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REVIEW ARTICLE

A Review of Curriculum-Related Factors Influencing Academic Achievements Among Students in Public Secondary Schools in Kenya

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Abstract

Secondary Education provides a vital link between basic education and the world of work, on one-hand, and further training on the other. It is an important sub-sector of education in the preparation of human capital for development and provision of life opportunities. For this reason, Kenya has invested heavily in secondary education as evidenced by the introduction of Free Secondary Education (FSE) in 2008. Despite this, effectiveness of curriculum implementation factors, namely academic staff, physical facilities and students' enrolment have not been established well in some parts. Further, it is not clear how academic staffing, physical facilities and enrolment have influenced students' academic achievement since the inception of subsidized FSE from the year 2008 to 2010. This paper therefore seeks to establish the influence of academic staffing, physical facilities and enrolment on public secondary school students' academic achievement in Kenya. The paper is a review of past studies in these areas. The methodology is based on the adopted theoretical underpinnings of education production function of Cohen in 1972 and Psacharopoulos and Woodhall in 1985. The above conceptual framework illustrates the relationship between educational inputs (independent variables) and educational output (dependent variable). From the above conceptual framework, students' academic achievement cannot be attained in the absence of the required inputs in the teaching and learning process. These inputs includes; teachers, books, equipment, instructional materials, desks, chairs, and classrooms. The inputs are provided through the processes like teacher recruitment, construction of physical facilities and the provision of enough textbooks and instructional materials. The paper provides relevant information on the influence of academic staffing, physical facilities and enrolment on students' academic achievement. From this information, ways of strengthening curriculum implementation in schools will be made and the significance of academic staffing, physical facilities and instructional materials in enhancing students' academic achievement in Kenya established.

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Introduction

Since independence in 1963, the Government of Kenya recognizes education as a basic human right and a powerful tool for human and National development. Nearly 73 percent of the government's social sector spending and about 40 percent of the national recurrent expenditure go to education. This

translates to 7 percent of the Gross Domestic Product (GDP) (MOE, 2008). The number of students enrolled at various levels has substantially increased. At the Early Childhood Development and Education (ECDE), enrolment grew from 483,148 children in 1982 to 1.69 million children in 2007. Enrolment in formal public primary schools grew from 891,533 pupils in 1963 to 5.9 million in

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2002 and 8.2 million pupils in 2007; while at secondary level, enrolments grew from 30,000 students in 1963 to 1,180,268 students in 2007 (MOE, 2008).

Kenya is a signatory to several international conventions and agreements and has ratified a number of them. These documents reiterate the need to eliminate all forms of discrimination; hence the right to education by all citizens. Key policy pronouncements include the initiation of Free Primary Education (2003) and Free Secondary Education (2008) among others (MOE, 2008). Education is a centre piece of the Kenya Government's Vision 2030, its ambitious plan to transform Kenya into a middle income country by 2030. Free Primary Education (FPE) and Free Day Secondary Education (FDSE) are part of this Vision and have produced a dramatic response. Since 2003, primary school enrolment has increased by nearly 3 million pupils (a 46% increase, while the number of schools grew by 7,000 (a 38% increase). Free Day Secondary Education has produced equally dramatic effects in that enrolment has more than doubled between 2003 and 2009. Unfortunately, educational quality has not kept pace with quantity. The dramatic rise in enrolment has further stressed Kenya's inadequate teaching force and physical infrastructure (UNESCO, 2008).

The Government is devoted to the expansion of education in the country and continues to provide policy direction in; development of curricula and curriculum support materials; recruitment of qualified and trained teachers; provision of quality assurance and standard services, and a wide range of infrastructure including Information and Communication Technology (ICT) (MOE, 2008). Immediate strategies for secondary education include expansion of existing secondary schools to a minimum of three streams, the establishment of new mixed day secondary schools, especially in deficit areas, improvement of facilities in existing secondary schools and increasing class size from 40 to 45 students (Republic of Kenya, 2011).

Wolfenson (2000) has submitted that education is a fundamental human right and it is the key to sustainable development, peace and stability within and among populace of such countries. Availability of teaching/learning resources enhances the effectiveness of schools as these are basic things that can bring about good academic performance in the students. Maicibi (2003) opines that all institutions or organizations are made up of human beings (workers) and other non-human resources. Maicibi (ibid.) further asserts that when the right quantity and quality of human resources is brought together, it can manipulate other resources towards realizing

institutional goals and objectives. The implication of these opinions is that effective head teachers and teachers together with the availability of physical facilities and learning/teaching materials, if well deployed to secondary schools, will bring about well rounded students who will perform academically well in Kenya Certificate of Secondary Education (KCSE) examinations.

Most of the governments of the world spend a significant amount of their budget on resources inputs in the education sub-sector. They make decisions about providing resource inputs to enhance student achievement and performance. Resource inputs have a vital role in the education process. Student achievement at any point is a cumulative function of inputs such as laboratories, textbooks, school buildings and libraries, among others (Dahar & Faize, 2011). The provision of more classrooms/laboratories leads to better academic performance of students. This is followed closely by the provision of stationeries/teaching aids. This implies that the more the provision of stationers/teaching aids to schools the better the academic performance of students (Yara & Otieno, 2010). The findings of Yadar (2001) and the Report by UNESCO (2008) have shown that classrooms, teaching aids, stationeries and laboratories affect academic performance of the learners. Further, Mutai (2006) asserts that learning is strengthened when there is enough reference materials such as textbooks, exercise books, teaching aids and classrooms and that academic achievement illustrates per excellence the correct use of these materials.

Education reforms that are aimed at increasing access to and participation in any level of education carry significant financial demands. In 2003, Kenya introduced the FPE, and having successfully initiated the implementation of this policy, the country is now gearing to widening access to and improving the quality of secondary and tertiary education (Onsomu *et al.*, 2006). As the country moves towards achieving universal primary schooling, demand for education is shifting to secondary education. Educating people mean putting opportunities into their hands, and is recognized as one of the best anti-poverty strategies (Onsomu *et al.*, 2006).

According to Onsomu *et al.* (2006), secondary education provides a vital link between basic education and the world at work, on one hand, and further training on the other. It is therefore an important sub-sector of education in the preparation of human capital for development and provision of life opportunities. Primary education alone is not sufficient to provide the quality skilled human resource necessary for the country's sustainable development. Moreover, primary school pupils

complete 8 years of schooling when they are still too young to engage in productive activities and contribute meaningfully to Nation-building. In addition, children from poor families who fail to join secondary schools because of lack of school fees often revert back to illiteracy, thus reversing 8 years of investment in their primary education. It is for these reasons that the Government undertook to implement the FDSE programme for the year 2008 (UNESCO, 2008).

The provision of FDSE funds is meant to cater for tuition and operations costs in schools. A large amount of the FDSE funds go to tuition vote head for the purchase of classroom teaching and learning materials to enhance students' academic achievement (MOE, 2009). However, despite its importance in the process of development, the expansion of quality secondary education is far from being achieved. This is because in the year 2010 alone whereas KCSE examination was set by 357,488 candidates, above which is considered the minimum university entry benchmark (KNEC, 2011). It is against this background that this paper undertakes a review of issues on the influence of curriculum-related factors, namely, academic staffing, physical facilities and enrolment on public secondary school students' academic achievement in Kenya.

Students' Academic Achievement

Academic achievement is a measure of the degree of success in performing specific tasks in a subject or area of study by students after a teaching/learning experience (Changeiywo, 2000; Shertzer & Linden, 1979). Students' academic achievement is hampered by the absence of sufficient, qualified teachers and adequate classrooms with the required numbers of desks and chairs to accommodate the required number of students (EFA News, 2004; WCEFA, 1990). Inadequate number of teachers, textbooks, instructional materials, classrooms, desks and chairs may lead to poor students' academic achievement. This is because students' academic achievement depends on these important educational inputs (Beynon, 1997).

Psacharopolous and Woodhall (1985) assert that a good result in education has to do with the way the inputs are transformed into outputs. Input-output or production-function model assumes that performance output of the educational process is related to a series of inputs. For schools, the input groups usually are classified as family resources, school resources, community characteristics, student resources and peer group characteristics, while the outputs are scores on achievement tests. The purpose of input-output research is to predict on outcome rather than to explain how the results were produced. In terms of

the open-systems model, input-output research ignores the system's internal transformational process and uses only inputs to predict outputs (Hoy & Miskel, 1996). One of the goals of all managers is to be productive. Productivity is about the output-input ratio within a time period with due consideration for equality; and it implies effectiveness and efficiency in individual and organizational performance. Effectiveness is the achievement of objectives while efficiency is the achievement of the ends with the least amount of resources. In essence productivity improvement is about effectively performing the basic managerial and non-managerial activities (Olum, 2004).

A system is a collection of part unified to accomplish an overall goal. If one part of the system is removed, the nature of the system is changed as well. This theory holds that the teaching/learning process is dynamic and has inputs and outputs. The best results are achieved when the most suitable materials are fed into the teaching/learning process in the best way possible. A systems approach involves the co-ordination management of the components in the system for the best results. In the education system, teachers, instructional materials, classrooms, desks and pupils form the components. The interaction of these inputs in the education system results into better learning outcomes (Ngala *et al.*, 2005). The quality of human and material resources (inputs) available for teaching and learning determines the type of results (outputs), which in this study is students' academic achievement.

However, Githua (2002) and Wachanga (2002) have noted that the provision of educational inputs must be accomplished by high motivation of students and teachers if better learning outcomes are to be achieved. Besides academic achievement, the teaching/learning process should be able to address the effective and psychomotor domains. The affective domain involves developing positive attitudes, feelings and values by students. The psychomotor domain involves physical development through bodily movements and muscular co-ordination (Oketch & Asiachi, 1992). All these must be addressed because an education system should produce a whole person who can fit and be useful in society.

Limitations

The curriculum-related factors discussed in this paper are based on the analysis of existing literature only. There could be other factors that could influence effective curriculum implementation in schools that may not have been captured. Despite this limitation, this paper generates a number of critical issues of concern on the need for effective curriculum

implementation in schools in order to enhance Kenyan students' academic achievement.

METHODOLOGY

The review of existing literature is informed by the model of the education production function of Cohen (1972) and Psacharopoulos and Woodhall (1985). According to this model, for any quantity of output there is a given combination of input variables. This can be illustrated as follows:

$$A = f(x_1, x_2, x_3, x_4, \dots, x_n)$$

Where

A = Students' academic achievement
 $(x_1, x_2, x_3, x_4, \dots, x_n)$ = curriculum implementation factors that influence students' academic achievement.

Based on the education production function model, this paper focuses on the relationship between the educational inputs and outputs. From this understanding, students' academic achievement cannot be attained in the absence of the required inputs in the teaching and learning process. These inputs includes: teachers, books, equipment, instructional materials, desks, chairs, and classrooms. The inputs are provided through the processes like teacher recruitment, construction of physical facilities and the provision of enough textbooks and instructional materials. The author posits that the Free Day Secondary Education (FDSE) in Kenya has affected the candidate classes since teachers are now handling large classes thus hindering their effectiveness. Indeed subsidized FDSE has led to influx of students and has resulted in over-enrolment in most classes. As such, this paper undertakes a review of issues that relate to curriculum implementation in trying to shed light on this problem and point a way forward out of it.

MAIN DISCUSSION

Among the curriculum-related factors that influence students' academic achievement include academic staffing, teaching and learning resources, student/teacher ratio and physical facilities. All these are discussed below.

Influence of Academic Staffing, Teaching and Learning Resources on Students Academic Achievement in Kenya

Teachers are very important facilitators of the teaching and learning process. They are responsible for arranging learning experience (Shiundu & Omulando, 1992). When there are few teachers, there efficiency in arranging comprehensive learning experiences for learners is hampered. Further, when

teachers are few and students are many, their workload becomes more, thus making it difficult for them to perform to their optimum level, to enable students to release the expected learning outcomes (EFA News, 2004). Meaningful learning takes place in the classroom through the interactions of teachers and students. Effective instruction therefore results in meaningful learning process. Teachers are crucial to meaningful learning that results into high student academic achievement (ADEA, 2004).

The Teachers Service Commission, the governmental agency that employs teachers, has frozen the recruitment of additional teachers, only employing staff to replace those leaving the 235,000 strong services. The Ministry of Education's policy is that schools must have a minimum of 40 and maximum of 45 students per class in order to receive money under the new Free Secondary Education initiative. Teachers are expected to deal with overly-large classes. Further, a lack of facilities at schools, and busier teachers, indications are that many public secondary schools are already struggling to perform well in national examinations, a situation that could be worsened by students entering institutions that are ill-equipped to receive them (Oyaro, 2008).

Under the secondary schooling programme, authorities will pay schools about 130 dollars per students annually, an amount that is to be allocated in lump sums at the start of each of the three terms, and which is expected to cover tuition and administration costs, school maintenance and improvements, and class activities. Parents are still responsible for uniforms and lunches and subsidy, does not cover residence costs for children at boarding school. Despite varied challenges facing Free Secondary Education initiative, the new secondary education policy has been welcome by most parents because bright children from poor homes will now have a chance to develop an opportunity nonetheless (Oyaro, 2008).

Influence of Physical Facilities and Enrolment on Students Academic Achievement in Kenya

A dearth of teachers, scarcity of textbooks and inadequate facilities were amongst the problems that made for a bumpy rise as primary schools went from educating about six million children in 2002. Arguably, these experiences should have proved an excellent dress rehearsal for the introduction of Free Secondary Education in 2008. The rise in student enrolment has raised concerns that there is considerable strain on existing physical facilities in schools. Classrooms are meant to accommodate at most 45 students as a policy requirement by the Ministry of Education. This situation in schools has brought concerns that students' academic

achievement may have declined due to poor learning conditions in schools (Oyaro, 2008). Expanding access to secondary schools, where fees are still charged is particularly difficult in Kenya and other poor countries. One proposal under study is to develop a national fee structure to prevent local school boards from charging high fees to keep poorer students out. The government is also experimenting with the use of secondary day schools instead of the traditional boarding schools to make secondary education more affordable (Fleshman, 2009).

According to some estimates, at least 4,000 new classrooms; the equivalent of 250 schools, were needed to accommodate the 1.4 million students expected in secondary schools in the year 2008. Kenya currently has 4,478 public secondary schools, many of which are in a state of disrepair and lack essential facilities (Oyaro, 2008). According to Eshiwani (1984), availability of classrooms, desks, laboratories, workshops and library were symbols of high education quality. Lewis (1984) also makes a similar observation that shortage of textbooks and teaching materials has had harmful effects on satisfactory teaching in mathematics and sciences. Mwiria (1985) also suggests that students' performance was affected by the quality and quantity of teaching and learning resources. He notes that schools with adequate facilities such as laboratories stands a better chance of performing better in examinations than poorly equipped schools.

The Ministry of Education's recommendation of 40 students per class is aimed at providing achievement (Republic of Kenya, 2011). However, since most schools do not have prior arrangement for extra classes in anticipation of more students due to Free Secondary School (FSE), this recommendation has caused a major threat to students' academic achievement (Oyaro, 2008). The question "Are smaller classes better than larger classes?" continues to be debated among teachers, administrators and parents as well as in the research community. However, Robinson (1990) has concluded that research does not support the expectation that classes will be themselves result in greater academic gains for students. He observes that the effects of class size on student learning vary by grade level, student characteristics, subject areas, teaching methods and other learning interventions. Adeyela (2000) has found that large class size is not conducive for serious academic work. Afolabi (2002) has also found no significant relationship among the class size and students' learning outcomes.

Eshiwani (1984) asserts that availability of classrooms, desks, laboratories, workshops and library are symbols of high education quality. Lewis (1984) also makes a similar observation on the

shortage of textbooks and teaching materials in mathematics and sciences. Mwiria (1985) suggests that students' performance is affected by the quality and quantity of teaching and learning resources. He notes that schools with adequate facilities such as laboratories stood a better chance of performing better in examinations than poorly equipped schools. Laboratories are "discovery centres" and any young person's desire is to discover why things exist the way they do. The most esteemed laboratory is the computer laboratory (Ingubu & Kyalo, 2011). Banerjee *et al.* (2004) have found that the idea of using computers in schools seems particularly promising in areas where both the number of qualified teachers and the quality of employed teachers is notoriously poor. This is practically the situation in Kenya. MOEST (2005) agrees that Information and Communication Technology (ICT) has a direct role to play in education and if appropriately used can bring many benefits to the classroom as well as education and training processes in general. With the enthusiasm over ICT, many secondary schools have received an influx of students with the thirst for computer knowledge. So far the availability of computers in many schools is quite low, some even as low as 2 pieces for a population of over one hundred students. With the influx, it is expected that schools will beef up the available stock in order to make the whole learning process a success (Ingubu & Kyalo, 2011).

Turning to the science laboratories in general, it is worth noting that the effect visited on these facilities is immense given that about 75% percent of science instruction takes place here. Crowding is the norm and with crowding, young students are likely to encounter plenty of accidents in the laboratories, ranging from chemical burns to suffocating fumes and breakages of glassware such as burettes. It is characteristic of learners once aware that they are many, against the limited space in the laboratory, to scamper and hustle into the laboratory with abandon. The results are catastrophic. The school administration is also at crossroads on how to determine the cost of laboratory equipment (Ingubu & Kyalo, 2011). The MOEST (2005) says that it is difficult to determine unit cost of laboratory equipment and chemicals. It is not easy to determine the amount of sulphuric acid to be used by a single student in a term or a year, yet a lump sum amount of Ksh300 per child per annum is proposed. Laboratory adequacy has been reported to affect the performance of students in Chemistry (Raimi, 2002; Adeyegbe, 2005). Farombi (1998) argues that students tend to understand and recall what they see more than what they hear as a result of using laboratories in teaching and learning of science.

Individual reading done in the library is quite beneficial to learners. It is here that learners get to update class work with individual research and reading. However, the experience is not smooth. Libraries are poorly stocked and the existing books are obsolete. This problem is compounded by the fact that libraries are makeshift rooms recently converted from a derelict building to convince all that there exists one. In well established schools, libraries are well-built, modern, conducive but lacking in materials especially books and computers for research. With the influx of learners therefore these problems have trebled. Libraries are not only congested but are also rendered stuffy and noisy thus distorting the whole mood that was meant to exist for research in the first place (Ingubu & Kyalo, 2011). Lockheed and Verspoor (1991) state that educational systems in developing countries are inherently inefficient due to among other reasons a low budgetary allocation which lowers the quality and quantity of inputs, especially physical infrastructure such as classrooms, workshops, laboratories and learning materials. In the sub-Saharan Africa, the expenditure per student as a percent of GDP per capita is put at 10.6 and 25.8 for primary and secondary respectively (Glewwe & Kremer, 2005). In Kenya alone, in 2007, the development budget for 59,551 basic education institutions and 10.1 million learners is given as Ksh1.28 billion as shown in Table 1 below. Such a budget is a far cry from what

is required to provide quality facilities in all schools year round.

The input-output studies based on cognitive achievement of students provide little evidence that school resources have any regular important effect on results. Some studies have shown such factors to be apparently effective, whilst others have shown the opposite and the total outcome of these studies throws doubt on the importance of school facilities in the learning process (Ayot & Briggs, 1992). That notwithstanding, many parents associate the poor students' achievement in public schools due to the lack of adequate learning facilities and shortage of teachers. This is the scene that prevails given the influx of learners in schools. A classroom is basically meant to take up to 20 double desks or 40 single desks. It has been found that up to six students will squeeze onto a desk meant for only two. It all leads to the conclusion that very little learning can be said to be taking place given such horrendous conditions (Ingubu & Kyalo, 2011). Kosgey *et al.* (2006) agree that physical assets have a lot to do with moral education, that it is a fact that attractive environments lift the human spirit. That, it would be easier for a teacher in a neat, well-built school with adequate facilities, well trimmed grass, flowers and trees to encourage aesthetic aspects like beauty, joy, peace and general values such as tidiness, generosity, than a teacher in a poor and ugly environment.

Table 1: Expenditure on Education in Kenya

	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
Recurrent	72,405.54	80239.91	88,357.51	99,806.41	112,485.15
Development	4,314.25	4770.47	4002.84	10020.78	12799.01
Total	76724.79	85,010.38	92,360.35	109,827.19	125,284.15

Source: Ministry of Education, 2008

Lewin (2008) says that expansion of secondary education requires the purchase of furniture, equipment and learning materials; and the provision of supporting infrastructure. Costs depend on design criteria and specifications and can vary widely. The basic characteristic of equipment is that they are perennially substandard. Their durability and versatility are questionable. It is not any wonder then that with soaring enrolments, such facilities can

hardly last a term. Therefore the maintenance and replacement costs are bound to be astronomical. Worse, educational managers are ill at will to incur expenditure twice a year over the same facility. The upshot is that quality of education is bound to decline drastically if facilities and equipment are shoddily looked at (Ingubu & Kyalo, 2011).

With regard to quality and relevance, concern continues to be raised on the failure to satisfactorily

inculcate a modern scientific culture, imbue learners with desirable social skills and values. This is attributed to inadequacies in the provision and maintenance of essential physical facilities, instructional and research materials and human resource capacity. Now with projected increases in enrolment, this scenario is bound to worsen. With dilapidated facilities, learning will no longer be enjoyable but business as usual (Ingubu & Kyalo, 2011).

School facilities have been observed as a potent factor to quantitative education. The importance to teaching and learning of the provision of adequate instructional facilities for education cannot be over-emphasized. The dictum that "learning is inseparable from learning but learning is not separable from teaching" is that teachers do the teaching to make the students learn, but students can learn without the teachers (Owoeye & Yara, 2010). According to Akande (1985), learning can occur through one's interaction with one's environment. Environment here refers to facilities that are available to facilitate students learning outcome. It includes books, audio-visual, software and hardware of educational technology; so also size of classroom, sitting position and arrangement, availability of tables, chairs, chalkboards, shelves on which instruments for practicals are arranged (Farrant, 1991; Farombi, 1998).

According to Oni (1992), facilities constitute a strategic factor in organizational functioning. This is so because they determine to a very large extent the smooth functioning of any social organization or system including education. Oni further states that their availability, adequacy and relevance influence efficiency and high productivity. To Farombi (1998), the wealth of a Nation or society could determine the quality of education in that land; emphasizing that a society is wealthy will establish good schools with quality teachers, learning infrastructure that with such, students may learn with ease thus bringing about good academic achievement. Writing on the role of facilities in teaching, Balogun (1982) submits that no effective science education programme can exist without equipment for teaching. This is because facilities enable the learner to develop problem-solving skills and scientific attitudes. In their contribution, Ajayi and Ogunyemi (1990) reiterate that when facilities are provided to meet relative needs of a school system, students will not only have access to the reference materials mentioned at their own pace. The net effect of this is increased overall academic performance of the entire students. Ajayi (1996) identifies the significance of facilities in teaching learning spheres and submitted that absence and or deteriorating quality of educational facilities

can affect academic performance. Gamoran (1992), however, notes that facilities, teachers' salaries, had little impact on variation in students' achievement once student background variables had been taken into account. This implies that before such student could perform well in higher educational level, he must have been groomed or cushioned by availability of resources in his elementary days upon which he now uses as spring board. According to Hallack (1990), facilities form one of the potent factors that contribute to academic achievement in the school system. They include the school buildings, classroom, accommodation, libraries, laboratories, furniture, recreational equipment, apparatus and other instructional materials. Hallack (ibid.) further says that their availability, relevance and adequacy contribute to academic achievement; however, unattractive school buildings and overcrowded classrooms among others contribute to poor academic attainment.

Libraries and Students' Academic Achievement

The Oxford Advanced Learners Dictionary describes a library as a building or room in which collection of books, tapes, newspapers etc are kept for people to read, study or borrow. Owoeye and Yara (2010) submit that a library is an essential factor in teaching-learning process. It forms one of the most important educational services. The educational process functions in a world of books. The chief purpose of a school library is to make available to the students, at their easy convenience, all books, periodicals and other reproduced materials which are of interest and value to them but which are not provided or assigned to them as basic or supplementary textbooks. As a resource, library occupies a central and primary place in any school system. It supports all functions of school-teaching and provides service and guidance to its readers. According to Fowowe (1988), a library must be up-to-date and at the same time allow access to older materials. It must be properly supported financially to fund materials and services among others.

While itemizing the types of libraries, Ola (1990) opines that secondary school library in whatever form, has replaced the traditional method of "check and talk" in imparting knowledge to students that its effects on academic performance need not to be over-emphasized. Ola concludes that a well-equipped library is a major facility which enhances good learning and achievement of high educational standards. On the other hand, Farombi (1998) reiterates that school libraries may not be effective if the books therein are not adequate and up-to-date as its impact may only be meaningful if the library could be opened to the students always for a

considerable length of time in a school day. With all the above mentioned facts, it is sad to note that many schools operate without libraries (Shodimu, 1998), whereas Ogunseye (1986) has noted that total absence of an organized school library would continue to spell dooms for thousands of secondary school students. This statement clearly implies that many schools operate without libraries and had affected the academic performance of their students. Moreover, Fuller (1985) identifies a school library as an instructional resource which may significantly influence students' achievement after controlling for students' family background. Fuller (1985) has found that effect of library size and its activity have been positive in 15 out of 18 analyses. In a study on the relationship between instructional facilities and academic performance, Popoola (1989) has found that library correlates with academic achievement and those schools with well equipped library normally maintain high academic performance. In another study on raising school quality in developing countries, Fuller (1985) has found that collection of books kept for reading in the library is related to performance. Reporting on the state of library in Lagos secondary schools of Nigeria, Shodimu (1998) submit that the guidance that each school should be provided with a library with 100 students seating capacity was not followed as most of the schools he sampled had seating capacity of less than 100 students.

Textbooks and Students' Academic Achievement

A textbook constitutes an important tool for academic achievement (Owoeye & Yara, 2010). Many writers, as cited in Owoeye and Yara (2010), have variously highlighted the contribution of textbooks to academic achievement. Studies have revealed in some instance, that textbooks provide the only source of information for students as well as the course of study for the subject. After exploring the effects of textbooks and other factors on student achievements, Lockheed *et al.* (1986) have found in their longitudinal data from a national sample of eight grade mathematics classrooms in Thailand that textbooks may affect achievement by substituting for additional post secondary mathematics education of teachers and by delivering a more comprehensive curriculum. Altbach (1983) opines that "nothing has ever replaced the printed word as the key element in the educational process and as a result, textbooks are central to schooling at all levels". In an empirical study on the use of textbooks and educational achievement involving 1,006 primary school pupils, Fuller (1985) has revealed that students who had used more than two textbooks were almost three times as likely to pass, at 67 percent graduating examination

compared to students who had no textbooks in schools (only 24 percent graduating). Squire (1991), writing on teachers' reliance on textbooks, states that those seeking to improve the quality of education believed that improvements in instructional materials would inevitably lead to changes in actual teaching. For many teachers, textbooks can provide an excellent and useful resource, without usurping the position of the teacher. While the selection of a textbook has been adjudged to be of vital importance to academic achievement, it is sad to say that relevant textbooks are not available for teaching and learning activities (Odulaja & Ogunwemimo, 1989). Lack of textbooks could be identified with the high costs. When this happens, Fuller (*ibid.*) further notes, students cannot afford to purchase; the implication therefore is that the teachers will serve as the only source of information his selection of a textbook may be biased. This bias is in the sense that students' selection may be based on reasonably unsatisfactory criteria such as its attractiveness in terms of colour, print, photograph, the author's qualifications and the recognition he has accorded in some other publications (Owoeye & Yara, 2010). In a study on resources and resources utilization as correlates on academic achievement, Oni (1992) has reported that there is a significant relationship between recommended textbooks and academic performance in introductory technology, business studies and home management respectively. Glewwe and Kremer (2005) find no evidence that provision of official Kenyan government textbooks increase scores for the typical student. However, they do find evidence that textbooks lead to higher test scores for the subset of students who scored well on a pre-test. The authors note that, English, the medium of instruction in Kenyan schools and the language in which textbooks are written, is the third language for most pupils, and there is evidence that many pupils have difficulty reading the books. Glewwe and Kremer (2005) have found that the workbook-pupil ratio has significantly positive coefficients for both subjects, so that providing a work book for each student in schools that have none increases Maths and reading scores by 0.22 and 0.21 standard deviations, respectively. The only other school variable significant at the 5 percent level was lack of adequate furniture, which was associated with a drop of -0.32 standard deviations in maths and -0.29 standard deviations in reading.

Laboratory and Students' Academic Achievement

Laboratory has been conceptualized as a room or a building specially built for teaching by demonstration of theoretical phenomenon into practical terms (Owoeye & Yara, 2010). Farombi (1998) argues that

“seeing is believing” is the effect of using laboratories in teaching and learning of science and other science related disciplines as students tend to understand and recall what they see that what they hear or were told. Laboratory is essential to the teaching of science and the success of any science course is much dependent on the laboratory provision made for it. Affirming this, Ogunniyi (1983) says there is a general consensus among science educators that the laboratory occupies a central position in science instruction. It can be described as a place where theoretical work is practicalized whereas practicals in any learning experience involves students in activities such as observing, counting, measuring, experimenting, recording, observation and carrying out field work. These activities are totally different from the theoretical work which involves listening to talks and taking down notes from such talks.

According to Ango and Sila (1986), laboratory work:

- Stimulates learners’ interests as they are made to personally engage in useful scientific activities and experimentation
- Promotes that science is not only products or process
- Affords the learner the basic skills and scientific method of problem solving
- Knowledge obtained through laboratory work promotes long term memory

Laboratory helps to provide a form wherein the learner is given the exercise to subjects, his beliefs, ideas, statements, theoretical propositions etc to some forms of experimental test (Soyibo, 1990). To maintain and arouse the interests of students in subjects involving laboratory work, the teacher should be effectively involved in order to transfer knowledge and facts to learners for a good performance in any examinations. In line with this, one then pauses to ask: to what extent has laboratory been able to achieve its objectives? Odulaja and Ogunwemimo (1989) point out that the teacher assumes a position of dispenser of knowledge with the laboratory serving the function of drill or verification. They further explain that at the other extreme, the teacher assumes the position of a guide to learning and laboratory as a place where knowledge is discovered. However, there are growing evidences that teachers do not exhibit behaviours which are complementary to achieving the stated objectives. They include methods of teaching practical work; inadequacy or absence of well-equipped laboratories; high enrolment of students; inadequacy of resources for teaching and learning practical work; quantity and quality of teachers.

Nwachukwu (1984) has discovered, in a survey of the resources for the teaching and learning of Biology in some of the new secondary schools in Lagos, that there is a general inadequacy of resources. Nwachukwu (ibid.) has also found among other things that (a) out of 80 percent of the old schools that accepted as having laboratories, none had a well-equipped laboratory at all (b) 40 percent of the schools had no laboratory at all, while the remaining 60 percent had rooms labelled “laboratory” without adequate apparatus. She concludes that teaching of Biology practical by teachers would be difficult and that students learning experiences would be limited.

Balogun (1982) says that no effective science education programme can exist without equipment for teaching. In terms of academic achievement, Soyibo and Nyong (1984) have shown that schools with well-equipped laboratories have better results in the school certificates science examinations than those that are ill-equipped. Corroborating this, Gana (1997) reiterates that students instructed entirely by the laboratory methods had higher attitude’s scores but lower achievement scores than students instructed entirely by the traditional lecture or textbook mode. Yadar (2001) opines that no course in science and mathematics can be considered as complete without including some practical work. The practical work ought to be carried out by individuals either in science laboratories or in classes. At school level, practical work is even more important because of the fact that we learn by doing. Scientific practices and applications are thus rendered more meaningful. It is an established truth that an object handled impresses itself more firmly on the mind than the object merely seen from a distance or in an illustration. Thus practical work forms an important feature in any science and mathematics course (UNESCO, 2008). In view of these different and conflicting findings, it is clear that physical facilities influence academic performance of students in schools.

CONCLUSION AND WAY FORWARD

This paper contributes to the expanding knowledge in the field of education for the improvement of students’ academic achievement. Most scholars agree that high students’ academic achievement leads to high transition rate to middle level colleges and universities, thus avoiding education wastage. As such, effective curriculum implementation factors, such as adequate teachers and physical facilities, aid in achieving better learning outcomes. The paper highlights the importance of understanding the influence of academic staffing, physical facilities and enrolment on students’ academic achievement, so that improvement on these four factors can be

addressed in schools to realize high academic achievement.

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