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This issue of TAS will reach most of our readers in January, 2007. Albany State University’s IT had some problems toward the end of 2006 which paralyzed the E-mail system. Many files were lost and those included ones with stored journal articles. Frantic efforts were made to retrieve many of them and I am delighted that another issue of the journal has been put together.

Solicitation for articles from other parts of Africa especially the East and South parts spearheaded by Professor Barnabas Otaala is already yielding fruitful results. More and more authors from East and Southern Africa are sending articles for publication. Aside from the ten articles in this issue, the DOCUMENT folder contains two interesting papers. Patience Mahlalela (Director of British Council in Namibia); Professor Barnabas Otaala (Adjunct Professor, International University of Management, Windhoek, Namibia); and Professor Bob Thackwray (Director, Membership and Organizational Department, UK Leadership Foundation for Higher Education) jointly presented a conference paper, “University of Namibia and Investors in People: A Case Study” at a recent meeting in Stellenbosch, South Africa. This paper is a must read for university leaders and administrators in African countries both because of the ever timely subject matter and the well qualified authorships. The second paper is Professor M.J. Kelly’s inaugural address on the occasion of World Aids Day in Dublin, Ireland. Professor Ploghoft has described Professor Kelly as an amazing person, very committed to African education in all aspects. He is a tireless worker, who is highly respected generally and especially for his humane approach to an otherwise clinical/medical worldwide crisis. These sterling qualities are demonstrated in Professor Kelly’s address included in the DOCUMENT folder of The African Symposium.

This issue, as usual, also parades well articulated views on educational and human development issues in Africa. Dr. Ravinder Rena descriptively analyzed Eritrean government documents to highlight some of the problems and challenges of youth education in post-independent Eritrea. For youth gainful employment to achieve positive social and economic change, the author opines that the identified problems and challenges should be adequately addressed by the Eritrean government and other stakeholders. Drawing mainly from School Effectiveness Research, Peretomode and Idiaghe studied the effect of school facilities, teacher qualification, and school location on student academic achievement in some secondary schools in Delta State of Nigeria. The authors found that eight predictor variables either individually or in combination were not good predictors of student academic achievement in science and vocational subjects. They strongly advocate parental involvement in student education through active participation of Parent and Teacher Associations and collaboration between schools and other stakeholders.

Gender disparity and its negative implications for women emancipation form the focus of a study by Ayodele, Popoola, and Akinsola. Their study of women education at the University of Ado-Ekiti, Southwest Nigeria, revealed an imbalance in student enrolment against females. The enrolment of the few females was also found to be lopsided in favor of the Arts and Humanities.
courses as opposed to the Sciences and Engineering courses. The authors recommended public education and enlightenment to encourage more girl-education and they advocated enhanced opportunity for female academic staff advancement in Nigerian universities. Dr. Kobiowu of Obafemi Awolowo University, Nigeria examined the effect of socio-economic status and adolescent attitudes to peer and parental authority. In this generation dynamics study, 1,500 students in selected schools in Southwest state of Oyo comprised the sample. The study revealed that there was a significant difference between children of literate and illiterate parents, relative to parental and peer-compliance.

Akhahowa and Osubor, both of Nigeria’s University of Benin discussed a relatively new teaching strategy called e-learning. According to the authors, e-learning serves to disseminate a standard up-to-date version of a wide range of resources to a large number of students. This new information revolution that provides a flexible and more open learning environment for students has however not been embraced by many African universities; hence their recommendation for implementing and sustaining this technology-based learning method. Chimeke and Ukaoha of the same university also discussed their development of a multi-agent intelligent tutoring system for teaching computer-programming languages through the World Wide Web. The advantage of their system was demonstrated by comparing the developed multi-agent intelligent system with real-life classroom settings. The conclusion was that using computers facilitates the learning process and can compensate for shortage of teachers in some instances.

Ademokoya and Akhigbe of the University of Ibadan compared job satisfaction of able-bodied and people with disabilities with regards to placement on job and incentives they enjoy at their work places. They studied 60 able-bodied and 60 persons with disabilities using the Job Satisfaction Assessment Scale. They found that there was a significant difference between the experience of able-bodied workers and workers with disabilities concerning placement on job assignments; but found no significant difference in the welfare packages to the two groups of workers. The authors recommend that discrimination against workers with disabilities should stop and merit should determine a worker’s treatment rather than disability.

Improving Kenya’s higher education through better financing was advocated by Gravenir, Ouma, Mse, and Njihia in their paper titled “Re-thinking the financing of Kenya’s higher education: Options for enhancing equity, access, and quality.” The paper discussed the evolution of funding of higher education in Kenya and how changing funding policies have impacted equity, access and quality. The authors observed that no single funding model would satisfy equity, access and quality of education in Kenya and therefore recommended an eclectic funding approach.

Solomon Oyelekan sought to find the level of understanding of some chemistry concepts by selected secondary school students in Osun state of Nigeria. Using a test item called Test of Concept Understanding in chemistry; the author found that students’ level of understanding of theoretically-related concepts was higher than practically-related concepts. Various factors were attributed to this problem, many of which the author recommended solutions to. Drs. Boaduo and Shaibu of the University of Botswana, Southern Africa discussed the contributions senior citizens could make to the economic and social development of Botswana. Rather than looking at
senior citizens as a burden to the society, the authors suggest that the positive contribution of senior citizens outweigh whatever problems associated with ageing they may exhibit.

With this issue, The African Symposium successfully concludes the sixth year of publication. Enjoy your reading as we all look forward to very many more years of academic and social interaction.

The following scholars are hereby acknowledged, with thanks, for reviewing articles that appear in this issue:

Dr. Milton Plochoft (Professor Emeritus, Ohio University)
Dr. Claude Perkins (Professor of Educational Leadership, Albany State University)
Dr. Jacqueline Robinson (Social Work, Albany State University)
Dr. Adebisi Fabayo (Nursing, Albany State University)
Dr. Kwame Dankwa (Political Science, Albany State University)
Dr. Kimberly Fields (Special Education, Albany State University)
Dr. Gerald Burgess (Technology Application to Learning, Albany State University)
Dr. Reginald Nnazor (Higher Education, Fort Hayes State University, Kansas)
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Comparison of Job Satisfaction between Able-Bodied Workers and Workers with Disabilities in Oyo State, Nigeria.

J. Abiola Ademokoya. Ph.D., and O. C. Akhigbe

Abstract

This study sought to ascertain whether or not able-bodied workers and those with disabilities do experience the same job satisfaction with regards to job placement, assignment of roles and incentives they enjoy at their workplaces. The study engaged 120 workers (60 able-bodied workers and 60 workers with disabilities). Two hypotheses were raised for testing on job placement, assignment of roles and incentives offered the two groups of workers. The major instrument used for the study is Job Satisfaction Assessment Scale (JSAS). Findings showed that there was a significant difference between the experience of able-bodied workers and those with disabilities concerning job placement and assignment of roles. This implies that unlike their able-bodied counterparts, workers with disabilities are not always placed on job cadres or assigned job roles which are appropriate to their qualifications. However, there was no significant difference in the provision of incentives for the two groups of workers. It was therefore recommended that employers should avoid discriminating against workers with disabilities by offering them job positions or assigning them functions which belittle their qualifications. Merits of every worker should determine their treatment at work and not disability.
Introduction

Improved rehabilitative and educational services for persons with disabilities in recent times are resulting in higher aspirations and more impressive achievements among the same people. They appear now more determined than before to compete with and excel their able-bodied colleagues in their careers and other pursuits (ILO, 1983; Famuyide, 1998; & Heward, 2000). Students and apprentices with disabilities are indeed showing greater achievement motivation in schools or workshops where they are undergoing trainings for future endeavors. Those who are working in public or private sectors are equally becoming more conscious of the need to enhance their employability as well as to improve their productivity (Cooper & Robertson, 1995; Badmus, 1996).

These welcome developments appear to have resulted from some new mindsets which persons with disabilities have evolved about themselves much more than from any assistance offered by the non-disabled individuals, groups or government (Ademokoya, 2001). In fact, it is now apparent that persons with disabilities have recognised that some negative attitude and erroneous perceptions which non-disabled people have towards them are more handicapping to them than their disabilities (Meadow-Olans & Erting, 2000; Ademokoya, 2004). More than often, persons with disabilities do contend with distrusts and discriminations which they experience from non-disabled persons much more than they contend with whatever limitations their disabilities cause them (Adima, 1988).

History has it that various persons with disabilities have had to take their destinies into their hands and struggled to attain their aspirations. For instance, the famous “Deaf President Now” protest at the Gallaudet University, Washington D.C. in 1980 resulted in the appointment of the first deaf president for the same university. As the only university worldwide specifically established to provide higher education for students with hearing disability (deaf students) students of the same university in 1980 demanded that “a deaf president” be appointed to man the affairs of the university (Heward, 2000). The students argued that only one of their own will understand their plights much better than the hearing presidents and as a result would tackle them effectively. The protest lasted for a week. The governing council of university eventually appointed Dr. Jordan King who was a deaf academician to head the university. Dr. King’s subsequent achievements at the university have indeed been a glowing testimony of what competent persons with disabilities can do if given support.

Mba (1995) and Ademokoya (2001) however observed that persons with disabilities who have put up strong determination courage to acquire necessary academic and vocational skills seem not to be getting expected results for their efforts. Wehman (1992) for instance reported that between 50% and 75% of trained adults with disabilities are unemployed. Those who got employment are often faced with various job related problems. As Scuccimarra and Speece (1990) put it, many employed persons with disabilities receive incomes which hover near the poverty level. This is in addition to other denials or discriminations they encounter at workplaces. For instances, less than half of the employed youths with mental retardation received health insurance, sick leave or vocation benefits (Frank & Sitlington, 1993). However, their able-bodied colleagues do enjoy these incentives.

Job satisfaction as a concept describes pleasure, fulfilment, or positive emotional state of mind resulting from one’s appraisal of his experiences on job (Locke, 1976). It also involves a number of activities which influence one’s levels of motivation in his employment (Arnold, Cooper & Robertson, 1995). Factors determining one’s job satisfaction therefore include one’s attitude, thinking about his pay, working conditions, relationships with colleagues and boss,
career prospects and some intrinsic aspects of the job itself. Mullins (1996) also added that frustration and alienation at the workplace are also some determinants of job satisfaction.

Employees with disabilities according to Arnold, Cooper and Robertson (1995) often share the same fate which other minority workers usually encounter at workplaces. Such workers do experience some job-related problems such as entry obstacles, career discriminations and incentives denials. Workers who are often categorised as minority groups at work include women, the sickly and those who come from disadvantaged ethnic groups. McHugh (1991) listed disabled persons as those suffering from deafness, blindness, severe learning difficulties, motor or neurological disorders and so on. The listed are usually stigmatized and discriminated against in society as well as in the workplaces. They usually contend with some job problems such as low pay, assignment of functions which are below what they are qualified to do (Asagba, 2005).

It is against this background that this study sought out to ascertain two important indices of job satisfaction among some able-bodied employees and those with disabilities. These job satisfaction indices are placement on job, assignment of roles, as well what sort of incentives these workers receive in their workplaces.

Placement on job implies that one is unconditionally placed on appropriate job level or cadre worthy of his professional or academic qualifications. It also includes situations whereby an employee is delegated (whenever there is a need for that) to do or perform some functions which are appropriate to his status. More than often, factors such as unemployment, maladministration, discrimination and so on may necessitate that one is offered a job which is inappropriate to his qualification or delegated to perform certain duties that are much lower than what is expected of this rank and file. In societies or workplaces where there is high prevalence of prejudices, stereotypes or bias against people with disabilities, offering an applicant with disability a job which belittles his qualification, placing him on cadres that are below what he actually merits or delegating him to perform functions which fall short of his status could be a common norm. It could also be a practice of people or a workplace that whatever job, job placement or incentives offered employees with disabilities are privileges and not rights.

Job incentives refer to some welfare provisions which workers ought to enjoy in addition to their salaries. Such incentives are usually given to workers as means of motivating them and to facilitate an improved productivity. They therefore include staff training and development programmes, health and safety policies, retirement benefits, promotion and compensation benefits. Enjoying or participating in job incentives available in a workplace could depend on what views do top officeholders of that employment have about persons or employees with disabilities. It is not unlikely that workers with disabilities would be discriminated against in the incentive provisions in workplaces or societies which have low perspectives for persons with disabilities.

The purpose of this study therefore is to compare the job satisfaction of able-bodied employees against that of their colleagues with disabilities in relation to: (i) where they are placed in their employment and what sort of roles they are often delegated to do as well as (ii) what forms of incentive they enjoy on their job.
Hypotheses

This study raised two hypotheses for testing. They are:

HO1: There is no significant difference between the job placement trends/assignment of roles among able-bodied workers and workers with disabilities and

HO2: There is no significant difference between incentives enjoyed by able-bodied workers and workers with disabilities.

Participants

The study engaged 120 workers made up of 60 able-bodied workers and 60 workers with disabilities who were purposively selected from some public owned establishments in Oyo state, Nigeria. Involved establishment are: (i) Power Holding Corporation of Nigeria (PHCN), (ii) Nigerian Postal Service (NIPOST) and (iii) Teaching Service Commission (TESCOM). 20 of them (10 able-bodied workers and 10 workers with disabilities) are graduates from Nigerian universities or polytechnics. Again 20 (10 able-bodied workers and 10 workers with disabilities) have National Certificates of Education (NCE) and 40 (20 able-bodied workers and 20 workers with disabilities) have graduated from the federal or state technical colleges. The remaining 40 participants (20 able-bodied workers and 20 workers with disabilities) possess primary school leaving certificates. Engaged employees work as administrators, teachers, clerks, office assistants and messengers. All of them have put up at least five years in their respective jobs.

Instrument

The major instrument engaged in this study is a self-made scale known as Job Satisfaction Assessment Scale (JSAS). It has three major sections. Section A contains some demographic questions designed to obtain necessary information on the biodata and some job related information of the participants. Section B is a 6-item piece designed to ascertain the participants’ expressions of their placement on job and assignments of roles. Section C is also a 6-item piece designed to determine the participants’ views about the incentives they enjoy or not on their job.

Sections B and C were designed in likert scale form. This means that the respondents are to quantify their satisfactions or dissatisfaction by ticking from options stated as (5) strongly agree, (4) agree, (3) undecided, (2) disagree and (1) strongly disagree.

The scale was validated by administering it on 80 able-bodied workers and 70 workers with disabilities selected from various parts of Oyo state. Oyo state is located in the south western part of Nigeria. The scale’s reliability value is r. =.80

Data Analysis

The study data was analysed using descriptive statistics which essentially employed t-test analysis. The results are presented below.

Results

Results are presented according to the two tested hypotheses.

HO1: This hypothesis sought to ascertain how able-bodied workers and workers with disabilities consider their job placement and assignment of roles. Results are presented in table 1.
Table 1: t-test Comparison showing how Able-bodied Workers and Workers with Disabilities Assessed their Job Placement and Assignment of Roles (Delegated Duties).

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>S.D</th>
<th>X</th>
<th>Df.</th>
<th>t-Crit.</th>
<th>t-Cal.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able-bodied Workers</td>
<td>60</td>
<td>3.05</td>
<td>12.97</td>
<td>59</td>
<td>2.00</td>
<td>2.98</td>
<td>0.05</td>
</tr>
<tr>
<td>Workers with Disabilities</td>
<td>60</td>
<td>3.17</td>
<td>13.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the table above it was discovered that there is a significant difference between placement on job trends and assignment of roles of able-bodied workers as against that of workers with disabilities (t. Cal, 2.98 > t. Crit, 2.00). This hypothesis is therefore not accepted. This means that there is a sharp discrepancy in regards of how the two sets of workers consider their experience of placement on job and assignment of roles as indices of their job satisfaction. While able-bodied workers are satisfied with their placement on their job and assignment of roles, workers with disabilities expressed their dissatisfaction on their placement on job and roles delegated to them.

HO2: This hypothesis tested whether or not able-bodied workers and workers with disabilities equally enjoy the same incentives on their jobs. The results are presented on table.

Table 2: t-test Comparison Showing how Able-bodied and Workers with Disabilities Assessed their Incentives at the Workplaces.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>S.D</th>
<th>X</th>
<th>Df.</th>
<th>t-crit.</th>
<th>t-cal.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able-bodied Workers</td>
<td>60</td>
<td>2.99</td>
<td>15.28</td>
<td>59</td>
<td>2.00</td>
<td>1.004</td>
<td>0.05</td>
</tr>
<tr>
<td>Workers with Disabilities</td>
<td>60</td>
<td>2.38</td>
<td>10.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 above showed that both able-bodied and workers with disabilities enjoy almost equal incentives at work. As a result there exist no significant difference between them (t. cal = 1.004, < t-crit. =2.00). This hypothesis is therefore accepted. The implication is that there is an agreement of satisfactions over incentives which both able-bodied and workers with disabilities enjoy at workplaces.

Discussions

Discussions on findings of this study are done in relation to the two hypotheses which this study sought to verify.

1. **Job Placement /Assignment of Roles (Delegated Duties)**

As shown on table 1, 60 able-bodied workers and 60 workers with disabilities were requested to assess their experience on job placement and assignment of roles. The meanscore for able-bodied workers is 12.97 with a standard deviation of 3.05 while the meanscore of workers with disabilities is 13.22 with standard deviation of 3.17. The degree of freedom is 59 at the probability level of 0.05. The t-critical value is 2.00 while the t-calculated value is 2.98.

The question raised by this hypothesis is whether or not both able-bodied and their co-workers with disabilities do experience the same trends in job placement and delegation of duties. The findings showed that there is indeed a significant difference in the experiences of the two groups of workers (t.cal, 2.98 > t.crit., 2.00). This hypothesis is therefore not accepted.

Findings showed that workers with disabilities are not usually placed in cadres or job levels appropriate to their qualifications. Neither are they often assigned or delegated to perform
roles which are in accordance with their status. This is probably because some employers still consider the employment of persons with disabilities as an act of philanthropy rather than a norm even when certified competent by relevant professional bodies or academic institutions. (Succimarra & Speece, Olubela, 1996, & Ademokoya, 2001).

2. Provision of Incentives to Able-Bodied and Workers with Disabilities

Results on table 2 showed that the meanscore for able-bodied workers is 15.28 with the standard deviation of 2.99, while the mean score for workers with disabilities is 10.33 with the standard deviation of 2.38. The degree of freedom is 59 at the probability level of 0.05. The t. critical value is 2.00 while t-calculated value is 1.004. Again, the second hypothesis sought to determine if able-bodied workers enjoy the same incentives with their disabled counterparts. Findings showed that the two categories of workers do enjoy almost equal incentives at their workplaces (t.cal, 1004, < t.crit, 2.00). This hypothesis is not therefore accepted.

Provisions of incentives for employed workers with disabilities may in real sense take the form of sympathy or philanthropy rather than a right. People are usually fond of giving alms or donations to persons with disabilities found on streets, special schools or rehabilitation centres. The same practice could be extended to the workplaces where workers with disabilities are. Workers with disabilities probably were denied of rightful placement on job could be placed by the granting them sick or casual leaves, or giving them some money. (Ajobiewe, 2000).

Recommendations

It is therefore recommended that the practice of placing competent workers with disabilities on less satisfying or less motivating cadres should be discontinued with. As long as workers with disabilities are certified capable of holding an office title or handling a job responsibility, they should be unconditionally assigned to do such. It must be recalled that persons with disabilities are usually admitted into schools, colleges or universities not on compassion reasons but on merits just like their able-bodied counterparts. (Joint Admissions and Matriculation Board, 2006). Similarly, certificates are also awarded based on performances and not on any other passionate grounds. One wonders therefore why they should be discriminated against in placing them at appropriate job cadres or assigning them job roles which befit their professional status.

It is only when a worker with disability fails to satisfactorily perform a job role offered him that he could be considered for handling less challenging tasks. Morethanother, workers with disabilities usually require some orientation or induction to enable them get on well with their work activities. When such is not properly done it would be unethical for employers to underestimate their capabilities or blame him for low productivity.

Conclusion

This study sought to ascertain trends of job satisfaction among able-bodied workers and those with disabilities. Findings showed that workers with disabilities do not enjoy similar appropriate job placement and assignment of roles or delegations as their able-bodied co-workers do enjoy. However, both able-bodied workers and those with disabilities enjoy similar incentives on their job. In spite of these findings, there would still be some need to undertake further studies especially on finding means for improving the employers’ perceptions about employees with disabilities and how to enhance the employability and productivity of workers with disabilities.
References


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E-Learning: A Technology-Based Teaching Method For Providing Access To Sustainable Quality Education.

Akhahowa, A.E. and Osubor, V.I.

Abstract

Technology is driving radical change in the learning communities as traditional forms of teaching and learning are converted into Internet or Web-Based environments. With the advent of the new communication revolution, the world is witnessing an expansion in learning. This new information revolution has enabled academic institutions to provide a flexible and more open learning environment for students. However, many countries and high school in Africa have not taken advantage of this revolution thus, traditional learning system is still the order of the day in many high schools today. In this study, we consider a technology-based teaching method called electronic learning (e-learning) that serves to disseminate a standard up-to-date version of a wide range of resources to a large number of students. We then recommend measure in implementing and sustaining this technology-based learning method.
Introduction

With the advent of the new communication revolution, the world is witnessing an expansion in learning. This new information revolution has enabled academic institutions to provide a flexible and more open learning environment for students. Harasim (2002) points out that the convergence of new information technologies such as telecommunications, computers, satellites, and fibre optic technologies is making it easier for institutions to implement distance education. In Nigeria, distance education system is being considered as the most viable solution to the menace of satellite campuses recently banned by the Federal Government. The Government of Nigeria have been reactivating the National Open University of Nigeria (NOUN) that will be innovative and involving state-of-the-art teaching and learning multi-media packages. Folorunso, Longe, & Ijere (2003) report that the ultimate trend to the reactivation of the National Open University of Nigeria (NOUN) is towards delivery of courses through electronic networks.

African universities and high schools have been confronted with numerous changes in their external and internal environments. They are forced to respond to emerging challenges such as the continual development in ICT and in recent years, the rapid decline in educational standard is evident due to crumbling infrastructure, unpredictable academic calendar, flight of researchers and professional abroad, and the declining respect for its graduates across the globe. Providing access to quality education for every student in the universities is a significant task that must be accomplished so that they can reach their potentials. Therefore, they must follow the prevailing trend in most parts of the world by applying new technologies to overhaul and enhance its educational materials and resources. Though these universities and high schools are confronted with critical challenges to meet the new demands for the ever increasing student growth, they lack expansion in terms of educational resources to accommodate the increasing number of students. Therefore, they need educational environments that would make them more responsive to the confronted challenges. One of such environments/ways to providing access to educational needs is electronic learning which helps to provide students with the opportunities to have access to available experts, best resources and up-to-date information.

E-learning is fast becoming an accepted and indispensable part of the mainstream of educational systems especially in developed countries. This growth has been structured in the path by the internet among educators and trainers in the use of new internet-based and multimedia technologies. It is fast transforming the educational sector in the industrialized world and it is worthwhile considering how these new technology can be successfully implemented in many African high schools and universities thus this study to educate them on e-learning.

The E-Learning System

E-learning is delivery and / or management of training using computers and technology. This delivery process usually involves one or more of the following: CD-ROMS, a corporate intranet and the internet. Other common names for e-learning include: Computer-Based Learning (CBL), Web-Based Learning (WBL) and Multimedia-Based Learning. Taylor (2002) reports that e-learning is not intended to be blended with other training delivery methods to increase overall learning effectiveness and reduce cost. A study (Aber, 2003) reported that e-learning provides a fast and effective way to use digital technologies to deliver needed knowledge. It takes two forms, both of which are independent of location, so you can access them directly from your office. One form is “self-paced learning”, in which training is conducted at your own discretion and convenience. The other form is “real-time audio/visual communications,” which allows you
to access demonstration, seminars and so on as they occur. According to the United States Distance Association reported by CNN on August 20th, 2004, the e-learning movement is pretty common in higher education in USA where 90 percent of four-year public school and more than half of four-year private schools offer some form of online education. There is no doubt that e-learning is a growing trend in higher education field. Figures 1 gives a vivid description of an e-learning system.

Figure 1: Pictorial definition of an e-learning system
Source: Authors’ Fieldwork, 2006

Hambrecht (2000) clearly identifies the differences between e-learning and online learning. E-Learning represents the whole category of technology-based learning, while online learning is synonymous with web-based learning. In this case, online learning is actually a subset of e-learning. E-Learning (also called Technology-Based Learning) covers a wide set of applications and processes, including computer-based learning, web-based learning, virtual classrooms, and digital collaboration. In this study, we define e-learning as the delivery of content via all electronic media including the Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM. Terms like e-learning, technology-based learning and web-based learning are defined and used differently by different organizations and user group. Moreover, use of these terms is constantly changing, as the world of e-learning evolves. Online learning (also called Web-Based Learning) constitutes just one part of technology-based learning (e-learning) and describe learning via the Internet, Intranet and extranet. We use the terms online learning synonymously with web-based learning or Internet-based learning in this report.
Comparisons between E-Learning (EL) and Face-To-Face (F2F) teaching (Traditional Learning)

In this study we summarize in Table 1 below, several opinions as regards the comparison of e-learning and traditional learning.

<table>
<thead>
<tr>
<th></th>
<th>E-Learning</th>
<th>F2F/Traditional Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Classroom discussions</td>
<td>The learner talks at least as much as or more than the Instructor.</td>
</tr>
<tr>
<td>2.</td>
<td>Learning material</td>
<td>The learner is more actively engaged with the learning material.</td>
</tr>
<tr>
<td>3.</td>
<td>Learning process</td>
<td>Most of the learning processes occur in groups or by the individual learner.</td>
</tr>
<tr>
<td>4.</td>
<td>Collaboration and peer discussions</td>
<td>Allows for greater problem discussion, peer collaboration and synchronous discussion with the instruction; Allows for easy online collaboration, sharing &amp; networking of ideas between and among the learners.</td>
</tr>
<tr>
<td>5.</td>
<td>Subject matter</td>
<td>The Learner is involved in determining the subject matter since studying is based on various information sources, including web data banks and net experts location by the Learner; Subject matter is richer and includes materials in different formats.</td>
</tr>
<tr>
<td>6.</td>
<td>Emphasis on research study</td>
<td>The Learner learns &quot;how&quot; and less &quot;what&quot;, with the learning involving research study which combines searching for and collecting information from web databanks and authorities on the communications network</td>
</tr>
<tr>
<td>7.</td>
<td>Learner’s motivation and performance</td>
<td>The learners' motivation is high as a result of their involvement in matters closer to them and the use of technology; Higher performance and scores for learners</td>
</tr>
<tr>
<td>8.</td>
<td>Learning location and instructor’s role</td>
<td>Learning takes place with no fixed location(anywhere) and the instructor directs the learner to the information</td>
</tr>
<tr>
<td>9.</td>
<td>Lesson structure</td>
<td>Structure of the lesson is affected by the group dynamics.</td>
</tr>
</tbody>
</table>

Table 1: Comparison of E-Learning and Traditional (Face-To-Face) Learning

*Source: Authors’ Fieldwork, 2006.*
E-Learning System Functional Model

Figure 2 gives a visual representation of the components that make up an e-learning environment and the objects that must be moved among these components. It is a simple functional and conceptual model designed in this study to understand how the different components of an e-learning system might work together.

Wiley (2000) defines learning objects as digital resources that can be reused to support learning or instructional components that can be reused a number of times in different learning contexts. Content repositories are storehouses for learning objects and can be accessed on one hand by people and systems creating content, and on the other hand by people and systems using the content. A learning offering is defined as content that is assembled into a package of learning (ideally including assessment components) that is then offered to learners as a unit. An offering catalog may associate offerings with learning paths that lead to degrees, certifications and/or skills. This catalog may be integrated with a more general content repository or may be a separate component, depending on the physical architecture of the learning environment. Suffice it to say that content repositories must maintain a searchable index of learning objects and ideally, descriptive information about the structure and properties of the objects.

Content (and Assessment) Authoring tools and services allow subject matter experts and instructional developers to create and modify learning content objects. Professional Instructional Developers typically require these tools to provide a rich set of functions, whereas subject matter experts are better served by tools that are easy to use and learn, and provide standard templates for the content being developed. It is important for authoring tools to allow content authors to locate existing content to reuse or repurpose it rather than completely recreate it; thus, in an ideal e-learning environment as in this study, authoring tools integrate smoothly with content repositories, allowing them to find, retrieve, modify, store, and replace objects and their metadata. Content Assembly refers to the linking of content objects together into cohesive learning modules with navigation between objects clearly defined and with assessments associated to appropriate content. Rules and/or behaviors for navigation through an offering is established during content assembly. It is usually performed using a different tool than the authoring tool used to create the learning objects, although many authoring tools include assembly capabilities. Thus, content assembly tools may support the creation and application of content templates that act as the basis for packaging content consistently and efficiently into learning modules.

Content/Catalog management is the process of defining the learning that will be offered to different audiences, establishing learning plans (degree paths, certification paths, skill development curricula), scheduling the resources needed to support learning delivery, establishing the business processes for registering learners in offerings, and making the offering catalog accessible to the target audiences. Catalog manager components are typically, interfaces that allow authorized individuals to make learning available and to set access rules, restrictions, prices, and so on.

Learning is ultimately about learners and thus, e-learning systems typically keep information about the learners that use them. This information includes: personal data, learning plans (e.g., degree plan), learning history, certifications, and degrees, assessments of knowledge (skills and competencies), and the status of participation in active learning (registration, progress). The sum total of this information is called a “learner profile”, and e-learning systems require a component that manages this profile. The Learner Profile Manager makes learner info available to other components and retrieves and updates learner information on the basis of data.
reported by other components. Each learner’s profile is stored in the “Learner Profile Repository”. The Delivery Environment provides the learner with access to learning content and other components of a learning environment such as chat, email, quizzes, multimedia players, collaboration tools, application sharing, shared whiteboards, equation editors etc. The environment also provides tools for instructors if there is an instructor-led component of the learning. Data on a learner’s activities and status in an offering may be passed back to the learner’s profile.

**Figure 2: E-Learning System Functional Model**

*Source: Authors’ Fieldwork, 2006*

**Benefits of E-Learning System in Education**

The benefits of e-learning to both the Instructor/Teacher and the Learner/Student are numerous. Some of the outstanding advantages of e-learning to the Instructor include: Reduced overall cost since cost associated with instructor’s salaries, meeting room rentals student travel, lodging, meals etc are eliminated; Kruse(2002) points out that learning times are reduced by an average of 40-60% through e-learning; expert knowledge is captured and communicated; essential element of training and initiatives can be automated, and consistent content delivery is possible with asynchronous, self-paced e-learning.

The benefits of e-learning to the learner include: Increased retention; reduced learning time; students can complete training conveniently at off-hours or from home based on on-demand availability; reduces stress and increases satisfaction for both slow and quick learners (since it
Designing a Course for e-learning system

Instructors and Course Developers must simultaneously consider the following when or before designing an e-learning course to ensure optimum impact:

(i) **Course Material**: Instructors need course contents that are current and relevant to the student’s career choices thus, they need to know the students needs. All instructors must work to keep up with current course content since these contents are dynamic.

(ii) **Student’s learning styles**: Instructors should plan course presentations based on the students learning styles and not based on his/her learning style or the way he/she was taught.

(iii) **Methodologies of presentation**: Methods of effective presentation can widely vary among disciplines thus, the right choice of technology suitable for enhancing different learning methods should be chosen.

(iv) **Assessment**: This is considered at the development stage of the course material. At the beginning of the course, it is very important to know the beginning level of students understanding of the subject. It is also important that all subjects know their own learning styles and the best way to approach learning based upon them.

Technologies involved in E-Learning

The basic building blocks necessary for the successful implementation of a sustainable e-learning system include:

- Highly available and quality broadband internet connectivity.
- PCs and Workstations with at least 450MHZ speed with speakers, soundcard, printer, Operating System (Windows95, Windows98, Windows2000 or WindowsXP) and RAM size of 128MB or more.
- Reliable e-mail software and active e-mail account.
- MODEM speed of 56Kbps (Kilobits per second).
- Reliable electric power supply available 24-hours a day and 7days a week.
- UPS and backup power systems such as those that include solar power batteries and wind energy.

Barriers to implementing e-learning in African Schools

(i) **Technological and Cost Infrastructure**: E-Learning requires a reasonable technological infrastructure and cost and e-learning can happen whenever this is lacking. They include: setting up of servers, PCs and Internet at reasonable access speed of at least 56K. Also, issues of reliance, maintenance, quality of service, IT support such as learning technologist or e-moderator are required.

(ii) **Social aspect**: Learners tend to feel isolated. Trainers are worried that they will lose their jobs. Learners and Trainers need to pick up skills for online learning and training.

(iii) **Pedagogical aspects**: It is imperative to familiarize learners and trainers with new way of learning because education will become learner-directed than instructor-directed. Learners need to discipline themselves, and learn a new way of learning, gathering information, getting resources and sharing knowledge and experience with others.
(iv) Mindset aspect: E-Learning requires a total change of mindset thus, strong support from senior management is extremely important for any institution that wants to implement e-learning. However, this is lacking in many Africa High Schools.

Why Every High School In Africa Should Embrace And Implement E-Learning

From our study, we have seen that the potentials of e-learning system cannot be fully realized until staff and students are using it. Therefore, every high school in Africa should embrace and implement e-learning for the following reasons:

(i) It is accessible 24 hours a day, 7 days a week and helps improve learner's effectiveness and retention levels.
(ii) It can serve as a standalone course for refresher training, pre-class preparation, corrective training, as an assessment tool and for just in-time performance support.
(iii) It provides greater and more equal access to quality education. Training can be delivered to places where student populations are not significant enough to support an instructor or where qualified teachers are unavailable.
(iv) Through e-learning, students are given greater control and responsibility for their own learning processes as they discover new areas of interest and accomplishment. They become knowledge-seekers and not just instructor-recipients, and actively construct it on the basis of their prior knowledge and experiences, which the traditional learning most of the time simply ignore.
(v) E-Learning seeks to improve the quality of graduates by utilizing modern instructional materials and methods, including increase in the use of ICT in teaching and research. Also, considering the increasing number of intakes into our Universities and high schools which in most cases, is not matched with spacious classrooms and structures, e-learning will make that not affect students.

Conclusion And Recommendation

Sustainability of e-learning is dependent on the recurrent costs on information resources. We recommend the following for every high school in Africa:

(i) In each school/college, an e-learning team consisting of a content expert, an instructional designer, a programmer, a web-interface designer, a graphic designer and an assessment expert adequately equipped with ICT skills, teaching skills (experience), operational and good communication skills, should be constituted.
(ii) A helpdesk should exist as a point of contact, staffed by personnel who can give immediate support or referral to specialists, with the e-learning team continually liaising with the helpdesk for information resources management.
(iii) Every high school should provide adequate funds for the purchase of e-learning materials for use in all e-learning centres to continually upgrade staff skills.
(iv) All academic staff should be made to undergo compulsory training in education techniques with emphasis on e-learning. Also, all students need to be trained on a continuous basis to equip them with requisite e-learning skills.
(v) Each department should set up an e-learning laboratory to develop local capacity in developing and evaluating appropriate training software.
(vi) All students are required to take the prescribed introductory level module(s) as a requirement for e-learning.
(vii) Appropriate common e-learning infrastructure and software responsive to academic needs should be established in all designated e-learning centers.
(viii) Strategies have to be developed for collaborative partnerships, broadband connectivity, universal access, e-learning and e-administration.

(ix) The university’s policies should create organizational (trainer capacity and training management) and technical (practice laboratory and computer-based training tools, self-paced training mode) conditions assuring continuous in-house e-learning capabilities in the long term.

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Family Socio-Economic Status And Adolescent Attitudes To Peer And Parental Authority

Dr. Kobiowu, S. V.

Abstract

Cultural changes have origins in the never-ending drama of the succession of generations. This study attempted to deal with the issues of age-cohort personality development, otherwise referred to as generation dynamics, as manifested in the sociology of parent-youth conflict. A questionnaire was the main instrument for data collection for the study. The sample comprised of one thousand five hundred (1,500) forms four and five students in selected secondary schools in Oyo State, Nigeria. The study revealed that there is a significant difference between children of literate and illiterate parents, relative to parental and peer-compliance.
Introduction

The family, otherwise referred to as a social unit made up of two or more persons related by blood, marriage, or adoption, and who often live together in the same household, has been the initial and universal unit of social experience. Families are a key mechanism of socialization in all human cultures. The enduring importance of families may largely result from the diversity and versatility of the highly personal services they have been able to perform for their members.

The child for example, is socialized into a segment of a given society by his or her family. They represent a particular slice of the society. They are of a particular social class, child of a teacher, or a truck driver, Christian or Jew, member of a dominant or subordinate ethnic group, member of a family respected, or scorned by neighbours. In other words, the family exercises the most immediate and most enduring influence on the child.

However, with the increasing complexity in contemporary times, the family is becoming increasingly incapable of supplying the child, and particularly the adolescent, with the necessary ethos to make him a well-rounded person. For each child, there comes a time when some degree of family disengagement must occur. Parents are usually the child’s first significant others, but soon, brothers and sisters (siblings) and cousins, and neighborhood children become important as factors in the child’s socialization. The child’s peer group has considerable influence on his early behavior, and where opportunities to participate are readily available, children from unstable homes are likely to become more influenced by their peer-group than by their family. According to the United Nations Population Fund (UNFP), and the Action Health Incorporated (AHI) (2002), over three billion young people exist in the world today. Over forty million of them are Nigerian youths. According to Bamgbose (2002, p.569), adolescents constitute about 43 percent of the population of Nigeria.

The peer-group, as a factor in socialization provides a way in which children can become independent of authority, particularly parental authoritarian relationship, and provides access to such knowledge that they do not have in the family, particularly on such issues as sex, dance, music, dress, etc. The peer-group also helps to widen the horizon of the child, and thus make him a complex person. In other words, the influence of the peer-group on the child, viz a viz that of the parents, can appear to be at variance. This appears much more so when one examines the various socio-economic groups that comprise any society.

These seemingly conflicting expectations among other reasons, necessitated embarking on this study. The study sought to establish the direction of the pull and push of the parents, and the peer-group on the child.

Literature Review

Studies of parental socio-economic group viz-a-viz adolescent peer group interaction have yielded contradictory results. For example, Newman and Newman (1976) postulated that the adolescent social world is comprised of an array of peer-groups, which vary substantially in normative attitudes, interests and behaviour Cusick (1973) and Brown (1982) discovered that adolescents reported significantly stronger peer and conform to peer norm than participate in family activities. The trend among adolescents is to uphold the values of the peer group, which
may run counter to adult values in the society, (Nwazuoke 2004, p.26) Several studies have also shown that in difficult and important area such as those involving vocational and educational decisions (Eme et al, 1979), where parents may be perceived as having some “expert knowledge”, high school students have been found to choose their parents' advise, and opinions, rather than those of their friends (Sebald and White, 1980). On the other hand, in situations, where the decisions about dating, dressing, social events and hobbies were to be made, the opinions of friends were perceived as more important (Sebald and White, 1980). Age and Sex (Emerich, 1987), and cultural background (Vallant, 1983) have also been shown to influence adolescents choices between parents and peer groups. Blyth et al (1982) and Keats et al, (1983) found that parents were nominated first as the most important source of reference, followed by friends, adults and siblings, in that order.

Parental value largely manifest in the behaviour of children. Parental values refer to those standards of desirability that parents would most likely see embodied in the children’s behaviour (Kohn. 1977). On the basis of perceptual data, lower class blue-collar parents have been reported to be more autocratic and rejecting (Elder, 1962), less willing to discuss issues in a democratic manner (Psathas, 1967), and less competent, less interested in their own endeavors, especially in the case of fathers (Rosen, 1964). One can thus infer from this that children of blue-collar, lower class parent will, more often than not, turn to the peer group for the warmth and nurture that are patently lacking in the home. By the same token, one might be tempted to conclude that children of white-collar parents, whose homes radiate warmth, openness and nurture would rather prefer to conform to parental wishes and desires, rather than peer-group values and desires. However, this feeling is essentially speculative and not empirically based. This study will attempt to supply this seemingly missing link. Two hypotheses were generated for the study.

Research Hypotheses

1. There is no significant difference between children of literate and illiterate parents relative to parental and peer-group authority.
2. There is no significant difference between children of white-collar and blue-collar parents relative to parental and peer-group authority.

Methodology

The main instrument for the study was a questionnaire designed to elicit information that relate to the null hypotheses that were generated for the study. Questions such as could make manifest the socio-economic status of the parent, the preferential conformity of the children, whether peer-group or parents, in addition to the demographic variables, featured in the questionnaire.

Questionnaire

The instrument was an adapted version of Coleman (1961) instrument on a study of the adolescent society. The variables that were pertinent to the study were retained, while the unnecessary ones were expunged. It was a standardized instrument, which was nonetheless revalidated to suit the local condition within which the study was conducted.
Sample

The sample comprised of one thousand five hundred forms four and five secondary school students randomly selected from public secondary schools in Oyo State, Nigeria. The decision to make use of students in forms four and five was premised on the fact that they would be more socially aware, and react more meaningfully to the questionnaire, relative to their counterparts in the lower classes.

The subjects were asked to provide information about their family background. Such information as the level of education of the father and mother, the occupation of the father and the mother, location of the residence of parents, and the income of the parents, all featured in the questionnaire, in addition to the pertinent issues that were raised. The questions asked in the area of literacy level included whether their parents had (NCE) National Certificate in Education. Or (OND) Ordinary Level Diploma, or (HND) Higher National Diploma. These are apart from the conventional degrees-B.A. B.Sc. etc.

The National Certificate in Education (NCE) is the certificate that is awarded to graduates of Colleges of Education, after successfully completing a three-year programme, after they must have passed the required number of ordinary level courses in the secondary school West African School Certificate Examination. The Ordinary National Diploma (OND) is awarded to graduates of polytechnics, while the Higher National Diploma (HND), as the name suggests, is awarded after a further two-year programme.

The questionnaire was administered on the pupils in their classes. Verbal clarifications were given to complement the instructions on the questionnaire. The questionnaire was administered with the assistance of the class teachers. It was collected promptly, so as to reduce the risk of loss or mutilation.

Results

Hypothesis One

This states that there is no significant between children of literate and illiterate parents relative to parental and peer-group authority.

The responses are as contained in Tables 1 and 2:

Table 1: Subjects’ responses to authority relative to fathers’ literacy/illiteracy

<table>
<thead>
<tr>
<th>Father’s Literacy Level</th>
<th>Conformity with Parent</th>
<th>Conformity with Peer-Group</th>
<th>X2C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father literate</td>
<td>614 (70.9%)</td>
<td>254 (29.1%)</td>
<td></td>
</tr>
<tr>
<td>Father illiterate</td>
<td>436 (69%)</td>
<td>196 (31%)</td>
<td>4.2011</td>
</tr>
</tbody>
</table>

Xt = 3.841, d.f. = 1, P<0.05 (significance)

Table 2: Subjects’ responses to authority, relative to fathers’ literacy level

<table>
<thead>
<tr>
<th>Fathers’ Literacy Level</th>
<th>Conformity with Parent</th>
<th>Conformity with Peer-Group</th>
<th>X2C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary/Secondary/NCE/OND</td>
<td>742 (71%)</td>
<td>304 (29%)</td>
<td></td>
</tr>
<tr>
<td>B.A./B.Sc./HND/M.A./Ph.D</td>
<td>308 (67.8%)</td>
<td>146 (32.2%)</td>
<td>4.1000</td>
</tr>
</tbody>
</table>

Xt = 3.841, d.f. = 1, P<0.05 (significant)
Table 1 above reveals that out of those respondents who had literate father, 614 representing 70.9 percent indicated that they would conform to parental pressure; while 252 or 29.1 percent indicated that they would conform to peer-group pressure. Moreover, out of those respondents who had illiterate fathers, 456 or 69 percent stated that they would conform to parental pressure, while 196 or 31 percent opted for peer compliance. When the data were subjected to chi-square statistics for further analysis, a significant value of 4.2011, (p<0.05), was recorded.

Table 2 revealed that out of those whose parents had primary, secondary, NCE or OND Certificate, 742 or 71 percent stated that they would conform to parental pressure, while 103 or 29 percent expressed that they would conform to peer-group pressure. Out of those respondents whose parents had B.A./B.Sc., H.H.D., or Ph.D., 398 representing 57.8 percent indicated that they would conform to peer-group demands. The data were subjected to chi-square statistics, and a significant value of 4.1000 was computed (p<= 0.05). The calculated chi-square values are significant. Therefore, the hypothesis which states that there is no significant difference between the children of literate and illiterate parents relative to parental and peer-group authority is rejected.

Table 3: Subjects’ responses to authority relative to mothers’ literacy level

<table>
<thead>
<tr>
<th>Mother’s literacy level</th>
<th>Conformity with parent</th>
<th>Conformity with peer-group</th>
<th>X²C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary/Secondary/NCE/OND</td>
<td>656 (66.5%)</td>
<td>331 (33.5%)</td>
<td>20.2797</td>
</tr>
<tr>
<td>B.A./B.S./HND/M.A./Ph.D</td>
<td>395 (77%)</td>
<td>118 (23%)</td>
<td></td>
</tr>
</tbody>
</table>

Xₜ = 3.841., df. = 1. P<0.05 (significant)

Table 4: Subjects responses to authority, relative to socioeconomic status (S.E.S)

<table>
<thead>
<tr>
<th>Socio-economic Status (S.E.S)</th>
<th>Conformity with parent</th>
<th>Conformity with peer-group</th>
<th>X²C</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-collar class</td>
<td>667 (70%)</td>
<td>286 (30%)</td>
<td>16.5564</td>
</tr>
<tr>
<td>Blue-collar class</td>
<td>385 (70.3%)</td>
<td>162 (29.2%)</td>
<td></td>
</tr>
</tbody>
</table>

Xₜ= 3.841., df. = 1. P<0.05 (significant)

Table 3 reveals that 656 or 66.5 percent of those whose mother had primary, secondary, Ordinary National Diploma (OND), National Certificate in Education (NCE) certificate opted for parental authority, while 331 or 33.5 percent indicated that they would conform with peer-group. Out of those whose mothers had B.A. B.Sc., H.N.D., M.A., or Ph.D. 395 or 77 percent indicated that they would conform to parental control, while 118 or 23 percent stated that they were for peer-compliance. The data reveal a chi-square value of 20.2798, which is considered statistically significant (P< 0.05).

Table 4 shows that when the socio-economic status of the respondents was taken into consideration, 667 or 70 percent of those from white-collar class decided that they would rather abide by their parents’ wishes and desires, while 286 or 30 percent indicated that they would favor peer-compliance. Out of those with blue-collar background, 383, representing 70.3 percent decided that they would prefer parental-compliance; while 162 or 29.2 percent stated that they would rather abide by their peer-groups’ wishes. The data when further analyzed yielded a significant value of 16.5564 (P< 0.05).
All the calculated chi-square values are significant. Therefore the hypothesis, which states that there is no significant difference between the children of white-collar and blue-collar parents relative to parental and peer-group compliance is also rejected.

Discussion

The result of this study indicated that a greater magnitude of the sampled adolescents conformed to parental pressure, rather than peer authority. This is somewhat surprising, albeit mildly. One would have expected that a significant proportion of adolescents would conform to peer-group pressure. The result showed that contemporaneity notwithstanding, parents still largely influence Nigerian adolescents, that parents still exert a considerable amount of pull on their children, relative to the pull of their peers. Perhaps, this is so because Nigeria is still largely a traditional society.

The most striking and seemingly consistent finding to emerge from these data is that pressure appears to be a more dominant and influential feature of high school life for boys, than for girls. The pressures reported by males were comparatively more intense and more strongly interconnected. This pattern tends to reinforce a rather traditional portrait of men as more radical than females, to influence by other people. Of course, the data do not suggest that females were unaffected by peer pressure, but that they were simply influenced to a lesser extent.

A sizeable proportion of the literature on adolescence deals with the relative influence of parents and peers on the attitudes and behaviour of adolescents. Much of this literature argue that in contemporary society, the influence of peers is in the ascendant, while parental influence and that of adults in general, is in decline (Mead 1970, Munns, 1972). Lasseigne (1975) however, found that the influence of both parents and peers upon moral beliefs of adolescents had significance. The degree of peer-group involvement has been demonstrated by Iacovetta (1975) to be inversely related to the quality of adolescents’ relationships with adults. Thus, one might say that adolescents whose attitudes are favorable toward their parents and other adults, will be conforming to adult standards of behaviour, while non-conforming behaviour will be more typical of adolescents who had negative attitudes towards parents and adults. A body of evidence supports this supposition. Nye (1956), Megarge and Golden (1973) found that alienated adolescents perceived their parents as hostile, non-accepting, and controlling through such psychological means, as instilling persistent anxiety.

Other set of theories relating to how adolescents can be affected by parental or peer pressure has dominated the thinking of investigators. The first is an instrumental or role-conflict theory, which appears to reflect the thinking Merton (1949) or Gross et al (1956). According to this theory, adolescents are seen as likely to conform to parental or peer pressures when those others may observe the adolescent behaviour, and are deemed likely to apply sanction to encourage conformity (Burkett and Jensen, 1975). The second is the socialization theory, which appears to be based on the reflections of Freud (1933), or Parsons (1951). This theory argues that the adolescent is influenced primarily because he or she has internalized the other's pressure. Thus, what was once the parent's (or peer's) pressure has now become an expectation that is accepted by the adolescent for his or her own conduct (Campbell, 1964; Whitehead and Harvey, 1974). In examining the issue of conformity further, studies of modeling have assumed that influence is provided when parent or peer exhibits appropriate behavior. In some studies, modeling behaviour were indicated by parental or peer exceptions for their own behaviors (Kandel and Lasser, 1969), while in others, modeling behaviour was reported by parents (Sham, 1974), or by peers (Forslund and Gastafson, 1976).
The result of this study revealed that the youth is not in rebellion against their parents, their values, or the authority of their culture. This finding is consistent with many conclusions which have been reached in previous researchers on adolescents’ attractions to parents and friends as reference sources (Lynn 1962; Kahn and Fielder, 1961; Nisbet, 1969). Even though Meredith (1972) concluded that experimental results support the hypothesis that children conform more to a system of peer-group values, the cumulative effect of empirical research has revealed disconcertingly little foundation of a fierce “conflict of generation” (Yankelovich, 1970). The result of various researchers can be said to be overwhelmingly in support of the fact that adolescents are more drawn to parents, rather than to the peer-group.

Conclusion/Recommendation

Parent should strive to manifest desirable tendencies at all times realizing that they are models for their children, who in turn are their mirrors to the outside world. The school should strive to partial out, as much as practicable, the overt effects of class differentials among students. Teachers should relate to the pupils on equal basis. There should be no preferential treatment for children from white-collar background, at the expense of their less privileged colleagues. Children from the lower class should be encouraged by teachers to develop a positive self-concept.

It should be realized that in the contemporary society, socialization is a symbiotic process. Elders should realize that they have some things to learn from the younger generation, though not so formally as the incumbents may be teaching the neophyte. The seeming antagonism between parents and their children cannot be adequately explained by the theories of value differentiation, because clearly, many young people share their parents’ values, attitudes and norms. What in fact they do not, and on occasion have confronted, are the hypocrisy of their parents’ muted idealism and their insensibilities regarding modern institutions, personal identity, and the conundrum of alienation in the contemporary society.

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Re-thinking the Financing of Kenya’s Higher Education: Options for Enhancing Equity, Access, and Quality

Prof. F. Q. Gravenir, Dr. Gerald W. Ouma, G. S. Mse, & Mukirae Njihia

Abstract:
Financing Kenya’s higher education can hardly be said to encourage equity, access and quality. The situation is further aggravated by government’s plummeting financial support for higher education and the absence of elaborate and effective student financing schemes at the lower levels of the educational system. Against this context, this paper seeks to discuss the evolution of funding of higher education in Kenya and how changing funding policies have impacted on equity, access and quality. Given that no single funding model can satisfy demands of equity, access and quality, an eclectic mix of various funding approaches is recommended.
Introduction

The complex question of how universities should be financed is one that has seen various models being suggested. The various models can be abstracted into two polar cases: the first case is that of absolute state subsidization and the second extreme case is where universities are privately financed without any assistance from the state. Until fairly recently, variants of the first case were in vogue in most African post-colonies, and countries of Eastern Europe and elsewhere, driven by Marxist ideology. The second model applies in the case of proprietary, for-profit universities.

These two extreme funding cases hardly exist in a pure form. The second case is obviously not available to state universities. It has been argued, especially for state universities, that the ‘correct’ funding model lies somewhere between the two extreme situations i.e. from both public and private sources. The problem is further compounded by the pecuniary difficulties many countries are currently facing coupled with an ideological orthodoxy (neo-liberalism) that privileges depressed expenditure on social services, including higher education.

This paper sets off by broadly sketching the evolution of funding public higher education in Kenya, with emphasis on the policy shifts that have so far been registered. The various funding mechanisms and their rationales are teased out, and then interrogated to show how they have favoured or disfavoured the attainment or improvement of access, equity and quality higher education. This is then followed by a discussion of a possible eclectic mix of funding approaches, which, hopefully, can enhance the attainment of the three lofty ideals. An attempt will be made to shed more light on how student loans can be used to steer the higher education system towards achieving the three ideals of improving access, equity and quality.

The evolution of funding public higher education in Kenya

The evolution of funding public higher education in Kenya provides a narrative marked by shifting positions, determined, in the main, by local macro-economic fluctuations and policy shifts of supra-national institutional agencies, mainly the World Bank and the International Monetary Fund (IMF).

Overall, three broad phases of the evolution of funding higher education in Kenya can be identified. These are: the era of free higher education, the era of cost-sharing and finally, the era of privatisation.

The era of free public higher education

Public higher education in Kenya was historically free, with the public purse covering both tuition and living allowances. The rationale for state subsidisation of higher education (as in many other post colonies) was based among other things, on the country’s desire to create highly trained manpower that could replace the departing colonial administrators, and also to ensure equity of access. In the welfare-dominated post-colonial period, it was argued that unless the state subsidised the highly expensive higher education, many people would be unable to benefit from it (Weidman, 1995; Sanyal, 1998.).

The university was also seen as the epicentre of social and economic development, which the newly independent state so much desired and aspired to. To achieve its role of spurring social and economic development, it was argued, and rightly so, that generous funding be provided. Free provision of university education was further made possible by the small number of
students. In 1964/65 for instance, there were only 651 students enrolled at the then University College of Nairobi. This number rose to 926 in 1965/66 and reached 1,779 in 1968/69 (Republic of Kenya, 1967, 1968, 1969, as cited in Otieno, 2005). Otieno (2005) argues that by offering highly subsidised education, free of any direct charges, the government hoped to stimulate enrolments (access) in university education. Given the small number of students and the generous funding from government, it may well be argued that high standards were maintained.

It was not long before it became impossible to carry on with free higher education. In the subsequent years after Kenya attained political independence, the social demand for higher education started soaring. Unfortunately, this soaring demand was taking place at a time when the country’s economic performance was plummeting. It was no longer possible to provide free or a highly subsidised higher education in the face of shrinking resources. Consequently, cost-sharing and cost-recovery measures were introduced.

The era of cost-sharing

Significant changes in the financing of university education in Kenya draw their genesis from the 1988 World Bank prescribed reforms in the financing of higher education. Against the backdrop of resource insufficiency for the education sector, the World Bank published an influential policy paper: *Education in Sub-Saharan Africa: Policies for Adjustment, Revitalization, and Expansion* (World Bank, 1988), which had major implications on the entire education sector in sub-Saharan Africa. This particular policy paper departed from the perspective that education in sub-Saharan Africa was in crisis hence the need for major reforms. The point is made that governments cannot be expected to increase substantially the resources they devote to higher education. The paper further condemned the cost of higher education in sub-Saharan Africa as being needlessly high, and called upon African governments to “relieve the burden on public sources of financing by increasing the participation of beneficiaries and their families” (World Bank, 1998: 77). The paper also decried the high levels of government subsidisation for higher education. To remedy this situation, the paper recommended the expansion of access for part time, fee-paying students. African governments were also directed to “introduce fees in public [universities], initially for non-instructional services such as food and lodging and then as tuition for instruction” (p.79).

Besides financial and institutional reforms, ostensibly to enhance the quality, efficiency and effectiveness of universities’ programmes, the World Bank argued that beneficiaries of higher education needed to make significant monetary contributions to their education since they stood to gain more from the system (World Bank, 1988). Effectively, the Bank prescribed reduced funding by government to the higher education sub-sector.

As if to take a cue from the World Bank, but more so compelled by the dismally performing economy, soaring demand, and implementation of Structural Adjustment Programmes (SAPs), the Kenyan government was forced to adjust education financing and reduced expenditure on higher education. The initial response to the declining state budget for higher education was the introduction of cost sharing in 1988 via *Sessional Paper No. 6* (Republic of Kenya, 1988). Cost sharing required students or their parents to cover both tuition and the cost of maintenance. The severity of these adjustments started being felt in 1994 when the government cut allocation to the ministry of education from about forty to thirty per cent and at the same time adopted the unit-cost mode of financing higher education, where universities were allocated Ksh120,000 for every student (Ksh. 120,000 remains the assumed unit cost of university education to date). Of the Ksh. 120,000, the government contributes Ksh. 70,000, and students contribute Ksh. 50,000. The Ksh. 120,000 is grossly inadequate for institutions that have a large number of
science programmes. The introduction of cost-sharing also saw the abolition of all pocket allowances, free food and accommodation, which university students had hitherto been enjoying.

Kihara (2003) cites a study carried out in 1997, which showed that after the introduction of the unit-based method of financing universities, the institutions were under-funded in the range of between 10 per cent and 35 per cent, depending on the nature of academic programmes. The University of Nairobi, which offers a wide range of technical, pure science and medical related programmes, was the most affected. The survey is said to have showed that the institutions required about KSh130,000 annually for every student in social sciences, KSh175,000 for pure and natural sciences and KSh256,000 for those in medical related courses. This does not include about KSh 44,000 that a student needs for accommodation and subsistence (Kihara, 2003).

Overwhelmed by the universities’ funding requirements, the government directed public universities to turn to other sources to be able to meet their staff costs, learning and research materials and even capital development expenditure. This marked the beginning of a number of radical measures in the financing of university education in Kenya. The measures included the introduction of small earmarked fees (to cover registration, examination or even caution, removing students grants (boom), removal of subsidy on food and accommodation (by making students pay upfront for the services) and the introduction of direct tuition fees (Kihara, 2003; Abagi, 1999).

The introduction of cost sharing turned public universities into sites of confrontation between protesting students and state security agents. University resources were overstretched and the student to staff ratios rose. It was during this period of cost-sharing that concerns started surfacing about the quality of Kenya’s higher education. The phrase ‘half-baked graduates’ quickly gained currency. The university system, having expanded considerably was under immense pressure to do more with less. This was made worse by the under-performing economy, termination of donor support in the early 1990s, and the relentless social demand for higher education. The government was quickly becoming an unreliable patron.

Cost-sharing went hand in hand with heavy subsidisation of the system. Heavy subsidisation, which still applies to date, covers all students admitted through the Joint Admissions Board (JAB), irrespective of their ability or inability to pay. This policy, which treats all the students the same, irrespective of their socio-economic backgrounds, does not take into consideration the fact that some families are able to meet the cost of their children’s university education. This policy perpetuates inequalities of opportunity to access higher education for the poor. The heavy subsidisation, financed from general taxation, is, paradoxically, a gift provided by the poor to the privileged members of society, who dominate higher education. This policy does not favour equity and limits access to higher education for students from families that are economically challenged.

The unit cost, which forms the basis of government allocations to higher education, has remained the same since 1994 when it was arrived at. Obviously, after eleven years, the value of Ksh. 120,000 has considerably depreciated in absolute terms. It is difficult to imagine how public universities can provide quality education with this kind of funding. No wonder, given the shoe-string budgets universities had to operate on, faculty were demoralised, libraries were under stocked, laboratory consumables were in short supply, important equipments could not be provided and buildings were in a sorry state of disrepair. These were ideal conditions for a mediocre higher education.
There was therefore an urgent need to re-think the financing of Kenya’s higher education. With the government having pleaded inability to continue large scale funding of the sub-sector, it was inevitable that universities look elsewhere for financial survival. Time had come for Kenya’s public universities to live by their own devices; which brings us to the era of privatisation and commercialisation.

The era of privatisation and commercialisation

Buffeted by social and economic conditions that obviated it from continued generous funding of higher education, the Kenya government began to withdraw from taking an active and direct role in defining the response to the fiscal crisis of higher education. The government, through pronouncements at graduation ceremonies of public universities and other forums, called upon public universities to fatten up their funding by diversifying their sources of revenue (see Kiamba, 2004). Public universities were thus discouraged from relying solely on the public purse, which was already struggling to put up with the demands of the sub-sector.

In response to the government’s challenge and their own need for survival; public universities responded by introducing a measure of self-financing. The universities embraced both privatisation and commercialisation. Commercialisation involves engagement in ventures such as consultancies, commercial farming, restaurants and cafeterias, abattoirs, among others. Privatisation refers to the admission of privately sponsored fee-paying students over and above the quota of students that come in with government subsidy. These are the students admitted through JAB. Privatisation is the epitome of the self-financing effort by Kenya’s public universities, and is carried out through courses, invariably referred to as parallel programmes. Privatisation has not undermined the heavy subsidisation JAB admitted students receive from the government. It has simply opened an additional source of funds for the universities.

These programmes, which are now in vogue in Uganda, Tanzania, Malawi, Rwanda, Zambia, etc., were first introduced in Kenya in 1998 by the University of Nairobi. Today, all public universities run these programmes, and some have even opened up special campuses for students in these programmes. As aforementioned, students in the parallel programmes bear the full cost of their studies. These programmes, though opening up access, have been mounted primarily for the purpose of raising income (Kiamba, 2004). In fact, at the University of Nairobi (UoN), these programmes and other income generating activities are managed by the University of Nairobi Enterprises and Services Limited (UNES). UNES’ main functions are to promote, manage and coordinate income-generating activities (Kiamba, 2004). Kenya’s public universities have thus effectively evolved into commercial dealers in knowledge services.

Since the introduction of parallel programmes, a debate around issues of quality, access and equity has persisted. Unfortunately, not much has been done to empirically interrogate these issues by way of research. Much of what abounds on the subject are journalistic accounts. We cautiously employ these accounts to carry forward the debate.

The introduction of parallel programmes has rejuvenated concerns about the quality of Kenya’s higher education. The programmes have invariably been accused of compromising quality. Nyassy (2002) reports of the danger of higher education standards sinking deeper into decay if the trend of establishing parallel degree programmes is not checked. He reports claims that some of the universities were offering in their parallel programmes courses they were incapable of teaching. Bone (2003) also perceives parallel degree programmes as compromising quality. He avers that with the introduction of parallel degree programmes and liberalization of higher
education, public universities in Kenya have gradually drifted away from the pursuit of academic excellence. He further complains that these institutions focus on numbers rather than quality of the graduates they produce.

Other critics claim that students with grades as low as C+ are now gaining admission into competitive professional courses like Medicine and Law on parallel degree programmes. Previously, these demanding courses were reserved for students with A- and above. According to Chacha (2004), many of these students are reportedly struggling to keep up with the rigorous standards demanded of them.

Quality concerns over these programmes are accentuated by the fact that the programmes have led to a sudden upsurge in the number of students. This increase has unfortunately not been matched with a concomitant increase or improvement of other important resources and facilities such as libraries and laboratories, library books, journals, teaching and learning materials.

Ramani (2004: 8) reports a case where “the examinations board at the faculties of Arts and Commerce [University of Nairobi] discussed the emerging trend whereby parallel degree students are performing better than the regular ones”. The very concern that ‘parallel’ students are performing better than the ‘regular’ ones is in itself quite interesting. It can only be understood against the background that most of the parallel students did not perform as well as their ‘regular’ colleagues in the Kenya Certificate of Secondary Examinations (KCSE). “It was noted with concern” Ramani (ibid.) continues, “that the huge classes of sometimes 300 students made it possible for even strangers (added emphasis) to sit examinations for weak students if the necessary care was not taken”. These issues lead one to ponder over questions raised by Oketch (2003: 313): Will [privatisation] lead to increased enrolment, providing quantity-driven education full of credentials but little academic value in terms of quality? Will students graduate with degrees without learning?

Another key issue concerning the introduction of private studentship in Kenya’s public universities is access and equity. It is not easy to discuss access without mentioning equity and vice versa. The changing funding policy environment in which public universities now have to operate presents these institutions with major challenges concerning access and equity. On the one hand, the universities have opened up access to higher education; conversely, this access is only available to those who can pay the high fees. Given their commercial nature, premium is placed more on those who can pay the high fees. The programmes have in the main, given a second alternative choice to working students in search of career advancement and students from privileged socio-economic backgrounds. The poor are shut out.

As already observed, the parallel programmes have opened up access to higher education. In the past, public universities admitted only about 8,600 students annually, about 28 % of the candidates. Some 17,000 Kenyans missed higher education places every year, after about 1,200 were absorbed in private institutions and 3,000 in foreign universities (Onyango, 2002). The UoN, which has the broadest experience with these programmes, already has more ‘parallel’ students (14,800) than the ‘regular’ ones (13,000), i.e. during the 2002/2003 academic year (Kiamba, 2004). The parallel programmes could therefore be credited with hastening the massification of higher education in Kenya.

It is important to dispel the notion that ‘parallel’ students are always less qualified. It is emerging that a good number of the privately sponsored students performed highly in KCSE but JAB failed to place them in their preferred programmes. Some students with A- and even A may
not survive JAB’s screening (limited capacity is usually cited as the reason). Such students, especially those from privileged backgrounds, turn down JAB’s offers and instead enrol into their preferred courses through the parallel programmes. In this regard, parallel programmes could be lauded for affording students a second opportunity to pursue courses of their choice—the high cost notwithstanding.

Another major equity concern is that some programmes, offered to ‘parallel’ students are not on JAB’s list of available programmes (Mutai, 2004). This means that such programmes are not available to students admitted through JAB. Privately sponsored students therefore have a wider scope of programmes to choose from. At the onset of parallel programmes, public universities came up with new courses designed to attract many students, especially those who were already working. Of course to post good returns, public universities had to be market-driven. It is unfortunate that some of the new market-driven programmes have not been made available to government-sponsored students.

The preceding discussion has teased out the evolving funding scenario in Kenya’s higher education. We have shown how the country’s public universities have moved from absolute dependence on the public purse, then to a low cost-recovery and low-tuition fees period coupled with an undifferentiated unit cost funding, which persists to date; and finally to raising their own revenue, to supplement dwindling state allocations. The dramatic financial declines (in real terms) in state allocations to public universities have led to major concerns about diminished quality. Further, the state’s policy of ‘equal’ treatment of all students, with regard to state subsidy, has led to counterproductive equity effects. It has been argued that heavy subsidisation of students in higher education means that poorer families who lack access to higher education support the more privileged (Lewis & Dundar, 2000). This is because the subsidy favours students from middle and high income families, who are over-represented in public higher education.

In the subsequent section, we discuss the student loans scheme and other funding options that could be explored by the government to ensure a higher education funding regime that is sensitive to the ideals of access, equity and quality. Overall, we argue for a demand driven funding system, away from the current, predominantly, supply driven funding regime.

**The Student Loans Scheme**

The government’s inability to continue providing free university education necessitated that other funding mechanisms that would ease pressure on the government be sought. As such, in 1974, the government introduced a mortgage type student loans scheme (Otieno, 2005). Later, in 1995, the government established the Higher Education Loans Board (HELB) to manage the student loans scheme. The scheme provides a maximum of Ksh. 52,000 for successful applicants, and also a bursary of Ksh. 8,000 to needy students, paid directly to the university in which the student is enrolled. These loans were originally meant for, and are still primarily targeted at students in public universities. Few students in private universities have since recently benefited from the scheme.

The student loans scheme has two main objectives: increasing higher education participation and access amongst qualified students from economically challenged backgrounds, and cost-recovery. The scheme has also recently started disbursing loans to post-graduate students enrolled in a range of HELB defined ‘priority courses’. The loans given to post-graduate students are thus geared towards meeting certain occupational or manpower needs.
The loans scheme has undoubtedly increased the participation of students in higher education. The scheme has helped many students to overcome the burden of fee payments and living expenses, hence improving social equity. Ziderman (2004) argues that the traditional, and most effective, method of enhancing access to university education for the poor, has been through the provision of means tested loans to cover tuition and living expenses as well. One may also argue that such student loans schemes enhance the quality of higher education, such that financial pressures, which may have negative effects on a student’s academic performance (thus compromising effective human capital formation), are mitigated.

Although the student loans scheme has played, and continues to play, a critical role in financing higher education, the scheme has been blamed for failing to enhance equity in the award of loans. In a recently concluded study, Otieno (2005) reports of cases where deserving students fail to get loans while non-deserving ones get. This anomaly undermines the very essence of the scheme: It frustrates the attainment of the three lofty ideas of enhancing access, equity and quality. To remedy this anomaly, a rigorous means testing procedure is requisite.

In proposing an effective and equitable students financing scheme for higher education, it is necessary to consider what financing mechanisms for the needy are available at the lower levels of the educational system. The rationale for this perspective is that an equitable students financing scheme for higher education cannot be arrived at until the lower levels enjoy the benefits of an equitable students financing scheme.

Currently, in the free primary education programme, government provides Ksh. 1020 per annum per pupil. It is very clear that the allocation per pupil is insufficient to meet the total per pupil cost. Therefore, in one way or the other, parents incur extra costs in sending their children to primary schools. It has been roughly estimated that households contribute about three to five times more than the government in maintaining pupils in primary schools. Households whose disposable income is very low may, as a result, be unable to send their children to school. In addition, there is an emerging group of increasingly marginalized and vulnerable children e.g. AIDS orphans, child labourers, etc. who cannot afford to enrol in primary schools. There are no consistent and effective financing schemes to cater for these groups.

At the secondary level, the bursary scheme introduced by government to cater for students from poor families has encountered considerable problems and has not been effective. Some of the problems encountered by the bursary scheme are: inefficient administration of the scheme at the school level; awardees of the scheme not ‘truly’ deserving; award not lasting the cycle of secondary education; and inadequate funds committed by government to the scheme.

Since there are no elaborate and equitable students financing schemes at the primary and secondary levels, it is logical to conclude that, on the whole, only pupils/students whose parents can purchase primary and secondary education for them end up being qualified for admission into higher institutions of learning. This scenario creates considerable concern as to why government, through the Higher Education Loans Board (HELB) provides subsidy using the taxes of parents who cannot purchase primary and secondary education to support students in universities.

While the government supported student loans scheme is critical in enhancing both equity of access to, and quality of, higher education, it is important to note that a loans scheme does not necessarily constitute the optimal funding mechanism for achieving these goals. Other funding policy options for achieving these goals are available. As aforementioned, not a single funding
mechanism can achieve all these goals. As such, attaining the three goals requires that several funding mechanisms be applied simultaneously.

The following higher education funding mechanisms are discussed:
(a) Charging market or near market fees (Cost-based tuition fees)
(b) Entrepreneurialism
(c) A voucher system

**Charging market or near market fees (Cost-based tuition fees)**

It has been established that the current low-tuition, taxpayer subsidised approach to higher education results in large subsidies for students from middle and high income families, and locks out many students from disadvantaged backgrounds. It is a funding system that has been condemned as unfair—one that inhibits access to university education for the poor segments of society.

Adopting cost based tuition fees; together with a need-based-financial-aid approach is considered one important way of improving access considerably. Kenya’s higher education is currently dominated by students from middle and high income families, who are capable of paying higher fees than is currently charged. The cost-based-tuition, need-based-financial-aid scheme (such as HELB) will ensure that many students from low-income families access higher education. It would reduce the net price of higher education to students from poor families. Moving away from the current uniform state subsidised approach would mean higher enrolment among low-income students (who are price inelastic) but no significant reductions in enrolments among students from middle and higher income families.

**Entrepreneurialism**

Seeking alternative funding, away from the exchequer has become the survival strategy of choice for many universities suffering reduced state subventions. Entrepreneurialism provides means by which universities can become less dependent on any particular source of income and more capable of controlling their own destinies. Entrepreneurialism can thus be described as the development of capacity for universities to be more self-reliant in revenue generation and not be entirely dependent on traditional sources of revenue.

Kenya’s public universities’ entrepreneurial model is organised around parallel programmes. We have already discussed the access, equity and quality implications of this programme. The universities also provide certain kinds of auxiliary services on an entrepreneurial basis. Provision of auxiliary services on entrepreneurial basis is not yet well developed in most universities. Actually what most of them do could be described as petty trade - running butcheries, hawking food, renting of venues for weddings, etc.

Other than raising revenue from auxiliary activities, a few public universities undertake commercial farming, offer distance and open learning programmes, etc. Overall, entrepreneurialism is a funding strategy that has not been fully exploited by Kenya’s public universities.

There are a number of other areas, which public universities should examine for potential entrepreneurial opportunities. These include research and service contracts with government
and industry, commercialisation of research and development activities (technology transfer) and commercial investments. Revenue that accrues from these ventures could be used to develop bursary funds hence enhance access and also improve educational provision. It is obvious that many public universities do not have the capacity to generate revenue from these sources. Consequently, before thinking of venturing into these areas, universities must develop and improve their research capacities, set up centres of excellence and invest in technology innovation. There is also a need for public universities to create an administrative and policy infrastructure that supports these activities.

Voucher system

Otieno (2005:31) defines educational vouchers as coupons issued by a funding agency specifying the amount of financial support for which a beneficiary is eligible, surrendered to an educational institution upon admission, which in turn surrenders it to the issuing agency for cash. Vouchers would grant students the latitude to join a higher education institution of their choice. Proponents of educational vouchers argue that they spur competition for students, and thus universities would be forced to improve the quality of their programmes so as to attract students. A voucher system would therefore encourage students to decide which university to join primarily on the basis of quality rather than price.

An educational voucher system may consist of a mixture of a grant and a loan, and this may vary with the type of programme and student characteristics (Otieno, 2005). To enhance equity, an educational voucher could consider giving vouchers with a larger grant component to students from low-income families. Vouchers could also be utilised to improve the participation of certain groups in higher education, viz. girls. Overall, vouchers are usually employed to correct social inequalities by facilitating the access of the underprivileged and improve the efficiency of the education system.

Conclusion

The paper has teased out the various higher education funding mechanisms that have evolved in the country and makes a case for the urgent need to reform the financing of Kenya’s public higher education to address access, equity and quality effects of current practices. For instance, it is curious that the undifferentiated unit cost funding promulgated in 1994 is still in place to date, unchanged. It is obvious that different programmes require varying amounts of resources for effective provision. This then makes the case for a differentiated unit-cost funding system necessary. If a differentiated unit cost funding system is still not possible to implement, then at least, the Ksh. 120,000 unit cost should be increased. Obviously, after eleven years, the value of Ksh. 120,000 has considerably depreciated in absolute terms.

This paper has pointed out that there exists inequity in primary and secondary education, and that any effective and equitable students financing scheme for higher education can truly be considered as equitable if there exists a similar scheme at the lower level.

To attain the goals of enhancing access, equity and quality, no single funding mechanism is sufficient. We recommend that the current funding mechanism be reformed to provide for greater instructional cost-recovery through expanded student fees, the feasibility of an educational voucher system be established to replace the student loans scheme and that universities diversify their sources of private revenue, beyond parallel programmes. It should be
emphasized that unless universities strengthen their capacities, then winning large revenues from high profile entrepreneurial activities such as technology transfer will remain a mirage.

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Gender Analysis Of Student Enrolment And Academic Staff In University Of Ado-Ekiti, Nigeria: Implications For Women Emancipation.

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ABSTRACT

Sustainable development of a nation depends on full participation and contribution of every member of the society. This study examined female enrolment in university education at the University of Ado-Ekiti, Nigeria. Data on undergraduate student enrolment and academic staff by gender and discipline obtained from the Academic Planning Unit of the University were used for analysis. The result of analyzed data revealed an imbalance in student enrolment against the female gender. The study also revealed that female student enrolment was lopsided in favour of arts and humanities. Findings further revealed that a gap existed between male and female academic staff in favour of male gender. In view of the implications of these findings for women empowerment and educational/national development, it is recommended that public education enlightenment is needed to ensure that parents embrace girl-child education. In addition, female students could be encouraged through subsidy and separate cut-off marks in the admission process. Female academic staff should be given enhanced opportunity for advancement.
Introduction

Education is a veritable tool to bring about the much-desired social, political, economic, scientific and technological progress of any nation. It is in recognition of this that the federal government of Nigeria has adopted education as an instrument par excellence for effecting national growth.

Governments, at the three ties (Federal, State, and Local) in Nigeria have been devoting substantial proportion of financial resources to education in view of its importance. This allocation is done without gender bias in favour of male and female.

One then begins to wonder why there has been gender disparity in the participation for enjoyment of the resource provisions for education. This trend constitutes a serious drawback in the developmental process of a country like Nigeria despite the fact that every Nigerian citizen, irrespective of gender, has the right to be educated.

The historical “invisibility” of Nigerian women, according to Airewele and Ukeje (1998) manifests in their growing impoverishment, lack of self confidence in mathematics, inferior status in the family and society and unequal access to legal rights, social welfare, education, property and political participation. In the views of Mansaray (1992) and Uko-Avionoh(2004), the level of illiteracy among Nigeria women is still very high and they are mainly young girls and unmarried women who cannot afford education and may not easily have access to it. This may account for the tendency to opt for the literary disciplines, such as secretariat work, sewing and hairdressing. Their participation in the labour market is limited, with more women concentrated in the informal sectors of the economy.

Substantiating the level of women improvement, Sesay and Obadare (1998) and Tahir (1999) reported that women constitute a larger percentage of the world population, about 70% of the world’s 1.3 billion poor. Their level of participation in educational programmes is not proportional to their number. Uko-Avionoh (2004) added that:

“About 10 million women are reported to daily battle chronic hunger and malnutrition. Also about two-thirds of the world’s illiterate populations are female and about 80% of refuges and displaced populations world-wide are women”. p 5

Meece and Jones (1996) were of the opinion that gender difference still persists in registration for science/technological courses due to differences in rote and meaningful learning modes. Boys were reported to show greater confidence in many orientations. This means that there is little support for women who are found engaging in school learning especially in the tertiary institutions.

The above scenario is worrisome considering the enviable role of women in the society. For instance, it has been reported that about 130 million women in sub-Saharan Africa live in chronic poverty in spite of the fact that African women produce an estimated 70% of the continent’s food and 55% of the foods grown in the developing world as a whole (Ekejiuba 1992; Red Cross and Red Crescent, 1995 & Popoola, 2003).

Uko-Avionoh (2004), while x-raying the educational needs of the illiterate women in Nigeria, reported that the Nigerian woman’s situation is not different from her counterparts in other developing nations of the world in terms of women impoverishment, since there are fewer girls completing their secondary education. The seemingly gender role distinction all over the
world may have created gaps in opportunities between men and women (Adeyemi and Akpotu, 2004). They added that the imbalance is noticeable in gender enrolment at all levels and types of education, as well as across various disciplines and programmes, especially at the tertiary level. It needs to be stressed here, and as noted by Subbaro, Raney, Dunder and Haworth (1994), that tertiary education for women is important not only to ensure equity but because of the appreciable economic returns by raising women’s productivity and health, educational and income levels of families.

It is against this background that this study examined female participation in university education in the University of Ado-Ekiti (UNAD) between 1994/2003 academic sessions. The following questions were raised to pilot the study:

(i) What was the proportion of female student enrolment at UNAD between 1994/2003 academic sessions?
(ii) Were there variations among disciplines in the proportion of female student enrolment of UNAD within the period?
(iii) What was the proportion of female academic staff strength at UNAD between 1994/95 academic session and 2002/2003 academic sessions?
(iv) Were there variations among disciplines in the proportion of female academic staff at UNAD within the period?

It is hoped that findings from this study would enable policy makers to assess the situation with a view to empowering the women to enable them play their role effectively in the society.

Literature Review

Adeyemi and Akpotu (2004) reported that ‘while 60% of Nigerian women were illiterate in 1980, it increased to 63% in 1995’. They equally reported that a total of 42.9% of Nigerians were illiterate by 1995 of which 32.7% were male and 52.7% were female. This worrisome state of illiteracy among Nigerian women has link with the imbalance in student enrolment at all levels against female group.

According to Adeyemi and Akpotu (2004) the country’s average enrolment in primary schools between 1989 and 1995 showed that girls recorded a national average of 44.46%. In the same vein, population reference bureau (2000) noted that the percentage of enrolled at the secondary schools in 1980 and 1999 were 13% and 30%, respectively, while they were 25% and 30%, respectively for the male. The records from the federal office of statistics (1995, 1999) showed that female enrolment at the primary education level ranged between 43.2% and 44.5% between 1990 and 1998, while it ranged between 42.7% and 47.7% during the same period at the secondary education level. School enrolment data reported to UNESCO in 1999 indicated the influence of the school administrators (principals) who exaggerate enrolments, especially if there is a financial incentive to do so.

The consistent imbalance in student enrolment against the female gender at the primary and secondary levels of education may have far reaching direct consequences on the gender distribution in high university enrolment and consequently in the participation of women in high manpower occupation. In fact, studies have shown that disadvantaged groups in specific societies or women almost everywhere find it not easy to compete for places in higher education system (World Bank 2000). It is also worth mentioning that limited employment and lower market returns for women discourage parent of girls from investing in education.
Kayode and Adesina (1999) reported that in Nigeria, tertiary institutions enrolled 15 females per 100 enrolments in 1970; 21 females per 100 enrolment in 1985 and 27 females per 100 enrolments in 1990. In their study on gender analysis of enrolment in Nigeria universities, Adeyemi and Akpotu (2004) found out that a gap existed between female and male in the university enrolment with lower female enrolment in all aspect of the universities. In a similar study carried out at the University of Benin, Imhabekhai (2003) found that between 1988/89 and 1999/2000 session’s undergraduate enrolment for female ranged between 28.3% and 39.9%. The study further showed that in academics, females are underrepresented; and the higher the rank, the lower the proportion of female academics. UNESCO (1998) reported the trend of enrolment of girls in tertiary institution. According to the report girls that dropped out were more than the actual number of boys. That means the number of females who entered into the work force of tertiary institutions are very small. The present study is replicates the studies of Imabekhai (2003) and Adeyemi and Akpotu (2004) and it is designed to seek the status of women participation in a typical state-owned university like UNAD vis-a-vis the courses they enrol in.

Imhabekhai (2003) reported that women enrol more in humanities and related courses than in science related courses. This may have accounted for variation between males and females in enrolment into various courses / discipline in the universities. In a study carried out in the University of Lagos, Owolabi (2001) found out that for science education, female enrolment was 36.8% for the science. The study further showed that female enrolment for engineering was 9.3%. Likewise, Adeyemi and Akpotu (2004) reported that female enrolment in the science and sciences-based courses was low while it was appreciable in the humanities.

Yahaya (2004) found that there were disparities in male and female enrolment in science and technology-based courses at the University of Ilorin. He observed a relatively low enrolment of female undergraduates in the faculties that are science and technology-based. In the study, less than 25% of the undergraduates in the faculties between 1991/1992 and 2000/2001 sessions were females. Thus, the males constituted the larger percentage of student enrolment. This is perhaps because of cultural barriers, community role expectation for women, early marriage, teenage pregnancy, religious beliefs, peer influence, socialization experiences of home and at school as well as overt negative attitude of male science teachers to female science students.

Methodology

The study is an ex-post facto research. Data on students’ enrolment and academic staff strength were collected from the Academic Planning Division of the University of Ado-Ekiti, Nigeria, and percentage scores were used to analysis the collected data.

Results

The results of data analysis on the basis of the research questions are represented in tables 1-4.
Table 1: Distribution of students’ enrolment in the University of Ado-Ekiti by gender (1994/95-2002/2003).

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Female%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994/95</td>
<td>4073</td>
<td>1737</td>
<td>5810</td>
<td>29.9</td>
</tr>
<tr>
<td>1995/96</td>
<td>5262</td>
<td>2704</td>
<td>7966</td>
<td>33.94</td>
</tr>
<tr>
<td>1996/97</td>
<td>5256</td>
<td>2873</td>
<td>8129</td>
<td>35.34</td>
</tr>
<tr>
<td>1997/98</td>
<td>5508</td>
<td>3353</td>
<td>8861</td>
<td>37.84</td>
</tr>
<tr>
<td>1998/99</td>
<td>7085</td>
<td>4284</td>
<td>11369</td>
<td>37.68</td>
</tr>
<tr>
<td>1999/2000</td>
<td>9040</td>
<td>5298</td>
<td>14338</td>
<td>36.96</td>
</tr>
<tr>
<td>2000/2001</td>
<td>7988</td>
<td>4557</td>
<td>12545</td>
<td>36.33</td>
</tr>
<tr>
<td>2001/2002</td>
<td>7766</td>
<td>4349</td>
<td>12115</td>
<td>35.9</td>
</tr>
<tr>
<td>2002/2003</td>
<td>7443</td>
<td>4289</td>
<td>11732</td>
<td>35.9</td>
</tr>
</tbody>
</table>

Source: Compiled from data obtained from Academic Planning Division, University of Ado-Ekiti, Nigeria.

Table 1 shows the gender distribution of undergraduate students at the University of Ado-Ekiti (UNAD) between 1994/1995 and 2002/03. Female enrolment in the university ranged between 29.9% (in 1994/95) to 37.84% (in 1997/98). The table further revealed an increase in the percentage of female undergraduate enrolment from 29.9% in 1994/95 to 37.84% in 1997/98. A fall in this proportion was however witnessed thereafter. The table shows that the percentage fell to 36.56% in 2002/03.

Table 2: Percentage distribution of student enrolment in the University of Ado-Ekiti by faculty and gender (1994/95-2002/2003)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- 68</td>
<td>66</td>
<td>66</td>
<td>68</td>
</tr>
<tr>
<td>Arts</td>
<td>69 31</td>
<td>64 36</td>
<td>60 40</td>
<td>56 44</td>
<td>52 43</td>
<td>57 40</td>
<td>60 40</td>
<td>60 40</td>
<td>60 40</td>
<td>60 40</td>
</tr>
<tr>
<td>Education</td>
<td>61 39</td>
<td>58 42</td>
<td>54 46</td>
<td>51 49</td>
<td>50 51</td>
<td>49 52</td>
<td>48 51</td>
<td>49 52</td>
<td>49 52</td>
<td>49 52</td>
</tr>
<tr>
<td>Engineering</td>
<td>92 8</td>
<td>92 8</td>
<td>90 10</td>
<td>86 14</td>
<td>87 13</td>
<td>90 10</td>
<td>90 10</td>
<td>91 10</td>
<td>89 10</td>
<td>89 10</td>
</tr>
<tr>
<td>Law</td>
<td>27 23</td>
<td>27 23</td>
<td>27 23</td>
<td>27 23</td>
<td>27 23</td>
<td>27 23</td>
<td>27 23</td>
<td>27 23</td>
<td>27 23</td>
<td>27 23</td>
</tr>
<tr>
<td>Management science</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
</tr>
<tr>
<td>Medicine</td>
<td>67 33</td>
<td>64 36</td>
<td>62 38</td>
<td>59 41</td>
<td>59 41</td>
<td>59 41</td>
<td>59 41</td>
<td>59 41</td>
<td>59 41</td>
<td>59 41</td>
</tr>
<tr>
<td>Science</td>
<td>70 30</td>
<td>64 36</td>
<td>65 35</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
</tr>
<tr>
<td>Social science</td>
<td>70 30</td>
<td>64 36</td>
<td>65 35</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
<td>62 38</td>
</tr>
<tr>
<td>Total</td>
<td>70 30</td>
<td>66 34</td>
<td>64 36</td>
<td>63 38</td>
<td>63 38</td>
<td>63 38</td>
<td>63 38</td>
<td>63 38</td>
<td>63 38</td>
<td>63 38</td>
</tr>
</tbody>
</table>

Source: Compiled from data obtained from Academic Planning Division, University of Ado-Ekiti, Nigeria.


Table 2 shows discipline and gender distribution of undergraduate student enrolment in UNAD by between 1994/95 and 2002/2003 academic sessions. The table reveals that there were variations in the proportion of female enrolment across faculties. The percentage of female undergraduate enrolment raged between 10.25 in the faculty of engineering to 48.46% in the faculty of education.
The table also reveals an imbalance in the distribution of female undergraduates in favour of the arts and humanities and against science and technology–based disciplines. For example the percentage female enrolment in the faculties of arts, education and management science were 48.46%, 47.03%, and 37.23%, respectively while the figures for the faculties of engineering and the college of medicine were 10.25% and 15.15%, respectively.

### Table 3: Distribution of academic staff by gender in the university of Ado-Ekiti, Nigeria (1996/97-2002/2003)

<table>
<thead>
<tr>
<th>Year</th>
<th>Prof/Assoc Prof</th>
<th>Srn Lecturer/Snr Res. Fellow</th>
<th>Lecturer/Res Fellow/Snr Librarian</th>
<th>Asst. Lecturer/Jnr Res Fellow/Lib I</th>
<th>Graduate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996/97</td>
<td>23.1</td>
<td>1</td>
<td>4.17</td>
<td>M F %F</td>
<td>M F %F</td>
<td>217</td>
</tr>
<tr>
<td>1997/98</td>
<td>34.1</td>
<td>2.86</td>
<td>5.3</td>
<td>78 10 11.36</td>
<td>14 21.21 30 3 9.09</td>
<td>230</td>
</tr>
<tr>
<td>1998/99</td>
<td>34.1</td>
<td>2.86</td>
<td>4.9</td>
<td>81 13 13.83</td>
<td>14 21.88 31 2 6.06</td>
<td>235</td>
</tr>
<tr>
<td>2000/2001</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA NA NA NA</td>
<td>NA NA NA NA NA NA NA NA NA</td>
<td>258</td>
</tr>
</tbody>
</table>

**Source:** Compiled from data obtained from Academic Planning Division, University of Ado-Ekiti, Nigeria.

Note: Data on academic staff for 1994/95, 1995/96, and 2001/2002 academic sessions are not available.

Table 3 shows the distribution of academic staff by gender in UNAD between 1996.97 and 2002/2003 academic sessions. The table shows that only one female Professor has been in the employment of the University since 1996/97 academic session. The table also revealed an increase in the proportion of female academic staff from 9.96% in 1996/97 to 15.72 in 2001/2002. There was, however, a fall in this proportion to 13.47% in 2002/2003 academic session.

### Table 4: Distribution of academic staff by gender in the university of Ado-Ekiti, Nigeria (2002/2003)

<table>
<thead>
<tr>
<th>Faculties</th>
<th>Prof/Assoc Prof</th>
<th>Srn Lecturer/Snr Res. Fellow</th>
<th>Lecturer/Res Fellow/Snr Librarian</th>
<th>Asst. Lecturer/Jnr Res Fellow/Lib I</th>
<th>Graduate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>3</td>
<td>1</td>
<td>1 100 11 4 26.67</td>
<td>1 1 21.43</td>
<td>269</td>
<td></td>
</tr>
<tr>
<td>Arts</td>
<td>2</td>
<td>12</td>
<td>7.69 2 35.3 13.04</td>
<td>1 3 21.43</td>
<td>188</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>3</td>
<td>3</td>
<td>- 1 10 1 10</td>
<td>15.38 3 4 37.14</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>3</td>
<td>3</td>
<td>12 - 16 2 11.11</td>
<td>- 1 1 15.38</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Law</td>
<td>1</td>
<td>1</td>
<td>8 - 2 - 15 1 15.38</td>
<td>- 1 1 15.38</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>1</td>
<td>3</td>
<td>6 1 14.29 2 10 1 15.38</td>
<td>23 1 4.17</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td>13</td>
<td>7.14</td>
<td>11 8 42.11 20 1 4.76</td>
<td>18 2 10 14 16.28</td>
<td>234</td>
<td></td>
</tr>
<tr>
<td>Social Science</td>
<td>3</td>
<td>10</td>
<td>- 10 16.67 14 14 14.29</td>
<td>- 8 2 20 47 4 7.84</td>
<td>162</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>2.94</td>
<td>50 15 19.48 88 12 13.64 56 12 21.42</td>
<td>289 45 13.47</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Compiled from data obtained from the Academic Planning Division, University of Ado-Ekiti, Nigeria.
The study also revealed that more women are found in the lower and middle level cadres of the academic staff (Lecturer I/II, Asst. lecturer and Graduate Asst). The table further revealed a rather low percentage female academic staff throughout the years under consideration. Table 4 shows the distribution of academic staff in UNAD by discipline and gender in 2002/2003 academic session.

The table revealed that there was no female in the faculties of law and medicine, while there was only one female lecturer in the faculty of management science. Only two female academic staff members (Asst. Lecturers) were in the faculty of engineering. It should be noted especially that there is only one female professor in the university and she is in the faculty of science. In addition, there were only five female Senior Lecturers during the period (2 in the faculty of education, 1 in the faculty of arts and 2 in the faculty of science).

The table further revealed an imbalance in the distribution of female academic professors. A relatively higher proportion was in the faculties of agriculture (21%), arts (18%) and Education (21%), while the proportion was lower in the faculties of engineering (5%) and management science (4%).

Discussion

Findings from this study show that the percentage of female enrolment between 1994/95 and 2002/2003 academic session was less than 40%. This implies relatively low female enrolment in university education vis-à-vis their male counterpart. This finding corroborates the findings of Kayode and Adesina (1999), Adeyemi and Akpotu (2004) and Imhabekhai (2003). This finding may perhaps be a reflection of the imbalance in student enrolment against the female gender at the primary and secondary levels of education in Nigeria. It equally reinforces the observation of higher illiteracy level among the women folk (Ukoh-Aviomoh, 2004).

The present study also found that there was an imbalance in the distribution of female undergraduates in favour of the arts and humanities and against science and technology-based courses. This corroborates the findings of Owolabi (2001), Imhabekhai (2003), and Adeyemi and Akpotu (2004). This perhaps may be attributed to gender bias for vocations. Women have been erroneously believed to be more suited for less tedious disciplines and vocations. Science and technological-based courses have thus been seen as too tasky for the female gender while the Arts and Humanities are believed to be “easy” for the female group. This notion has the tendency to widen the gap in opportunities between men and women.

The study further revealed a rather low percentage of female academic staff. In addition, among the female academic staff, most are found in the lower and middle level cadres. The above findings corroborate the findings of Imhabekhai (2003) at the University of Benin. These findings may not be unconnected with the imbalance in female undergraduate enrolment. This has given rise to little female participation in teaching in higher institutions. Perhaps this is in line with the observation of the World Bank (2000) that women almost everywhere find it uneasy to complete for places in higher education.

Our study also found that there was an imbalance in the distribution of female academic staff among disciplines. The proportion was as low as 5% in the faculty of engineering. This is perhaps a reflection of occupational disparity between men and women. Some believed that certain tedious and tasking vocations are for men while less tasking jobs for the women folk.
Conclusion And Recommendations

This paper found that there was a wide gap in undergraduate student enrolment at the university of Ado-Ekiti, Nigeria. The gap was found to be wider in the science and technology-based disciplines compared with the arts and humanities. Female participation in teaching activities in the university was also found to be low.

In view of the implications of the findings from this study for women education and educational development in the country, the following recommendations are considered necessary:

(a) Government at various levels and private organizations should provide incentives for more girls’ university attendance.
(b) Schools should be brought closer to homes, thereby making the students safer e.g. multiple school shifts, satellite schools, mutigrade classrooms and distance education can also do much to improve attendance.
(c) There should be improved quality and relevance of education. Classroom curricula, teachers behaviour and school organisation define the quality and relevance of girls’ education and thus affect girls’ participation and academic achievement. These can be addressed through curriculum reform, gender sensitization programmes for teachers, recruitment of female teachers and prevention of sexual harassment.
(d) Supportive national policies should be established.
(e) Sound economic policies that support employment of women and equitable pay policies should be promulgated by government. Public laws should be made gender-neutral and incentives for women to enter the work force should be increased.

References

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Red Cross and Red Crescent. (1995). 1, 1


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The African Symposium (ISSN# TX 6-342-323) 55
Multi-Agent Intelligent Tutoring System For Teaching Computer Programming Languages

Chiemeke, S. C. and Ukaoha, K. C.

ABSTRACT

Web-based educational systems are receiving more and more attention because of the explosive growth of the Internet and the World Wide Web. However, this kind of self-study system still lack several aspects compared to a real life classroom setting. The major objective of this paper is to develop a multi-agent intelligent tutoring system for teaching computer-programming languages through the web. In this system, many teachers can come together to put the curriculum of one or more computer programming languages and students can access the system through the web. It utilizes a client-server relationship which on its own represents the relationship between the teacher and the student. It also allows having many teacher agents attending to the needs of a single or multiple student agents.
Introduction

The use of artificial intelligence techniques in educational software design influenced the evolution from Computer Assisted Instruction (CAI) to Intelligent Computer Assisted Instruction (ICAI) or Intelligent Tutoring Systems (ITS). Developers have tried to incorporate “intelligence” in the areas of knowledge, problem solving, tutoring and communication with the student in order to create a system, which is expert in a particular field and also able to provide personalized instruction. For the purposes of design and conceptualization, ITSs are described as having four major components namely:

- The Domain Knowledge Module which is designed to store, manipulate and reason with the knowledge of the domain being taught
- The Pedagogical Module which provides information about the teaching strategy that must be used to a specific student
- The Student Module which stores and analyzes information about students’ current state of knowledge and personal characteristics
- The Interface Module which handles the form of communication between the ITS and the student (Wenger, 1987).

When an agent is applied in an ITS, it becomes an agent-based educational system. Evidence is now emerging to show that the use of Intelligent Pedagogical Agents within systems is providing an improved learning experience from students’ perspective (Dehn et al., 2000).

Learning one of the computer programming languages is essential for students in both undergraduate and postgraduate levels in science and engineering education. However, lack of personalized instructing material that match the knowledge of the students is a major problem which can be solved by using CAI and the Internet.

This work proposes and implements a multi-agent based system that teaches computer-programming language. The proposed system consists of two agents representing a Client-Server relationship; teacher agent as the “server” and student agent as the “clients”. The two agents communicate with the Internet to retrieve the tutoring dialog of the commands the student wishes to learn.

Background Knowledge

In this section, we briefly review intelligent tutoring systems and multi-agent intelligent tutoring systems.

Intelligent Tutoring Systems

Traditional Computer-Assisted Instruction (CAI) presents instructional materials in a rigid tree structure to guide the students from one content page to another depending on his/her response. This approach is restrictive in that it does not consider the diversity of student’s knowledge states and their particular needs (Yao and Yao, 2003). Brusilovsky (1999) noted that CAI systems are not adaptive and are also unable to provide individualized attention that a human tutor can provide.
An Intelligent Tutoring System (ITS) is a computer-based program that presents educational materials in a flexible and personalized way (Brusilovsky, 1999; Johnson, 2001). These systems can be used in the normal educational process, in distance learning (as a stand-alone application or as knowledge delivery over the Internet). Shute and Psotka (1996) noted that an ITS must be able to achieve three main tasks namely:

a) Accurately diagnose a student’s knowledge level using principles rather than programmed response  
b) Decide what next to perform and adapt instruction accordingly and  
c) Provide feedback

It has been proved that individual one-to-one tutoring is the most effective mode of teaching and learning (Bloom, 1984). ITSs uniquely offer a technology to implement computer-assisted one-to-one tutoring.

Multi-agent Intelligent Tutoring Systems

The study of intelligent agents in general, dates back to the 1960s when Joseph Weizenbaum developed the first system named ELIZA (Weizenbaum, 1965). ELIZA was the first system that was capable of holding a convincing conversation with a human. This program was a text-based application without any speech engines or graphical interface.

An agent, in real world sense is a person who carries out a specified task on behalf of another (Green et al., 1997). Examples of this are estate agents or a travel agent who liaises with travel agency or airline on behalf of a customer. The idea of an intelligent agent is to provide the same services as a human agent, but to be implemented in software. According to Green et al. (1997), the concept of Software Implemented Intelligent Agent is “a computational entity” which

• acts on behalf of other entities in an autonomous fashion,
• performs its action with some level of proactivity and / or reactiveness,
• exhibits some level of the key attributes of learning, cooperation and mobility.

A human expert produces the semantic rules for the programming language to be taught, the teacher agent searches previous tutoring text for these semantic rules. Once the semantic rules are found, it produces the tutoring text base or it asks the human expert to provide it.

Software agents have so far been deployed in several areas including call centers, education and web bots for searching the web (Murray, 1999).

Since the emergence of software agents, many researchers have explored agent-based architecture (Singh, 1994; Singh, 1997; Arcand and Pelletier, 1995). These architectures are based on Intelligent Tutoring Systems and Multiagent Systems. Among the features of agents, modularity is one of the foremost. Because of this feature, we can design agents with different functions locally as long as they satisfy some high-level communication and performance standards of the system. Moreover, we can expand our system in the future by adding more agents as long as all agents can cooperate well. Thus, it offers us a very attractive implementation environment (Tang and Wu, 2000).

The multi-agent system has three main features that make it more effective and reliable to implement and emulate the learning of programming. It can be autonomously designed, flexibly designed and autonomously executed (Tang and Wu, 2000).
The architecture of our agent-based system is shown in Figure 1. It is a Client-Server relationship. They communicate through the web (WWW). This allows extending the features of the system to communicate with other agents to exchange semantic rules and tutoring text for different languages. The Teacher Agent serves as the “Server” and the Student Agent as the “Client”.

Teacher Agent

The Teacher Agent consists of three parts; expertise module, semantic rule base and tutoring text base. The purpose of this agent is to standardize the decomposition of the computer language under investigation. It helps the teacher to cope with the knowledge base of a computer programming language under investigation, to add or modify the command structure that will be taught and to produce the syntax and rules representing this language also called semantic rules.

Expertise Module

The Expertise Module consists of domain knowledge that the teacher intends to teach to the student. Generally, it requires significant knowledge engineering to represent a domain so that other parts of the tutor can access it. In Hartley and Tait (1986), it is noted that the method used to organise the domain knowledge in the expertise module includes:
- development of semantic networks,
- application of production system,
- procedural representation and
- building of script frames.

In our system, a production rule to construct modular representations of commands is used. By using this method, the teacher can compare the student’s solution to the expert’s solution pinpointing where the student had difficulties. In addition, the system provides for feedback since the student can get a direct access to the teacher’s module whenever the need arises and feedback can be in terms of correction to wrongly answers, posting of questions and comments within or outside the scope of the lecture and even updates on earlier completed lectures.

**Semantic Rules**

When a teacher wants to build the semantic rules base, the screen of building the semantic rules base will appear containing the keys guide to build the knowledge base. In this phase, the teacher puts the structure of each command (using upper case characters for reserved keywords only), e.g.

```
IF “t”
  THEN “u”
  ELSE “v”
```

which means that, IF the condition (variable operator or \( t \)) is satisfied THEN do the statement \( u \), ELSE do the statement \( v \).

**Tutoring Text-base**

The tutoring text-base contains the text that represents the commands of computer programming languages. Text is organized in terms of a conceptual network hierarchically into lessons, sections, subsections and review questions. (Brusilovsky et al., 1996). The review questions contain the problems to be solved for the current command under investigation before it introduces new commands. Tutoring module retrieves the structure of commands to be presented during the tutoring dialog. Moreover, the students’ model consults it to check the answers of the students.

**Student Agent**

The Student Agent consists of three parts namely:

- Student Model,
- Tutoring Module and
- Student database.

**Student Model**

The Student Model is used to assess the student’s knowledge state and to make hypotheses about his/her conception and reasoning strategies employed to achieve the current knowledge state. At a minimum, such a model tracks how well a student is performing on the material being taught. A possible addition to this is to also record misconception. Since the purpose of the student
model is to provide data for the pedagogical module of the system, all of the information gathered should be able to be used by the tutor.

**Tutoring Module**

The Tutoring Module consists of the studying lecture notes, tests and examination module. When the student accesses the module, the system asks about the computer language which the student wants to learn. The system downloads the tutoring dialog of this language and waits for the student to select a chapter he/she wants to practice, to retrieve the associated tutoring dialog’s file(s).

When a student begins to browse the lecture notes, the system will look into the learning history of the student to see if the student has browsed the note yet or not. It will display a warning message when the student wants to browse next chapter’s note without having browsed its preceding chapter’s note previously. It will also inform the student about the browsing frequency of the notes. For example, if the student has browsed a chapter three times, the system will notify the student that he/she has browsed the system three times already. The limit of the number of browsing for each chapter is between 1 and 15 times.

For each chapter, there will be a test. The tests are generated randomly. That means each time a student logs in, the tests may be different from previous ones at last logins. After each chapter, the system prompts the student to perform a test. After completion of all the tests for any chapters to the end, the system will ask the student if he/she wants to take an examination paper. There are several examination papers which, can be built with any kind of questions such as multiple-choices, short answer or long answer.

**Student Database**

This component is responsible for storing the student model and it is specified using fuzzy sets. This database is usually accessed in order to detect learning problems in the student profile and update the content sequencing properly.

**Illustrative Example**

The student interacts with the learning environment using a web browser. When the student logs in, the system firstly verifies the user login and the tools available with user’s browser to be used in a tutoring for programming course. A screenshot of login page of the Multi-Agent Intelligent Tutoring System is as shown in Figure 2:
The student selects a programming language e.g. FORTRAN, the system would get the requested programming language from the Tutoring Module and then display it on the screen which in this case is the blackboard and the student can scroll through the contents. On getting to the end of a dialog or content, the student can take an appraisal test after which he can move to the next dialog. If the selected programming language for instance, is FORTRAN, the student can study its table of contents menu located on the left part of the page and select a topic or lesson. Figure 3 depicts a sample screenshot for the FORTRAN programming language.
Each session, dialog or content can be regarded as units, lessons or chapters containing the requisite topics like; Introduction; Variables, Constants and Expressions; Control Statements; Arrays; Subprograms; Files, etc. under which specific aspects of the Programming language are grouped. Figure 4 shows a sample of control statements for the student to learn the control structures available in FORTRAN language.

The system equally utilizes a vast amount of IF-THEN-ELSE statements for comparison, matching and decision-making. For instance, if a choice were to be made when asked for, the system responds as follows:

\[
\text{IF } \text{<choice>} \text{ equals } \text{<option>} \\
\quad \text{Then} \\
\quad \text{Go To } \text{<Menu Selected>} \\
\quad \text{Otherwise} \\
\quad \text{<choice not among options given>}
\]
The purpose of the Intranet / Internet Network is to ensure that as many students as possible irrespective of their location, can access the same system as long as they are connected to the network. This would eventually make the implementation an ideal one for a distant learning scheme.

Relationship between the Multi-agent Intelligent Tutoring System and the Real-life, Classroom Setting.

The Multi-Agent Intelligent Tutoring System possesses some similarities and differences when compared with the real-life, classroom setting. Some of the similarities are:

- They both utilize the current educational syllabus,
- They both encourage a teacher(s) – student(s) interaction
- They both help to develop the students’ intelligence and
- There is a feedback between the students and teachers in both methods.

CHAPTER 4.0

CONTROL STATEMENTS

Every program written in any programming language could be written in any of the following 3 forms:

- As a sequence of statements terminated by a STOP and END statement.
- As a conditional Selection statement, and;
- As a series of loops known as ITERATION

Three unconditional control features in FORTRAN are:

STOP statement
END statement and
GO TO statements.

The Multi-Agent Intelligent Tutoring System

Department of Computer Science, University of Benin, Benin City.

Figure 4: A Screenshot for Control Statements in FORTRAN Language

Some of their differences are summarized in Table 1.0 below:

<table>
<thead>
<tr>
<th>S/N</th>
<th>Multi-Agent Intelligent System</th>
<th>Real-Life Classroom Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Indirect interaction between the students and their teachers. The students may end up not seeing their teachers physically</td>
<td>Direct interaction between the students and their teachers. The students always have direct access to their teachers.</td>
</tr>
<tr>
<td>2.</td>
<td>A student can repeat a lesson through the tutoring module and still get the same lecture notes.</td>
<td>A student, even if the teacher were to repeat a lesson, will never get the same (exact) wordings as the previous Lesson.</td>
</tr>
<tr>
<td>3.</td>
<td>One teacher can attend to the needs of so many students who can be of an infinite number.</td>
<td>One teacher can only attend to the needs of students limited to the classroom size.</td>
</tr>
<tr>
<td>4.</td>
<td>The student can access the lessons from any place at any time without being confined to a learning environment</td>
<td>The student’s access to their teachers is restricted to the classroom or learning environment.</td>
</tr>
<tr>
<td>5.</td>
<td>The students have a choice of several topics to pick from. Their learning approach could be random.</td>
<td>The students only have to learn what is prepared by the teacher and their learning mode is strictly sequential.</td>
</tr>
<tr>
<td>6.</td>
<td>Scores for tests and exams are instantly displayed on completion of the tests or exams.</td>
<td>Scores for tests and exams are not readily available until they are graded by the teacher.</td>
</tr>
</tbody>
</table>

Table 1: Comparison of Agent tutoring system and the traditional classroom setting

**Conclusion**

The benefits of using computers in facilitating the learning process are numerous. Computer scientists are constantly coming up with newer ideas and technologies that are geared towards making the learning process faster, more convenient, reliable and better. The benefits of the Multi-agent Intelligent Tutoring System cannot be overemphasized. Its use would simplify the learning and teaching of any computer programming language and its knowledge base can be updated as frequently as new ideas and technologies emerge.

Further study must be carried out to access the negative aspects of intelligent pedagogical agents over human tutors. However, there is huge potential for extensive study within the domain of ITS, especially applying technology to teaching where there is a shortage of teachers. Although, the pros and cons of such system must be ascertained before it can be introduced into the classroom.
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Secondary School Students’ Level Of Understanding Of Selected Chemistry Concepts In Osun State, Nigeria.

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Abstract

This study was carried out to find out the level of understanding of selected chemistry concepts by senior secondary school students in Osun state, Nigeria. Two hundred and ninety one senior secondary school III (SSIII) students from six purposively selected secondary schools were used for the study. A test item termed test of concept understanding in chemistry (TCUC) was used. It was found out that the students’ level of understanding of chemistry concepts was low and that students performed better in theoretically related concepts than in practically related concepts. Students also found it difficult to understand the following concepts: the mole concept, electrolysis, chemical formulae, equations and balancing of chemical equations, electronic configuration, preparation of salts, calculations in volumetric analysis, physical and chemical changes, and properties and identification of gases. Students however found it easy to understand acids & bases, and simple separation techniques.
Introduction.

Many research findings have shown that students’ performance in ordinary level chemistry over the years does not indicate that the objectives of the senior secondary school chemistry are being achieved as desired. Notable among these findings are those of Aghenta (1982), Aboaba (1984), Rosier (1990), and STAN (1992). From 1995 to the year 2000, the percentage credits (A1 to C6) in senior secondary school chemistry examination conducted by West African Examination Council (WAEC) are respectively 32.72, 33.46, 16.27, 21.40, 31.08, and 31.88. Heys (1972) emphasized the need for chemistry education by listing the following three reasons why chemistry should be studied:

1. To discover as much as we can about the behavior of different kinds of matter.
2. To find out reasons for this behavior and so obtain a deeper understanding of its nature.
3. To put this knowledge gained into practical use that would lead to the development of man.

If students continue to perform poorly in chemistry as evidenced above, these reasons will be defeated. It is well known that chemistry is central to the training in science-oriented professions like Medicine, Engineering, Pharmacy, Teaching, Agriculture, etc. Research into the extent to which students understand chemistry concepts is therefore necessary as a way of formulating appropriate methods and actions that can improve their performances in the subject.

Purpose of the study

The main purpose of this study was to find out the general level of understanding of chemistry concepts by Osun state secondary school students. It also sought to find out:
1. Chemistry concepts which students find very easy to understand.
2. Chemistry concepts which students find easy to understand.
3. Chemistry concepts which students find difficult to understand.
4. Whether students understand practically related concepts better than theoretically related concepts.

Research questions

In this research, answers were sought for the following questions:
1. To what extent do students understand senior school certificate chemistry concepts?
2. Which chemistry concepts do students find very easy to understand?
3. Which chemistry concepts do students find easy to understand?
4. Which chemistry concepts do students find difficult to understand?
5. Do students understand practical chemistry concepts better than theoretical chemistry concepts?

Research hypothesis

1. Students do not understand practically related chemistry concepts better than theoretically related chemistry concepts.
Instrumentation

Six chemistry teachers and ten chemistry students were interviewed to find their perception about the status of various chemistry concepts, i.e. whether a particular concept is very easy to understand, easy to understand, or difficult to understand. The information gathered from the interviews were used to construct an achievement test called “Test of Concept Understanding in Chemistry” (TCUC) from both the concepts perceived as difficult and those perceived as easy. The instrument is made up of a total of sixty (60) questions. There are two sections, A and B. The questions in section A are derived from theoretically related concepts, while those in section B are derived from practically related concepts. The two sections carry equal marks. Each section has thirty questions. The first fifteen questions in each of the sections are developed from concepts perceived as difficult for students to understand while the remaining questions are developed from concepts perceived as being easy for students to understand. The students were examined on twelve (12) concepts. On every concept, five questions were asked. Some of the questions were structured short-answer questions while some were of the multiple-choice type. All the questions were developed from areas of the syllabus which pupils will have been previously taught in the classroom as at the time of the field work.

Instrument validation

To ensure content validity, the researcher ensured that the test items selected fairly covered the areas selected for the test. So also the test items were carefully drawn to ensure that the items fall within both the scope of the SSCE syllabus, and the specific areas that have been selected for the purpose of the research. The test items were referred to three (3) experts in educational research for criticism and modification. To ensure reliability, the instrument was field-tested with 5 pupils who were representative of the target population. A field study was therefore conducted with a larger group of 25. At the end of the study, necessary modifications were made based on the performance and reactions of the respondents. The split half method of determining reliability was used. The Pearson Product Moment of Correlation was used to analyse the scores and show whether the test items were reliable or not. When the instrument was field tested with 5 students and the scores were analysed, a reliability value of 0.71 was obtained. The result of the field study with 25 students gave a reliability value of 0.87.

Data Analysis technique

Data analysis was done by finding out the mean score of students in each concept, the mean score of students in all the theoretically related concepts, the practically related concepts, and in all the concepts put together. The mean score was analyzed as follows for the total score:

- 70% and above------Excellent
- 60% to 69%----------Good.
- 50% to 59%-----------Fairly good.
- Below 50%-----------Poor.

The status of each concept was determined as follows:
- Less than 2.5 = Difficult to understand.
- 2.5 to 3.9 = Easy to understand
Above 4.0 = Very easy to understand.

By comparing the mean scores of section A of the test items (which was based on theoretically related concepts), and section B (which was based on practically related concepts), it was possible to deduce which of the two areas the students found easier to understand. The area that had the highest mean score (better performance) was considered better understood by the students.

Results

The table below summarizes the result of the study.
Table Showing Level Of Understanding Of Students In The Respective Concepts, In Each Of The Schools Used For The Study.

Total mark per concept = 5.
* Difficult concepts.
** Easy concepts.
*** Very easy concepts.

In this table, the average scores of the students from each of the schools in each of the schools examined were presented. For an example, in school I, the average score of the students in the mole concept is 0.72. Figures for each school added together for each of the concepts and the average of the scores were determined by dividing the total sum by 6 since there are six schools. For example, the scores in the mole concept were added together and divided by 6.

\[ \text{i.e.} \ 0.76+0.72+2.08+1.46+1.15+2.63 \div 6 = 1.47. \]

This means that the average score of the two hundred and ninety one student samples in the mole concept is 1.47 out of a total maximum score of 5. The same was done for all the other concepts.
To find out the average score/5 of the students in all the theoretically related concepts, the average score/5 in the six theoretically related concepts were added together and divided by 6 (since there are a total of six theoretically related concepts). Thus for the theoretically related concepts, the average score for all the respondents 
\[
= \frac{1.47 + 1.58 + 1.49 + 1.24 + 2.32 + 2.72}{6} = 1.80 \text{ i.e. } 1.80 \text{ out of a maximum score of 5.}
\]
For practically related concepts, the average score for all respondents =
\[
= \frac{1.6 + 0.32 + 0.67 + 1.72 + 2.50 + 1.20}{6} = 1.34 \text{ i.e. } 1.34 \text{ out of a maximum of 5.}
\]

Average scores for the theoretical concepts (1-6)
\[
= \frac{1.47 + 1.58 + 1.49 + 1.24 + 2.32 + 2.72}{6}
\]
\[
= 1.34 \text{ i.e. } 1.34 / 5
\]

Summary of major findings

This study showed that none of the concepts examined was found very easily understood by students. However, students found it easy to understand two out of the twelve concepts examined. The two concepts that were easy for them to comprehend are acids & bases, and simple separation techniques. Students found ten (10) of the twelve (12) concepts examined (83%) difficult to understand. The difficult concepts for the students are:

1. The mole concept
2. Electrolysis
3. Oxidation and reduction
4. Chemical formulae, equation of reaction and balancing of chemical equations
5. Electronic configuration
6. Preparation of salts
7. Calculations involved in volumetric analysis
8. Qualitative analysis
9. Physical and chemical changes
10. Properties and identification of gases

It is also significant that students performed better in theoretically related concept than in practically related concepts. It was also found that, generally, students had a poor understanding of concepts in ordinary level chemistry.

Discussion

The outcome of this study gives an insight into one of the reasons behind persistently poor performance of students in chemistry in the senior secondary school final examinations. For instance, it was found in this study that ten (10) out of the twelve (12) i.e. 83 percent of the chemical concepts examined were difficult for students to understand, leading to poor performance in the test items. This could be attributable to poor performance of students in the final school certificate examinations over the years (STAN, 1992). What are the underlying factors that are responsible for this? Ahiakwo (1984) identified some factors contributing to low performance of students in ordinary level chemistry. According to him, the factors include: inadequate competent teachers, poor preparation of lessons by teachers, inadequate monitoring of teachers, overcrowding in classrooms, and poorly stocked laboratories. In another study, the
Science Teachers Association of Nigeria (STAN, 1992) listed some factors responsible for students’ poor performance in science generally. These factors are: overcrowding, poor laboratories, lack of adequate textbooks, inadequate libraries and personnel.

Looking specifically at some of the concepts that were found to be difficult to understand by the students, Ahiakwo (1984) also identified similar concepts as being difficult for students to understand. Such similar concepts are: the mole concept, electrolysis, preparation of salts, and calculations in volumetric analysis. To a very large extent, these similar concepts require mathematical competence. This confirms the findings of Teibo (1975) who had much earlier identified two of the problem areas of chemistry as being topics that dealt with abstract concepts and those requiring mathematical competence. Onwu and Moneme (1986) sought to find the extent to which chemistry students failed to solve electrolysis problems. The analysis of the researchers’ result confirmed that learners generally find solving problems in electrolysis difficult. This was also confirmed by findings from the present study.

The fact that students perform better in theoretically related concepts than practically oriented concepts in this study appears to be supported by available literature. For an example, Aboaba (1984) listed inadequacy of practical work as one of the reasons behind students’ poor performance in chemistry. Experimentation is a major process in the learning of chemistry. It is not an understatement, therefore, to say that “no experimentation, no chemistry.” Besides, chemistry is an experimental subject and as such its implied learning approach should stimulate students, bridge the gap between theory and reality, promote scientific attitude and scientific knowledge, and lead to better understanding of abstract concepts (Onwu, 1983). If the learning of chemistry is deficient in practical work, no meaningful leaning can take place. As pointed out by Onwu (1983), abstract concepts can be made simple and easily understood if practical experiences are included in the learning process (see Onwu 2000b).

Conclusion

A critical analysis of the table of result brings certain conclusions to the limelight. From the general performance of the students in the test items, it can be concluded that there is a general low standard of teaching and learning of chemistry in our public schools. A situation where students are merely able to score average marks in two out of the twelve concepts examined is not desirable.

1. Students did not perform well in concepts requiring mathematical competence.
2. Students performed better in theoretically related concepts than practically related concepts. This in itself is a pointer to the fact that students do not have enough laboratory experience to cope with the demand of the subject.
3. Based on the low scores of students, students found the following concepts difficult to understand: the mole concept, electrolysis, chemical formulae, equations and balancing of chemical equations, electronic configuration, preparation of salts, calculations in volumetric analysis, physical and chemical changes, and properties and identification of gases. Students however found it easy to understand acids/bases, and simple separation techniques.
Recommendations

The following recommendations are therefore considered appropriate if the prevailing situations are to be properly tackled.

1. Since chemistry is an experimental subject, government and parents should work hand in hand to build appropriate laboratories for effective learning and these laboratories should be adequately equipped with necessary equipment and reagents for instruction, so that practically related concepts are better understood.

2. Chemistry teachers should give more priority to practical experiments as part of instruction in order to improve students’ understanding of practically related concepts.

3. Since the result of this work has shown that students do poorly in concepts requiring mathematical competence, adequate effort should be made by appropriate authorities: government, school authorities, etc. at ensuring that students are well tutored in Mathematics.

4. Chemistry teachers should work hand in hand with mathematics teachers in their schools to ensure that aspects of mathematics required in chemistry are properly taught to improve performance in concepts requiring mathematical competence.

5. Chemistry teachers should be encouraged to be members of professional bodies and associations like the Science Teachers Association of Nigeria (STAN). They should also be given the opportunity to attend seminars and conferences organized by these professional bodies where they can rub minds with colleagues in the teaching profession on how to improve the teaching and learning of chemistry in our schools.

6. Curriculum developers should have a critical look at the present senior secondary school chemistry curriculum. Teachers often complain that the senior secondary school chemistry syllabus is too wide. The outcome of this is that teachers often rush over the syllabus not minding whether the students understand or not. Streamlining the chemistry curriculum will enable teachers to spend more time on difficult concepts and students will hopefully learn better.

7. Majority of our schools have no functional libraries. In a period when prices of books are not within the reach of the average family, school libraries should be well stocked with appropriate textbooks to enable students study privately after their lessons in the class and the laboratories. This will foster better understanding of chemistry concepts generally.
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What Contribution Can Senior Citizens Make Towards The Economic And Social Development Of Botswana?

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Abstract
Senior citizens (pensioners) have been known by society to be people who have exhausted their worth and wealth of expertise and knowledge and for that matter have no role to play or have no further contribution to make towards the social, political, educational and economic development of Botswana. Some families consider them as a burden. They are associated with community-based home care, demanding attention from care givers, and behave like they have never lived a fulfilling life. This notion is held by majority of Batswana. What seemed forgotten is the fact that majority of senior citizens had themselves been professionals of some sort and had contributed towards the social, political, educational and economic development during their time of service. The authors of this random survey hold a different view about senior citizens in relation to the contributions that they can make towards the development of Botswana. From the literature, education, health, entrepreneurship, community development, adult literacy, counselling services, youth development and practical-manual skills training were identified as areas where senior citizens can be useful to the society. We conclude with some propositions to the Government of Botswana and the NGOs to consider making would-be senior citizens more useful and equipped with skills that can make them make further contribution towards the social, political, educational and economic development of Botswana.
Introduction

Most literature about senior citizens (pensioners or retirees) concentrates only on the negative aspects of old age – abuse, neglect and ill-treatment by their children and the state representatives (Ministerial Commission, RSA: 2001). Reports from committees from the nine provinces in the Republic of South Africa (RSA) revealed abysmal neglect, abuse and ill-treatment of older persons (ibid. 2001:1-14). The situation in South Africa, we believe, is not different from that of Botswana where the majority of pensioners reside in the rural areas.

In December 1991, the United Nations General Assembly adopted the United Nations’ Principles for Older Persons and again proclaimed these principles in 1999 (UN Principles for Older Persons, 1999). Since the inception of these principles, governments have been encouraged to incorporate the five principles, namely: independence, participation, care, self-fulfilment and dignity into national programmes to be able to accord senior citizens the respect and dignity they deserve.

As regards independence, the UN Principles for older persons stipulates that older persons should:

• have access to adequate food, water, shelter, clothing and health care through the provision of income, family and community self-help.
• have the opportunity to work and to have access to other income generating opportunities.
• be able to participate in determining when and at what pace withdrawal from labour force takes place.
• have access to appropriate educational and training programmes.
• Be able to live in environments that are safe and adaptable to personal preferences and changing capacities.
• Be able to reside at home for as long as possible.

With reference to participation in whatever category the UN Principles for older persons states that older persons should:

• Remain integrated in society, participate actively in the formation and implementation of policies that directly affect their well-being and share their store of knowledge and skills with younger generations.
• Be able to seek and develop opportunities for service to the community and to serve as volunteers in positions appropriate to their interests and capabilities.
• Be able to form movements or associations of older persons.

With regards to care, the UN Principles for older persons make it clear that Older Persons should:

• Benefit from family and community care and protection in accordance with each society’s system of cultural values.
• Have access to health care to help them to maintain or regain the optimum level of physical, mental and emotional well-being and to prevent or delay the onset of illness.
• Be able to utilize appropriate levels of institutional care providing protection, rehabilitation and social and mental stimulation in human and secure environment.
• Be able to enjoy human rights and fundamental freedom when residing in any shelter, care or treatment facility, including full respect for their dignity, beliefs, needs and privacy and for the right to make decisions about their care and the quality of their lives.
With reference to self-fulfilment, the UN Principles for older persons stipulates that older persons should:

- Be able to pursue opportunities for the full development of their potential.
- Have access to the educational, cultural, spiritual and recreational resources of society.

In relation to dignity, the UN Principles for older persons make it clear that older persons should:

- Be able to live in dignity and security and be free of exploitation and physical or mental abuse.
- Be treated fairly regardless of age, gender, racial or ethnic background, disability or other status, and be valued independently of their economic contribution.

A critical study and analysis of the provisions of the UN Principles for older persons reveal that senior citizens have a role to play in the social, political, educational and economic development of their respective communities and countries. In particular, Botswana senior citizens can make positive contributions towards the achievement of the Vision 2016 revolution.

The theory of Senior Citizenship: An Introspection - WHO’s perspective

According to the World Health Organisation (WHO 2002), ageing is to be a positive experience and that longer life must be accompanied by continuing opportunities for health, participation and security. Active ageing is a concept adopted by WHO to express this process. The WHO document titled *Active ageing: A policy framework* (2002:12), ‘Active ageing is the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age. This theory holds good for every living being, because, all things being equal, every living human being will eventually grow old and die’.

The WHO document referred to further explains the theory of ageing and adds that active ageing applies to individuals and population groups. It allows people to realise their potential for physical, social, economic and mental well being throughout the life course and to participate actively in society according to their needs, desires and capabilities, while providing them with adequate protection, security and care when they require assistance and unable to physically work.

The concepts **active ageing** were first adopted by WHO in 1990, and as used by WHO in the referred document encompasses physical ableness. According to WHO the word active refers to **continuing participation in social, economic, cultural, spiritual and civic affairs, not just the ability to be physically active or to participate in the labour force.** The implication in this respect is that Senior Citizens who retire from work and are physically fit and those who are ill or live with disabilities can remain active contributors to their families, peers, communities and nations. This study proposes to seek the goodness in senior citizens and make them known to governments, organisations and individuals so that the huge potential of their expertise can be still utilised during their retirement years.

The African Union’s (AU) (not dated) Policy Framework and Plan of Action on Ageing concurs with WHO’s document and further stresses that governments should not undervalue the worth and wealth of experience of senior citizens and that ways should be found to make sure that they are used to help to develop our nations as they retire.
Tapping the expertise and experiences of Senior Citizens

What follows is a detailed analysis and recommendations that our data sources revealed which we believe can help to unravel the potentials that lie dormant in senior citizens and use them to help in the social, political, educational, and economic development of Botswana to help in the attainment of the principles of Vision 2016.

Senior Citizens and Entrepreneurship Services Development

Our survey revealed that most senior citizens have the desire to run their own small businesses upon retirement. However, they are forced by circumstances of inadequacy in entrepreneurial skills to successfully operate small businesses. This survey revealed that those who have ventured into small businesses fade out after a few months of operation. When asked about the circumstances that lead to such failures, they indicated that they have not had any training in entrepreneurial skills to be able to operate their small businesses profitably. When asked about what they would like the government and the corporate world to do for them to be able to succeed in their endeavours, the following recommendations were identified from their propositions:

1. That the government should set up a commission or hire an NGO to undertake to train them in small business management and entrepreneurship where they would be given both the theoretical and practical orientations of small business operation a few months before they go on pension.

2. That this training should be organised and introduced to them 18 months [at least] before they go on pension so that they are able to steer clearly the path that they are going to take on retiring. For example those who are teachers and would like to set up nursery and pre-schools should be given adequate training to be able to set such schools up and run them successfully. Those who are health professionals could set up and run community health centres and provide health care services.

3. That the training should take into account the specific business interest of each retiree so that they are provided training in the business that they have interest to be able to successfully manage such business on retirement.

4. That such training should be on-going and that retirees who start such businesses after their training should be monitored and re-oriented in their pursuit so that evaluation and assessment could be initiated and the programme revised and implemented for greater success.

What have been listed above are what the senior citizens sampled for the study believe can help them to establish successful small businesses on retiring that will also help them to make visible contribution towards the social and economic development of Botswana.

One would-be senior citizen’s analogy is worth to be included in this discussion. He indicated that if, for instance 10,000 people go on pension in 2006 and receive such training and are able to establish small businesses and employ two persons each, the senior citizens would have created 20 000 jobs. If for instance the two employees come from two families with four members each, that means 40 000 family members would have been financially supported and sustained through senior citizens involvement in job creation and that the contribution this could make to the social and economic freedom of Botswana would be substantial.
Further to all these, our literature reviewed revealed that there have been several senior citizens entrepreneurial programmes that have empowered senior citizens to make positive contributions towards the social and economic development of their countries. These countries include South Africa, Japan, China, Sweden, the United Kingdom and the United States of America.

To this end would-be senior citizens reiterated that the Government of Botswana should put such mechanism in place to give would-be senior citizens skills that would enable them to operate small businesses of their choice to be able to make contribution after their retirement and still be part of the mainstream of economic, social, political and education development activities of Botswana.

**Senior Citizens and Health Development in Communities**

In 1999, which was the International Year of Older people, the World Health Organization (WHO) proposed the theme of active ageing, “Active ageing aims to extend healthy life expectancy and quality life for all people as they age, including those who are frail, disabled and in need of care” (WHO, 2002:12). WHO also proposed a life course perspective on ageing, to ensure that health promoting strategies are in place throughout the life span to ensure active ageing. For many countries including Botswana, the challenge therefore is ensuring that the concept of active ageing is adopted and applied in the face of many challenges such as globalization, changing family patterns, consequences of epidemiological transition, persistent inequalities and poverty, to name a few (WHO, 2002).

Nurses are the backbone of the health care delivery system in Botswana. The HIV/AIDS epidemic has put pressure on the limited resources of the health care delivery system. Although there is shortage of human resources of all cadres, the shortage of nurses seems to be acutely felt as the attrition of the nurses continues to rise. In response to the increased bed occupancy the Community Home Based Care (CHBC) programme was introduced in Botswana in 1995. Many retired nurses were hired to work in this programme at its inception. This is a good example of involving older nurses in community development as well as an example of active ageing which has been promulgated by WHO. Further, working in the community requires that one often works alone and makes decisions on their own without the immediate back up of other nurses and other health professionals as in acute settings, hence the advantage of having experienced nurses who draw a lot from their many years of experience in the workforce.

Other senior citizen nurses have been gainfully employed in other sectors of the health care delivery system like acute settings and local government. A common criticism has been that retired nurses are unable to cover vast distances on foot due to their old age and its associated musculo-skeletal disorders. However, where resources are available, vehicles are provided enabling them to see more CHBC clients and rendering quality care, as they are experienced.

Older people play an important role in community based models of care for chronically ill persons and other vulnerable populations. Several retired nurses in Botswana have established a day care centre for chronically ill patients and are rendering a community service that is needed given the high prevalence of HIV/AIDS in Botswana. Further, there are many families who have chronically ill patients and are unable to look after them during the day due to other commitments. The extended family is slowly being eroded due to social change and development, and for this reason, the services of senior citizen nurses offer a much needed
respite. Some of their clients include older persons and this is a necessary service given that more and more old people live alone (Bainame & Shaibu, 2003) and in times of illness may have no-one to look after them. These nurses require more resources for a scaled up response to these community needs.

An introduction of part time employment would also enable senior citizen nurses, medical doctors, teachers, and social workers an opportunity for flexi time and an opportunity to participate in gainful employment that suits their lifestyle. Most of such senior citizens have worked in the private sector on a part time basis. However, presently the Government of Botswana, which is the largest employer, does not offer part time employment. This needs to be reconsidered so that there is adequate involvement of senior citizens in the main stream economic and social development.

The Madrid International Plan of Action on Ageing (2002) commits all UN members to support older people living with HIV/AIDS with adequate information, training, treatment, medical care and economic support. The last BAIS II study indicated that 9% of older people (65 and above) were HIV positive. Yet, many of the HIV prevention programmes do not target older people (70-74 = 13.1%) as initially the highest incidence of HIV occurred among younger people who were within child bearing age. However, over the years, given that this epidemic has been around since 1985, we have seen a cohort of older people who are HIV positive. There is a need to recognize the sexuality of older people and their risk of becoming infected. Given that discussion of sexuality issues is taboo in Setswana culture, especially discussing this with older people, retired nurses could be mobilized to address older people on issues of HIV/AIDS and sexuality. At a Vision 2016 workshop that was held for older people in 2003, older people suggested that they would be more comfortable if older health personnel were to discuss issues of sexuality and HIV/AIDS with them rather than younger people. Therefore there is a need for inclusion of older people in programme responses to HIV/AIDS. Such programmes should reflect cultural sensitivity in order to be acceptable. Over the years, there has been a felt need for culturally sensitive care, especially when dealing with older people (Shaibu & Wallhagen, 2002).

The African Union (AU) policy framework and plan of action of ageing recommends that member states should undertake to guarantee the delivery of health services that meet the specific needs of older people. Although health is also a basic human right, access to health services is still problematic due to geographical and socio-economic reasons, even in Botswana where health services are free (Shaibu, 2002). Pensioners in the health arena could assist to mobilize health resources for older citizens. The role of older people in the care of sick individuals and orphans in the era of HIV/AIDS has been acknowledged. WHO acknowledges this role and maintains that for older citizens to continue to assist in this regard, they need to be healthy. It is in light of this that the WHO sought to do a study in several countries aimed at strengthening health services for older people in several countries, including Botswana. The results of this study have not been translated into policy yet. However, Botswana as a country needs to be commended for implementing the AU policy framework and plan of action of ageing as a needs assessment of older people has just been completed by the Department of Social Welfare and Services, and this is going to assist in the formulation of a Botswana policy on ageing.

In conclusion, senior citizens should not be considered to have exhausted their worth and that once their health which is pivotal in the accomplishment of active ageing and community development is still adequate, they should be given the recognition they deserve in our society to be able to continue to make contribution towards development. We can promote the active participation of senior citizens in community development by acknowledging them as
repositories of knowledge and expertise and bringing them on board. Better still, more non-
governmental organizations that deal with senior citizens need to also come on board to assist in
advocating the role of senior citizens in health, education and community development. Senior
citizens are the last vestiges of progressive advancement in society and should be recognized as
such.

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Education And Youth In Post-Independent Eritrea - An Analytical Study

Dr. Ravinder Rena

Abstract

The efficiency of any education and training system is often judged by how well this system prepares the youth for gainful employment and thus bring a positive social and economic change. The students in Eritrea need to acquire appropriate knowledge and skills as part of their education and training. The paper mainly deals with the areas of education and economic development, education and youth. In addition, it also highlights some of the problems and challenges of education in post-independent Eritrea. The methodology used in this paper is essentially a descriptive analysis of data obtained from secondary sources, mainly government and Ministry of Education documents, survey reports, research articles, books and other published, and unpublished, materials on Eritrea.

Keywords: Education, Youth, Eritrea, Social change and Development, Human capital.
Introduction

Education has long been considered a cornerstone of economic growth and social development and the principle means of improving the welfare of individuals. Education, in general, plays a significant role in economic planning and development. Higher education, however, also contributes to human resource development in a variety of ways (Rena, 2000: 2). Higher Educational institutions are responsible for fostering a country's professional personnel, including the managers, scientists, engineers, doctors, lawyers, teachers, administrators and technocrats who participate in the development, adoption, and dissemination of innovations in the economy. Such institutions should create new knowledge through research and advanced training, and serve as a conduit for its transfer, adoption and dissemination (Psacheropoulos and Woodhall, 1985).

Education is viewed as a strategic tool for development; therefore, the content of the educational system needs to be reviewed carefully. The education system in Eritrea must be geared up, not only at raising the general, social and scientific knowledge of the youth, but is must also equip the youth/individual with skills that would enable one to lead a productive, sustainable life. Education is the primary creator and conveyor of knowledge. It helps youth preserve and change society. Education also helps youth to understand, control and harness the forces of nature. Through shaping the behavior of youths and creating confidence in the minds of youth, education provides a strong base for rational and value-oriented, nation-building progress (Woodhall, 1992). Education is an integrative process in social life. There is no doubt that education is an effective instrument for large-scale achievement and revolution in all spheres. Furthermore, it assists and accelerates economic growth (Rena, 2002).

Based on his thinking that development is “a process of expanding the real freedoms that people enjoy” (Sen, 1999), Amartya Sen suggests that education contributes to development and social change: i) directly, because of its relevance to the well-being and freedom of people, ii) indirectly through influencing social change, and iii) indirectly through influencing economic production. Sen provides researchers as well as policy makers with a useful framework for analysis of the interlinked relationships between education and poverty reduction. In the context of Eritrea, Sen’s view is relevant in a way that education brings a positive social change.

Eritrea is bordered on the north-east by the Red Sea, on the south-east by Djibouti, on the south by Ethiopia and on the west and north-west by Sudan. Eritrea is also bordered with Saudi Arabia and Yemen across the Red Sea. The 45,754 square miles, which make up Eritrea, include over 350 islands. The population of Eritrea is about 4 million out of which one million citizens live outside of the country, a result of the colonial situation that prevailed in the country for three decades (Rena, 2006).

Educational Background of Eritrea

The educational system in Eritrea shows all the symptoms of prolonged neglect under conditions of colonialism and war. Decades of conflict and the recent border turmoil have led to the devitalisation of education in the country. As a result, Eritrea has had to undergo a process of rehabilitating its educational institutions and services that were devastated during the long war (Petros, 2000). After obtaining independence, the government of Eritrea has exerted strenuous efforts in rebuilding the education system from the scratches of war and destruction (Rena, 2005).
Before the independence of Eritrea, the Derg regime systematically dismantled the education infrastructure and corrupted the education system consequently degraded the education standard to one of the lowest even by African standard (Rena, 2002: 3). The lack of regular maintenance of the infrastructure also meant that all institutional buildings were in a state of disrepair. Amazingly, many of the outdated, rigid and unfair systems introduced by the consecutive colonial Governments are still maintained by an independent Eritrea (Rena, 2005a). Hence, the government is attempting to introduce a new education system, i.e., 'rapid transformation of education' that is firm and fair, as well as flexible, and of the highest standard.

The rest of the paper is organized as follows: Section two presents the educational development in post-independent Eritrea with certain challenges; section three deals with education and economic growth; section four discusses the youth and education in Eritrea; and, section five provides concluding remarks of the paper.

**Educational Development In Post-Independent Eritrea**

As the Chinese adage goes, “If you are thinking one year ahead Sow seeds. If you are thinking ten years ahead Plant a tree. If you are thinking 100 years ahead educate the people.” Since Independence, the government of Eritrea has embarked on a wide-ranging program designed to revitalize and develop the collapsed economy and to promote the country’s long-term growth. The overall vision of Eritrea’s future progress is ultimately based on human capital formation, with education and health as key objectives (Government of the State of Eritrea, 1994).

In Eritrea, over the last fifteen years, there has been a phenomenal increase in enrollment. The number of schools at all levels (Junior, Middle, Secondary and Technical) increased from 293 in 1990-91 to 1000 in 2002-2003, while the numbers of teachers increased from 5,286 to more than 10,000 (see appendix table-1). The total number of students at all levels was about 186,000 in 1991 and reached to about 700,000 in 2006. In addition, Eritrea now has Asmara University, Asmara Commercial College, Teacher Training Institutes (TTI), and a number of other technical and vocational institutions. Two remarkable developments in the education sector of Eritrea are the opening of the Eritrean Institute of Technology- Mai Nefhi and of the Orotta School of Medicine (both started in February, 2004). Furthermore, a number of additional colleges have been established, such as the College of Agriculture - Hamalmalo, the College of Marine Science and Technology- Massawa, the College of Business and Economics - Massawa, and the College of Social Sciences- Adi Queh, to name a few (Rena, 2004: 6). The University of Asmara is providing its academic programs in 43 departments encompassed in nine colleges: the College of Agriculture; the Faculty of Arts; the College of Business and Economics; the Faculty of Law; the College of Sciences; the Faculty of Education; the Faculty of Engineering; the College of Health Sciences; and, the College of Social Sciences. In addition, the University has launched post graduate programs in English, Economics, Geography, and Agriculture during the 2004-2005 academic year. Asmara University graduated 776 students in 2003, but jumped to approximately 2000 in the years 2004 and 2005 (see appendix table-4). During the 2000-2001 academic year, enrollment in elementary education increased by 1.0 per cent as compared to 1999-2000. The enrolment of girls in elementary education in 2000-2001, also, increased by 1.0 percent as compared to the previous year, whereas, the enrolment in middle and secondary education increased by about 3.0 percent and 7.3 percent, respectively (Rena, 2006).

The main asset of Eritrea is its human capital, the effective utilization of which is the crucial factor in determining the growth and prosperity of the economy of the country. In addition, the skill and talent of these individuals are critical to obtain maximum results. Realizing the importance of the human factor in the national economy, the Government of Eritrea has geared...
up all the possible ways to increase the number of required, skilled employees for its thirsty
economy (Rena, 2005). To do this, Eritrea is tackling the planning and implementing of clear
cut and fast targeted Human Resource Development (HRD) policies, which are designed to
ensure the optimization of available resources and to develop them for the future challenges. It
is observed that, most of the HRD programmes of the Ministry of Education (MoE) are being
systematically and successfully carried out by institutions involved in the process, such as the
University of Asmara and the Department of Technical Education and Vocational Training
(DTEVT), both of which have been playing a predominant role in the human resource
development of Eritrea (Rena, 2006).

During the academic year 2002-2003, Eritrea harvested its fruit of educated manpower who
were expected to shoulder the responsibility of building the nation from within their respective
educational sectors. During this last academic year, 2005-2006, at least 724 students graduated
from various schools and colleges under the DTEVT. Within the commercial stream, Asmara
Commercial College produced a total of 206 graduates with diplomas, from both their day and
extension programs. In the technical field, Pavoni Technical Institute produced 22 graduates;
Asmara Technical School - 166; Wina Technical School - 86; Maihabar Technical School - 122;
and Don Bosco Technical School - 42. Overall, since the 1991-92 academic school year, a total of
4,347 graduates have come out of the eight DTVE T institutions in the country. Most of these
graduates are serving in different government and private institutions and, thus, cater to the
labor market needs of the country in a larger extent (Rena, 2004).

In other fields outside of the DTVE T, the Hamelmalo Agricultural School and the
Hagaz Agricultural School produced 54 and 75 graduates respectively (see appendix tables 2
and 3). In addition to the large number of graduates within the DTVE T realm, the Asmara
Teacher Training Institute produced approximately 525 trained teachers and the Mainefi
Mother Tongue Teachers Training Institute commemorated another 336 students (Rena, 2004).
In the arts, the Asmara School of Music graduated 26 students in 2006, and in hospitality, The
Tourism and Hotel Training School, has trained a total of 657 personnel in basic tourism and
hotel service skills since its inception in 1998, just 8 years ago. Finally, attention should be given
to the unique situation in Mekerka, Gash Barka, where approximately 300 females successfully
graduated from a three-year course given by the Ministry of Justice in July 2003. All the
graduates that have emerged from these schools are professionals equipped with profound skills
and knowledge in a variety of technical and vocational fields, all of which are relevant to the
immediate need of the Eritrean nation. Most of the graduates come from the intermediate level
of education, but a full 1,002 graduates completed degrees at the advanced college level from
1996-97 to 2003-04. Only two of the schools mentioned above, the Asmara Technical Institute
and the Asmara Commercial College, are at the advanced level. All of these individuals are
gainfully employed and self-sufficient citizens who can contribute greatly to their country's
development. See Appendix Table 2 for the breakdown in graduates by gender and year at the
intermediate level. Appendix Table 3 provides the statistics for graduates from the advanced
college level by gender and year.

The increasing numbers of graduates from all fields is creating a new generation of skilled
manpower that is balanced between both general and technical, or vocational, fields. The
education and in-service training for teachers, and other professionals, is being systematically
organized and is a response to the development needs of the country for appropriate education
at all levels. This prosperity in education is obviously a great advancement for Eritrea and its
citizens, and directly contributes to the realization of the dream to make Eritrea a technological-
oriented and advanced nation. The cumulative effort of all involved is finally reaping fruit.
However, Eritrea faces certain challenges in the sector (Rena, 2006).
**Educational Challenges In Eritrea**

The challenge of educational development in Eritrea is a daunting one. Although there has been an enormous increase in demand for schooling and a corresponding growth in enrolment of those able to enter the formal education system, repetition and dropout rates are high. This is explained by the poor quality of education being received by children and the limited learning achievements being attained. The quality of education has been assessed with regard to what is taught, how it is taught, to which children and in what kind of setting. Most schools in Eritrea suffer from poor learning conditions; dilapidated or partially completed buildings; insufficient desks and text books; overcrowded classrooms; few or no learning materials; and poorly trained or unmotivated teachers (MoE, 1996).

The most urgent challenge facing educational reform in Eritrea remains the need to increase the access of school-aged children to primary schooling opportunities. Another major challenge is the how to retain the students who are already enrolled, and, how to ensure that the school system has the ability to offer those enrolled a quality education. In addition, a number of educational institutions in Eritrea are currently facing financial and other crises (Rena, 2005b). They are not in a position to make available to their students world-class services, due to the limited ability to find ways to generate internal resources. Often times, the parents are unduly burdened by tacking up the slack.

**Education And Economic Growth**

In Eritrea, education is important because it promotes the knowledge, skills, habits, values, attitudes, and understanding of the people of the country and thus make a positive contribution in developing Eritrean society. Education, indeed, helps Eritrean youth to become useful members of society. It also helps the youth to develop an appreciation of their cultural heritage and live more satisfying lives. The most common way to get an education is to attend school, college, or a university. These opportunities have become increasingly important as social changes today take place with increasing speed and greatly affect the lives of the people of Eritrea. Education contributes to economic growth in varied forms (Rena, 2005b). Education contributes directly to economic growth through differential productivity of human capital. Hence, education, unquestionably, can be considered a good investment in economic growth (Psacharopoulos and Woodhall, 1985; Rena, 2002).

Education, like other forms of investment in human capital, contributes to economic development and raises the incomes of poor as much as it does the investment in physical capital, such as transportation, communication, power, or irrigation (Psacharopoulos and Woodhall, 1985: 3). Furthermore, education is now universally recognized as a form of investment in human beings, which yields economic benefits and contributes to a country’s future wealth by increasing the productive capacity of its people (Woodhall, 1992:11). Therefore, investment in higher education can be a key contributor to a country’s economic growth (Rena, 2000).

**Financing of Education in Eritrea:**

In Eritrea, educational expenditure is generally expected to conform to a predetermined growth path. In essence, educational expenditure is believed to depend uniquely upon the spending power of the country. As the spending power on education increases, it will in turn increase the country’s economy in greater than proportional levels (Rena, 2004). The Government of the
State of Eritrea has been concentrating on the educational development of the country since Independence and it is responsible for the major share of all expenditure on education. The amount allotted for the development of education in the country dramatically increased from 35 million Nfa in 1992 to 287.3 million Nfa in 2002. At this stage, however, it is not possible to precisely determine the percentage of GNP spent on education. It would suffice to say that the government’s investment has been enormous (Rena,2005b).

Although the overall government contribution has been increasing for the last decade, it has not been able to keep pace with the rapid rise in enrollment and escalation in prices. Often the inadequacy of financial resources leads to poor infrastructure and physical facilities, low investment in research and development, and has an adverse impact on the quality and efficiency of the education system. Hence, the Government is trying to encourage private sector involvement in the running of schools at different levels. Currently, however, the participation level is low. For example, the private sector, in 1999-2000, accounted for only 13 per cent of enrollment, and in pre-primary education, which is entirely run by the private sector; only 3.4 per cent of children were enrolled.

Education and Human Capital in Eritrea:

The Eritrea Ministry of Education has played a very prominent role in re-building the economy. The successful implementation of human resource development plans depends substantially upon relevant policies and practices of other developed and developing countries apart from Eritrea’s own internal policies and constraints. This noble achievement is evident in the present educational programmes and current reforms that have been developed in the country (Rena,2006).

In Eritrea, human capital formation plays a commanding role in triggering the process of socio-economic transformation. The formation of human capital is influenced tremendously by the standard of education made available by Eritrean educational institutions. Since the majority of the education system is under the control of Eritrean Government, with the provision of education subject to financial restraints, the Government of Eritrea has taken responsibility for trying to foster the growth of human capital.

Youth And Education In Eritrea

Of importance is the face that Eritrean youth have been in the forefront of all historically registered national engagements. For example, the youth had a prominent position and participation during the thirty years freedom struggle (1961-1991). They also led the first post-independent development plan aimed at transforming the country’s economy. They, also, played a vital role during the border conflict from 1998-2000 in safeguarding the country and reconstructing the economy.

Given that upgrading youth capabilities will strengthen their position as the cornerstone in the advancement of the country, the Government of Eritrea is undertaking youth rehabilitation and qualification programmes in various fields and, accordingly, giving them more emphasis. As an example of this, Eritrea has allocated more than 4 per cent of its national income, and more than 37 per cent of budget services, for educational programmes (Rena, 2005b). This is indeed a major indication of the concern of states regarding the development of human resources. This financial investment translates directly into the building of pre-schools (kindergartens), elementary and secondary schools, all the way up to university education.
Eritrean youth are solid assets of the country. The country could not have put its economy onto a successful development path without the readiness of its citizens, especially its youth. Hence, youth in Eritrea are playing a pivotal role in the reconstruction of the economy and the Warsay Yikealo National Development Campaign. Recognizing this, the Eritrean government is trying to provide the privilege of education to those youth who have participated in such development activities as a kind of incentive. For example, the 5,500 youth that took the first matriculation exam in the Warsay Yikealo Secondary School were given the opportunity to continue learning in the Eritrea Institute of Technology (EIT), Mai Nefhi. Additionally, the 8,500 students who took the matriculation exam in July 2005 are joined the EIT. Every year substantial number of students is joining in EIT.

In Eritrea, after students complete grade XI, they will go on to attend the Warsay Yikealo Secondary School at Sawa to complete grade XII and take the matriculation exam. Based on the exam results, the students are then assigned to either EIT- Mai Nefhi or other colleges in the country. With such strong academic opportunities available to them, Eritrean youth have a good chance of finding ways of supporting their own life and the life of their families.

Hence, it is imperative to enable citizens through education and skill enhancement is more critical today to bring the social and economic change. There is fairly well-founded concern that in the next decade, Eritrea could find itself performing a difficult balancing act: catering to the needs of a significantly large growing population while trying to find opportunities for a newly emerging workforce of youth that does not have marketable skills. It is to be noted that thousands of youth enter the workforce each year in Eritrea without the benefit of a high school education and most have no skills for the job market. This must come as a sobering reality to those who are euphoric about the nation powering its way to superpower status in the foreseeable future.

The imparting of skills largely depends on the Industrial Training Institutes (ITIs) and technical schools that have a base in the public and private sectors of Eritrea. The ITI system, despite some attempts at a revamp, is viewed as insufficient and weighed down by factors such as the limited range of skills taught, outdated technology, high cost, and the requirement that those entering the system possess at least a high school qualification. The challenge before the State, therefore, is to build on the existing infrastructure of ITIs, schools, colleges, and institutions in the private sector. Computers and multimedia now make it possible to learn in an interactive manner and should help form the core of any new strategy. The potential of multimedia to train both literate and illiterate youth makes it all the more attractive. Courses in the service sector areas, such as tourism and health care, could be taught at centers employing such technology, in addition to the existing schools and colleges in Eritrea.

The youth’s economic reconstruction efforts have been successful in improving the quality of the country’s infrastructure. The overall reliability of the supply of power, transport and communication services has been restored and improved substantially in most parts of the country through the Warsay Yikealo Development Campaign. Eritrean youth not only cherish deep memories of their aspirations to break the fetters of colonial rule, but also renew their pledge to build the Homeland and create a solid foundation embodied with the concepts of ardent patriotism, unshakable unity, and hard work. Hence, the youth have a strong belief and confidence that “we can do it and we will do it”.
Concluding Remarks

Colonizers systematically degraded the Eritrean education system; subsequently, Eritrea faces many challenges in the redevelopment of education. Since independence, education in Eritrea has shown considerable progress. The Government has established a number of schools and colleges, and also developed its human resources in order to improve the quality of life of the people. Although there has been considerable expansion in the education sector, particularly in the creation of vocational and technical schools and science and technology institutes in different parts of the country, Eritrea still has a very long way to go.

Eritrean youth have played an important part in contributing to the reconstruction and development of the Eritrean economy. One could propose that these skills and knowledge have the power to change the shape of Eritrea's future. If Eritrea wishes to capitalize on this power, it must promote mass education problems in order to eradicate superstition and cultural stigmas, which are impediments to education and prolific in the rural areas. The focus of these educational programmes should be aimed at raising the capabilities and capacity of its citizens. Therefore, the policymakers and practitioners must go deeper in exploring the internal strengths, weaknesses of youth in Eritrea and needs to go wider in seeking external support. Policy-makers must take into account the representative situations of different educational institutions at the higher level and formulate into objectives of a new policy because it is teachers and students at this level who brings the social change through education.

Notes

1 Asmara Technical Institute former name was Pavoni Technical Institute establisehd by an Italian NGO. Then the MoE handed over the management in 2002.

2 There is one area of continuity with Eritrean People’s Liberation Front (EPLF)'s earlier practices; national service is required of all young people (men and women alike) who did not previously serve in EPLF. They receive six months of military training and are then deployed in rural areas for a year to help with road building, reforestation, and other projects. Some Muslim Eritreans have tried to argue for the exemption of Muslim women and some families apparently tried to use marriage as an exemption for women, but the government has held fast to the requirement that all young citizens regardless of Contradictions of Liberation and Development in Eritrea 153 gender, religion, or marital status must do their national service. The requirement of not only national service but military training for women is a significant legacy of EPLF’s revolutionary culture. It also can be interpreted as emphasizing the supreme authority of the government over its female citizens over and above patriarchal domestic and religious authorities.

Appendix Table -1 Male and female students in secondary schools from 1991 to 2003

<table>
<thead>
<tr>
<th>Academic Years</th>
<th>Total Student Population</th>
<th>Percentage of Female Students</th>
<th>Percentage of Male Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991/92</td>
<td>27,627</td>
<td>48</td>
<td>52</td>
</tr>
<tr>
<td>1995/96</td>
<td>39,188</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>1999/2000</td>
<td>59,626</td>
<td>37</td>
<td>63</td>
</tr>
<tr>
<td>2002/2003</td>
<td>68,857</td>
<td>33.4</td>
<td>66.6</td>
</tr>
</tbody>
</table>

Source: Ministry of Education Various Reports.
Appendix Table-2: Graduates of Intermediate Level by Gender and Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>115</td>
<td>18</td>
<td>133</td>
</tr>
<tr>
<td>1992</td>
<td>120</td>
<td>23</td>
<td>143</td>
</tr>
<tr>
<td>1993</td>
<td>86</td>
<td>7</td>
<td>93</td>
</tr>
<tr>
<td>1994</td>
<td>205</td>
<td>31</td>
<td>236</td>
</tr>
<tr>
<td>1995</td>
<td>182</td>
<td>19</td>
<td>201</td>
</tr>
<tr>
<td>1996</td>
<td>130</td>
<td>12</td>
<td>142</td>
</tr>
<tr>
<td>1997</td>
<td>177</td>
<td>21</td>
<td>198</td>
</tr>
<tr>
<td>1998</td>
<td>164</td>
<td>25</td>
<td>189</td>
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<td>1999</td>
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<td>148</td>
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<tr>
<td>2000</td>
<td>252</td>
<td>44</td>
<td>296</td>
</tr>
<tr>
<td>2001</td>
<td>263</td>
<td>57</td>
<td>320</td>
</tr>
<tr>
<td>2002</td>
<td>443</td>
<td>90</td>
<td>533</td>
</tr>
<tr>
<td>2003</td>
<td>492</td>
<td>179</td>
<td>671</td>
</tr>
<tr>
<td>2004</td>
<td>434</td>
<td>90</td>
<td>524</td>
</tr>
<tr>
<td>2005</td>
<td>409</td>
<td>121</td>
<td>530</td>
</tr>
<tr>
<td>Total</td>
<td>3,598</td>
<td>749</td>
<td>4,347</td>
</tr>
</tbody>
</table>

Source: Dept. of Technical and Vocational Education Training, MoE - various documents.

Appendix Table-3: Graduates of Advanced Level by Gender and Year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991/92</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1992/93</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1993/94</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1994/95</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>1995/96</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1996/97</td>
<td>39</td>
<td>16</td>
<td>55</td>
</tr>
<tr>
<td>1997/98</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1998/99</td>
<td>98</td>
<td>46</td>
<td>144</td>
</tr>
<tr>
<td>1999/00</td>
<td>139</td>
<td>58</td>
<td>197</td>
</tr>
<tr>
<td>2000/01</td>
<td>55</td>
<td>20</td>
<td>75</td>
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<tr>
<td>2001/02</td>
<td>87</td>
<td>20</td>
<td>107</td>
</tr>
<tr>
<td>2002/03</td>
<td>165</td>
<td>67</td>
<td>232</td>
</tr>
<tr>
<td>2003/04</td>
<td>160</td>
<td>32</td>
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</tr>
<tr>
<td>2004/05</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>743</td>
<td>259</td>
<td>1002</td>
</tr>
</tbody>
</table>

Source: Dept. of Technical and Vocational Education Training, MoE - various documents.

**Note:** There are two colleges at Advanced level - they are: Asmara Technical Institute and Asmara Commercial College, both these colleges did not produce any graduates during the academic year 2004/05 due to the government policy and reopened in September 2006.
Appendix Table - 4 University of Asmara Graduates by Gender and Type of Course from 1996 to 2003.

<table>
<thead>
<tr>
<th>Year</th>
<th>Certificate and Diploma</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>1996</td>
<td>17</td>
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<td>1997</td>
<td>26</td>
<td>90</td>
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<td>1998</td>
<td>14</td>
<td>111</td>
</tr>
<tr>
<td>1999</td>
<td>32</td>
<td>207</td>
</tr>
<tr>
<td>2000</td>
<td>47</td>
<td>234</td>
</tr>
<tr>
<td>2001</td>
<td>50</td>
<td>276</td>
</tr>
<tr>
<td>2002</td>
<td>78</td>
<td>428</td>
</tr>
<tr>
<td>2003</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: University of Asmara, Registrar Office – Documents.

References

School Facilities, Teacher Qualifications, School Location And Students’ Academic Achievement

Victor F. Peretomode & Juliana E. Idiaghe

Abstract
The study examines the relationship between educational facilities, teacher’s qualification, school location and the academic achievement of students in Senior Secondary Certificate Examination (SSCE) for three years in Biology, Chemistry, Physics, Agricultural Science and Home Economics. The sample of the study consists of 685 Heads of Departments (HODs) of the Science and Vocational Studies selected from 350 public and 245 government approved private secondary schools. A standardized instrument and checklist of approved standard laboratory and workshop equipment for secondary schools in Nigeria was used for data collection from the HODs. The results of students for three years at the SSCE of the selected schools were also examined in relation to predictor variables. The Pearson product Moment Correlation and the multiple regression statistics were used to analyze the data. The results show that while Biological, Physics and Agricultural Science laboratory facilities were very lowly related to student’s academic performance, teacher’s qualifications, school location, library holdings, and chemistry and home economic facilities were negatively related to student’s academic achievement in the sciences and vocational subjects. The total explanatory power of the set of the eight predictor variables combined on students academic achievement is only thirteen (13%) percent. It was therefore concluded that many more factors account for students’ academic achievement and since the school child spends only approximately 12.3% of his time in school and over 87% at home and in the wider society, parents and guardians have a role to play in enhancing student’s academic achievement in final examinations.
Introduction

The academic achievement of students is a major goal of formal educational systems. Resources such as finance, educational facilities, teachers and other school personnel are considered crucial in facilitating the teaching and learning processes in schools. Funding of education is vital in order to provide the needed educational facilities and the judicious utilization of these available facilities will lead to better standards and results.

The high standard of education and high academic achievement of students no doubt require a combination of variables such as school facilities, teacher quality, students readiness to learn, the school climate and culture, size of classes, and many other factors. These variables must be in the right quantity, quality and mix to have the desired effect.

In Nigeria, the standard of education is generally believed to be on the decline at all levels of the educational system and also in the various subject areas. Lack of adequate educational facilities is one of the basic factors responsible for this state of affairs. For instance, Ezike (1996) in his study found a steady decline in students' achievement in the sciences. He identified factors such as large classes and overcrowded classrooms, inadequate laboratories and laboratory facilities as the major problems. Similarly, the Shobo review Panel (2000) set up to analyze the educational facilities situation in Lagos State Secondary Schools revealed that of the 355 secondary schools and teacher training colleges in existence then, only one hundred has passable science laboratories.

The above finding when put in context of students' poor academic achievement is not surprising. Several studies (Earthman, 2002, Earthman and Lemaster, 1996; Fernandez and Timpane, 1995; Rivera–Batiz and Marti, 1995; Madukwe, 1999) for instance, have shown that school facility conditions do affect student academic achievement. Poor school building design features, poor lighting, poor acoustics, aging structures with enunciating painting; poor school facilities, overcrowding classrooms and poor laboratories have negative impact both on teachers performance and students academic achievement. It is not surprising, therefore, when emphasize is being put on the importance of adequate allocation of educational resources to schools.

One other factor that is believed to also impact on student academic performance is the quality of teachers engaged in the system and often expressed in teacher qualifications and professionalization. Heintschel (1998) pointed out that the training which a teacher receives has been proven to be important to student academic success. Similarly, the findings of the study of Osu (1998) showed that students in schools staffed with qualified business teachers performed significantly better than students in schools with less qualified business teachers. How his study controlled for other intervening variables such as availability of facilities, library books, socio-economic status of students’ parents, the schools climate and students' readiness to learn is not known. Madukwe (1999) found no significance relationship between the qualifications of teachers and academic performance of students.

Although higher teacher qualifications do not make better students (Hanushek, 1990), Klicka (2003) has clearly shown that a minimum level of teacher's education is required to promote students' achievement and this underpins the importance of appointing teachers with at least certain minimum level of education to teach in secondary schools.

The location of schools attended by students also affects their academic achievement. Winter (1993) observed that urban schools receive more educational resources than rural
schools. Kolade (1987) in his study found that students in urban schools performed better than students in rural schools in West African School Certificate Examinations because of the provision of more qualified teachers and adequate facilities in the urban schools.

Statement of the Problem

Like any other establishment, an educational set up, whether public or private, rural or urban, small or large, strives to achieve good performance. In any educational system, therefore, attention must be paid to the basic facilities, the quality of the teaching staff and the location of the schools as these are essential ingredients in ensuring enhanced students academic performance. Individually, each of these variables cannot adequately explain students academic performance. But what proportion of students’ academic achievement in the sciences and vocational subjects in the Senior Secondary Certificate Examination (SSCE) can be explained by a combination of predictor variables of laboratory facilities, library facilities and books, teacher qualifications and school location?

The problem to be investigated therefore is the relationship between school facilities, teacher qualification, school location and students academic achievement in the Sciences and Vocational subjects defined as Physics, Chemistry, Biology, Agricultural Science and Home Economics at the Senior Secondary Certificate Examinations (SSCE) for three years in Nigeria.

Purpose of the Study

The purpose of the study was to determine the relationship between eight predictor variables (namely physics, chemistry, biology, agricultural science, and home economics facilities, library stocks, school location and teachers qualification) and students’ academic achievement in the Sciences and Vocational subjects at the Senior Secondary Certificate Examination (SSCE), individually and in combination.

Research Questions

The study was guided by two research questions:

1. What is the relationship between the availability of Physics, Chemistry, Biology, Agric. Science, Home Economics laboratory facilities, teacher's qualification, school location, library stocks and academic performance of students in the Sciences and Vocational subjects in SSCE when the predictor (independent) variables are considered individually and separately?

2. What is the relationship between the eight predictor variables and students academic achievement when the predictor variables are considered simultaneously?

Research Hypothesis

One research hypothesis was formulated and tested in the study and that was, there is no significant relationship between the eight predictor variables and the academic achievement of students in the sciences and vocational subjects at the SSCE when the predictor variables are considered simultaneously.

Methodology

This study is an ex-post facto research in design. The researcher attempted to investigate the possible cause and effect relationship between the predictor variables (laboratory facilities,
library books, teacher qualification and school location) and the criterion variable (students academic achievement) which had already occurred using correlational analytical framework.

**Population of Study**

The population of study consisted of all of the 2975 heads of department (HOD) of science and vocational subjects (Agricultural Science, Biology, Chemistry, Physics and Home Economics) in Delta State public and government approved private secondary schools that presented students for the Senior Secondary Certificate Examination (SSCE) for the 2000/2001, 2001/2002, and 2002/2003 academic sessions. The HODs were from 350 public and 245 private secondary schools in the state.

**Sample and Sampling Techniques**

The sample of this study consisted of 685 heads of departments of the science and vocational studies. This figure consisted of 403 HODs representing 23% of the total 1750 in the 350 public schools and 282 representing also 23% of the total 1225 HODs in the 245 private secondary schools in Delta State of Nigeria. The proportional stratified random sampling technique was used to select the HODs from the three senatorial districts of the state. Also examined were the results for students for three years at the Senior Secondary Certificate Examination.

**Instrumentation**

The instrument used for collecting data was a standardized checklist of the approved standard laboratory and workshop equipment for secondary schools compiled and approved by the Ministry of Education, and the West African Examinations Council (WAEC). This check list is based on educational facilities recommended by the International Standardization of Educational Statistics (ISES). The checklist consisted of three sections; Section A which focused on general institutional data – school location, teachers qualification, enrolment and other demographic data. Section B solicited information on available physical facilities, including laboratory facilities for the Sciences and vocational studies and library holdings.

**Administration of Instrument**

The instrument for the study was personally administered on the respondents by the researchers who waited to retrieve them on completion on each occasion. This ensured a high percentage returns.

**Analysis of Data and Discussion**

The data were analyzed according to the research questions and hypothesis using the multiple regression and correlation analysis.

**Research Question 1**

What is the relationship between each of the eight predictor variables and students’ academic achievement in SSCE?

Table 1 shows the Pearson correlation matrix between each of the eight predictor variables and the criterion variable of students academic achievement.
The correlation matrix shows that of the eight predictor variables, teachers’ academic qualification (TAQ) correlated most with the criterion variable of students achievement in the Senior Secondary School Certificate Examination (SSCE). The simple correlation coefficient between both variables was -0.2516. This is considered to be low. The correlation coefficients between the criterion variable and each of the other predictor (dependent) variables in order of magnitude were as follows: location of school = -.1515; Biology laboratory facilities = .0680; Physics facilities = .0397; Agricultural Science facilities = .0335; Home Economics facilities = -.0280; Library textbooks = -.0119; and Chemistry facilities = -.0112.

**TABLE 1**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Physics</th>
<th>Chemistry</th>
<th>Biology</th>
<th>Home Economics</th>
<th>Agric</th>
<th>Location of School</th>
<th>TAQ</th>
<th>Types of Books</th>
<th>Academic performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics facilities</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry facilities</td>
<td>.05970</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biology facilities</td>
<td>2.678</td>
<td>.4789</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Home Economics facilities</td>
<td>4.633</td>
<td>.7277</td>
<td>.05461</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Science facilities</td>
<td>30.40</td>
<td>.6240</td>
<td>.4768</td>
<td>.6889</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of school</td>
<td>2.244</td>
<td>.0490</td>
<td>.0531</td>
<td>.1821</td>
<td>.0105</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualification of teachers</td>
<td>.0181</td>
<td>.1754</td>
<td>.1719</td>
<td>.1913</td>
<td>.056</td>
<td>.0709</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types of books in the libraries</td>
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<td>.0688</td>
<td>-.0312</td>
<td>.0696</td>
<td>.0084</td>
<td>.5952</td>
<td>.182</td>
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<td>.182</td>
</tr>
<tr>
<td>Academic performance</td>
<td>.0397</td>
<td>-.0112</td>
<td>.0680</td>
<td>-.0280</td>
<td>.0335</td>
<td>-.1515</td>
<td>-.251</td>
<td>-.0119</td>
<td>.0112</td>
</tr>
</tbody>
</table>

P< .05 critical value = .2319

**Hypothesis I:**

There is no significant relationship between the eight predictor variables and students academic achievement when the predictor variables are considered simultaneously.

To test the hypothesis that there is no significant relationship between the eight independent/predictor variables and the dependent/criterion variable of students academic achievement when the predictor variables are combined, the multiple regression analysis was used to analyze the data related to this hypothesis, and research question 2. In Table 2 below is presented the results of the multiple regression analysis when all the eight predictor variables where taken together. The F ratio calculated was 2.35862 and the F-critical ratio at .05 level of significance with df = 8, is 2.01. Since the calculated F ratio (2.359) was greater than the critical F ratio (2.01), we reject the null hypothesis and concluded that there was a significant relationship between all the independent variables combined and the academic performance of students.
The multiple correlation R in Table 2 showed the degree of the relationship between the criterion variable and a combination of the eight predictor variables to be .360. This is a low positive relationship. The Coefficient of determination ($R^2$) showed that approximately only 13% of the proportion of the variance in students academic performance is explained by or accounted for by the set of the eight predictor variables when combined together. Thus, 87% of the variance in students academic achievement in the sciences and vocational subjects in the Senior Secondary Certificate Examination (SSCE) could be due to other factors not considered in the present study.

An inspection of Table 3 which displays the regression analysis of the predictor variables and the criterion variable show that qualification of teachers with a beta coefficient of -.28593 has more important contribution to the students' academic performance than the other seven predictor variables. The second and third predictor variables are location of school and library stocks respectively. These three factors or predictor variables also showed a significant relationship between students' academic achievement in the sciences and vocational subjects at the Senior Secondary Certificate Examinations.

**Discussion of Results**

The findings of the study showed that when the predictor variables were taken individually, Chemistry and Home Economics facilities, location of school, qualifications of teachers and quality of library were negatively related with students' academic performance in the sciences and Vocational subjects at the SSCE. Physics, Biology and Agricultural Science facilities were positively related to students' academic achievement. These relationships generally were very low, the highest being -.2516.
The above findings should not be surprising because most schools surveyed lacked libraries and standard laboratories and where these existed, they were poor structures and lacked facilities. This finding supported the results of the study by Ivowi (1995), Ezike (1996) and Savage (1996). The paucity of laboratory and other educational facilities is even worse off with rural schools because they received less attention from government, Parent Teachers Associations, and non-governmental organizations. Qualified professional teachers often refused posting to rural schools. Consequently, they are poorly staffed with qualified teachers. These findings confirm those of Earthman (2002) and USDOE (2000) that showed that poor school facilities and overcrowded classrooms have negative influence upon student performance and also negatively impacted on teacher effectiveness and performance.

In this study, teacher qualification was negatively related to students’ academic performance. This finding is in consonant with Hanushek’s (1990) findings which showed that higher teacher qualifications do not make better students. Hanushek (1990) had surveyed the results of 113 studies on the impact of teachers’ qualifications on their students’ academic achievement. In eighty-five percent of the studies, he found no positive correlation between educational performance of the students and the teachers’ educational background. Five percent of the studies found a negative impact, and seven percent a positive correlation. Utulu (1993) reported that where there was serious shortage of qualified teachers in Physics, Chemistry, Biology and Mathematics among other subjects, this negatively affected the academic performance of students. In Delta State there are qualified school teachers, yet teacher’s qualifications had negative relationship with students performance. This finding confirmed the conclusion by Madukwe (1999) that high qualification of teachers is not a guarantee that students will perform better in the final examinations.

Similarly, Finn and Kanstoroom (1999) reported in their study that “contrary to conventional wisdom, mathematics and science students who have teachers with emergency credentials do no worse than students whose teachers have standard teaching credentials, all else being equal” (Klicka, 2003). Further more, as far back as 1964, the Coleman Report revealed that nearly all existing research on teacher qualifications or state regulations demonstrated that they have no significant relation to student performance. In fact, teacher qualification requirements have no positive correlation with even teacher performance.

In 1990, Ericksen, following his critical observation of the American education system and teacher certification requirements, stated that some of the worst teachers he had ever seen were highly trained and certified and they are many in the public schools. But that the best teachers he had ever seen, most of them are uncertified. This could be the reason why the title and substance of Klicka’s (2003) article is on “the myth of teacher qualifications”.

The above findings notwithstanding, a minimum level of teacher’s education is no doubt required to promote students’ achievement because a teacher cannot give to a student what he hasn’t got. The very low positive relationship between physics, biology and agricultural science facilities and students’ achievement in this study could be attributed to the availability of these laboratory facilities at the minimum coupled with high teacher qualification in urban schools and students’ family background.

The multiple correlation, (R) of the relationship between academic achievement and the simultaneous consideration of the predictor variables was .3597. The coefficient of determination, R² was .13, suggesting that the total explanatory power of the set of the eight predictor variables combined was only thirteen percent. This finding points to the fact that the predictor variables not only individually, especially when they are poorly provided, but also in...
combination, do not hold a strong promise as predictors of academic achievement at the Senior Secondary Certificate Examination in Delta State of Nigeria.

**Conclusion and Recommendations**

The findings of this study revealed that the eight predictor variables, either individually or in combination, are not good predictors of students’ academic achievement in the sciences and vocational subjects. Therefore, in addition to government, Parent and Teacher Associations, and other stakeholders should make genuine efforts to provide adequate educational facilities in our secondary schools, continue to update teachers skills and knowledge through staff renewal activities, and must also begin to critically emphasize other possible variables that can affect student achievement.

One of such very important factor that needs emphasis now should be the role of the families in the education of the child. The child spends approximately 1080 hours in school in nine months and 7,680 hours outside school in a year. That is, in a year, a school child spends just about 12.3% of his time in school and over 87% at home and in the wider society. How parents or guardians help students to effectively and productively utilize the hours outside the school can go a long way to enhance or mar what has been learnt and what they are supposed to be learning at school.

Other factors that could also affect student academic performance not covered within the scope of this study that should be examined include, the school culture, the school climate, class sizes, school building features including thermal and acoustic quality and teachers working conditions in Nigeria.
References
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