teachers for most of their early school experience scored significantly higher in reading than students with less experienced teachers. Students with experienced teachers for at least 2 of the 3 grade levels studied averaged 1.5 IRT unit's greater growth per year. Teacher experience accounted for 8 percent of African American students ' reading success growth and was particularly influential in predicting progress.

In addition, UNICEF (2011) indicated that teachers' skills and experience were important for pupils learning. Furthermore, in an interview with one head teacher which supported the findings in Table 6 and other studies that seemed to agree with the importance of teacher experience, and he said that:

> "*Teacher experience is a catalyst to good performance reason being, this content is taught year in year out. As someone does it year in year out, he or she masters the content and gradually develops different skills of delivering the content to the learners, one can even evaluate himself or herself because there is a basis for evaluation. One might have applied a particular method in the past year, and it did not work well then, they can authoritatively change to another method out of experience. But if you one not have the experience, one cannot tell which method works better for the learners*." (Head teacher 2, Interview, June 19th, 2019)

Experienced teachers are a factor in the performance of learners because they are able to use different skills that have been acquired overtime. Such skills may include interpersonal skills, managing conflicts in class, individualized teaching of weak learners and making groups or teams for discussions in class.

Another aspect that the study asked students to indicate was on whether indeed poor performance in science subjects was caused by less experienced teachers. According to the findings, a majority of the respondents; 80.3% disagreed with the assertion. However, this was in disagreement with a study carried out by Kosgei et al. (2013), who asserted that for teachers who had less than 3 years of experience their students' academic achievement was below average (83.3%) as compared to teachers who had 12 years and above teaching experience whose students' academic achievement was high (100%). Lack of experience by the teacher may negatively impact on the students' performance in such a way that a less experienced teacher may not be in position to use different skills of delivering the content during teaching.

Table 6 also indicates that 79.7 % of students agreed that mostly knowledgeable teachers enhance good performance. This is in line with Agoro and Akinsola (2013) and Ladipo (2013), who indicated that poor quality teachers are one of the major factors responsible for the consistently poor performance of secondary school students in the country's public examinations. Teacher quality is believed to be largely based on the essence of the instruction that teachers undergo, and there is no question that teachers vary in their depth of knowledge of "what" to teach and the "how" to teach due to differences in their own pre-service training. Two groups of teachers (qualified and

unqualified teachers) from three different learning routes, for example, in Ugandan secondary schools are responsible for preparing students for UCE examinations.

According to the findings in Table 6, 51.6% students disagreed with the assertion that less experienced teachers teach better than experienced ones while 23.4% of the students' respondents agreed with the notion that less experienced teachers teach better than experienced teachers. Indeed, students' academic performance and chances for success in exams are greatly enhanced by having been taught by well prepared and experienced teachers. Very experienced teachers are more effective in raising student performance than less experienced teachers. This resonates well with findings of Temitope and Olabanji (2015) that teachers' teaching experience has significantly influenced students' academic performance in mathematics and English language as measured by their performance in the SSC examinations and as perceived by the respondents in a study in Nigeria. However, one of the heads teachers said:

> "*Honestly, one would expect that the more one stays in the profession, the more one gets used to delivering the subject content. But it is unfortunate, according to my experience I have seen schools emerging the best in sciences and other subjects in some districts, but you cannot imagine that in most cases they employ senior six graduates. I have an example in one of the so called rural and weak schools where I was before I moved here, I had a student who scored 3 As and 1B and yet that student was taught by senior six graduates. Therefore, students who have just completed form six can teach so well sometimes better than graduate teachers who have stayed long in the profession. This I have even heard from so many of my fellow head teachers affirming it."* (Head teacher 7, Interview, June 23rd, 2019)

Therefore, teacher experience alone is not enough to make students perform well, there are a number of factors that must be packaged to enable a student to perform well. This is clearly stated in the constructivism theory of Jean Piaget which observed that people construct their own understanding and knowledge of different things such as practical, experiment observation and retention.

4.2 Science teachers' views on teacher experience and students' academic performance

Science teachers were requested to rate the items on teacher experience indicator in determining the Students' academic performance in science subjects, their responses are summarized in Table 7. The Likert's scale was used to get the information. The scores of the scale are: Strongly Disagree (SD) = 1 Disagree (D) = 2 Undecided (UD) =3 Agree (A) =4 and Strongly Agree (SA) =5. Scores of the scale are presented in frequency and percentages.

Table 2: Science teachers' responses on Teacher experience as a determinant of students' academic performance in Science subjects (n=110)

Item	SD		D		U		A		SA	
	F	%	F	%	F	%	F	%	F	%
Experience has made me an outstanding science teacher for the benefit of my learners	4	3.6	2	1.8	7	6.4	44	40	53	48
Students don't fail when taught by experienced science teachers	19	17.3	47	42.7	7	6.4	28	25.5	9	8.2
Teaching science subjects in class for years improves teachers' effectiveness.	7	6.4	9	8.2	7	6.4	43	39.1	44	40
Experience by the teacher may not necessarily translate into better teacher science results	14	12.7	13	11.8	11	10.0	53	48.2	19	17.2
Teachers with few years of teaching experience do not maintain or use science equipment's well during teaching and learning	35	31.8	40	36.4	10	9.1	18	16.4	7	6.4

As shown in Table 7, a majority of the science teachers; 88.8% confirmed that experience has made them outstanding teachers for the benefit of their learners. Indeed, teacher experience in classroom instruction had been a significant determinant of academic performance among learners in many schools. This finding resonates with that of Ogbonnaya's (2009) that there is a significant positive relationship between students' academic performance in mathematics and teachers' background such as teachers' years of experience, especially from six years of teaching. In addition, student performance improves with teacher experience, according to Buddin and Zamarro (2009), but the correlation is low and generally represents poor teacher results during their first or two years in the classroom. Wong (2013) asserted that teacher's teaching experience matters more in teaching mathematics and science subjects.

In a focused group discussion, one SESEMAT regional trainer narrated;

> "*With no doubt, experience matters a lot for a teacher to make learners perform well, but you must know that experience does not come with the number of years one has been in the profession. It is very possible to find a junior teacher in terms of years of teaching but very experienced when it comes to delivering the content and preparing learners to pass the exams while a very senior teacher in terms of years may not be so good in teaching the learners. What brings the difference sometimes is the passion one has for the profession. When one is passionate about the profession, one will always be at seminars and conferences, desiring to learn more which in the end leads to good performance of his or her learners*." (SESEMAT regional trainers, FDG, July 29th, 2019)

Experienced teachers therefore have an increased depth of understanding of the content and how to teach and apply it. Additionally, experienced teachers are more effective with students due to their use of a wider variety of strategies and have a richer background of experience to draw from and can contribute insight and ideas to the course of teaching and learning.

From the findings, 60% of science teachers disagreed with the assertion that students do not fail when taught by experienced science teachers in science subjects. The results are in conflict with Adeyemi (2017), who believed that practice improves teaching skills when learning better from teachers who have consistently taught them over a period of time. In the same breath, there should be a number of factors such as good learning environment; good facilities for use by the students and good delivery skills by the teacher. These factors combined with the experience of the teacher may make the students perform well in the science subjects. Otherwise experience of the teacher alone cannot make the student perform well.

Data in Table 7 show that 79.1% of the science teachers agreed that teaching science subjects in class for years improves teachers' effectiveness while 14.6% disagreed with assertion. In line with the majority of the respondents, it is clear that with the passage of time in the teaching profession, teachers become better and more effective, therefore for most teachers, effectiveness increases with experience. This is also in agreement with one heads of science department in an interview who asserted that:

> "*The more the teacher has many contact hours with the learners the more he or she gains experience to make them pass. Unfortunately, our government only looks at the number of years one has spent in the teaching profession for promotion or increment in salary and this sometimes demoralizes people. But the fact is, there are people who graduated so many years ago but cannot make learners pass well while there are teachers who are new in the profession but very innovative in making learners perform well. This is so because some teachers are naturally intelligent and scored well during their secondary school days. They know what to do to make one pass while others have more contact hours with students which eventually makes them effective*." (HOD 1, Interview, June 19th, 2019).

As teachers gain experience, their students not only learn more, as measured by standardized tests, but also are more likely to do better on other measures of success, such as school attendance. This finding concurs with Tara and Podslsky (2016) who noted that teachers who have repeated experience teaching the same grade level or subject area improve more rapidly than those whose experience is in varied grade levels or subjects. Teaching experience is positively associated with student achievement gains throughout a teacher's career.

From the findings in Table 7; 68.2% of the science teachers disagreed with the idea that teachers with few years of teaching experience do not maintain or use science equipment well during teaching and learning. It is known that science laboratories play an extremely important role in students' active participation in the learning process; hence science teachers are expected to be active in the laboratory environment, handling a number of science equipment. Majority of the respondents asserted that new teachers have the competency to handle the science equipment. This concurred with Copriady (2014), who noted that the professional teachers whether new in the profession or old must have professional educational ability exhibited in preparing and designing an

experiment, hands-on practical or experiment plan, implementing and evaluating a systematic and effective experiment.

4.3 Testing of Hypothesis

A hypothesis was tested using a chi-square test for association at 95% confidence level. The Chi-Square test of association was used to determine if there is a significant relationship between two nominal (categorical) variables. The first hypothesis looked at the relationship between teacher experience and students' academic performance in science subjects.

H0: There is no significant association between teacher experience and students' academic performance in science subjects at UCE in Buikwe district.

Ha: There is a significance association between teacher experience and students' academic performance in science subjects at UCE in Buikwe district.

The results obtained are summarized in Tables 8.

Table 3: Chi-square test for association on science teachers' responses on teacher experience and student academic performance (n=110)

Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	147.143[a]	2	.144
Likelihood Ratio	134.100	2	.385
Linear-by-Linear Association	.671	1	.413
N of Valid Cases	110		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is .04.

In Table 8, Chi-Square Tests result tells us that "0 cells have expected count less than 5 and the minimum expected count is 0.04". Therefore, the sample size requirement for the chi-square test of association is satisfied. The chi-square test statistic (chi-square=34.277) was p = 0.144, more than the alpha level of significance of (0.05). Therefore, we fail to reject the null hypothesis. This tells us that according to the responses from science teachers, there is no statistically significant association between teacher experience and students' academic performance in science subjects at UCE in Buikwe district. This implies that teacher experience can not necessarily determine students' academic performance in science subjects at UCE.

The findings disagree with Adeyemi (2017), who asserted that experience improves teaching skills while students learn better at the hands of teachers who have taught them continuously over a period of time. The overall results indicated that years of experience, as well as the interaction between years of experience and degree level, had an effect on students' performance in both communication arts and mathematics. Teaching experience is positively associated with student achievement gains throughout a teacher's career. Therefore, gains in teacher effectiveness associated with experience are steepest in teachers' initial years, but continue to be significant as teachers reach decades of their careers.

5. Summary of Findings

The major findings are that there is there is no statistically significant association between teacher experience and students' academic performance in science subjects at UCE. In addition, an experienced teacher maybe a catalyst to good performance, however, experience does not come with the number of years that one has spent in the teaching profession since graduation. Experience comes with rate of interaction with the content, students and how one is well disposed to acquire better delivery skills.

6. Conclusions

The main purpose of this study was to explore teacher experience as determinants of students' academic performance in science subjects at UCE in Buikwe District, Uganda. The following conclusions were made based on the findings of the study. First, the teacher experience is essential in enhancing effectiveness of the teacher as well as students' academic performance in science subjects. Therefore, teachers should acquire such through self-improvement, participating in seminars and refresher courses.

Based on the findings, the individual science teachers exhibited certain skills such as planning, organizing, and giving classroom rules to control student behavior, aptitude for team work, commitment, promoting initiatives, teachers' willingness to adjust, creating order in class, creative thinking and actions. However, each individual science teacher needs to be assisted in his or her unique way by the administration to become effective in teaching science subjects.

The study also concluded that overall, schools in Buikwe District performed poorly in science subjects at UCE in the recent years. The poor performance is in all categories of schools such as public and private, single sex, mixed schools, boarding as well as day school. This was so because of varied reasons pertaining to administration, teachers, students and other stakeholders. The identified reasons should be rectified in order to strengthen the study of science subjects which will put Uganda on the course of achieving her vision 2040.

Finally, the study concluded that there is need to provide resources especially construction of well-equipped laboratory, well trained teachers and eliminate part time teaching. This will enable teachers to have enough time to focus on the students. Teachers need to be provided with the teaching and learning materials especially the laboratory materials and be trained to use them. This will enhance the teachers' pedagogical performance and students' academic performance.

7. Recommendations

Basing on the findings of the study, the researcher makes a number of recommendations to education policy makers and implementers: the Ministry of Education and Sports, the Directorate of Education Standards, BOG, head teachers, science teachers, students,

parents and teacher training institutions. These people have different roles to play to ensure effective teacher performance in class and students' academic performance in science subjects. It is hoped, that if implemented the recommendations will set the agenda for strengthening the quality and effectiveness of the science teachers in class which may lead to good academic performance of students in science subjects.

The Buikwe District Education Department should have induction training in schools for the new science teachers. The teaching career's integrity must be instilled in the teachers who enter the teaching career to gain all the needed quality indicators which are beneficial to the learners. At District level, the head teachers should be well prepared to help teachers develop pedagogical and professional skills.

Head teachers should be innovative and supportive to students and science teachers. They need to provide the needed equipment and apparatus that are used in teaching science subjects. This is because science teachers need to use various teaching resources that are affordable and available to improve the quality of teachers and academic performance of students.

Strategies such as the symposium, discussion of staff, and participation of teachers in collective teaching methods enable teachers to improve their teaching skills. There are other approaches that can be used; having departmental notes, organizing science seminars in school, book clubs, and participation in curriculum design seminars and teachers networking. This should be done at the start of every term so that teachers teach with a lot of ease throughout the semester.

The MOES should invest more in building a robust school inspection system with a competent human resource to ensure accountability and guarantee compliance to education standards. It should continuously improve teacher quality and effectiveness through staff professional development. The MOES also needs to build the capacity of teachers and head teachers for self-evaluation and internal evaluation or inspection through appropriate in-service development programmes. The empowerment of teachers and head teachers in internal evaluation could help in closing the gaps caused by absenteeism by teachers, big workloads for some teachers and making teachers and head teachers accountable to each other at the school level.

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