

Examining the teaching and learning resources related challenges facing small and medium-sized public secondary schools in Kenya: A comparative analysis

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ABSTRACT

This article reports on the quantitative research survey findings regarding the challenges related to the teaching and learning resources affecting small and medium sized public secondary schools in Kenya. The aim of this study is to investigate the secondary school principals' views on the teaching and learning resources related challenges facing small and medium sized secondary schools. The study took place in Nyamira County and adopted a quantitative survey design. The study is a quantitative survey involving 81 public secondary school principals. Questionnaires (both open and closed-ended, and rating scale items) were used to collect data. The resulting data was analysed using Statistical Package for Social Science (SPSS) producing descriptive data. 14.4 and 4.8% of small and medium sized secondary schools respectively lack a library resource; 8.4 and 2.4% of small and medium sized secondary schools respectively lack laboratory resource and one small school lack a sports facility. Besides, 16.8 and 19.2% of small and medium sized secondary schools respectively assessed library as poor or average; 26.4 and 21.6% of small and medium sized secondary schools respectively assessed the laboratory resource as poor or average; 21.6 and 15.6% small and medium sized secondary schools respectively assessed classroom as poor or average; 27.6 and 14.4% of small and medium sized secondary schools respectively assessed furniture as poor or average; 27.6 and 19.2% of small and medium sized schools respectively assessed staffing level as poor or average and 27.6 and 18% of small and medium sized secondary schools respectively assessed workshops as poor or average. Other resources assessed as poor or average include playgrounds and sports facility. In conclusion, some small and medium sized secondary schools lack library, laboratory and sports facility. Other small and medium sized secondary schools charged all the teaching and learning resources considered in this article unfavourably suggesting some concerns about them in relationship to teaching and learning process.

Keywords: Resources, small and medium-sized schools, public secondary schools, challenges, Kenya.

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INTRODUCTION

There is significant consensus across school effectiveness literature regarding the importance of resources in the teaching and learning process (Owoeye and Yara, 2011; Onderi and Makori, 2013; Barrett et al., 2007; Gichura, 2003; Makori and Onderi, 2013; Lockheed et al., 1986; Musasia et al., 2012; Pule, 2007; World Bank, 2008). Resources considered in this article include textbooks, laboratory, equipment, playgrounds, sports facility, workshops (Mobegi et al., 2010; World Bank,

2008; Mudulia, 2012; Pule, 2007); Sports facility (Pule, 2007). All these resources are discussed in details in the literature review section of this article. However, the importance of these resources in the teaching and learning process is influenced by factors such as quality, availability, efficiency, conditions of resources, accessibility, participation and also resource; pupil ratio (Mobegi et al., 2010; Barrett et al., 2007; Pule, 2007; Mji and Makgato, 2006; Etsey, 2005; Mudulia, 2012;

Ogunmade, 2005). It is the positive combined effect of these resources factors that impact on students' or pupils' teaching and learning and/or achievement. It can therefore be argued that lack of one or several of these factors undermines the impact of resources on students' achievement. For instance, Steele (2007) observes that teachers may be inefficient in the use of certain resources and therefore weakening their impact on the teaching and learning process. Consequently, if the resource's impact is weak because it is inappropriately used by a teacher then it follows that its relationship to or impact on students' achievement may be negative or poor. It is also possible that the teachers using a particular resource are not well trained or competent enough and therefore the impact of that resource in the teaching and learning process may be poor or rather weak. In this case, the resource's negative contribution to the teaching and learning process is attributable to the teacher's incompetence or lack of the necessary skills. In reference to another factor, Engin-Demir (2009:23) as cited in Makori and Onderi (2013:175) argues that: "... merely equipping schools with such facilities is not enough to raise student achievement, rather what matters most is whether these facilities are utilized properly"

In that connection many studies have reported wide ranging verdicts on teaching and learning resources such as no significant effect, little association, inconsistent, negative or mixed results because they have failed to take care of the aforementioned factors in their investigations. For instance, inconsistent result has been attributable to methodological issues (Wei et al., 2011).

Having said that, it is important to reiterate the fact that expectations on educational researchers are high, for instance, many policy-makers and other stakeholders in education argue that educational researchers need to do more in terms of identifying or isolating resources that have greater impact on students' achievement (Marks, 2010). In other words, policy-makers would want to make informed decisions in terms of spending wisely on resources that would result in higher students/pupils performance or returns. Unfortunately this has been a recurring concern in the educational research literature for some time now (Marks, 2010).

This article reports on resource related challenges facing small and medium-sized public secondary schools in Kenya. It is an improvement on the two previous studies (Makori and Onderi, 2013; Onderi and Makori, 2013) through further analysis and/or data interrogation.

LITERATURE REVIEW

The school size debate

The debate on school size spans nearly fifty years having been influenced by two important books in the early 1960s. The first one was by James B. Conant '*The American High School Today*' published in 1959 and the

second one by Barker, RG and Gump, PV '*Big school, small school: high school size and student behaviour*' published in 1964 (Garrett et al., 2004). These two books led to a two directional debate about the school size resulting in 'small school' and 'large school' movements (Garrett et al., 2004). A report published by Estyn based on inspection and examination results indicates that there is a difference in performance between small, medium-sized and large larger schools, therefore suggesting that size does matter (Evans, 2013). Ready et al. (2004) note that enrolment size is an important ecological feature of any educational organisation.

Small and medium-sized secondary schools

Lack of consensus is evident regarding the definition of small schools, for instance, Estyn (2013) defines small schools as 'those with 100 or fewer children of statutory school age...' (p.1). Blum and Diwan (2007) support this definition. A definition of small secondary school is defined as those with 600 pupils or fewer (Estyn, 2013). Barker (2008) also observes that the most common accepted figure for determining small school is 300 or less. Therefore, there are definition problems in relation to the size of a small school. Just over 20% of secondary schools in Wales are small and about 10% of secondary school pupils are taught in such schools (Estyn, 2013). Barker reports that secondary schools with below 500 students are barely educationally viable (Barker, 2008).

Review of literature reveals a number of positive characteristics of small size schools which have been associated with social and cognitive benefits (Gordon, 2010). Some of the characteristics include smaller classes and low pupil-teacher ratio among others (Gordon, 2010). Low pupil-teacher ratios allows for more individualised instruction and more attention given to students (Nguyen, 2004), thus contributing towards students' cognitive growth and development. The cognitive benefits include improved instructional quality and academic success (Gordon, 2010). But success may only be possible if the school has all the essential features associated with school effectiveness (Noguera, 2002). Other positive features associated with small size include less intimidating environment, sense of belongingness, sense of pride, sense of personal possession and greater sense of unity linked to a set of belief system (Gordon, 2010; Barker, 2008). Smaller school size has also been associated with stronger and safer school communities (Nguyen, 2004).

However, small schools have been criticised in a number of fronts, e.g. for offering children less opportunity for diverse learning and a narrower range of subjects to study. Also small schools are more expensive than large schools (Merriam, 2009). Also according to Sheffield Local Authority in the United Kingdom, small schools are at greater risk of falling budget problems and risk the future of the entire school (Merriam, 2009). This

is further reinforced by the Norfolk (in the United Kingdom) councillors' report that small primary schools with between 76 and 210 pupils will face financial challenges. The report further says that small secondary schools are unlikely to be financially viable (Legett, 2012). Other challenges areas affecting small schools highlighted in the literature include leadership and management, staff development and curriculum planning (Estyn, 2013). In India small schools are commonly found in impoverished rural communities (Blum and Diwan, 2007) where they face significant shortages of teaching and learning resources and basic infrastructure often leading to poor educational quality.

Medium-sized primary schools are defined as those with between 101 and 300 pupils (Estyn, 2013). Medium-sized secondary schools are between 601 and 1100 pupils (Estyn, 2013). Literature on medium-sized schools in general is thin. However, a study by the National Foundation for Education Research found that medium-sized schools (those with 180 to 200 students) performed best, while very small or very large schools performed worst (Barker, 2008).

Large secondary schools

Large primary schools are defined as those with 300 and above (Estyn, 2013), while large secondary schools are 1101 or more (Estyn, 2013). About 25% of secondary schools in Wales are large schools and 37% of secondary students are taught in these schools (Estyn, 2013). Barker (2008) reports that one in seven students are now in secondary schools with over 1500 and the number of students in schools of over 2000 has doubled since in 1997. According to Merriam (2009) just over half (54.9%) of all secondary schools in England now have more than 900 students. Also there are 202 secondary schools with more than 1600 students. For instance, Nottingham Academy one of the largest schools in the UK, with 2,200 pupils aged 3 to 19 (Merriam, 2009).

Some of the strengths of large secondary schools include broader or wider curriculum provision and better balanced due to economies of scale (Estyn, 2013). For instance, where small schools may only be economically endowed to offer Spanish, larger schools might offer instructions in Japanese, German and French among others (Gordon, 2010). Large schools are also generally well placed to offer extracurricular activities (Gordon, 2010). In the United States, for instance, the arguments for consolidated comprehensive schools include economies of scale, social equality and increased provisional offering. Ready et al. (2004) comment that large school size lead to greater curriculum specialisation, more resources strength or both. Hence they are able to meet the needs of various students through the creation of specialised programmes (Ready et al., 2004).

However, some of the downsides of larger student bodies include less positive social environment, less social integration and less identity with the school (Nguyen, 2004). Other issues associated with comprehensive high schools include disengagement, violence and fragmentation (Noguera, 2002). Barker (2008) also observes that largeness of many schools could be one factor contributing to decline in test scores and increase in violence among students.

Teaching and learning resources

Library resource

The benefits of a functional and/or good library system are enormous and include (Busayo, 2011; Lingam and Lingam, 2013), the provision of access to books and other reading materials or resources. The immediate benefit of access to reading resources is the promotion of reading culture which in turn underpins the growth and strengthening of literacy skills. The positive outcomes of reading culture is a marked increase in reading fluency, vocabulary acquisition and usage, ability to express ideas and concepts more clearly and accurately (Busayo, 2011).

In a school setting, a functional school library system fulfils a number of purposes (Busayo, 2011; Krolak, 2005):

- i) Provision of material resource to enhance academic growth and development;
- ii) Guidance of students on the choice of relevant materials for study;
- iii) Provision of support to the teaching programme of school;
- iv) Provision of assistance to pupils in terms of developing of skills in the use of books and libraries;
- v) Acquisition of the relevant books and other reading materials relevant to the school curriculum. In other words libraries provide access to supplementary materials that complement and enhance the learning provided by prescribed textbooks;
- vi) The library helps to guide students in all aspects of their academic endeavour including developing research skills.

Makotsi (2011:5) observes that:

Regular access to books while at school and developing the habit of reading for pleasure have dramatic results in terms of increased vocabulary, text comprehension, and improvement in writing skills and self-expression.

Libraries in general also contribute to other areas such as (Krolak, 2005:3): lifelong learning, literacy enhancement,

informed citizenship, recreation, creative imagination, individual research, critical thinking and ultimately empowerment in an increasingly complex world. Mji and Mkagato (2006) add that library usage contributes to the improvement of the learners' higher order of learning skills such as analysis, problem solving and evaluation.

Sadly, in Sub-Saharan Africa, school libraries are either not available or in poor condition or both (Etsy, 2005). However, availability of libraries is one thing and utilising them effectively is another; for instance, Seniwoliba (2013:214-215) reports that in Ghana libraries are not fully utilised by either teachers or pupils.

Sports facility resource

It is believed that availability of functional sports facility or resources would result in significant sports and/or physical activity participation among students. Pule (2007:17) has highlighted the benefits of sports participation and include: unique developmental programmes and opportunities for school learners; positive influence on self-esteem and social competency. Also, participation in sports has been reported to contribute positively to students becoming more disciplined, setting goals, organising time and developing self-confidence (Pule, 2007:18). However, lack of adequate and/or sufficient facilities has been associated with decline in sports participation (Pule, 2007). In Rwanda, for instance, some schools' sports grounds have been reported to be muddy, uneven and often floods during rainy season (Grafweg, 2010). Such a state of sports facilities are likely to discourage pupils or young people from participating in sports.

Textbooks resource

The importance of textbooks in the teaching and learning process has been widely recognised in the literature (Gichura, 2003). Textbooks provide structure and order in the teaching and learning process (Johansson, 2006; Triyoga, 2010) and in the classroom, they are considered as useful and effective tools or instruments whose purpose is to facilitate the work of the teacher on a daily basis (Johansson, 2006; Padururu, n.d.). Padururu (n.d.) observes that textbooks give students stability and confidence. Textbooks also provide security and confidence to inexperienced teachers (Triyoga, 2010). However, Glennerster et al. (2011) observe that an average child does not benefit from textbooks.

Triyoga (2010:11) observes that: "There is no ideal textbook, ideal for every teacher, ideal for every group of learners and ideal for every teaching situation". And for that reason it is advisable to use them carefully and alongside other aids or other materials (Triyoga, 2010). Similar view is echoed by Indoshi (1993) as cited in Mudulia (2012:531) who argues "that the use of

textbooks among other materials raises academic standards and efficiency of a school system". Triyoga (2010) further identifies a number of limitations associated with the use of textbooks. They include inauthenticity, distorting content, may not reflect students' needs and may deskill teachers.

Poor performance in schools in Sub-Saharan Africa has been associated with shortage or lack of core textbooks (Mudulia, 2012). For instance, Eshiwani (2001) as cited in Musasia et al. (2012:5) argue "poor performance of mathematics in Kenya is attributed to poor teaching methods and acute shortage of textbooks. Shortage of textbooks may often result in students or pupils sharing textbooks. In some cases one textbook is shared between 6 or more pupils or sometimes no textbook at all (Makotsi, 2011; UIS, 2011). Worse cases of textbook: Pupils ratios have been reported in the literature, for instance in some schools in Macia the ratios are between 1:40 and 1:100 (World Bank, 2008). In Cameroon the ratio of textbook: pupil is 1:13 (UIS, 2011). In Fuji Islands, the textbooks were either outdated or not available in sufficient number in some rural schools (Lingam and Lingam, 2013). The whole situation of inadequate textbooks is exacerbated by the lack of supplementary instructional materials (Seniwoliba, 2013). Shortage of textbooks therefore put pressure on teachers and also affects the amount of homework they assign to pupils or students.

Laboratory resource

Kibirige and Hodi (2013:245) underscore the importance of laboratories in providing learners with opportunities to experience science by employing scientific research procedures. One such opportunity is engaging learners in the inquiry processes through which they can acquire research skills (Kibirige and Hodi, 2013). Also learners gain in terms of understanding the nature of scientific problem solving (Kibirige and Hodi, 2013). Similar views are echoed by Owolabi and Oginni (2012:44) who observe that one of the activities in science is experimentation because it provides a forum for practising the theoretical knowledge gained in the classroom and for demonstrating the psychomotor skills of a teacher and learner, thus reinforcing the fact that students' engaging in laboratory equipment and processes is key to achieving the learning objectives. Students who are not engaged in the laboratory equipment see science as abstract and irrelevant (Owolabi and Oginni, 2012). Kibirige and Hodi (2013:427) report in their study that learners who use laboratory investigation improve their understanding of physical sciences.

Mudulia (2012) reports on a relationship between availability of resources and achievement of science, arguing that high performing schools have higher availability of laboratory equipment and chemicals or consumables than low performing ones.

However, acute shortages of laboratory equipment and consumables have been reported in Zambia, Nigeria, South Africa and Fiji among other countries (World Bank, 2008; Ogunmade, 2005; Lingam and Lingam, 2013; Kibirige and Hodi, 2013). There are also reports of poor quality science materials in Fiji (Lingam and Lingam, 2013). Lack of proper use of laboratories has also been reported in South Africa and Portugal (Kibirige and Hodi, 2013). Other issues highlighted in the literature in relations to teaching science include science teachers lack teaching skills and competency (Kibirige and Hodi, 2013) and professional development is absent (Kibirige and Hodi, 2013).

Furniture resource

In many countries, furniture is either lacking or poor. In some situation the shortage has been described as acute (World Bank, 2008). For instance, in the Fiji islands, school furniture was reported as poor and inadequate to the extent that in some schools furniture shortage was acute and students and/or pupils had to sit on the floor (Lingam and Lingam, 2013). In Culcutta, India, a study involving head teachers of primary schools, identified lack of electricity, space and furniture as major challenges facing the schools. In Kenya, many schools in the Nairobi inner-city have inadequate furniture; they are either broken or lost (Dierkx, 2003).

Learners need physical comfort when sitting, reading and writing and furniture plays a key role in ensuring the comfort of learners. Four key areas in relation to furniture and the learning process:

- i) Well designed and constructed
- ii) Correctly sized
- iii) Fit for its purpose
- iv) If possible made and repairable locally.

Poor furniture design has been associated with back pain and more especially in girls (Higgins et al., 2005).

Other resources

One of such resource is the classroom physical environment. Quality physical environment is very important because studies have shown that it can significantly affect student achievement (Victoria Institute of Technology, n.d.). Similar views are echoed by Siddhu (2011) who based on a study in India, observed that quality of classroom conditions have strong positive effects on girls. Adedeji and Olaniyan (2011) note that many rural schools across African countries lack essential infrastructure thus making the learning environment less safe, less efficient and less effective. In Kenya in 1999 a government commission of inquiry on education system in part linked declining standards of

primary education to inadequate and unsuitable physical facilities (Republic of Kenya, 1999 as cited in Dierkx, 2003). Schools with poor physical environment are less likely to attract both teachers and students or pupils (Alhassan and Adzalilie-Mensah, 2010).

METHODOLOGY

The study reported in this article was conducted to increase knowledge and understanding about the secondary schools size and learning resources implications in a free secondary education provision. The data will contribute to building a knowledge base for understanding the nature of the issues and challenges facing small and medium-sized secondary schools. The issues and challenges appear to be linked to their emerging size characteristics. The study involved eighty one secondary schools which were purposively sampled from which eighty one principals were obtained for the study. Initially one hundred schools were sampled and contacted but in the end only eighty one responded representing a response rate of 81%.

The study employed a quantitative research design and data was collected from eighty one principals through a survey technique, using questionnaires. Prior to data collection, the researchers sampled and contacted school heads and invited them through a letter to take part in the study. In the letter the researchers introduced themselves, described the purpose of the study, explained what the participants were expected to do, indicated that they had a choice to opt out of the study at any time without any negative consequences on their part, assured them confidentiality and therefore undertook to keep their personal details strictly confidential and use them only for the purpose of research. At the end of the letter, participants were requested to sign a declaration of informed consent form in which they confirmed their understanding of the content of the letter, the purpose and nature of study and their voluntary participation in the same, explaining what was expected of them.

Questionnaires were used as the main toll for collecting data and were delivered to one hundred principals but only eighty one completed questionnaires were returned, representing a response rate of 81%. Questionnaire format consisted of closed, open-ended and rating scale items. This was necessary to diversity responses as well as reduce 'question fatigue' (Watson and Coombes, 2009; Onderi and Makori, 2012). The first part of the questionnaire collected demographic or background information including gender, years in headship, headship, school size, school setting whether rural or urban, whether mixed or single sex, denominational orientation, relationship with PTA and BOG and secondary school tier whether national, provincial (county) or district. The open-ended section offered the respondents an opportunity to make a comment, expand or clarify some information on their responses and thus help the researchers gain some insight in their perspectives on challenges affecting their roles and responsibilities in educational institutions. The open-ended comments or responses yielded qualitative data which was analysed into emerging themes. The resulting quantitative data was analysed using the statistical package for social science (SPSS) for obtaining descriptive data.

RESULTS AND DISCUSSION

Respondents' characteristics

The respondents were mainly secondary school principals and were 81 in number. Seventy percent (70%),

Table 1. School size and library.

Library (% , n = 81)							
School size	None	Poor	Average	Good	Excellent	No response	Total
< 200	14.4	8.4	8.4	1.2	0	1.2	33.6
201- 400	4.8	8.4	10.8	2.4	0	1.2	27.6
401- 600	0	1.2	6	12	0	0	19.2
601- 800	0	2.4	1.2	6	3.6	0	13.2
801- 1000	0	0	0	3.6	0	0	3.6
Total	19.2	20.4	26.4	25.2	3.6	2.4	100

n = 81) of them were males while thirty percent (30%, n = 81) were females. Further analysis reveal that 73% (n = 52) of principals who worked in district secondary schools were male. Overall just under half (47%, n = 81) of the male teachers worked in district secondary schools. This perhaps suggests something about females' representation in the educational leadership or decisions making positions.

Just fewer than two-fifths (37%, n = 81) had been in principalship position for less than five years, a third between five and ten years and another a third over ten years. Combining those that had between five and ten years of headship experience and those that had over ten years gives sixty three per cent, thus suggesting that a significant number of principals had substantial leadership and/or management experience in secondary school. Just over forty percent (42%, n = 81) were in their first headship, just fewer than forty percent (38%, n = 81) in their second headship and just over ten per cent (12%, n = 81) in their third headship. So combining those who were in their second headship, those in their third headship and those beyond third headship gives fifty eight percent, suggesting further that over half of them had significant experience of working in more than one secondary school.

Just over forty percent (42%, n = 81) worked in small secondary schools, just over forty percent (43%, n = 81) in medium school, just over ten per cent (11%, n = 81) in large school and just fewer than five percent (4%, n = 81) in mega secondary school. For the purpose of this article, it is evident from the foregoing analysis that 85% of the schools were small or medium secondary schools. Based on analysis, small size secondary schools have student population or enrolment of less 200, medium size 200 and 400, large schools between 601 and 800, and mega schools have.

Views about learning resources

Resources considered in this section include library, textbooks, laboratory, classroom, furniture, staffing level, workshops, playground and sports facility.

Based on Table 1, just fewer than 15% and just fewer than 5% of schools with less than 200 (small size) and

between 200 and 400 (medium size) student population respectively had no library. Also 16.8 and 19.2% of small and medium schools respectively assessed their library as poor or average, signalling some concerns, which may further suggest that the libraries could be understocked or stocked with outdated and irrelevant books and other reading materials. Thus the libraries are likely to be less functional. Such view is echoed by Read and Treffgaine (n.d: 3) who report that "very few developing countries systems particularly in Sub-Saharan Africa have functioning library system anymore". Functional libraries contribute to marked increase in reading fluency, vocabulary acquisition and usage, and in the ability to express ideas and concepts more clearly and accurately (Read and Treffgaine, n.d:3). Busayo (2011) adds that reading contributes to a better understanding of one's experience as well as an exciting voyage of self-discovery. Through reading books, newspapers, magazines and other materials, children and/or students come to know and understand the world and its environment (Busayo, 2011). Makotsi (2011:3) observes that "the ability to read is at the heart of self-education and lifelong learning".

The key issue here is accessing quality books and other learning resources. By accessing quality books and other learning resources one is able to establish a reading culture (Busayo, 2011; Makotsi, 2011), which contributes to strengthening literacy skills, broadening education and learning opportunities and in the end enable people to address issues associated with poverty.

Makotsi (2011:5) observes that:

Regular access to books while at school and developing the habit of reading for pleasure have a dramatic results in terms of increased vocabulary, text comprehension, and an improvement in writing skills and self-expression.

Makotsi (2011:5) further observes that:

If there is a significant general improvement in reading, comprehension and writing skills, it is bound to have an impact on learning and performance in all other curriculum subjects.

Table 2. School size and text books.

Text books (% , n = 81)						
School size	Poor	Average	Good	Excellent	No response	Total
< 200	3.6	22.8	7.2	0	0	33.6
201- 400	2.4	19.2	4.8	0	1.2	27.6
401- 600	1.2	6	12	0	0	19.2
601- 800	0	2.4	7.2	3.6	0	13.2
801- 1000	0	0	3.6	0	0	3.6
Total	7.2	50.4	34.8	3.6	1.2	100

Well-resourced libraries also promote private studies among students and teachers (Busayo, 2011) which are necessary for those who want to attain higher academic height. Schools library provide access to supplementary materials that complement and enhance the learning provided by the prescribed textbooks (Krolak, 2005). Similar views are expressed by Lingam and Lingam (2013:2162) that a good library can contribute enormously to the teaching and learning process.

But the sad reality is that many people in Sub-Saharan Africa and other developing countries lack access to such vital resources (Makotsi, 2011; Busayo, 2011). Lack of library resources impinges both the work of teachers and children (Lingam and Lingam, 2013). However, effective and efficient use of library is also very important for successful teaching and learning process. In Ghana, for instance, Seniwoliba (2013) reports that the few school libraries are less fully utilised by either teachers or pupils.

Based on Table 2, just fewer than one-third (26.4%) of the small schools assessed text books as poor or average while just over one-fifths (21.6%) of the medium schools rated text books as poor or average, a learning resource. Small percentage of Schools with higher enrolments e.g. 401 rated textbooks as average compared to small or medium ones. Otherwise many of the large and mega schools rated textbooks as good or excellent. Unfavourable assessment of textbooks in small and medium-sized schools suggest either high textbook: pupil ratio due to shortages or outdated textbooks

Access to textbooks and other learning/instructional materials contributes to school effectiveness (Barrett et al., 2007). Textbooks play important role in the teaching and learning process (Triyoga, 2010). However, in some areas in Kenya under the free primary education era textbook: pupil ratio is still high, 1:10 (Gichura, 2003). In Cameroon, on average the ratio of reading textbook to pupils is 1:11 and for mathematics is 1:13 (UIS, 2012). In Uganda, in 2002 even the most prestigious secondary schools experienced serious textbooks shortages even in core subjects such as English and mathematics (World Bank, 2008). Shortages and outdated textbooks in some schools in Afghanistan have been reported (Guimbert et al., 2008). In Fuji Islands textbooks were either outdated or not available in sufficient numbers in some schools (Lingam and Lingam, 2013). Similar sentiment is echoed

by Seniwoliba (2013:209) that outdated and worn-out textbooks are often shared by six or more pupils in many parts of the developing world. Limited amount of text books means students' accessibility is limited and that severely hampers any homework activities that teachers may intend to give (Lingam and Lingam, 2013). Therefore, poor performance in national examination in Sub-Saharan African countries is in part linked to lack of textbooks (Mudulia, 2012).

Table 3 shows that just fewer than one-tenths (8.4%) of small secondary schools and just fewer than 3% medium schools had no laboratory. Also 16.8 and 20.4% of small and medium schools respectively assessed their laboratories as poor or average. By rating their laboratories unfavourably they are suggesting that their laboratories have issues ranging from lack of chemicals and other materials (consumables) to lack of equipment and/or adequate working space.

Similar issues have been reported in Nigerian and South African rural secondary schools (Ogunmade, 2005; Kibirige and Hodi, 2013). For instance, in Nigeria students learn science by rote (Ogunmade, 2005). Also according to the World Bank (2008) Zambian secondary schools experience acute shortage of equipment and chemicals among other consumables. Shortage of laboratory materials and equipment raises serious concerns about the quality of teaching and learning science in secondary schools. Mudulia (2012) argues that a strong link do exist between availability of resources and achievement in science, for instance, he found out that high performing schools had chemicals and equipment compared to low performing ones. In Nigeria poor performance in science has been attributed to factors such as most teachers lack motivation, poor infrastructural facilities, inadequate textual materials and poor student attitude to learning. Science teachers lack the necessary teaching skills and competence. Teachers also lack professional development opportunities (Ogunmade, 2005). Other studies have cited issues such as poor classroom organisations, lack of management techniques, poorly coordinated students activity and reduced quality of science teaching and learning (Ogunmade, 2005). Shortage and poor quality of science materials has also been reported in Fiji (Lingam and Lingam, 2013).

Table 3. School size and laboratory.

Laboratory (% , n = 81)							
School size	None	Poor	Average	Good	Excellent	No response	Total
< 200	8.4	6	10.8	8.4	0	0	33.6
201- 400	2.4	6	14.4	3.6	0	1.2	27.6
401- 600	0	2.4	7.2	9.6	0	0	19.2
601- 800	0	1.2	3.6	4.8	3.6	0	13.2
801- 1000	0	0	0	2.4	1.2	0	3.6
Total	10.8	15.6	36	28.8	4.8	1.2	100

Table 4. School size and classrooms.

Classrooms (% , n = 81)						
School size	Poor	Average	Good	Excellent	No response	Total
< 200	6	15.6	12	0	0	33.6
201- 400	7.2	8.4	9.6	1.2	1.2	27.6
401- 600	2.4	4.8	12	0	0	19.2
601- 800	1.2	3.6	4.8	3.6	0	13.2
801- 1000	0	0	2.4	1.2	1.2	3.6
Total	16.8	32.4	40.8	6	2.4	100

Owolabi and Oginni (2012) argue that a key activity in science is experimentation, through which students practice theoretical knowledge gained in the classroom. Through experimentation students demonstrate psychomotor skills of teaching and learning (Owolabi and Oginni, 2012). Similar views have been expressed by Kibirige and Hodi (2013) that a key goal of science is laboratory investigations through which conceptual development and performance are improved. Kibirige and Hodi (2013:426) further, note that laboratory work provides learners with opportunities to experience science through the use of scientific research procedures. Besides, laboratory work engages the learners in the inquiry process and in the event they acquire laboratory investigation and/or research skills (Kibirige and Hodi, 2013).

Based on Table 4, just over one-fifths (21.6%) of small schools rated classrooms as poor or average. Just fewer than one-fifths (15.6%) of the medium schools assessed classrooms as poor or average. It is also interesting to note that the higher the school size the better the rates. For instance schools with student population between 8001 and 1000, poor and average rates were zero, suggesting that classrooms in general were good or excellent.

When it comes to poor state or conditions of classrooms rural areas appear to be most disadvantaged (Adedeji and Olaniyan, 2011). In some schools in certain states in Nigeria the classroom floors are full of holes and in a poor state of repair (Adedeji and Olaniyan, 2011). Sometimes it may be difficult to imagine that lessons could still be taking place in such classroom conditions in

rural schools across African countries. Stockard and Mayberry (1992) as cited in Nurul et al. (2011) note that students actually spend most of their time within classrooms. That being the case, the classroom environment is therefore very important in influencing students' attitudes towards schools as well as their attendance and learning performance (Nurul et al., 2011:209). Adeyemo (2011:75) also reports that there is a close link between learning outcomes and students' attitude towards learning and classroom environment. This is also echoed by Allen and Hessick (2011) who observe that the ways in which children perceive their surrounding greatly affect how they will perform.

Table 5 shows that just fewer than one-third (27.6%) and just fewer than 15% (14.4%) of small and medium schools respectively assessed furniture as poor or average compared to schools with higher enrolment. However from Table 5, the issue of furniture is widespread affecting schools with even higher enrolment e.g. 800 although the percentages are lower than small and medium sized schools. The unfavourable rating suggests issues with furniture, ranging from poor conditions, inadequate to wrong design desks or chairs. In this study furniture refer to desks, chairs, tables and cupboards among others (World Bank, 2008).

In many countries furniture is either lacking or poor (Leathes et al., n.d). In some situations the shortage has been described as acute (World Bank, 2008). For instance, in the Fiji islands school furniture was poor and inadequate to the extent that in some schools furniture shortage was acute and students and/or pupils had to sit on the floor (Lingam and Lingam, 2013). In Culcutta,

Table 5. School size and furniture.

Furniture (% , n = 81)						
School size	Poor	Average	Good	Excellent	No response	Total
< 200	6	21.6	6	0	0	33.6
201 - 400	3.6	10.8	12	0	1.2	27.6
401 - 600	1.2	8.4	9.6	0	0	19.2
601 - 800	1.2	3.6	6	2.4	0	13.2
801 - 1000	0	0	2.4	1.2	0	3.6
Total	12	44.4	36	3.6	1.2	100

Table 6. School size and staffing level.

Staffing level (% , n = 81)						
School size	Poor	Average	Good	Excellent	No response	Total
< 200	7.2	20.4	4.8	1.2	0	33.6
201- 400	6	13.2	7.2	0	1.2	27.6
401- 600	2.4	6	10.8	0	0	19.2
601- 800	1.2	3.6	7.2	1.2	0	13.2
801- 1000	0	2.4	1.2	0	0	3.6
Total	16.8	45.6	31.2	2.4	1.2	100

India, a study involving head teachers of primary schools, identified lack of electricity, space and furniture as major challenges facing the schools. In Kenya, many schools in the Nairobi inner-city have inadequate furniture; they are either broken or lost (Dierckx, 2003).

Table 6 shows that just fewer than one-third (27.6%) and just fewer than one-fifth (19.2%) of small and medium schools respectively assessed staffing level as poor or average compared with schools with higher student enrolment which rated staffing level positively. The staffing level issues seem to affect schools across the board, although it is more prevalent in small and medium schools. Unfavourable rating in small and medium sized schools may suggest issues with teacher student ratio or poor quality of teachers. High teacher-students level may have serious negative effect in the teaching and learning process, for instance, it may affect how students interact with each other, resulting in poor students engagement, may affect the levels of activities the teacher is able to offer to students and it may also affect the amount of time the teacher is able to focus attention to individual students specific needs (Ehrenberg et al., 2001).

The unfavourable assessment may also relate to situations where some schools have more untrained teachers than the qualified teachers (Makori and Onderi, 2013a). Use of untrained teachers raises concerns regarding the quality of teaching and learning.

Table 7 shows that just fewer than half (45.6%) of the schools did not have workshops. Of this, half (22.8%) of them are small schools and 14.4 % are medium sized schools. Just fewer than one-tenths (9.6%) and just over

10% (10.8%) of small and medium schools respectively assessed workshops as poor or average. This percentage rating is higher compared to schools with higher enrolment. Literature on workshops in relation to the teaching and learning process is thin.

Table 8 shows that just fewer than 4% (3.6%) of medium schools had no playground. Just over one-quarter (26.4%) and just fewer than two-fifths (18%) of small and medium sized schools assessed the playground as poor or average.

In a study, some schools in Ghana had playground facilities while others had none. However, those that had, their playground facility were described as poorly kept; mostly bushy or weedy (Alhassan and Adzalilie-Mensah, 2010). Such playground facility conditions discouraged students from playing and encouraged students to congregate around classrooms and the few clean spots in the school compound. In Calcutta, India, a study involving 11 primary schools revealed that only five of them had a playground.

Table 9 shows that just one small size school did not have a sports facility. Just fewer than one-thirds of the small size schools rated sports facility poor or average, while just over one-fifths of the medium size schools assessed sports facility as poor or average.

Pule (2007) observes that lack of adequate and/or sufficient facilities contributed to decline in sports participation among students. He also links low participation in sport at secondary schools to lack of facilities and structures (Pule, 2007). Some of the benefits linked to participation in sports include, learners develop self-esteem and social competency, learners

Table 7. School size and workshops.

Workshops (% , n = 81)							
School size	None	Poor	Average	Good	Excellent	No response	Total
< 200	22.8	4.8	4.8	1.2	0	0	33.6
201- 400	14.4	3.6	7.2	1.2	0	1.2	27.6
401- 600	4.8	6	7.2	1.2	0	0	19.2
601- 800	3.6	2.4	6	1.2	0	0	13.2
801- 1000	0	1.2	1.2	1.2	0	0	3.6
Total	45.6	18	26.4	6	0	1.2	100

Table 8. School size and playground.

Playground (% , n = 81)							
Student population	None	Poor	Average	Good	Excellent	No response	Total
< 200	0	15.6	10.8	7.2	0	0	33.6
201- 400	3.6	4.8	13.2	4.8	0	1.2	27.6
401- 600	0	3.6	12	2.4	1.2	0	19.2
601- 800	0	0	7.2	6	0	0	13.2
801- 1000	0	0	1.2	1.2	1.2	0	3.6
Total	3.6	24	44.4	21.6	2.4	1.2	100

Table 9. School size and sports facility.

Sports facility (% , n = 81)							
School size	None	Poor	Average	Good	Excellent	No response	Total
< 200	1.2	8.4	19.2	2.4	0	2.4	33.6
201 - 400	0	6	14.4	3.6	1.2	2.4	27.6
401 - 600	0	4.8	12	2.4	0	0	19.2
601 - 800	0	0	4.8	7.2	1.2	0	13.2
801 - 1000	0	0	1.2	1.2	1.2	0	3.6
Total	1.2	19.2	51.6	16.8	3.6	4.8	100

become more disciplined, set goals, organise time and develop self-confidence (Pule, 2007). In some schools in Rwanda sport grounds are muddy, uneven and often flooded during the rainy season (Grafweg, 2010).

Views about school size and syllabus coverage

Syllabus has been included in this analysis not as a resource but as a product of resources in general. For instance, lack of textbooks as been associated with syllabus coverage issues because it impacts negatively on the teaching and learning process and also affects the amount and rate of assignment teachers give to students or pupils.

Table 10 shows that almost one third (26.4%) of small and medium size secondary schools rated syllabus coverage as poor or average. Schools with higher enrolment rated syllabus coverage favourably.

Musasia et al. (2012:55) observe that there is a positive

correlation between syllabus coverage and national examination performance. Kananu (2011) as cited in Musasia et al. (2012:55) notes that syllabus coverage in public secondary schools in Kenya was inadequate and whatever was covered was not effectively covered, leading to poor performance in the subject. Musasia et al. (2012) also observe that early syllabus coverage is linked to students' self-efficacy and mathematical concepts, necessary in terms of contributing to students' self-confidence.

Factors attributed to inadequate syllabus coverage and especially in mathematics includes mathematics syllabus being too wide and time allocated is inadequate, use of unqualified teachers; overcrowded classrooms and non-equipped classrooms (Makori and Onderi, 2013; Musasia et al., 2012). Other factors that may affect the rate of syllabus coverage include students' attitude towards learning, students' understanding and mathematics anxiety, absenteeism, teachers workload, school discipline, time management, sickness, group

Table 10. School size and syllabus coverage.

Syllabus coverage (% , n = 81)						
School size	Poor	Average	Good	Excellent	No response	Total
< 200	2.4	10.8	20.4	0	0	33.6
201- 400	1.2	12	13.2	1.2	0	27.6
401- 600	0	4.8	12	1.2	1.2	19.2
601- 800	0	0	12	1.2	1.2	13.2
801- 1000	0	0	3.6	0	0	3.6
Total	3.6	27.6	61.2	3.6	1.2	100

discussions among others (Jennson and Beswick, 2010 as cited in Musasia et al., 2012). A study singled out absenteeism of both teachers and students as a major factor in non-coverage of the syllabus (Musasia et al., 2012). Nakhanu (2012) observes that late or non-coverage of the mathematics syllabus contributes to poor examination performance, arguing further that students who cover syllabus early in the year and have time for revision have an even better chance of obtaining better mean score than those who cover the syllabus just before examinations. However, Etsey (2005) seems to suggest that syllabus coverage is an issue of low-achieving schools than high-achieving ones. In a study he found out that more teachers in high-performing schools completed the English language and mathematics syllabus early than the teachers in low-achieving schools.

CONCLUSION

The study findings show that some small and medium sized public secondary schools lack the following teaching and learning resources: libraries, laboratories, sports facility and playground. Other small and medium sized public secondary schools rated the following teaching and learning resources unfavourably: libraries, laboratories, textbooks, classroom, furniture, staffing level, playground and sports facility. Syllabus coverage was also rated unfavourably. Unfavourable assessment of teaching and learning resources raises serious concerns regarding their effectiveness in the teaching and learning process. Poor syllabus coverage has been linked to lack of adequate teaching and learning resources. For instance, lack of textbooks affects the rate and amount of assignments teachers can give to students/pupils and that slows down the teaching and learning process which in the in the impacts negatively on syllabus coverage. And poor syllabus coverage is likely to lead to poor examination.

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