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Why Rural Community Day Secondary Schools students' performance in Physical Science examinations is poor in Lilongwe Rural West Education District in Malawi

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A study was conducted to investigate factors that affect students' poor performance in physical science examinations at Malawi School Certificate of Education and Junior Certificate of Education levels in Community day secondary schools (CDSS) in Lilongwe Rural West Education District in Malawi. Students' performance was collected from schools' Malawi National Examination Board results. Focus group discussion and personal interviews with students, teachers and parents were conducted. Regression analysis, Pearson Correlation and wilcoxon tests were run to determine relationship, correlation and level of significance between the identified factors and students' performance. Analysis of variance, level of significance and standard error deviations (SED) were worked out using SPSS 17.5 version. Results indicate that students' performance in un-approved CDSSs were significantly poor and different from approved CDSS ($p<0.01$, $a=0.001$), day secondary schools ($p<0.05$, $\alpha=0.05$) and national secondary schools in Lilongwe. Students' performance in CDSS without subject specialist was significantly low and different from CDSS with subject specialist ($p<0.001$, $a=0.05$). Students' higher frequency of outings and absenteeism strongly correlated with poor students' performance and greatest record of students' absenteeism in physical science lessons was recorded in rural CDSS and un-approved urban CDSS. Empirical models of the students' performance was more skewed towards poor performers than excellent performers in CDSS, unapproved CDSS, rural CDSS, CDSS without subject specialist, CDSS with majority of students operating from own home or in self-boarding hostels and CDSS with majority of students lacking home support or parental involvement in their education. Lack of or poor home support, high frequency of students' absenteeism, late reporting for classes and absence of subject specialist ranked high in impeding students' performance in both rural CDSS and unapproved CDSS in the study area. Education authorities should consider addressing the raised factors in order to level ground for students' performance in national examinations in all secondary schools.

Key words: Performance, students, community day secondary school, physical science.

INTRODUCTION

National examination reports in recent years have indicated that students continue to perform poorly in physical science examinations in most Community Day Secondary Schools (CDSS) in Malawi. In 2014 physical

science examiners report indicated students' performance in Physical science was poor in both CDSS and conventional day secondary schools (MANEB, 2013a; MANEB, 20143) despite being a prerequisite subject to most tertiary science careers. Most worrying are the rural CDSSs where pass rate was as low as 2%. It should be pointed out that Physical science is pivotal to country's development. Studies in physical science introduces learners to basic chemistry and physics principles vital scientific background (Dzama and *Osborne,* 1999) likely to enable learners pursue various careers in pure sciences, biotechnology, engineering, medicine, science and technology, natural sciences and many other related fields.. The noted poor performance at MSCE and JCE levels may indicate that majority of our secondary school learners are ill-prepared for these careers. Physical science, being a practical subject, requires substantial investment in terms of infrastructure. It requires a laboratory for experiments and practical sessions including during examinations. Most district day boarding secondary schools have purposely built laboratories which make them offer the subject without major hitches in terms of infrastructures. Unlike district day boarding secondary schools, most CDSS emanated from primary schools without proper structures and without purposely built laboratories for physical science practical lessons or demonstration sessions. Some of these CDSS operate as unapproved CDSS while others are approved CDSS. Almost all unapproved CDSS and some approved CDSS do not have facilities such as competent qualified Physical Science teachers, text books, laboratory and laboratory equipment for teaching Physical Science subject (MOEST, 2000). Most CDSS use laboratory of neighbouring conventional secondary schools or colleges for Physical science experiments (laboratory lessons) or practical examinations. Where CDSS do not have such alternative laboratories to use, teachers offer physical science without conducting a single experiment or conduct a demonstration of the required concept. Since laboratory practical experience offers significant contribution to meaningful learning (Smaldino et al., 2008) as well as successful delivery of physical science content (Dzama and *Osborne,* 1999), students who do not have such experience are ill prepared for a career with physical science subject as a prerequisite subject as well as for physical science examinations (Smaldino et al., 2008). Secondary school physical science is taught by unqualified teachers and/or primary school teachers in unapproved CDSS and some approved CDSS (MOEST, 2000) which compromise issues of quality and equity in terms of education standards since only competent physical science teacher can competently deliver content of physical science, physics or chemistry subjects (Long et al., 2014). Therefore, the noted poor performance in Physical Science examinations at JCE and MSCE in CDSS (especially unapproved CDSS) could reflect the incompetence of teachers in classroom interaction with students (Smaldino et al., 2008; Long et al., 2014). Since students' performance is one of those most relevant and qualified sources of determining whether or not classroom learning experience are productive, informative, satisfying or meaningful, it is justifiable to suggest that the observed poor performance could possibly be a result of such incompetence of teachers. Students' performance provides legitimate indicators of students' academic performance and satisfaction even though some researchers have argued that they are not direct measures of teachers' effectiveness and performance (Lamdin, 1996; Myers, 2000; Theall and Franklin, 2001). However, substantial research has connected students' satisfaction to effective teaching methods (Long et al., 2014). In addition, teachers who have developed strong teaching competencies such as mastery of subject matter knowledge and/or subject specific teaching methods deliver quality teaching that directly relates to students' achievement and superb performance (Lamdin, 1996; Matzler and Woessmann, 2010; Myers, 2000). Teachers that lack subject matter knowledge and subject specific teaching methodology are unable to comprehend the students with relevant knowledge and skills required for that particular subject. It is perceived that majority of Physical Science teachers in unapproved CDSS lack physical science subject matter knowledge as well as physical science subject specific teaching methodology which is important for physical science teachers to delivery training that meets the desired students' learning outcomes and learning satisfaction (Long et al., 2014).

Poor performance in physical science examination could also be attributed to poor provision of learning resources such as physical science text books and chemicals for laboratory experiment experience even in school with good laboratory facilities (Myers, 2000; Dzama and Osborne, 1999). High failure rates and the poor quality of the students could be a reflection of inadequate text books and reagent chemical for practical sessions in most CDSS. Lack of textbooks impairs students' performance as students may not have additional literature to consolidate the acquired knowledge (Farrant, 1997; Ndimbirwe, 1995). Availability of textbooks offers students to expand their understanding of particular concepts or principles being studied beyond the teachers' ability of delivery (Farrant, 1997). It helps mastering concepts and principles.

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Students' performance in rural remote areas may be poorly affected by parental support at home (Hoover-Dempsey and Sandler, 1997; Green et al, 2007). Parental involvement in their children's education varies with socioeconomic status (Ireson and Rushforth, 2014), parent's sense of efficacy for helping their child succeed at school (Bandura, 1997), and parent's construction of his or her role in the child's life (Hoover-Dempsey and Sandler, 1997). Parents with higher socioeconomic status are more likely to support their children with private tutors (Green et al., 2007; Hoover-Dempsey and Sandler, 1997) while with lower socioeconomic status are less likely to support their children with private tutors. Since majority of parents in Lilongwe rural communities are financially poorer than those in Lilongwe City, it is expected that majority of students in rural CDSS may be less likely supported by private tutors while those in the city may be adequately supported by private tutoring and or part-time tutors in addition to attending normal classes. Parents' construction of their role in the child's life is dependent of parents' level of education and the value they place on education generally (Ireson and Rushforth, 2014; Long et al., 2014; Hoover-Dempsey and Sandler, 1997). Since majority of the parents in rural areas are poorly educated and may not value educational achievement of their children therefore, they may fail to provide higher levels of home support. On the other hand, majority of parents in cities and urban areas have appreciable education of some kind (MIE, 1998) which may make them value educational achievement and ably calibrate the need for private tutoring against the family's intellectual capital and resources, hence provide higher level of home support to their children (Long et al., 2014; Hoover-Dempsey and Sandler, 1997). Therefore, there is need to examine and compare parental involvement in their children's education in rural CDSSs and urban CDSS. Therefore, the current trend of students' performance in physical science national examinations requires investigation to establish the extent of variations and reasons behind the variations for appropriate interventions to remedy the situation.

Students' absenteeism negative influences their students' performance (Epstein and Sheldon, 2002; Balfanz and Byrnes, 2013). In some schools, students' absenteeism is checked by calling students' register on daily basis. Students with chronic absenteeism for no valid reasons are punished accordingly to deter the same and to encourage as many students as possible to fully participate in classroom learning activities and thereby enhance meaningful learning. Students' full participation in classroom activities has greater benefits especially in science classes such as laboratory practical (Dzama *and Osborne,* 1999). It is alleged that students in CDSS miss classes chronically at will for no apparent reasons. Students characterized with chronic absenteeism score lower grades and are more likely to drop out than students with better attendance (Balfanz and Byrnes, 2013; Theall and Franklin, 2001). Thus, high students' failure rates in national examinations in CDSS could be a reflection of chronic absenteeism. Hence, the need to investigate the extent to which absenteeism has affected students' performance in Lilongwe. Therefore, a study was conducted to investigate why Rural Community Day Secondary Schools (CDSS) students' performance in Physical Science examinations is poor at Malawi School Certificate of Education and Junior Certificate of Education levels.

METHODOLOGY

Data collection

Study was conducted using two main methods namely: administration of questionnaires and face-to-face interviews with students and physical science teachers in the sampled secondary schools. Ten Community Day Secondary Schools (CDSS) were randomly selected in Lilongwe Rural West Education District in Malawi. Information regarding qualification of physical science teachers in the selected CDSS, students' performance in physical science national examinations, mode of operation to CDSS (i.e. whether self boarding or commuting from own home), frequency of students' absenteeism and unpermitted outing, amount of home support students receive and number of students that attended preschool education were collected from the school based information and interviews.

Data analysis

Statistical analyses were conducted in order to establish factors that affect students' poor performance in physical science examinations at Malawi School Certificate of Education and Junior Certificate of Education levels in Community Day Secondary School (CDSS) in Lilongwe Rural West Education District in Malawi. Specifically, descriptive analyses compared mode of schooling (operating from Own home (OH), self boarding facilities (SBF) and full boarding facility (FBF)), absenteeism in physical sciences classes, preschool education and home support across the secondary school types (unapproved CDSS, approved CDSS, DSS and NSS) and investigated the relationships and correlation among the tested variables. Regression analyses examined the extent to which mode of schooling (operating from Own home (OH), self boarding facilities (SBF) and full boarding facility (FBF)) impacted on students' absenteeism and students' performance in physical science examination. Analysis of variance, level of significance and standard error deviations (SED) were worked out using SPSS 17.5 version (SPSS, 2007).

RESULTS AND DISCUSSION

Performance in Physical Science National examination

As shown in Table 1, students who passed Junior Certificate of Education (JCE) examinations with A and B grades in both 2011 and 2013 academic years in CDSS were significantly lower than those in DSS ($p<0.045$, $\alpha=0.001$) and NSS ($p<0.015$, $\alpha=0.001$). The results indicate

Table 1. JCE students' performance in Physical Science in schools with unqualified Physical Science teachers.

	2011					2013				
School	**A**	**B**	**C**	**D**	**F**	**A**	**B**	**C**	**D**	**F**
Percentage of students										
Approved CDSS	0.0	0.0	17.0	66.0	17.0	0.0	2.4	15.9	57.3	24.4
Non approved CDSS	0.0	0.0	2.4	55.6	41.9	0.0	0.0	6.5	72.8	20.7
NSS	18.8	50.4	27.1	3.8	0.0	43.1	34.7	16.7	5.6	0.0
DSS	7.7	23.9	56.8	11.0	0.6	9.8	22.6	45.1	22.6	0.0

Note: A = 80-100; B = 65-79; C = 50-64; D = 40-49; F =<40.

Table 2. MSCE students' performance in *Physical Science.*

	2012					2013				
School	**1-2**	**3-4**	**5-6**	**7-8**	**9**	**1-2**	**3-4**	**5-6**	**7-8**	**9**
Un approved CDSS	0.0	1.0	4.5	45.4	49.0	1.5	1.5	10.6	57.6	28.8
Approved CDSS	0.0	5.9	11.9	31.5	50.8	0.0	8.3	11.1	66.7	13.9
National SS	8.8	48.5	30.4	11.3	1.0	12.9	40.0	36.9	9.8	0.4

Note: 1-2 = 75-100% marks; 3-4 = 65-74 marks; 5-6= 50-64 marks; 7-8= 40-49 marks; 9=<40 marks.

indicate poorer performance in CDSS than NSS or DSS. Similarly students that scored failing grades of D and F were significantly higher in CDSS than in DSS ($p<0.051$, $\alpha=0.001$) and NSS ($p<0.021$, $\alpha=0.001$). The analysis reveals great disparities in performance among students studying for JCE examinations in CDSS, DSS and NSS. The results indicate that majority of students in CDSS seem to find physical Sciences examinations more difficult than those in DSS and NSS. In a comparison between approved CDSS and unapproved CDSS, better performance was observed in approved CDSS than in unapproved CDSS (Table 1). However, percentage of students who scored grades of A and B in approved CDSS were not significantly different from those of unapproved CDSS IN 2011 ($p<0.205$, $\alpha=0.05$) in 2011. Whereas percentage of students who scored grades A and B in approved CDSS were significantly higher than those who scored similar grades in unapproved CDSS in 2013 ($p<0.021$, $\alpha=0.05$). Similarly, percentage students that scored grade A in NSS were significantly higher than those in DSS in 2011 ($p<0.031$, $\alpha=0.001$) and in 2013 ($p<0.015$, $\alpha=0.001$), indicating much better performance in NSS. Percentage of students who scored poor grades of D and F were significantly higher in CDSS (approved and unapproved) than in DSS ($p<0.05$, $\alpha=0.05$) and in NSS ($p<0.021$, $\alpha=0.05$), indicating that more students scored poor results in CDSS. The better performance in DSS and NSS is attributable to a number of factors including monitored compulsories evening studies, dedicated competent physical science teachers, strict discipline measures, restricted outings that limit classroom absenteeism and many others (Matzler and Woessmann, 2010; Balfanz and Byrnes, 2012; Tucker and Stronge, 2005; Farrant, 1997). Some of these factors were studied and are reported and discussed in subsequent sections.

As shown in Table 2, percentage of students who scored high quality grades of 1,2,3 and 4 in NSS were significantly higher than those who scored grades within the same range in approved CDSS ($p<0.035$, $\alpha=0.05$) and unapproved CDSS ($p<0.055$, $\alpha=0.05$) in 2012. Similarly, students scored failing grades of 7, 8 and 9 were significantly lower in NSS than those who scored the same range of poor grades in approved CDSS ($p<0.045$, $\alpha=0.001$) and in unapproved CDSS ($p<0.055$, $\alpha=0.05$) within the same period. The results indicated significant disparities in students' performance which may result from serious absence of certain learning requirements to enhance equal learning conditions in NSS and CDSS. Analysis of students' performance in 2013 indicated a slight departure to the observed trend. Students who scored high quality grades of 1,2,3 and 4 in NSS in 2013 were less significantly higher than those who scored grades within the same ranges of grades in approved CDSS ($p=0.125$, $\alpha=0.05$) and unapproved CDSS ($p=0.27$, $\alpha=0.05$). Students who scored failing poor grades of 7, 8 and 9 in NSS were less significantly different from those who scored the same range of failing poor grades in approved CDSS ($p=0.075$, $\alpha=0.001$) and in unapproved CDSS ($p=0.15$, $\alpha=0.05$) in 2013 school year, indicating similar percentage of students attained these failing grades. The congruency of performance could probably be attributed to the reported leakage of the National Examination papers, rather than improvements in learning and teaching in CDSS. Due to the leakage, a larger percentage of students scored at least 7 points in physical Science subject than in previous years. However, number of students getting high quality

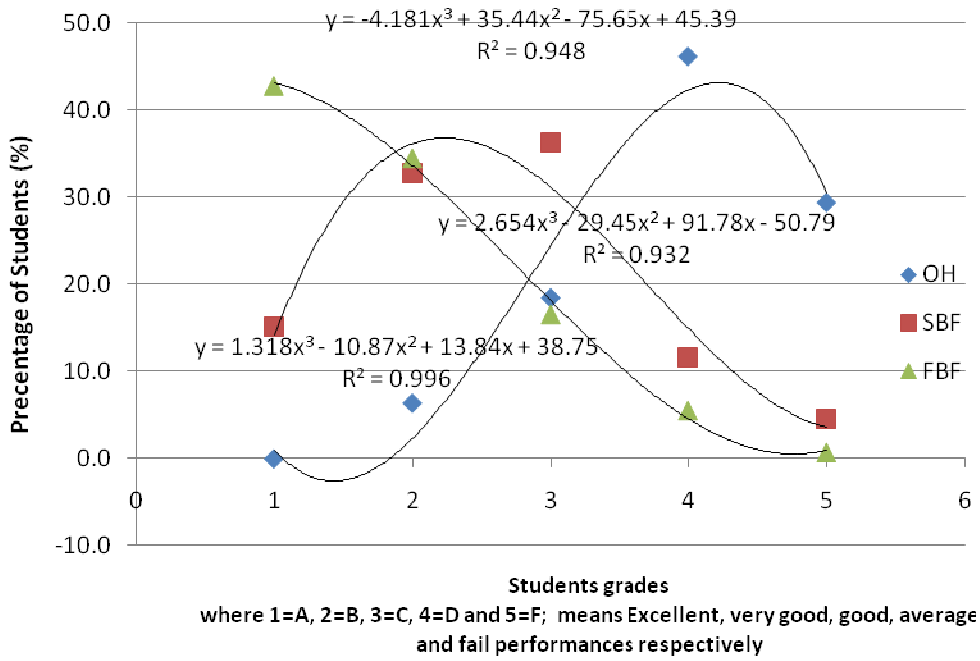

Figure 1. Impact of OH, SBF and FBF on JCE grades distribution in different schools. (Note: OH=Own home, SBF=self boarding facilities, FBF=full boarding facility; 1=A, 2=B, 3=C, 4=D and 5-F where A, B, C, D and F means Excellent, very good, good, average and fail performances respectively).

grades of 1, 2, 3 and 4 were still significantly higher in NSS than in CDSS, implying that leakage of examination papers had minimal impacts upon attaining distinction and strong credits passes (excellent and good performance), in the examinations (good to excellent performance) probably because such students in CDSS never mastered the concepts and principles. Therefore, they still found Physical Science subject difficult and scored poor grades besides the leakage.

As shown in Figure 1, graph line of students' performance operating from own home was skewed to right, indicating majority of students (>76%) operating from own home in rural CDSS performed miserably. . The graph line of student students' performance operating from full boarding was more skewed to the left, indicating that majority of students operating from full boarding (>67%) had good performance. The graph line of student students' performance operating from self boarding facilities was less skewed to right, indicating majority of students operating from self boarding facilities scored average grades; hence average performance indicated significant improvement (p=0.27, in physical science examinations. The results could be attributed to lack of home support given to students operating from own homes in rural CDSS. Most parents and guardians in rural CDSS are without formal secondary school education; hence they may not be able guide their students. Most parents in rural CDSS may not afford private tutoring for their students, hence not well supported. On the other hand, full boarding facilities which are usually managed by school authorities provides students with opportunity for peer teaching and learning, which improve their understanding and comprehension of difficult concepts. This consequently improves their performance in national examinations.

Impact of commuting from own home, self and full boarding facilities on Community Day Secondary Schools (CDSS) in terms of students' absenteeism and /reporting late for classes in term or semester

The results indicate that OH and SBF significantly increasers students absenteeism in Lilongwe DCSS ($p<0.051$, $\alpha=0.001$) whereas FBF significantly reduced students' absenteeism ($p<0.045$, $\alpha=0.05$). Thus there were significant differences in absenteeism among students in OH and SBF and FBF. As shown in Figure 2, chronic absenteeism was most prevalent and evident among students operating from OH and SBF. Chronic absenteeism was less prevalent and evident among students operating from FBF. As shown in Figure 2, further analysis showed that mode of operation was a function of absenteeism. Number of students operating from own home indicated a positive curvilinear relationship with absenteeism ($R^2 = 0.938$) (Figure 2). The correlation confirms that increased number of students operating from own homes in rural CDSS corresponded

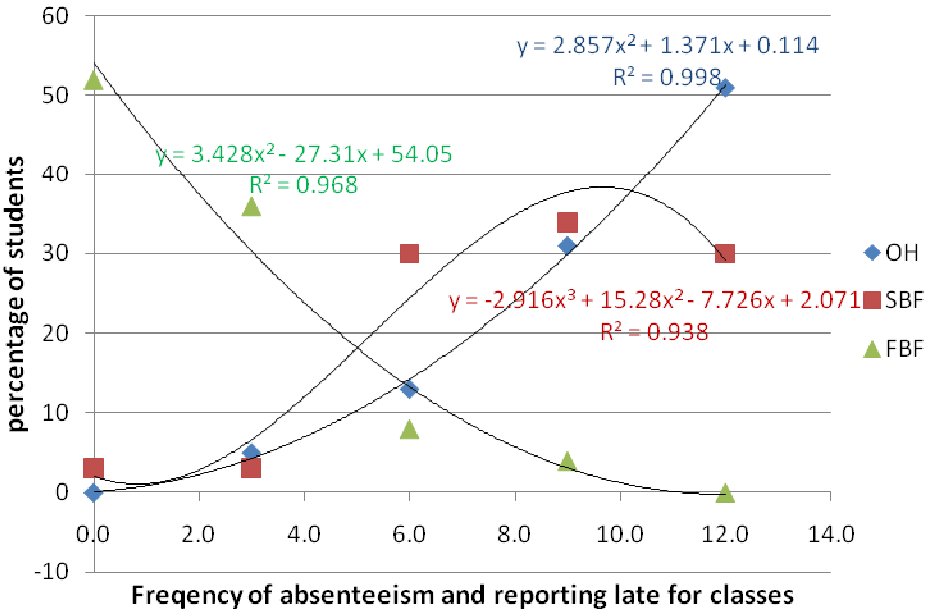

Figure 2. Impact of OH, SBF and FBF on absenteeism/reporting late for classes per term.

increased students' absenteeism. On the contrary, number of students operating from FBF, especially those managed by Association of Christian educators in Malawi (ACEM), indicated a negative curvilinear relationship with absenteeism (R^2 = 0.968) (Figure 2). The finding indicates that increased number of studenst operating from FBF in rural CDSS corresponded with decreased students' absenteeism. The difference is attributable to poverty levels among students. Majority of the low-income students fail to secure places in FBF CDSS and private schools, hence operate from OH or SBF. Therefore, the chronic absenteeism could be explained by the low-income status of the students in CDSS since chronic absenteeism is most prevalent among low-income students (Balfanz and Byrnes, 2012).

As shown in Figure 3, majority of students with excellent and very good performance were those with no record absenteeism and with at most three times absences in physical science class. Thus, excellent performance was observed in students with no registered record of absenteeism followed by those with low frequency of absenteeism, confirming that students with better attendance score higher on achievement tests (Epstein and Sheldon, 2002; Lamdin, 1996; Myers, 2000). Among those who scored low grades, students with frequent absenteeism were largest followed by those with at least three times absences; then those with no record of absenteeism. Upon employing Pearson correlation analysis, the study established a strong relationship between students' excellent performance and minimal frequency of absenteeism ($r=0.785$, $p<0.001$) in the studied CDSS. Thus, students' poor performance strongly correlated with high absenteeism frequency ($r=0.867$, $p<0.001$). Performance of students with an average rate of absenteeism of approximately 3-5 times per term was almost normally distributed. The results indicate that chronic absenteeism could be the likely factor that impaired students' meaningful and effective learning (Balfanz and Byrnes, 2012) in CDSS. Therefore, increase in chronic absenteeism was probably responsible for the observed poor performance gaps (Epstein and Sheldon, 2002; Ginsburg, 2013; Balfanz and Byrnes, 2012) at both JCE and MSCE levels in Lilongwe Rural West Education District CDSS. The finding could be explained by the amount of subject matter that students miss as chronic absenteeism emerges. Students with chronic absenteeism missed significant subject knowledge which increasingly made it difficult for the students recap the subject matter colleagues mastered during the period they were absent. However, about 6.25% of the students characterized with chronic absenteeism performed better. These could probably be among those whose CDSS had competent qualified teacher (Tucker and Stronge, 2005) and/or received private tutoring or peer teaching at home. Therefore, home support and high level of competency of teachers handling the subject enhanced meaningful learning as well as mastery of the physical science subject matter (Epstein and Sheldon, 2002; Balfanz and Byrnes, 2012; Tucker and Stronge, 2005).

Qualifications of Physical Science teachers currently teaching secondary schools

As shown in Figure 3, high failure rates and the poor quality of the students could also be a reflection of the

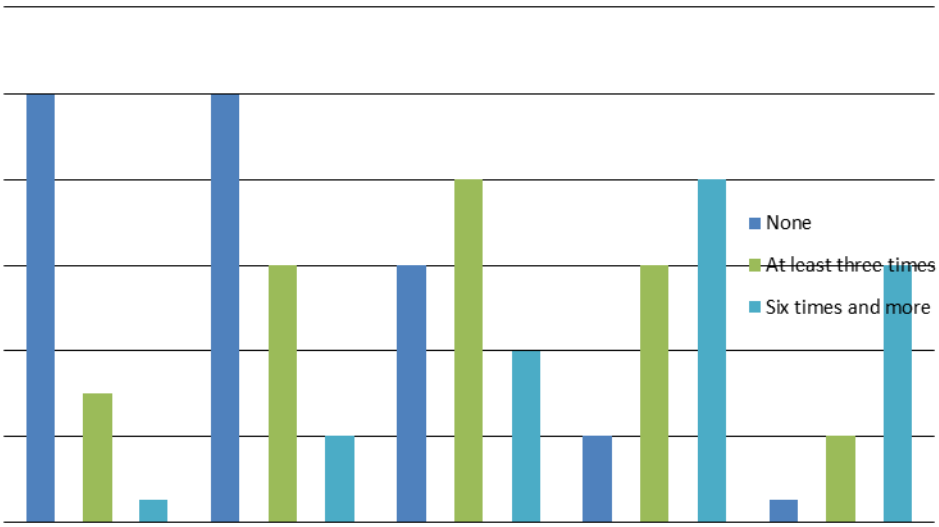

Figure 3. Effect of absenteeism frequency on performance.

Table 3. Effect of teachers' qualification on students' performance.

Teacher qualifications	Percentage of students attaining specific grades in a class.				
	A	B	C	D	F
Qualified competent physical science teacher	41.3	31.3	23.8	3.8	0.0
Qualified in non science subjects	0.0	1.6	29.8	60.5	8.1
Not qualified to teach at secondary level	0.0	0.0	6.5	72.8	20.7

teaching quality or lack of physical science teachers' competencies (Long et al., 2014; Long et al., 2014).

As shown in Table 3, about 72.6, 1.6 and 0% of the students scored at least B grades in classes managed by qualified competent physical science teachers, teachers qualified in non science subjects and teachers not qualified to teach at secondary level respectively. The results indicate that majority of the students in classes with competent teachers scored very good grades of A and B confirming that students in schools with qualified teachers perform better (Myrberg and Rosen, 2014), underscoring the significance of high quality teacher education program prepared for teaching in specific subjects at secondary school level (Myrberg and Rosen, 2014). Teaching efforts of qualified highly effective teachers yield high rates of students' learning (Morris, 1995; Tucker and Stronge, 2005). Further analysis indicated that students' performance in physical science is negatively affected by un-qualified incompetent teachers. The results indicate students' performance was negatively influenced by under qualification or Physical science Teachers in rural CDSS. Thus, incompetence of teachers in classroom interaction with the students could be responsible for the observed poor performance of students in National Examinations in CDSS (Bandura, 2001; Long et al., 2014) implying that learning experience was unproductive, not informative, unsatisfactory or not meaningful (Davison and Kanyuka, 1990), hence the observed students' poor performance. However, even though some researchers argue that opinions on these matters do not provide direct measures of teachers' effectiveness (Theall and Franklin, 2001), they provide legitimate indications of students' academic performance and satisfaction. Furthermore, there is substantial research connecting student satisfaction to effective teaching methods (Theall and Franklin, 2001; Long et al., 2014) since teaching quality is reported to be directly related to the students' achievement (Matzler and Woessmann, 2010), underscoring the importance of developing strong teaching competencies among CDSS teachers in order to deliver quality teaching.

Effect of home support on students' performance

As shown in Table 4, majority of students in rural CDSS do not receive adequate home support such as private tutoring, pear teaching at home etc since majority of students in CDSS are from poor background that could not afford to hire private tutors for their children and wards (Davison and Kanyuka, *1990*). Thus, poverty in rural areas negatively influences the need for hiring of private tutoring. The result supports the findings of those children in higher socioeconomic status families are more

Table 4. Effect of Home support on students' performance.

	Urban					Rural				
	Average no of students scoring specific grades per category of home support in a class.									
Amount of support	A	B	C	D	F	A	B	C	D	F
Supported by part time teaching	12	11	5	1	1	2	1	0	0	0
Parents helping their children with home work	4	7	4	2	1	2	1	1	0	1
Less often support	1	1	4	6	5	1	0	2	6	5
Receive no support	1	0	1	3	7	1	1	1	3	17

Table 5. Effect of preschool education on students' performance.

School	Background	80-100	70-79	50-69	40-49	0-39
RCDSS	No preschool	0.0	1.1	13.1	42.1	28.6
	Preschool	0.0	5.3	4.9	4.2	0.9
UCDSS	No preschool	2.6	2.9	20.7	4.8	4.3
	Preschool	12.5	29.8	15.6	3.8	0.1

likely to have tutors than children in poorer families (Davison and Kanyuka, 1990; Ireson and Rushforth, 2014). Significant support was observed in urban CDSS. Parents may use private tutoring as an affordable alternative to private schooling. However, involvement in home learning and private tutoring are both affected by unobserved characteristic such as parents' beliefs about learning and the value they place on achievement (Ireson and Rushforth, 2014; Long et al., 2014).

The results in Table 4 also indicate existence of minimal parental involvement in helping their wards or children with school work in rural CDSS compared to urban CDSS. Parental involvement in children's school work in rural CDSS was significantly lower than in urban CDSS (Chi square=23.98769, $p<0.001$, $\alpha=0.01$, Pearson), indicating parents in urban CDSS provided higher levels of home support. Parent with children in urban CDSS probably calibrated the need for private tutoring upon noting poor performance of their wards or children (Ireson and Rushforth, 2014). On the contrary, parents in rural areas, due to poor education background and limited resources could rarely calibrate such a need to support their children with home support because majority of them are formerly educated (Davison and Kanyuka, 1990). Alternatively, they quickly marry them off if their children or wards are finding difficulties with academic life especially for girl children because majority of parents in rural areas are not formerly educated (Davison and Kanyuka, 1990). However, the results indicate that students who received meaningful home support in both rural and urban CDSS significantly perform much better (Chi square=22.5465, $p<0.001$, $\alpha=0.01$, Pearson) than those received minimal or poor or no such support at all, suggesting that home support significantly influenced children's performance in CDSS. The observation support findings that private tutoring positively affects performance and promote children's success throughout their school experience (Vukovic et al., 2012; Green et al., 2007).

Effect of preschool education on students' performance

As shown in Table 5, over 97% of students in urban CDSS attended preschool school education and their English language hearing and listening skills were more superb than those who did not attend such preschool education. Less than 6% in rural urban CDSS attended preschool education English language hearing and speaking skills were quite good in comparison to those who did not attend preschool. Therefore, superb performance of students in urban CDSS could be attributable to preschool background in such schools. Students who attended kindergarten might have developed "better pre-reading skills, richer vocabularies, and stronger basic math skills than those who do not," (Barnett, 2008; Kanter, 2014) hence performed better. Majority of the students who indicated they did not enter kindergarten had difficulties in communication skills. Most teachers in rural CDSS engage students in vernacular language (Chichewa) most often and yet students are tested in English language (Kanter, 2014). On the other hand, speaking English is compulsory in most urban schools; hence students in urban schools are less likely to be challenged with communication in English. Thus, rural CDSS students are greatly disadvantaged with learning process as well as examination language supporting that

Table 6. Why students' performance in physical science is miserable in unapproved CDSS.

Constraints	Percentage	Rank
Reporting late classes	87	3
High frequency of absenteeism	89	2
Incompetent physical science teachers	95	1
Lack home support	74	4
Students are lazy in CDSS	37	6
Lack of monitored study	68	5

"well-designed preschool education programme produce long-term improvements in school success, including higher achievement test scores, lower rates of grade repetition and special education, and higher educational attainment" (Barnett, 2008). Economically, disadvantaged students who attend preschool education reap long-term benefits from such preschool education.

Both students and teachers in approved and unapproved CDSSs identified five critical factors that they feel contributes to poor students' performance in their schools (Table 6). A factor that ranked highest was that of incompetent physical science teachers (95%), followed by high frequency of students' absenteeism (89%), then late reporting for classes (87%) and poor home support (74%) which have been explained above. Lack of monitored study, though not ranked highly seems to be more eminent among students operating from self boarding and own homes. School authorities have no mandate on monitoring studies of students operating from private dormitories (Mlangeni, 2015). Therefore, there is room that the suggested factors could possibly impede students' performance in rural CDSS and unapproved CDSS.

Conclusion

Research findings underscore the importance of developing strong teaching competencies in CDSS teachers in order to deliver quality teaching since students meet the desired learning outcome and learning satisfaction if their teachers are well versed with the subject matter. Furthermore, the study identifies mode of schooling in rural areas (operating from Own home (OH), self boarding facilities (SBF) and full boarding facility (FBF)), amount of home student support, incompetence of CDSS teachers, early childhood education (kindergarten education) to evidently affect performance in physical science. Unsatisfactory performance rural CDSS correlated with operating from own home (OH) and small boarding facilities (SBF), unqualified physical science teachers, lack or limited home support and lack of kindergarten education in majority of the students. Relatively superb performance in physical Science examinations Day and National secondary schools (DSS and NSS) positively correlated with operating from FBF in which study period is strictly monitored, availability of qualified competent physical science teachers, positive home support through private tutors and attending kindergarten education that provided the students with basics numerical and verbal skills. More physical science teachers should be trained and be deployed in rural areas. An increased number of preschool classes in rural areas should be established as part of compulsory education. Education authorities and stakeholders should develop education programmes that target rural parents to sensitise them on effects of students' absenteeism on performance and lifelong achievements, their role in providing home support to their children and putting more structures for monitored full boarding facilities in CDSS.

Conflict of Interests

The author has not declared any conflict of interests.

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