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CONTENTS

1. **Mainstreaming Environment and Sustainability Issues in Institutions of Higher Education: The Case of the University of Botswana**
Kethloilwe, M. J. & Jeremiah, K.
10. **The Use of Artificial Intelligence to Identify People at Risk of Oral Cancer: Empirical Evidence in Malaysian University**
Rosma, M. D., Sameem, A. K., Basir, A., Siti Mazlipah, I. & Norzaidi, M. D.
21. **Pedagogical Practices of Business Studies Teachers in Botswana Junior Secondary Schools: Are Teachers and Curriculum Planners Singing from the Same Hymnbook?**
Sithole, B. M.
29. **The Construction of Girls' Motivational Orientations through their Social Engagement in School Mathematics**
Nkhwalume, A. A.
51. **Determining Mediating Effect of Information Satisfaction on International Students' College Choice: Empirical Evidence in Malaysia's University**
Nurlida, I., Faridah, H, Nooraini, M.S., & Norzaidi, M.D.
64. **The Impact of Instructional Media on the Education of Youths on HIV/AIDS in Nigeria Urban Communities**
Adekola, G.
73. **The Rationality of Rotational Presidency: Multi-ethnicity Hampers Smooth Educational and Political Development**
Eresia-Eke, A. & Eberiyé, S. S.



Mainstreaming Environment and Sustainability Issues in Institutions of Higher Education: The Case of the University of Botswana

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Abstract

Environment and sustainability issues are contemporary in educational innovations in institutions of higher education particularly in their core business regarding teaching, research and community engagement. The introduction and implementation of the United Nations Decade of Education for Sustainable Development (UNDESD) (2005-2014) has added impetus to the contemporariness of environment and sustainability issues in education. This paper is based on the empirical data generated within a selection of University of Botswana departments and units to determine the extent to which sustainability issues and concerns are implemented. The paper provides the outcome of the audit exercise that indicated that some of the University of Botswana departments and units are not incorporating sustainability issues in their practices (be it in teaching, research, community engagement or management practices). The paper recommends a systematic approach to mainstream environment and sustainability issues across the faculties.

Keywords: Environmental Education, Education, Transformative Learning, Mainstreaming, Sustainable Development, Environment and Sustainability

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INTRODUCTION

The introduction and implementation of the United Nations Decade of Education for Sustainable Development (UNESCO 2005) in institutions of higher education is an educational innovation that may promote transformative learning for social change. The declaration of the United Nation Decade of Education for Sustainable Development is a challenge to institutions of higher education to engage in educational innovation that would encourage sustainable development. Innovation in higher education curriculum may be a viable vehicle to promote sustainable world economies and natural resources conservation for future generations. The University of Botswana curriculum, like in other intitutions of higher education worldwide is expected to respond to global environmental discourses. This research paper is based on a change project research carried out at the University of Botswana to determine efforts made by the university to incorporate environment and sustainability issues. The University of Botswana has come up with a number of policies and strategies that provide an opportunity to mainstream environment and sustainability issues. The paper examines how the national and institutional contexts influence transformative learning by intergrating environment and sustainability issues.

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The Change Project

The change project focuses on higher education curriculum innovation to mainstream environment and sustainability issues. This encompasses strengthening the existing programmes, courses and praxis on environmental sustainability. The aim of the project was to collaboratively work with faculties and departments to strengthen what already existed and initiate mainstream of environment and sustainability concerns. The project progressed through systematic consultation and engagements with academic staff to generate data facilitate transformative learning and the mainstreaming of environment and sustainability issues into the university curriculum. The initial implementation plan was a university-wide approach which proved to be too cumbersome complicated by the researchers' teaching and community engagement workloads.

Description of the National Context of the Project

The University of Botswana's curriculum is not only responding to global and regional knowledge generation discourses but is informed by national policies. Environmental and sustainability discourses are integral parts of education and national development plans and policies. Environmental education has been recommended by the 1994 Revised National Policy on Education (Botswana Government, 1994) and the University of Botswana has been called upon to in-service and pre-service teachers on environmental education. It was encouraged to be exemplary to the rest of the community through environmental ethos (Botswana Government, 1993 and 1994). Sustainable development and education for sustainable development discourses have been introduced through curriculum documents such as the different subjects' syllabi and the *Environment Education Guidelines* (Ministry of Education, 2002).

The Botswana Government has also shown interest in environment and sustainability issues by making sustainable development a focus for *National Development Plans* (Botswana Government, 1991/7, 1997/2002 and 2003/09) and 2010/16). Other important policy documents are the *National Environmental Education Strategy and Action Plans 1 and 2* (Botswana Government, 1996 and 2007). University of Botswana's activities related to environment and sustainability are part of the current environmental education strategy and action plan (ibid). The strategy and action plan emphasize both environmental education and education for sustainable development. The above mentioned policies are some of the national policies that gave impetus to this Change Project at the University of Botswana.

Institutional Context

The University of Botswana operates through administrative structures guided by policies. A Change Project such as "*Curriculum Innovation to Mainstream Environment and Sustainability at the University of Botswana*" considered some of these policies to be accepted and implemented successfully. The University of Botswana has a Centre for Academic Development (CAD) which is responsible for promoting academic excellence and innovations in teaching, research and professional development. Two policies guide this division, the Academic Quality Management Policy (2003) and the Affiliations and Validation Policy (2003). Each Department in the faculty has a Departmental Quality Assurance Team which reviews departmental operations and comes up with recommendations of structures for quality assurance in their respective sections. This project considered these structures although individual departments are responsible for consulting the Centre for Academic Development once they decide to engage in major curriculum innovation to mainstream environment and sustainability issues.

The University of Botswana (UB) aims at promoting research to develop and generate knowledge on sustainable development. The 2005 and 2008 audit of the university programmes has indicated that almost all faculty programmes are doing something related to sustainable development. This Change Project to mainstream Environment and Sustainability issues into the University of Botswana curriculum is consistent with the UB mission and vision statement, the UB Research Strategy (2007), particularly strategic areas number three and twelve on *Environmental Studies and Natural Resources Management and Sustainable Development* (ibid) respectively.

The following policies support environment and sustainability efforts of the University of Botswana:

- Learning and Teaching Policy (2008)
- UB Research Strategy (2007)
- Academic Quality Management Policy (2003)

- Occupational Health and Safety Policy (2007)

The Change Project came at a time when UB is reviewing its entire curriculum. This is an opportune time to infuse and integrate sustainability issues and concerns in new and merged departments/units in the areas of curriculum, teaching, research and community service.

Institutional structure and key stakeholders in the change project

To influence change at UB is a mammoth task as there are laid out procedures and structures pertaining to programme and course introduction, review and revision. This has and is still affecting this Change Project. For minor curriculum innovation individual lecturers need not consult either the Department or Faculty Board. For a major innovation such as major course review, introduction of a new course or programme, Academic Quality Assurance Team, Department Board and Faculty Executive are consulted. Ultimately the Faculty Executive makes a recommendation to the University Council. This may take some months before an innovation could be approved. Evidence may be required from a benchmarking exercise and recommendation from potential employers and the Tertiary Education Council. However, this change project did not extend to programme or courses approval from different faculties or departments. Once lecturers have decided on minor or major curriculum innovation they would have to follow institutional procedures and structures to get innovations approved.

The situation prior to starting the project

Prior to the starting of the Change Project the researchers were not aware of the extent to which environment and sustainability issues were integrated in teaching, research and community service at the University. There was no collaboration between the Departments of Environmental Affairs, Wildlife and National Parks, Students, Environmental and Conservation Clubs and our Department particularly with regard to environment and sustainability concerns. On the formal curriculum side there were limited environment and sustainability components/topics across the UB faculties particularly in the Faculty of Education courses. In some instances, there was overlapping of courses on components of environment and sustainability. This situation is not completely eliminated as the courses review is an on-going process.

Conceptual framework

This project is based on *Transformative learning theory* developed by Mezirow ([1978, 1997]). Transformative learning is a form of adult education involving experiences that result in a deep, structural shift in thoughts and feelings, which then inform one's actions. The project is intended to influence change through experience, critical reflection, and rational discourse (Taylor, 1998) to mainstream environment and sustainability issues. It intends to alter ways of making meaning, understanding and relationships with other people, the environment and its natural resources. Transformative learning is approached through a conscious rational process to support social transformation that embodies equity for all people to promote sustainability.

Transformative learning involves *premise reflection* that leads to questioning the relevance of the environment and sustainability issues, the assumptions, beliefs, or values underlying the problem investigated. This process is distinct from problem-solving and can lead to transformative learning (Cranton, 1996). The change project encourages exploration of the concepts of environment and sustainability concerns to influence transformative learning among academic staff and students' community.

METHODOLOGY

This qualitative research project was strengthened by quantitative data (See Table 2) to make an informed analysis of the extent to which environment and sustainability issues are mainstreamed in the university curriculum. Data were generated through the administration of the Unit-Based Sustainability Assessment Tool (USAT), individual interviews and documents analysis. Data generation techniques included consultation with the Dean of Education through Heads of Department (HODs) who provided information and assured the researchers of their support. The research targeted individual Heads of Departments and Lecturers to administer the USAT (a questionnaire) (See Table 1). Some HODs and Lecturers completed the instrument on their own while others were assisted by the researchers as they claimed the

instrument was complex to comprehend. The complexity of the instrument was attributed to the environment and sustainability terminologies and concepts used that the respondents were unfamiliar with. The respondents who were interviewed did not have any language problems since they had the opportunity to ask for clarification in case of unfamiliar concepts.

Table 1 Respondents by gender, position and qualifications

Gender	Status/Position				Highest Qualifications	
	Lecturer	Senior lecturer	Asso. Professor	Professor	M	D
Male: 21	6	11	2	2	3	18
Female: 5	1	1	0	3		5

Key: L: Lecturer, SL: Senior Lecturer, AP: Associate Professor, P: Professor, M: Masters Degree, D: Doctorate

USAT was sent through internal mail and hand-delivered to about twenty departments, units, students' body associations/societies and clubs and the UB administration Units. The response was very low from across respondents' categories (See Table 1). The departments that responded were namely: The Departments of Languages and Social Sciences Education, Marketing, Mathematics and Science Education, Architecture and Planning, and Environmental Health. Through consultation with the Dean of Education and Heads of Departments it was agreed to limit the change project to five departments that had responded in the first phase hoping that the outcome of this project would help them make informed curriculum innovation decisions in future to mainstream environment and sustainability issues.

The administration of the Unit based assessment tool was followed by interviews with Heads of Departments and individual Lecturers. The interviews narrowed data generation to academic departments as it was now clear that a university wide approach has some challenges and needs to be done in small steps until a satisfactory coverage is achieved.

To strengthen the USAT results, individual and unit meetings were held with staff from the seven faculties in August and September 2008. Following these meetings on Mainstreaming Sustainability in courses some Lecturers mostly in education departments showed interest. These were from the Departments of Primary Education and Educational Foundations.

Further validation of data was through documents analysis. The researchers did an audit for environment and sustainability issues by examining courses offered by departments that participated in the project (See Table 2). The documents analysed were mainly departmental academic calendars containing course descriptions and synopses. The focus was on specific courses and topics within courses on or related to environmental and sustainability issues. Documents analysis led to some modification of data generated through USAT and interviews as evidence of environment and sustainability related issues were found in the courses' contents. The plan is to continue including other departments until most of the university programmes are involved. That means restricting the project to teaching, research and community service.

The Findings

The results of the USAT used in this paper are based on the five University of Botswana departments of Education, Business, Health Sciences, Engineering and Technology who completed and returned the questionnaire and those who honoured the interview. The results are presented in Table 3. Some of the results are a modification of the initial ratings by the Heads of Departments after documents analysis and follow-up interviews had been carried out (or conducted).

Table 2: UB Departmental Sustainability Performance

Code	Marketing	Architect and plan	Enviro health	DMSE	DLSSE	Total	% Rating	Average
C1	1	4	4	X	1	10	50	2
C2	1	3	4	X	2	10	50	2
C3	1	4	4	X	3	12	42	2.4
C4	1	4	4	X	3	12	42	2.4
C5	x	4	4	X	X	8	50	1.6
T6	4	3	4	3	3	17	29	3.4
T7	3	3	4	3	X	13	39	2.6

T8	3	3	4	3	2	15	33	3
T9	3	2	0	4	2	11	46	2.2
T10	2	2	4	3	2	13	39	2.6
R11	2	2	4	0	2	10	50	2
R12	1	2	4	0	1	8	62.5	1.6
R13	3	2	4	X	3	12	42	2.4
R14	3	1	3	0	3	10	50	2
R15	X	2	4	0	X	6	83	1.2
E16	1	2	4	0	2	9	56	1.8
E17	1	2	3	0	2	8	62.5	1.6
S18	X	2	4	X	X	6	83	1.2
S19	3	2	4	X	3	12	42	2.4
S20	1	2	4	X	1	8	62.5	1.6
Total	34	51	74	16	35			2
% Rating	42.5	81.25	92.5	20	43.75			
Average	2	2.55	3.7	1.45	2.19			

Key for codes: C1-5 = Curriculum, T6-10 =Teaching, R1-15 = Research, E16-17= Examinations, S18-20 = Service

In terms of percentage ratings, it shows that the Department of Environmental Health is leading (92%) in integrating environmental and sustainability issues into the curriculum. This is supported by high scores in the five (5) areas, that is, in curriculum, teaching approaches, research, service and scholarship, examination of sustainability topics and staff expertise. The Department of Architecture and Planning follows with a percentage rating of 81.25%. For this department, the highest scores were observed in curriculum content followed by teaching approach. The scores decline in research, service and scholarship activities, examinations of sustainability topics, staff expertise and willingness to participate in sustainability activities. It was noted that staff participation was through membership in Non Governmental Organisations and research.

The third department in percentage rating is the Department of Languages and Social Sciences Education, with an average rating of 2.19 points (43.75%). The results indicate almost a balance of scores throughout the areas of curriculum, teaching approaches, research, service and scholarship activities, examinations, and staff expertise. The fourth department is Marketing in the Faculty of Business with 42.5% from an average score rating of 2 points. Its performance is weak in the curriculum area, but has some fluctuating scores in other areas ranging between 0 and 4 points. It performs better in teaching approaches and research. This is an area where teachers could be innovative and infuse or integrate sustainability issues.

The last department in percentage rating is that of Mathematics and Science Education (DMSE) with an overall rating of 20%. This is a department that would be challenging to deal with as members of the department are said to be unwilling to integrate sustainability issues claiming that they are ‘not’ relevant to their subjects. However, document analysis indicates that two of the units (or courses) in the department, namely, Science and Biology education courses offer opportunities for the integration of sustainability issues. That would affect curriculum, teaching and research/service scores and rating. The Unit Based Sustainability Assessment results indicate that DMSE is very weak in curriculum, in research/service and scholarship in terms of integrating environment and sustainability issues, but about average in teaching approaches.

Documents analysed revealed more evidence of possibilities of mainstreaming environment and sustainability issues in different courses (See Table 3 below).

Table 3: UB Environment and Sustainability Integration in Courses

FACULTY	DEPARTMENT	TOTAL NO. OF COURSES	COURSES WITH ESD
BUSINESS	Accountancy & Finance	26 (Undergraduate)	7
	Management	16 (Undergraduate)	5
EDUCATION	Adult Education	51 (Undergraduate)	11
		18 (Graduate)	3
	Educational Technology	5 (Undergraduate)	1
	Educational Foundations	5 (Undergraduate: Special Education)	1
		9 (PGDE)	3
HEALTH SCIENCES	Home Economics	59 (Undergraduate)	6
	Nursing	49 (Undergraduate)	4

		53 (Graduate)	4
FET	Architecture & Planning	34 (Undergraduate)	10
	Civil Engineering	67 (Undergraduate)	7
	Electrical Engineering	54 (Undergraduate)	8

It emerged from curriculum audit that there was a need to review and revise the university courses to avoid repetition of some topics on environment and sustainability concerns within environmental education courses. Pedagogical and epistemological overlaps were identified in environmental education courses in the departments of Languages and Social Sciences Education and Primary education. More overlaps emerged in Social Studies Education which is offered by both these named departments. This revelation led to the revision and merging of some courses to eliminate overlaps. It also led to strengthening some courses by integrating environment and sustainability issues.

The project also influenced the development of a proposal to introduce a post graduate programme to mainstream environment and sustainability issues in the Department of Languages and Social Sciences Education. It emerged that this development would enable the department to show-case the mainstreaming of environment and sustainability issues. Although the key stakeholders in the change project were Lecturers and HODs, recently students have reacted by inviting the researchers to a seminar to explain environmental conservation and sustainability issues and their role in conservation of natural resources. In this seminar officers from the Departments of Environmental Affairs and Wildlife and National Parks and school clubs representatives were invited. This has created an opportunity for collaboration with students' organisations to sustain their enthusiasm to engage in environment and sustainability related activities.

DISCUSSION: *THE MAIN OUTCOMES*

ESD considerations in the project

The project provides an opportunity to strengthen institutional and operational capacity for a consistent and systematic mainstreaming of environment and sustainability concerns programmes, teaching, research and community service activities. It is in line with and complements the University of Botswana's research strategy, particularly in areas such as culture, environmental studies and natural resources management, gender, HIV/AIDS, indigenous knowledge systems, policy studies, poverty alleviation and sustainable development. These areas, which are aspects of the university curricula discourses, are also connected to the three sustainable development pillars, namely: environment, society and economy. They link very well with departments' programmes and course titles (e.g. Department of Environmental Science, Social Sciences Faculty and Economics Department).

Through its academic policies the University of Botswana is committed and has responded to the challenges of academic excellence in the country and beyond in the quest for knowledge. This quest for knowledge seeks to address various national concerns by developing the capacity to carry out research through the development of both graduate and postgraduate programmes. The University of Botswana's teaching, research and community services activities address sustainability concerns. This project and many other documents would further guide the university on the focus it should take to meet the challenges of our times. These challenges are academic excellence and innovations in teaching, research and professional development. The challenges are both socio-ecological and economic development oriented affecting socio-political change. Public education on environment and sustainability issues remains a challenge to the university. Through professional service to the community, research and publications and use of different media, sustainability of the environment and its natural resources could be enhanced. There are still issues of poverty, vulnerability and risks within Botswana society that could be addressed through a change project by the university. Equally important is a need to address, through a change project, gender related issues, resources distribution imbalances and land related issues.

Educational considerations that informed the project

The University of Botswana aims at promoting research to develop and generate knowledge on sustainable development. This project will go a long way in strengthening teaching, research and service to the community which are core activities of the UB. The project would strengthen many of our teaching and learning activities to focus on environment and education for sustainable development in a bid to provide quality and relevant education to our university graduates. On collaborative basis the project would promote departmental and institutional

networking/partnerships and encourage local collaboration and/or partnerships to enable the university academic staff members to be more proactive in addressing ESD principles.

The Department of Languages and Social Sciences Education, through its Environmental Education Unit has been very active in its internal and outreach activities particularly in pre-service and in-service teacher training activities. This Change Project may bring on board other units and staff to strengthen what has been going on in terms of teaching, research and community service. This may happen through reflection on teaching, research and community service in the context of environment and sustainable development. All the university academic programmes have small or major scale research projects. It is hoped that through these projects more research related to environment and sustainability would emerge. Continuation of this change may lead to transformative learning and ensure quality and relevance of University of Botswana curricula.

There are both institutional and external challenges regarding integration of environment and sustainability issues. The project provides an opportunity for strengthening the integration of sustainability issues across faculties and management practices. The project already has academic management support in the Faculty of Education and hence this positive development has prospects for the implementation of environment and sustainability concerns.

The outcome of this research include a proposal to introduce a Master of Education (EE) programme that would assist in showcasing how to mainstream environment and sustainability issues in the curriculum (Ketlhoilwe and Maila, 2008). The researchers felt this would be one component of the project that could be easily implemented unlike a university wide campaign to mainstream environment and sustainability concerns which is muddled by resistance. This proposed programme would be collaboratively taught by lecturers from different disciplines and departments to showcase infusion/integration of sustainability issues in teaching, research and community service. These would not be an imposed collaboration but an informed approach based on the Unit Based Sustainability Assessment results (See Tables 2 and 3).

The project has stimulated interest in education for sustainable development among some staff members and students. This could be sustained through collaborative research to continue working with those interested in environment and sustainability research projects. Individual contacts and discussions have proved that there is lack of understanding of environment and sustainability issues among lecturers and hence an uninformed resistance. It emerged from the data generated through interviews, USAT and documents analysis that some HODs were not aware of what was going on in some units as far as sustainability performance is concerned. As a result, they either rated their departments high or low in mainstreaming environment and sustainability concerns. This may have been influenced by subject specialization by HODs. Finally, it is emerging from the project that transformative learning is a long process. Given the university curriculum innovation procedures and staff specialisations the researchers recommend a sustained systematic approach to influence transformative learning to promote the mainstreaming of environment and sustainability issues into the curriculum and community engagement. This would contribute to the implementation of the United Nations Decade of Education for Sustainable Development goals.

CONCLUSION

The on-going project reported in this paper aims at attempting to influence change by mainstreaming environment and sustainability concerns across the University of Botswana's (UB) faculties, programmes and courses. It is informed by both national and institutional policy contexts. It emerged from the project outcome that there is a potential for collaborative teaching, research and service at UB to enhance sustainability performance. Although a number of UB academic departments are not participating, the 2005 environmental and sustainability audit revealed that almost all departments were doing something related to sustainable development. An audit during the project implementation (See Table 3) has revealed that all faculties were engaged in environment and sustainability related activities. The departments involved in this project showed commitment to sustainability performance. It came out clearly that a change is not always easily welcomed even in an academic institution such as the University of Botswana. Management sticks to policies that are sometimes rigid and constraining. Academic staff members are closed in little boxes called 'areas of expertise and disciplines'. They seem to be informed more by their training and research interests. Although they do research on regular basis they are not open to being researched. They are not prepared to be trained in a 'strange area' such as environment and sustainability issues. Some claim they are already doing it so there is no need to be engaged. It proved that an interview is more appreciated than responding to a questionnaire. It also emerged that people accept change slowly. So it is likely that this change project would take more months to be appreciated by many and hence we recommend a systematic and sustained approach until a satisfactory level of

transformation is accomplished. Finally, we also learnt that some projects such as this curriculum innovation project may not need any funding as it is internal and could be done online where and when possible.

Implications for research and practice

The University of Botswana should take deliberate steps to strengthen the integration of environmental and sustainability issues in curricula for departments which have already integrated them. The respective departments should be commended for having taken the right direction in integrating those issues. Furthermore, the said departments should be encouraged to put the environment and sustainability issues integrated in their curricula into practice through research projects in the wide community in the countryside in areas deemed appropriate. Those departments that are lagging behind in integrating environmental and sustainability issues in their curricula should be encouraged to take some steps towards integration and eventually put into practice such issues in the form of practical research projects.

As the departments at the University of Botswana achieve full integration of environmental and sustainability issues in their curricula with subsequent practice of these issues, they should then engage in research to generate more knowledge and insights which will in turn improve on environmental and sustainability practice. Research on these issues could be collaborative, if not, interdisciplinary because of the possible collaborative nature of the academic departments of the University of Botswana. A monitoring and evaluation mechanism of the University of Botswana's Research Strategy could be put in place to support the departments' efforts to integrate environmental and sustainability issues in their curricula.

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The Use of Artificial Intelligence to Identify People at Risk of Oral Cancer: Empirical Evidence in Malaysian University

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Abstract

The purpose of this study was to evaluate the ability of a fuzzy neural network model and fuzzy regression model to predict the likelihood of an individual in developing oral cancer based on knowledge of their risk habits and demographic profiles at Oral Cancer Research and Coordinating Centre, University of Malaya, Malaysia. Performances of the two artificial intelligent prediction models were compared with the prediction made by a group of oral cancer clinicians. The prediction performance was measured in terms of sensitivity and specificity. The mean accuracy, sensitivity and specificity of the models were 59.9, 45.5 and 85.3 for fuzzy neural network models; 63.1, 54.2 and 78.6 for oral cancer clinicians predictions and 67.5, 69.0 and 64.7 for fuzzy regression prediction models. Areas under the receiver operating characteristic curves reflect the prediction accuracy of the models. There were no significant differences in the prediction performance among the three models for single-input and two-input predictor sets. However, fuzzy regression and fuzzy neural network performed better than oral cancer clinicians when the size of input predictor set was increased to three and four. In short, this study is perhaps one of the first that address the use of artificial intelligence to identify oral cancer in Malaysia.

Keywords: Artificial Intelligent, Fuzzy Neural Network, Fuzzy Regression, Oral Cancer, Malaysian University.

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INTRODUCTION

Oral cancer often seen as a persistent ulcer is easily detected by health personnel through oral examination. However, in most cases oral cancer is detected at a late stage thus causing gross defect and reducing function. It was reported that the survival rate for oral cancer patient in Malaysia remained at 50 percent for the last 15-20 years (Zain, 2004). There is well documented risk habits associated with oral cancer worldwide which may or may not be applicable to this part of the world. Currently, an intervention program in this country is limited to the high risk group such as those associated with the usage of tobacco and betel quid chewing only. However, other factors including physical environment, genetic molecular make-up and lifestyle (occupation, dietary intake) are shown by more recent studies to be associated with oral cancer among Malaysians (Zain et al., 2006).

Even though oral cancer shows relatively low incidence compared to other types of cancers, it was found to have high mortality and morbidity due to late detection and treatment (Speight & Hammond, 1998). World wide, oral cancer is reported to have the lowest survival rate (Kujan, 2005). This has led to an increased concern over the role of cancer screening program (Kujan, 2005; Speight & Hammond, 1998).

Screening is defined to be a process by which a test is administered to detect a disease at an early stage (Miller, 1988). Case detection alone is not sufficient in a screening test but it must also be of adequate sensitivity and specificity. Ethically, a screening test must be both effective and hazard free (Miller, 1988). The whole purpose of screening is to sort out people who probably have a disease from those who probably do not (Speight & Hammond, 1998). In the case of oral cancer the aim of screening is to detect early lesion which can be cured, or precancerous lesion which can be treated before they progress.

Different strategies for oral cancer screening have been reported including mass (population) screening, opportunistic screening and targeted screening of selected high risk groups (Nagao, 2000). A Working group on Screening for Oral Cancer and Pre-cancer established in the UK in 1991 and other groups who were working on the same idea of advising on the feasibility of screening for oral cancer did not recommend population screening but instead suggested on the benefits of opportunistic screening of high risk groups (Speight & Hammond, 1998).

The first study on the potential efficacy of machine learning in oral cancer screening done by Speight and Hammond suggested the promising strategy for a cost effective screening program. A machine learning technique particularly neural network was used in that particular study. Successful applications on the use of machine learning to aid in screening for other type of cancers have also been reported for cervical cancer and also in diagnosing and predicting breast cancer and prostate cancer (Speight & Hammond, 1998).

A machine learning prediction technique is an algorithm that estimates an unknown dependency between a set of given input variables and its response variable. When such dependency is discovered, it can be used to predict or deduce the future output associated with a different set of input values. This is done by identifying the target function that best describes the behavior governing the input-output pattern. Learning in this context refers to the process of minimizing the difference between observed data and model output (Shretha, 2006).

The current study contemplates on the use of artificial intelligent since there have been no attempts to relate all possible factors of predicting risk cancer in one single setting. To fill the gaps, this study is aimed at evaluating the ability of two artificial intelligent prediction models namely fuzzy regression and fuzzy neural network models to predict the likelihood of an individual developing oral cancer on knowledge of their risk habits and demographic profiles.

Fuzzy Neural Network Prediction Model

Fuzzy Neural Network modeling has been intensively studied since the early nineties. The learning capability of neural networks is combined with the expressiveness of fuzzy if-then rules using linguistic variables to produce a hybrid model called Fuzzy Neural Network. A neuro-fuzzy classifying system, in general, has n inputs (attributes or features) $x_1, x_2, x_3, \dots, x_n$ and an output which has the form of a possibility distribution over the set $Y = \{y_1, y_2, \dots, y_H\}$ of class labels. In medical and dental field, each input x_i represents one input medical or dental attribute which could be either a 'symptom' for diagnostic purposes or a 'risk factor' for prognostic purposes (Gorzlaczany, 1999).

In this study, a fuzzy inference system called the Adaptive Neuro Fuzzy Inference System (ANFIS) introduced by Jang (1992) was used to model the relationship between the inputs and the response variable. ANFIS, posses the main components of the fuzzy inference system namely the input fuzzification, implication and output defuzzification processes (Jang, 1992). The ANFIS system is depicted in Figure 1.

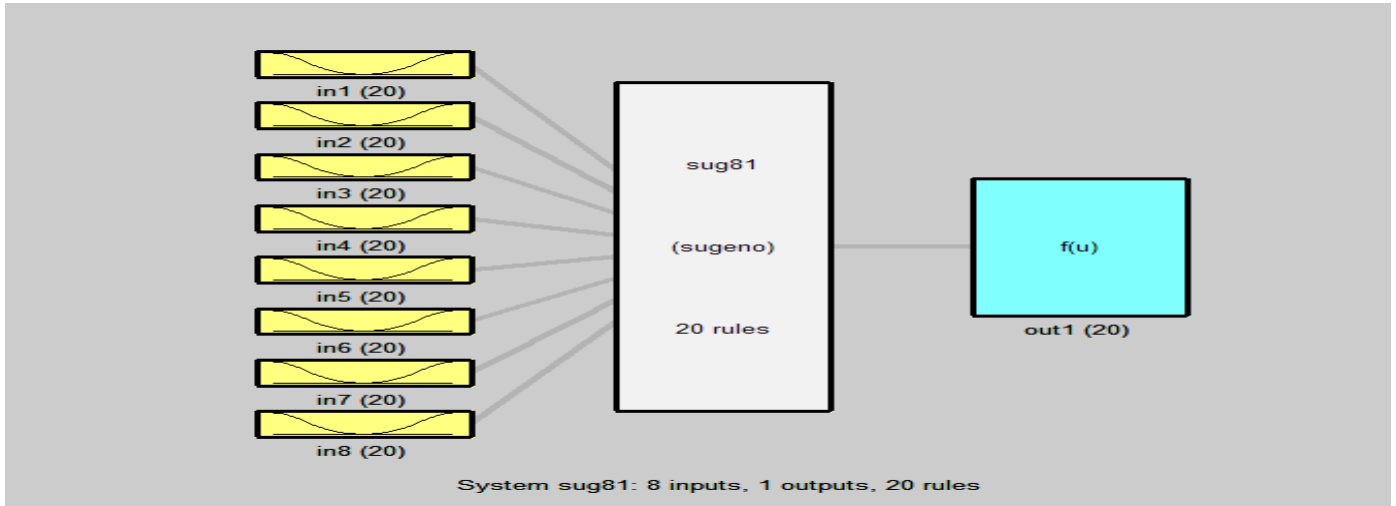


Fig.1: ANFIS inference system with 8 inputs and one output

Fuzzy Regression Prediction Model

A Fuzzy regression model is a non-parametric model that can be used to explain the variation of a dependent variable Y in terms of the variation of the independent variables X as $Y=f(X)$ where $f(X)$ is a linear function (Tanaka & Uejima, 1982). Fuzzy regression provides a means for handling regression problem lacking a significant amount of data and with vague relationships between the explanatory and the response variables (Shapiro, 2005, Wang, 2000). It was first introduced by Tanaka in 1982. A fuzzy linear regression model expresses the regression coefficients as fuzzy numbers in an interval form (Tseng, 2005). The estimated dependent variable Y is also a fuzzy number since the regression coefficients are fuzzy numbers (Savic, 1991).

There are two approaches to fuzzy regression. The first approach also known as the possibilistic regression is based on minimizing fuzziness as an optimal criterion. The second approach uses least squares of errors as a fitting criterion (Shapiro, 2005, Savic, 1991). In fuzzy regression, deviations between observed values and estimated values are assumed to be due to system fuzziness or fuzziness of regression coefficients (Tanaka & Uejima, 1982). In this study the fuzzy regression model used is based on Tanaka's possibilistic regression in which

$$Y=A_0x_0 + A_1x_1 + A_2x_2 + \dots + A_jx_j + \dots + A_kx_k$$

where Y is the fuzzy output, $x = [x_1, x_2, \dots, x_k]^T$ is the real-valued input vector of independent variables and each regression coefficient $A_j, j=0, \dots, k$, was assumed to be a symmetric triangular fuzzy number with center α_j and half-width $c_j, c_j \geq 0$.

The fuzzy linear regression model can now be rewritten as:

$$y = (\alpha_0, c_0) + (\alpha_1, c_1)x_1 + (\alpha_2, c_2)x_2 + \dots + (\alpha_k, c_k)x_k.$$

The following linear programming formulation was employed to estimate $A_j = (\alpha_j, c_j)$:

$$\text{Minimize } J = \sum_{j=0}^k (c_j \sum_{i=1}^n x_{ij})$$

$$\text{Subject to } \sum_{j=0}^k \alpha_j x_{ij} + (1-h) \sum_{j=0}^k c_j x_{ij} \geq y_i$$

and

$$\sum_{j=0}^k \alpha_j x_{ij} - (1-h) \sum_{j=0}^k c_{jx} x_{ij} \leq y_i$$

$a_j \in \mathbb{R}$, $c_j \geq 0$ $j=0,1,2,\dots,k$

$x_{i0} = 1$, $i=1, 2 \dots n$ $0 < h < 1$

Where J is the total fuzziness of the fuzzy regression model. The h value is the threshold level that determines the degree of fitness of the fuzzy linear model to its data (Wang 2000).

MATERIALS AND METHODS

The two artificial intelligent prediction models used in this study were described above. An unmatched case-control study was conducted using 84 newly diagnosed oral cancer patients and 87 non-cancer subjects selected from the same locations as cases. Sociodemographic data was obtained from the Malaysian Oral Cancer Database and Tumour Bank System (MOC DTBS) provided by the Oral Cancer Research and Coordinating Center (OCRCC), University of Malaya, Malaysia. Cancer patients and control group demographic profiles (age, gender) and oral cancer risk habits (cigarette smoking, alcohol drinking, tobacco chewing) were used as input variables and the outcome refers to health condition of ‘cancer’ or ‘healthy’. Through the MOC DTBS, peripheral blood was obtained from consented individuals, genomic DNA extracted and the GSTM1 and GSTT1 genotypes were determined using Polymerase Chain Reaction (PCR) and restriction enzyme digestion at the CARIF laboratory.

Demographic and disease variables of patients that were reported to be associated risk factors to oral cancer were used as the predictor variables in developing the fuzzy regression and fuzzy neural network prediction models. The full dataset were split randomly into a modeling dataset (65 percent of the total) and testing dataset (the remaining 35 percent). The dichotomous output refers to the health state of either “cancer” (1) or “healthy” (0). In this study a validation exercise was carried out involving twenty seven (27) oral cancer clinicians from the Faculty of Dentistry at the University of Malaya. The group of clinicians ranges from junior clinicians to professors. The validation exercise was pen and paper based where the oral cancer clinicians were asked to make predictions whether an individual will develop oral cancer based on several risk habit factors such as betel quid and tobacco chewing, cigarette smoking, alcohol drinking as well as patients’ demographic profiles including age group and gender.

The objectives of this validation exercise were:

- To measure the prediction accuracy of human expert prediction
- To measure the prediction consistency of human predictions.

The two artificial intelligent prediction models were similarly tested by presenting them with the same 12 different input variable sets as used by the oral cancer clinicians in the validation exercise. The 12 input variable sets were made up of either single-input, two-input, three-input or four-input predictor sets based on the variables shown in Table 1.

Table 1: Input Variable Descriptions

Variable	Description
Smoke (S)	No=0 Yes=1
Drink (D)	No=0 Yes=1
Chew (C)	No=0 Yes=1
Age group (A)	> 40 years : 0 < 40 years : 1
Gender (G)	Female=0 Male=1

RESULTS AND DISCUSSION

A Chi-squared concordance test was carried out to measure the consistency among oral cancer clinicians' predictions. The consistency or the concordance evaluation of the clinicians' prediction was done based on the Phi-value of the test. High Phi value together with p-value of less than 0.05 indicates high concordance or high consistency between the clinicians' predictions and vice versa.

Table 2 lists the Phi values when consistency in predictions based on 1-input variable sets and 4-input variable sets for clinician R1 was compared with the other 26 clinicians. For 1-input variable sets, clinician R1 was completely consistent with clinicians R11 and R22 only (7.69 percent). Consistency of clinician R1 with the other clinicians varies with 16 out of the 26 clinicians (61.5 percent) having high consistency with R1, while the remaining 8 (30.8 percent) showing low consistency relationship.

When the number of input predictor was increased to 4, none of the clinicians was found to have complete consistency with other clinicians involved in the validation exercise. The concordance test also shows that for predictions based on 4-input predictor variables the percentage of high consistency among clinicians also dropped from 61.5 percent to 50 percent (13 out of 26 clinicians found to have high Phi value when tested against clinician R1) and that leaves the remaining 50 percent having low consistency relationship to clinician R1.

Table 2: Measured prediction consistency between R1 and the other 26 oral cancer clinicians' predictions

Clinicians	Phi Value for 1-input variable sets	High Consistency	Phi Value for 4-input variable sets	High Consistency
R1&R2	.802	Yes	.818	Yes
R1&R3	.535	No	.522	No
R1&R4	.429	No	.499	No
R1&R5	.089	No	.351	No
R1&R6	.429	No	.533	No
R1&R7	.655	Yes	.732	Yes
R1&R8	.764	Yes	.605	No
R1&R9	.802	Yes	.614	No
R1&R10	.429	No	.454	No
R1&R11	1.000	Yes	1.000	Yes
R1&R12	.655	Yes	.529	No
R1&R13	.802	Yes	.790	Yes
R1&R14	.802	Yes	.706	Yes
R1&R15	.764	Yes	.680	Yes
R1&R16	.535	No	.248	No
R1&R17	.655	Yes	.522	No
R1&R18	1.000	Yes	.965	Yes
R1&R19	.218	No	.457	No
R1&R20	.655	Yes	.719	Yes
R1&R21	.802	Yes	.964	Yes
R1&R22	1.000	Yes	.965	Yes
R1&R23	.655	Yes	.889	Yes
R1&R24	.764	Yes	.402	No
R1&R25	.655	Yes	.732	Yes
R1&R26	.655	Yes	.523	No
R1&R27	.535	No	.719	Yes

Oral cancer experts' predictions and the two artificial intelligent models predictions on oral cancer susceptibility based on twelve (12) different input sets were measured. The accuracy, sensitivity and specificity of the models are summarized in Table 3. Definitions of accuracy, sensitivity and specificity are summarized in Table 4 and Table 5. Different predictor set was found to exhibit different prediction abilities. Comparison of the mean values of the accuracy, sensitivity and specificity for the models showed that fuzzy neural network prediction model has the lowest mean accuracy and mean sensitivity but the highest in mean specificity. Fuzzy regression prediction model has higher mean accuracy and mean sensitivity but lower mean specificity compared to oral cancer clinicians predictions.

Table 3: Prediction measurements based on accuracy, sensitivity and specificity for fuzzy regression (FuReA), fuzzy neural network (Fnn) and oral cancer clinicians (Occ).

	Accuracy			Sensitivity			Specificity		
	Occ	Fnn	FuReA	Occ	Fnn	FuReA	Occ	Fnn	FuReA
A	80	35	80	94.9	0	94.9	52.4	100	52.4
C	61.7	61.7	61.7	51.3	51.3	51.3	81	81	81
D	63.3	63.3	63.37	46.2	46.2	46.2	95.2	95.2	95.2
G	35	35	48.37	0	0	59	100	100	28.6
S	48.3	35	51.7	30.8	0	69.3	81	100	19.0
CS	71.7	61.7	61.7	76.9	51.3	51.3	61.9	81	81
CD	75	75	75	74.4	74.4	74.3	76.12	76.2	76.2
CA	61.7	61.7	61.7	51.3	51.3	51.3	81	81	81
CDS	71.7	70	75	76.9	66.7	74.4	61.9	76.2	76.2
CDA	75	75	75	74.4	71.8	74.4	76.2	71.8	76.2
ADCG	59.6	71.7	76.7	37.5	66.7	89.74	95	81	52.4
ADCS	53.70	73.37	80	36.4	69.27	92.34	81	81	57.1
Mean Value	63.1	59.9	67.5	54.2	45.5	69.0	78.6	85.3	64.7

Table4: Measures of prediction performance

Measure	Description	Calculation
Accuracy	Probability to correctly classify outcome	$\frac{a + d}{a + b + c + d}$
Sensitivity	Probability to predict positive outcome when true state is positive	$\frac{d}{c + d}$
Specificity	Probability to predict negative outcome when true state is negative	$\frac{a}{a + b}$

Table 5: Conditions of terms used in the measurement of prediction performance

Observed Output	Predicted Output	
	Negative	Positive
	Negative <i>a</i> (True Negative)	Positive <i>b</i> (False Positive)
	Positive <i>c</i> (False Negative)	<i>d</i> (True Positive)

Next, comparisons were made based on area under the receiver operating characteristic curves by grouping the single-input and two-input predictor set in one group and three-input and four-input predictor set in another as shown in Table 6 and Table 7. Common measures of discrimination are sensitivity, specificity and percent accuracy (Dreiseitl 2002). The area under the Receiver-Operating-Characteristics Curve (ROC) is normally used to depict the graphical representation of discrimination.

The receiver operating characteristics (ROC) was originally used for signal detection during the Second World War before it was used in medical diagnostic and prognostic tests (Hopley, 2001). The receiver operating characteristics (ROC) is used to determine the accuracy of predicted values and can be used across different classification tools (Abdul Kareem, 2002; Speight et al., 1995). The plot of an ROC curve shows the false positive rate on the x-axis and the 1 minus the false negative rate on the y-axis. It is normally termed as the sensitivity versus one minus specificity.

A good diagnostic test is one that has small false positive and false negative rates across a reasonable range of cut off values. A bad diagnostic test is one where the only cut offs that make the false positive rate low have a high false negative rate and vice versa. The larger the area, the better the diagnostic test is. An ideal test will have an AUC of 1 because it achieves both 100 percent sensitivity and 100 percent specificity (Lasko, 2005).

Table 6: Prediction measurements based on area under the receiver operating characteristic curves for fuzzy regression, fuzzy neural network and oral cancer clinicians on single-input and two-input predictor sets

Input Predictor	AUC for Occ	AUC for FuReA	AUC for Fnn
A	0.644	0.634	0.634
C	0.648	0.684	0.684
D	0.724	0.713	0.713
G	0.43	0.455	0.456
S	0.5	0.452	0.456
CS	0.6	0.672	0.675
CD	0.78	0.766	0.767
CA	0.724	0.782	0.782
Mean Value	0.631	0.645	0.646

Table 7: Prediction measurements based on area under the receiver operating characteristic curves for fuzzy regression, fuzzy neural network and oral cancer clinicians on three-input and four-input predictor sets

Input Predictor	AUC for Occ	AUC for FuReA	AUC for Fnn
CDS	0.619	0.81	0.785
CDA	0.779	0.826	0.816
ADCG	0.661	0.737	0.785
ADCS	0.465	0.824	0.828
Mean Value	0.631	0.799	0.804

Two different statistical measurements were employed in the comparison procedure namely the Analysis of Variance (ANOVA) for the 1-input and 2-input predictor sets and the Non-Parametric Mann-Whitney U test for the 3-input and 4-input variable sets. The ANOVA (An analysis of Variance) One-Way Between-Groups test was run by taking the areas under the receiver operating characteristic curves (AUC) values as the “dependent variable” and the three prediction models as the “factor”. In the comparison carried out in this study the ANOVA test is appropriately used for

comparing the differences in the areas under the receiver operating characteristic curves (AUC) values associated with the 1-input and 2-input variable sets since the normality assumption is satisfied as reflected by the p-values bigger than 0.05 for both the Kolmogorov-Smirnov and Shapiro-Wilk tests and by the skewness statistic values lying in the range of [-1,1] which indicate normality in distribution shown in Table 8.

Table 8: Test values for normality check for 1-input and 2-input variable sets

Model	Skewness	Kolmogorov-Smirnov	Shapiro-Wilk
Oral cancer clinicians	-.633	.168	.630
Fuzzy regression	-.848	.216	.117
Fuzzy neural network	-.845	.216	.109

The Tukey HSD ANOVA test results are tabulated in Table 9. A p-value of greater than 0.05 implies that the Null hypothesis H_0 is true and therefore H_0 is accepted. Accepting H_0 in this case implies that the means of the AUC values for the models are significantly similar ($\mu = 0$). Thus the prediction performance of fuzzy regression, fuzzy neural network and oral cancer clinicians' prediction models are found to be significantly the same for single-input and two-input predictor sets (p-values =1.0).

Table 9: The Tukey HSD ANOVA calculated p-values and comparison implication between fuzzy regression, fuzzy neural network and oral cancer clinicians' prediction for single-input and two-input predictor sets

Pair	p-value	Implication on comparison of Prediction performance
FuReA & Fnn	1.0	No Significant Difference
FuReA & Occ	1.0	No Significant Difference
Fnn & Occ	1.0	No Significant Difference

The Mann-Whitney U test results for the 3-input and 4-input variable sets are given in Table 10. Mann-Whitney U test is the non-parametric alternative to the *t*-test for independent sample commonly used for comparing the mean value for some variable of interest between two samples. A p-value of greater than 0.05 implies that the Null hypothesis H_0 is true and vice-versa. Thus the prediction performance of fuzzy regression prediction model is significantly the same as the prediction performance of fuzzy neural network model for 3-input and 4-input predictor sets. However, the prediction performance of both fuzzy regression and fuzzy neural network models are found to be significantly different from the prediction performance of oral cancer clinicians for 3-input and 4-input predictor sets (p-value=0.043 and p-value=0.02). Looking back at the mean AUC values (Table 5) we conclude that fuzzy regression and fuzzy neural network perform better in predicting oral cancer susceptibility in the given sample.

Table 10: Mann-Whitney U test calculated p-values and comparison implication between fuzzy regression, fuzzy neural network and oral cancer clinicians' prediction for three-input and four-input predictor sets

Pair	p-value	Implication on comparison of Prediction performance
FuReA & Fnn	1.0	No Significant Difference
FuReA & Occ	0.043	Significant Difference
Fnn & Occ	0.02	Significant Difference

CONCLUSION

Human experts' valuable knowledge and abilities in making predictions can never be replaced. This is a fact that cannot be mistaken especially in the medical and dental field. However, in many professional fields including medicine and dental, expertise is a scarcity and the documentation of knowledge is limited in practice. Furthermore, the ability of individual expert varies according to their previous knowledge and working experience. These are among the reasons why there have been an increased interest in implementing computer aids to decision making in areas such as dental prediction understudy. The argument is not whether the computer-based systems have the potential to exceed the performance of experts. This paper argues that the best system may yield results from the integration of specific domain expert knowledge with the machine learning approaches.

Good performance is one of the desired features in an artificial intelligent prediction tool for it to be useful for medical and dental diagnostic applications (Kononenko, 2000). Good prediction performance of the fuzzy regression and fuzzy neural network prediction models measured in terms of the model calibration and discrimination ability were recorded in this study as compared to the human expert prediction performance. These results may set the foundation for future use of artificial intelligent prediction in oral cancer susceptibility in this country.

In conclusion, the findings of this study suggest that both fuzzy regression and fuzzy neural network models provide good alternative to human expert prediction in predicting oral cancer susceptibility. Hence the use of artificial intelligent prediction models is proposed as a suitable filtering system in identifying people at risk of oral cancer based on their risk habits and demographic profiles.

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Pedagogical Practices of Business Studies Teachers in Botswana Junior Secondary Schools: Are Teachers and Curriculum Planners Singing from the Same Hymnbook?

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Abstract

This study was conducted to determine the extent to which the teaching practices of Business Studies teachers in Botswana junior secondary schools conform to pedagogical practices recommended by curriculum planners. The findings of this study suggest that teachers and curriculum planners are not singing from the same hymnbook, thus, the pedagogical practices of Business Studies teachers are at variance with the expectations of the curriculum planners. Teacher-centred pedagogy is the dominant mode of instruction used to teach Business Studies in Botswana junior secondary schools despite the fact that curriculum planners advocate for a paradigm shift from teaching to learning through the employment of learner-centred entrepreneurial-directed teaching methods. The study concludes with the recommendation that, for pedagogical practices of business teachers to be aligned with those prescribed by curriculum planners, educational authorities and school administrators should put in place support structures aimed at monitoring and ensuring that the delivery of business education is done according to the stipulated business curriculum standards as well as enforcing the fulfillment of pedagogical practices set in the syllabi.

Key words: Business Studies, Entrepreneurial Pedagogy, Entrepreneurial-directed Approach, Mini Enterprise, Vocational Education.

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BACKGROUND

Business Studies was recommended as part of the junior secondary school curriculum in Botswana as early as 1977 and in 1994 the Revised National Policy on Education recommended that Commerce, Bookkeeping /Accounting and Office Procedures be incorporated (Georgescu et al., 2008). Business subjects fall under Creative, Technical and Vocational Subjects within the entire secondary school programme. The subjects are classified as “practical subjects” in the Revised National Policy on Education (RNPE). The subjects aim at equipping students with practical business skills which will enable them to participate meaningfully in production in future. As practical subjects they are intended to prepare students for the world of work both as employees and employers. To equip learners with these skills, it is recommended in the business subjects syllabuses that teachers employ learner-centred teaching approaches in which they are facilitators of learning. Teaching methods prescribed include project work, educational visits, use of business resource persons, business simulations, group discussions, case studies and the use of school-based mini enterprises run and operated by students (Republic of Botswana, 2008a; Republic of Botswana, 2008b).

Available literature (Fuller & Snyder, 1991; Farstad, 2002; Dube & Moffat, 2009) suggests that teacher-centred pedagogy in which periods of instruction are occupied wholly or mainly with exposition by the teacher is the dominant mode of instruction in Botswana secondary schools. The organization of classes and teaching are quite rigid and leave little room for practicals, site visits to industry and employment of entrepreneurial pedagogies as prescribed in the business subjects syllabi (Farstad, 2002). Similar findings were made by Dube and Moffat (2009) in their study on Social Studies instruction in Botswana secondary schools. They came to the conclusion that the techniques used by teachers were incompatible with the goal of trying to prepare learners for the world of work. Data they collected showed that the majority of teachers were still yoked to the conventional teaching methods such as lecturing. Using traditional teaching methods to develop practical business skills is inappropriate and can be likened to teaching “to drive a car using the rear mirror” (Gibb, 1993 in Garavan & Cinneide, 1994). The teaching of business skills requires the use of kinaesthetic and experiential pedagogical approaches which encourage learning by doing in real or closely simulated contexts which will lead to the development of key business and life skills (Borrington, 2004).

Business subjects are to be taught using a pedagogical approach which Jamieson (1984) described as “education through enterprise” which involves the use of teaching styles which use entrepreneurial situations such as school-based mini enterprises. The best way of learning business skills is through direct experience and practice and this can be achieved through the establishment of mini enterprises in schools which are run and managed by students themselves. The mini enterprise mode of delivery has the advantages of focusing on the development of basic business skills, business management skills and personal entrepreneurial skills. This approach will enable young people to set up and run a project with a business or community focus. It involves “active learning” on their part which leads to the acquisition of skills which are transferable. Mini enterprise methodology is used fairly extensively in Botswana’s junior secondary Business Studies in which the mini enterprise project constitutes approximately 40% of the total teaching time of the three year course (Lauglo, 2004). According to Swartland (2008) the mini enterprise methodology as employed in Botswana junior secondary school Business Studies involves learners in description and explanation of the economic institutions of recording, processing and storing business information and of studying business management functions.

Resourcing for the delivery of business education should include the provision of computer laboratories. In Botswana ICT is a major focus of the country’s economic agenda and the Revised National Policy on Education (1994) highlighted the need for all learners to be taught computer skills at all levels of school. Botswana has made a tremendous effort to provide resources for its junior secondary schools and this is evidenced by the fact that all junior and senior secondary schools have fully equipped computer laboratories (Isaacs, 2007). ICT has considerable potential in the business classroom (Borrington, 2004) in that it can be used whilst undertaking a variety of classroom activities such as research assignments, key business applications like spreadsheets, databases and presentations, including the use of the Internet as a resource for acquiring knowledge. The Internet opens up vast knowledge sources, is available around the clock and it optimally supports student-centred teaching (Motschinig-Pitrik, 2001).

In light of the above, this study sought to examine the approaches to the teaching of Business Studies in Botswana secondary schools in an attempt to find out if the aims and objectives of curriculum planners were being realized through teachers’ pedagogical practices. Of particular concern were the research questions:

1. What are Business Studies teachers’ perceptions on the vocational relevance of the subject?
2. What are the pedagogical practices of Business Studies teachers in Botswana secondary schools?
3. Do Business Studies teachers employ experiential and entrepreneurial pedagogies as stipulated in the syllabi?
4. Do Business Studies teachers incorporate ICT into their lessons?

METHODOLOGY

The study adopted a descriptive survey design in which both qualitative and quantitative data were collected from the teachers participating in the study. The sample for the questionnaire survey consisted of 28 junior secondary school Business Studies teachers (T1, T2, T3,... and T28) who were selected from secondary schools which the researcher visited during teaching practice supervision. The teachers were chosen using the guidelines of purposeful sampling (Saunders, Lewis & Thornhill, 1997) and they were chosen because (1) they taught Business Studies and (2) they agreed to participate in the study. The secondary schools selected were made up of (1) government schools, (2) independent/private schools and (3) schools in both rural and urban settings.

An 11 – item questionnaire adapted from Hemmasi and Graf (2003) was used to collect data from the respondents. It elicited information about their ideas, beliefs and experiences in the teaching of Business Studies with

regard to the imparting of entrepreneurial skills, use of entrepreneurial pedagogies including contextualized learning and adequacy of support systems. These aspects encompass the main ingredients of effective business education teaching (Borrington, 2004; Coucom, 2005). The data collected through questionnaires were complemented with interviews organised with 6 selected teachers in the sample (Ti, Tii, Tiii, Tiv, Tv and Tvi). The interview schedules were designed to cross-check teachers' practices with regard to the pedagogical issues outlined in the questionnaire. The use of triangulation or multiple data collection methods was a way of enhancing the credibility of data collected (Wiersma, 2000).

Limitations of the study

There are limitations inherent in this study. First, the questionnaire response rate of 82% was not anticipated and this resulted in a sample size slightly smaller than initially expected. This might have exposed the study to potential bias from non-response in the event that non-respondents differed significantly from the survey population (Dillman, 2007). Secondly, due to budgetary constraints, only two data collection methods, questionnaires and interviews with 6 teachers, were used and these limited the researcher's capacity to carry out methodological triangulation of the data. Methodological triangulation is a powerful technique that facilitates validation of data through cross verification from more than two data collection methods in the study of the same phenomenon (Wiersma, 2000). In this study, the credibility of the findings could have been enhanced if interview and questionnaire data were complemented with lesson observations and the analysis of teaching documents such as lesson plans and schemes of work.

RESULTS AND DISCUSSION

Profile of teachers

Of the 28 teachers in the sample, 17 (61%) were holders Diploma in Secondary Education (DSE) while 11 (39%) held university degrees. Of the degreed teachers, 3 were holders of the Postgraduate Diploma in Education while 2 studied for Bachelor of Commerce + Education degrees. The remaining 6 (21%) had no teaching qualifications. Diploma holders specialized in Commerce, Accounting and Office Procedures while degree holders specialized in various fields of business education such as Marketing, Accounting, Economics and Business Administration. Teachers' teaching experience ranged from 6 months to 10 years. 20 (71%) of the teachers had teaching experience of 5 years or more. Table 1 below summarises the profile of the participants in this study:

Table 1: Profile of Participants

		N	%
Qualification	DSE	17	61
	Bachelor's degree holders	11	39
	Master's degree holders	2	7
Professionally qualified degree holders	PGDE	3	11
	Bachelors degree + Education	2	7
Area of specialisation	Commerce	18	64
	Accounting	22	79
	Office Procedures	17	61
	Other	4	14
Experience/length of service	Less than 5 years	8	29
	5 years +	20	71

The majority of respondents in the sample were well-experienced teachers and the mean length of teaching service/experience for the sample was 5.3 years. It is assumed that the responses that the teachers gave relating to the pedagogy of Business Studies were a result of their experience(s) in the teaching of the subject.

Teachers' views on the vocational relevance of Business Studies

Business Studies in Botswana schools curriculum is intended to prepare students for the world of work both as employees and employers and this belief was shared by 24 (86%) of the respondents who were of the view that it is

vocationally relevant because it leads to learner acquisition of knowledge relevant to the world of work. This belief is captured, for instance, in the following selected statements:

T3: “Business studies does prepare learners for the world of work by imparting entrepreneurial skills, developing Accounting problem-solving skills (sic) and giving them a feel of the world of work”.

T9: “The mini enterprise gives students insights into the working of the world of business”.

T13: “As learners learn Business Studies they bear in mind that there are many careers/job opportunities that they can do, not relying on teaching alone (sic)”.

T23: “Business Studies is a combination of various disciplines including marketing, human resources, finance, economics and general business management, thereby preparing students for careers in any of the fields mentioned above, thus giving them a wider choice to choose from”.

This is significant because teachers play a key role in successful curriculum implementation and their beliefs will have a bearing on their pedagogical practices. Kennedy and Gibson (1992), whilst discussing vocationalisation of curricula in Australian schools, have argued that policy makers in vocational education must not ignore the beliefs, perceptions and concerns of the teachers who are the curriculum implementers.

Pedagogical practices of teachers

Available literature suggests that traditional teacher-centred methods of teaching are prevalent in Botswana secondary schools. Using traditional teaching methods to teach business subjects was discredited as long ago as 1972 when Brendel and Yengel (1972) stated that methods of teaching such as the lecture, question and answer and drill are not conducive to the development of business ideas, concepts, understandings and attitudes because such methods only help students to learn about the theory of business without knowing how to apply that theory (ibid). The National Business Education Association (2004) believes that the most effective instructional strategies for business understanding should include case studies, cooperative and individual research projects, guest speakers, role play, debates, simulations, surveys and critical- thinking exercises for teaching global business concepts. These same teaching methods are the ones prescribed in the Botswana junior secondary Business Studies syllabus. To find if teachers’ pedagogical practices conform to the aspirations of the curriculum planners, respondents were asked to indicate how often they employed instructional strategies suitable for imparting business skills and understanding. Below is a summary of their responses:

Table 2: Pedagogical practices of respondents, N=28

	Most of the time		Sometimes		Never	
	n	%	n	%	n	%
Use the lecture and direct instruction as methods of teaching	9	32	17	61	2	7
Use interactive teaching strategies in your class(es), e.g. group work, pair work, team presentations, panels, etc.	18	64	10	36	0	0
Take students on field trips to business organizations	2	7	17	61	9	32
Use assignments requiring students to identify potential business ventures	9	32	16	57	3	11
Require students to develop a business plan for a personal or school-based operation	13	46	13	46	2	7
Use business simulation game(s) in class(es), e.g. experiments, role play.	5	18	22	79	1	4
Assign research projects related to the world of business and economics	4	14	16	57	8	29
Assign case studies that relate to business management and operations	4	14	18	64	6	21
Use materials from local newspapers and periodicals to develop case studies for use in your class(es)	10	36	12	43	6	21
Use business people as guest speakers in class(es)	2	7	7	25	19	68

Questionnaire responses show that teachers try, to some extent, to employ teaching approaches relevant to business subjects. Teacher-centred methods such as the lecture are prevalent as indicated by 32% and 61% of respondents who use the method “most of the time” and “sometimes” respectively. Although 64% of respondents claimed to use interactive strategies most of the time, responses from all 6 interviewees revealed that the commonest interactive strategy used was group work. Interactive strategies such as simulations, games and case studies are used “most of the time” by only 18% and 14% of respondents respectively. Furthermore 79% of respondents use simulations and games “sometimes”. Responses provided in interviews helped to clarify this. All 6 interviewees said that they use the lecture method most of the time:

Tii: “I use the lecture method 90% of the time. I am not conversant with the other methods.”

Tiii: “I lecture most of the time. It is the best method to teach Commerce”.

Tv: “The syllabus is too long and there is no way I can cover it using group work and other methods”.

Responses from interviews also indicated that action-oriented teaching methods such as case studies, simulations and role play are rarely used in teaching Business Studies:

Ti: “To tell you the truth I have never used simulations. I don’t really understand the method”.

Tii: “Sometimes I use games, for example when I teach production, needs and wants where I make students compete for resources”.

Tiii: “I have never used games or simulations. I sometimes use role play to teach the duties of receptionists in Office Procedures”.

Tvi: “No, I want to cover as much (of the syllabus) as possible. The methods are also difficult to use in my classes where slow learners are mixed with bright pupils”.

The best way of learning business skills is through direct experience and practice, and the use of closely simulated contexts. Teachers could experiment more with simulations and games in their teaching. They constitute a highly versatile and flexible medium whereby an extremely wide range of educational aims and objectives can be achieved, being particularly useful in achieving higher-cognitive objectives of all types, affective objectives and interpersonal objectives (Percival & Ellington, 1980). In Business Studies they can be used for developing a wide range of skills such as problem-solving, improving teamwork, building communication skills, honing negotiation techniques and developing functional/technical skills such as marketing, human resource management and financial management (Doyle & Brown, 2000).

Employment of entrepreneurial pedagogies and use of business community resources

The teaching of business skills requires the use of kinaesthetic (learning by doing) and experiential pedagogical approaches (Borrington, 2004). A teaching approach that is well-suited to the teaching of vocational business subjects is the entrepreneurial-directed approach which involves the use of teaching styles which use entrepreneurial situations such as school-based mini enterprises. 23 (82%) of the respondents said they run mini enterprises in their schools while 5 (18%) indicated that they do not. This is not surprising at all because the mini enterprise constitutes a core part of the three-year junior secondary school course in Government schools while private schools follow the IGCSE curriculum. The types of mini enterprises established in schools mostly involve the retailing of consumables (50%) such as confectionery. Some are involved in micro-production of items such as popcorn, fat cakes, hotdogs, and in one case, basket-weaving. This study did not go as far as assessing the quality of the entrepreneurial activities involved using mini enterprise methodology such as the developing of business ideas and drawing of business plans by students. What was established, however, confirms the findings of Lauglo (2004) that mini enterprise methodology is used extensively in Botswana secondary schools and that, through the use this approach, students may be able to gain real experience in raising money and planning all the business management functions such as production, marketing, finance and the real business operation.

Teachers' responses also indicate that some teaching strategies that encourage enterprise activities among students such as assigning mini research projects related to the world of business and economics and assigning case studies that relate to business management and operations are never used by a significant number of teachers. Teachers who "never" use and "sometimes" use these approaches are respectively 29% and 21%, and, 57% and 64%. In responding to the item on the frequency with which they assign case studies and/or project-based activities some of the teachers interviewed had this to say:

Ti: "I rarely use case studies. They are time-consuming and it is difficult to come up with cases. Kids (sic) are limited mentally (sic) to work on cases and it takes too long to work on them".

Tii: "They require lots of materials and are time-consuming. We need to cover the syllabus".

Tv: "I sometimes use newspaper articles or magazine stories to come up with case studies but mostly I use the lecture method to cover the syllabus".

It is apparent from both questionnaire and interview responses that local business community resources are grossly underused. For instance 9 (32%) of questionnaire respondents indicated that they never took students on field trips to business organizations, 19 (68%) have never used local business people as guest speakers or resource persons and 6 (21%) never use materials from local newspapers and periodicals to develop case studies for use in their classes. Of the 6 interviewees, 3 once took their class(es) to visit the Post Office, once in each case, and the rest have never used field trips. Constraints to using this approach are mostly to do with organization and funding:

Tiii: "I have never used educational visits. It is difficult to organize such visits"

Tvi: "I have never used them (field trips). Scheduling them is cumbersome...you need to write letters get school permission, get funds, arrange transport..."

The local and national business community should provide the laboratory of business teachers and students. Community institutions, people and business firms are a rich reservoir of instructional materials for business teachers and the more teachers relate what they do in the classroom to the real world, the better for the students. Business Studies is the study of businesses and educational visits are a way of bringing alive the topics taught. A visit to a business firm will enable students to see/watch batch or flow production taking place, stock control, motivation of employees, management styles, quality assurance and control and a host of other things teachers take for granted (Borrington, 2004).

Use of ICT in teaching

Information communication technology (ICT) has immense potential to motivate and engage students in learning. Innovations in technology can be used in enhancing existing teaching and learning tools in the classroom in order to facilitate the development of computer-related competencies in Business Studies (Joshi & Chugh, 2009). Technology allows students to have control over their learning environment and to act as self-directed learners, promoting more active learning. In this study, 21 (75%) indicated that they use ICT in their teaching, 5 said they do not and 2 did not respond to this item. Responses indicate that computers in schools are not enough to go round but teachers do use computers in teaching topics such as computerized accounting, spreadsheets, internet searches and computerized filing (in Office Procedures) as well as PowerPoint. Selected questionnaire responses to this item:

T3: "Yes, I use ICT when teaching database and computerized accounting".

T4: "I sometimes use ICT because it helps learning to take place effectively and efficiently. e.g. a lesson using PowerPoint will be more effective".

T10: "No, we do not have computers in the Business Studies lab".

T17: "Often I make use of the internet to research on certain topics and I do use multimedia to teach topics like breakeven charts".

T25: "Yes, in computerized accounting and filing. It enhances the teaching and learning because students learn by doing and they don't forget easily what they have done".

Despite limitations caused by the inadequacy of computer resources, it is evident that ICT is being used as a tool to aid learning and/or as the major facilitator in the learning process. This was confirmed by all 6 teachers interviewed who

explained in detail how they use computers in teaching Accounting and Office Procedures. In this era of rapid advances in information and communication technologies, teaching and learning strategies should move away from procedural tasks and memorising professional standards towards more conceptual and analytical teaching and learning (Ramsden, 2003).

CONCLUSION

Business education curriculum planners in Botswana expect junior secondary school students who go through the three-year junior secondary school Business Studies programme to acquire “practical business and entrepreneurial skills and attitudes to prepare them for self-employment” (Republic of Botswana, 2008). To equip learners with these skills, they recommend that teachers employ learner-centred teaching methods such as project work, educational visits, use of business resource persons, business simulations, group discussions case studies and school-based mini enterprises run and operated by students. The findings of this study suggest that teachers and curriculum planners are not singing from the same hymnbook, thus, the pedagogical practices of Business Studies teachers are at variance with the expectations of the curriculum planners. Teacher-centred pedagogy is the dominant mode of instruction while entrepreneurial pedagogies are used sparingly. Teachers seem to be more concerned with completing the Business Studies syllabus in time for examinations at the expense of imparting business skills and literacy through the use of constructivist pedagogies as prescribed in the syllabi.

Implication for Practice and Research

The findings of this study suggest that the practices of Business Studies teachers do not conform to the expectations of curriculum planners in that teacher-centred and not learner-centred pedagogy appears to be the dominant mode of instruction in schools. If business education curriculum planners want their prescriptions translated successfully into practice, they must factor in support structures to ensure that these prescriptions are fully adopted and implemented. There is need for staff development to assist teachers with the implementation of the business education curriculum through the provision of readily available local, specific workshops and in-service activities designed for the implementers of the business education curriculum (Kennedy & Gibson, 1992). The school inspectorate, the National Business Studies Panel and school administrators should monitor and ensure that the delivery of business education is done according to stipulated curriculum and set standards as well as enforce the fulfillment of pedagogical practices set in the syllabi. If there is discord in a choir, it is the duty of the choirmaster to direct the choristers in a way that ensures that harmony, rhythm and tempo are maintained. In the same vein, if teachers are deviating from prescribed teaching methodologies, it is the responsibility of school administrators and heads of Business Studies departments to ensure that the best standards in the teaching and learning of the subject are complied with.

Due to the limitations of the study cited above, future studies might do well to use multi-method research designs to examine more fully the current practices of Business Studies teachers including their weaknesses with a view to proffering pedagogical models and approaches that would help to maximize learner acquisition of business skills, literacy and competencies. Such studies could also focus on identifying specific intervention strategies that will assist teachers to employ recommended pedagogical practices in Business Studies classrooms.

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The Construction of Girls' Motivational Orientations through their Social Engagement in School Mathematics

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Abstract

This paper represents the voices of six Botswana girls in a case study that investigated social influences on their motivation in mathematics. Interviews were conducted and observations made to explore the girls' experiences to shed some light on where their motivations were most influenced. The girls' perceived motivational orientations and subsequent performance in mathematics as reflected in their case scenarios were used as a way of explaining their social implications. Their social experiential narratives were analysed for meaning with a focus on understanding them from an African context in contrast with Western cultural research perspectives. The study emanated from the fact that Botswana women are not vividly present at the post-secondary level in mathematics, science and technology. A compulsory mathematics at senior secondary school level, most young women opt out of mathematics and technology related programmes. The girls' social experiential narratives were collected and analysed for meaning with a view to understand their implications in learning mathematics in the context of Botswana. The study adopted the Marxist social theory as its theoretical framework and used the concepts of contradiction, ideology, discourse and *habitus* as operational tools for the girls' socialised orientation towards mathematic. It emerged that social environment, namely: the family (*socioeconomic status, educational beliefs, attitudes, availability of books*); the school system (schooling, teachers, textbooks, mathematics curriculum, and assessment) and peer groups (friends, classmates) were the key sources of influence. The interpretations of the girls' narratives gave rise to the conclusions drawn and the recommendations made concerning social influences on their motivational orientations in learning mathematics.

Keywords: Gender Differentials in Mathematics, Botswana Mathematics Education, Social Structures, Girls' Motivational Orientations, Women and Girls' Voices.

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INTRODUCTION AND BACKGROUND TO THE STUDY

The system of education in Botswana prior to tertiary level is in three phases, namely Primary School, Junior Secondary and Senior Secondary school. Girls are generally not doing well in mathematics particularly at the senior secondary school level where it matters most. There are no significant gender differences in mathematical performance at the primary and junior secondary school level. However, examinations at senior secondary school level continue to show girls performing poorly as compared to boys. This has prompted the author to investigate if social structure in Botswana influences the way girls learn mathematics.

Social conditions profoundly influence behaviour and modify the development and action of persons who grow up within a given society. Social determinants influence the formation of traits of personality, attitudes, interests,

motor behaviour and goals (Young (1961: p. 22). As in most African societies where traces of patriarchal attitudes still prevail, there seems to be limited cultural flexibility in the means by which individuals are permitted to achieve a code of behaviour in Botswana.

The Africa Economic Commission (AEC, 1999: p. 3) reported that in African cultures:

Many harmful practices are perpetuated due to ignorance, or although recognised as harmful, because ostracisation from one's group has very severe consequences, those who dare to break with tradition are often cruelly teased, humiliated, mocked and looked down upon.

In many cases, good conduct is imposed both by the family and the community in the form of a rigid social code. Personal differences in attempting to restyle social demands to suit personal drives are discouraged by the school, the church, the family and by peer culture.

The research was informed by the structural Marxist social theory, while Foucault's approach to discourse offered a way of analysing the girls' social conditioning through mathematics, despite his criticism of Marxism. Foucault introduced *discursive practices* and *discursive formations* to the analysis of particular institutions and their ways of establishing orders of truth, or what is acceptable as 'reality' in a given society. The general use of discourse is to designate the forms of representation, codes, conversations and habits of language that produce specific fields of culturally and historically located meaning. For this paper, discourse forms can be written or spoken; they include conversations, interviews, speeches, narratives and so on. The characteristics of a discourse derive from the participants' social relations, including their purpose for engaging in the discourse.

Patterns of social discourses were analysed from the girls' experiential narratives in an effort to establish meaning. Gates (2000: p. 127) argued that these patterns of social discourses are:

[...] not constructed purely by individuals, but constructed through engagement in the social field and social world, outcomes of one's dispositions and socialisation, mediated by social engagement.

In this sense, the ideological positions that individuals take are derived in part through engaging in such discourses. For this paper, discourse was a key tool in the analysis of the social influences on the girls' motivation in mathematics. While challenging the influences of Marx and Freud, Foucault postulated that everyday practices enabled people to define their identities and systematise knowledge. From this postmodernist view, the underlayers of suppressed and unconscious knowledge form the codes and assumptions of order, the structures of exclusion that legitimise the epistemes, by which societies achieve identities (Appignanesi, 1995: p. 83).

The construction of girls' motivation in mathematics is partly due to changes in their social personalities resulting from their learning personalities. Each girl's learning personality is the combination of natural talent, personal interest, current opportunity, social environment, character, motivation and how the brain processes information. The girls' experiences as captured through interviews and observations were presented in story form.

The Study Goals

The study aimed at contextualising the 'gender in mathematics' debate by using the voices of six Botswana girls in their social engagement in school mathematics. It did this through investigating the social influences on the girls' motivation in mathematics with a view to explaining their poor performance in the national examinations which has been consistent over the years. The theoretical and conceptual frameworks used in the investigation are discussed below.

THE THEORETICAL AND CONCEPTUAL FRAMEWORK FOR THE STUDY

The study stems from the author's argument that learners are constructed to view mathematics the way they do by the operations of social structures. For this reason, the study adopted the structuralist Marxist social theory as the basis for investigating the social construction of six Botswana girls in mathematics education. The concepts of contradiction, ideology, discourse and *habitus* were then used to aid the operationalisation of this theoretical framework.

Social structure refers to those features of a social entity (a society or group within a society) that have certain permanence over time, are interrelated, and determine or condition to a large extent both the functioning of the entity as a whole and the activities of its individual members. Accordingly, human beings form social relations that are not

arbitrary or coincidental, but exhibit some regularity and persistence. Social life is not amorphous but is differentiated into groups, positions, and institutions that are interdependent, or functionally interrelated. These characteristics of human groupings, although constituted by the social activities of individuals, are not a direct corollary of the wishes and intentions of these individuals; instead, individual choices are shaped and circumscribed by the social environment.

In relation to the girls in this study, the social structure puts constraints on what they should know about mathematics, and suggests to them how they should feel about, perceive and react to it. The notion of social structure implies that the girls are not completely free and autonomous in choosing their activities, but rather they are constrained by the social world they live in and the social relations they form within it.

Case study scenarios were constructed encapsulating the social and cultural structuring of the girls in the learning process. This construction reflected the author's understanding and interpretation of the six girls' experiences, which directed their inclination to (or away from) mathematics. The analyses of the interviews revealed how the girls acquired certain ideas about mathematics, its nature and learnability through interacting in social and cultural environments. Such ideas became internalised and incorporated into their belief systems ultimately appearing as their own, with an impact on how each of them experienced mathematics in classroom dynamics.

The study regarded the internalisation of ideas and subsequent beliefs about mathematics as ideological formations. Accordingly, the girls were being interpellated to view the world of mathematics in a particular way by the environmental factors around them. Each girl developed an ideological level opinion resulting from the correlation of opinions on a wide range of issues relating to her knowledge of mathematics. Ideology in this sense refers to a highly organised structure of opinions representing a general way of thinking about the world or society. It is from this understanding that the construction of the girls' stories proceeded and each story represented a social critique. The stories constructed thus, were forms of discourses derived from or created through certain material and ideological structures, bearing their meaning inherently.

The structuralist route that the study took assumed a constant structuring of mathematics learners as subjects, having certain social values and expectations. Learners are tied to the whole structure of 'school culture', that is, to the values socially and culturally attached to this culture. The structuring occurred within the socio-cultural context of Botswana; hence the girls expressed personality characteristics within that context.

The Marxist social theory adopted to understand the social influences on girls' motivational orientations, poses questions on why the concepts of contradictions, ideology, discourse and *habitus* were used for its operationalisation. Within social structures, contradictions between the socially dominant and subordinate groups usually lead to tensions and conflicts. Individuals within societies face conflicts because of problems related to the distribution of power to control. This relates to unequal distribution of goods, differences in social and economical opportunities, social suppression, tribal struggles and many other areas of power relations. Because tensions and conflicts are discernible, the study endeavoured to find out to what extent the girls' social frameworks indicated the existence of these concepts, how they were resolved and to what extent they were indicative of the girls' motivational orientations.

Habitus and ideology are concerned with the internal way in which the girls were reacting, why the girls are what they are and how this relates to the pattern of Botswana society. What they do not indicate is how these issues get played out. Knowing that the girls acquire *habitus* and that they are subjected to the subtle constraints of ideology does not tell us how this happens. It is through understanding what discourse is all about that one begins to see another dimension that seeks to explain how the other concepts are played out. It was necessary to look at the motivational influences of the six girls through the lens of these concepts because each of them adds its own dimensional flavour to the structuring process.

Habitus is a set of dispositions, reflexes and forms of behaviour people acquire through acting in society (Bourdieu, 1990). There are ways in which it has an affinity with ideology, yet both are complex to define. The beliefs, values and habits acquired through 'cultural conditioning', which is the *habitus*, define ideology. In this sense, the operation of both ideology and *habitus* are geared towards 'naturalising' the actions of individuals within social structures. *Habitus* underlies second nature human characteristics and their infinite possible variations in different historical and cultural settings (Shirley, 1986). Ideology is "a socially defined way of thinking and acting, a set of conventions and assumptions which make meaning possible, the taken for granted world of everyday life" (Sharp, 1980: p. 96).

In order for the girls in this study to participate willingly in activities and institutions such as school, family, church, and peer groups, the activities have to make sense to them in the context of a particular *habitus*. The willing participation means that much of your *habitus* is communicated through how people talk, what they talk about and what they do, which is what discourse is about. Burke (1989) argued that culture and communication mould who we

are, how we think, and how we act. Berlin (1993: p. 103) argued that ideology “addresses and shapes (subjects) through discourses that point to what exists, what is good and what is possible”. According to Halliday (1978: p. 100), “ideology gives language a very active role in coding experience and mediating social meanings.” It suffices to say that the girls acquired their *habitus*s, which formed their personalities, and were constructed by ideological forces in subtle ways through discursive means.

In this way both ideology and *habitus* use discourses as their *modus operandi*. The major differences between ideology and *habitus* lie in their effects on those they operate. In this study, each girl is equipped with a *habitus* (shaped in formative years by home culture) that bears affinity to a larger referential group/class *habitus*. Their *habitus*s are reflected through the forms of conduct most likely to succeed for them in light of their resources and past experiences in learning mathematics. For instance, their tendency to “*work with people*” on which they formed a consensus, derives from the Botswana cultural beliefs which constrain girls towards being nurturant. But this is in conflict with their more ideological ‘*mathematics is important*’ discourse since it turns them away from that discourse. Yet, they cannot escape since they have to be assessed in mathematics as a way of ‘filtering’ them for socio-political purposes.

In contrast, ideology operates in covert, but hegemonic ways as a system of ideas that aspires both to explain the world and to change it. In the context of this study, ideology constructed the general Botswana public’s notions about the importance and usefulness of mathematics. Skovsmose (1994: pp. 5-6) underscores this point by asserting that students study mathematics knowing its importance for their future careers. In this sense, mathematics, albeit in disguised form, is a practical political force that socially constructs learners and affects the way they live and relates to their real conditions of existence. In other words, it has “a material reality and a material force” (Sharp, 1980: p. 95) for the girls.

The girls’ discourse patterns arise from their *habitus*s as aspects of their enculturation into social groups, and from the constraining power of the ideological forces acting on them. With respect to learning mathematics, the girls’ *habitus*s are inscribed within the discursive formations which designate the shape of their wider social and political structures, their nature and role as individuals within those structures and the distribution of power in their society (Berlin, 1993). It suffices to say that ideology operates in subtle ways, using discursive strategies to foster the legitimatimisation of dominant ideas. Hence, the girls’ *habitus*s are acquired under the constraining influences of ideologies, which name the boundaries of what is known or knowable at a given moment in history. The dispositions they acquire are culturally dependent and imbued with ideas and beliefs characteristic of their culture, which means they are ideologically grounded.

Both *habitus* and ideology operate through the power relations between the girls as learners of mathematics and their social milieu. As indicated earlier, the acquiring of dispositions and the controlling power of ideology occur through communication in social fields. These social fields contain competing and contradictory discourses with varying degrees of power to give meaning to and organise social institutions and processes (Weedon, 1987: p. 35). Within the repertoire of discourses in Botswana society, some thoughts are silenced or marginalized if they are not part of the commonsense ideas of society. Culturally, girls in Botswana have certain expectations imposed on them due to their femaleness. This represents the role of discourse as a mode of concealing and perpetuating inequity and regulating behaviour. Some of the things that the girls talked about during the interviews are discourse patterns; they are the things that are believed to be ‘true’ in their social environment. The sources of the girls’ behaviours are patterned by their dispositions, needs or instincts, and by experiences characteristic of their membership to social culture and traditions.

THE STUDY METHODOLOGY

The Study Population

A purposive selection of three girls per school in two secondary schools: one a junior and the other a senior school, was adopted for the study. The mathematics teachers for the two classes were randomly selected by their respective headmasters and in turn, the teachers randomly selected the classes from which the participants came from.

The choice of the sample involving a junior and senior secondary school was an attempt to get views from across the appropriate gender and education spectrum. Gender differentials in mathematics education are widely reported to appear at the beginning of secondary school (Fennema, 1974; Wood, 1976; APU 1985; Hyde *et al.*, 1990). The assumption was that patterns of gender differentials in mathematics begin to emerge as the students enter and proceed with secondary education.

The six participating girls had varying mathematical abilities and each set of three came from the same class in the respective schools. The preference was to get the views from across the mathematical ability range labelled as 'low', 'average' and 'high' to avoid using a homogeneous ability group whose responses might be extremely biased.

Data Collection Procedures

Data was collected during the second school term in the months of July/August before the students began their end of term tests in two phases. The interviews extended to the beginning of the third term in September/October. The timing of the interviews was dictated by the formal schools' timetable, the headmasters' preferences to minimise disruptions, and the avoidance of times when students engaged in local or national academic activities.

The data collection exercise comprised class observations and interviews. The lessons were observed for familiarisation and developing diaries of how the girls responded in class to corroborate or refute claims they made during interviews. Semi-structured interviews were used with probes and follow-ups as the situation demanded. Powney and Watts (1987) describe an interview in terms of a conversation between two or more people with one or more of the participants taking the responsibility for reporting the substance of what is said. A tape recorder was used to record the students' experiences in learning mathematics.

The recorded material was transcribed after every session to help conduct follow-up observations and interviews based on the information gathered. The two teachers were also interviewed to corroborate students' claims accordingly.

Data Analysis

The analysis began with the transcription of the taped information. The data was then sorted according to theme areas, categories and subcategories, linking ideas together and comparing the data according to how the girls differed or shared common ideas in their responses in line with the continuous comparison method.

The data was subjected to coding and re-coding as part of the analysis procedure. The continuous comparison test method was used to find patterns in the data from which meaning could be drawn. The emerging patterns were used to develop stories of each girl in an effort to understand how social factors affected their learning of mathematics. The constructed stories formed part of the data analysis from which conclusions on social influences were drawn. According to Holstein and Gubrium (1995: p. 28):

Storytelling is collaborative, but not simply in the conventional sense that interviews ask questions and respondents provide answers. Rather, the interviewer and respondent interact more dynamically to produce meaningful stories.

The analysis endeavoured to unravel the ways in which mathematics 'filtered' students with detrimental consequences for girls' motivation in the subject. At the same time there was constant awareness over the methodological issue of re-conceptualising and recognising learner-generated knowledge in educational research.

THE POWER OF STORY TELLING IN CONTEMPORARY RESEARCH

In investigating the influences on Botswana girls' motivational orientations towards mathematics, the author represented their responses through stories to illustrate how storytelling can contribute in de-silencing the silenced voices of women and girls in African contexts. Foucault's notion of *subjugated knowledge* was used to illustrate the epistemological position in this paper. When referring to knowledge that has been *buried* in the mainstream, Foucault (1980: p. 81) advises that:

[...] subjugated knowledges... a whole set of knowledges that have been disqualified as inadequate to their task or insufficiently elaborated; naïve knowledges, located low down on the hierarchy, beneath the required level recognition or scientificity... it is through the re-appearance of this knowledge, of these local popular knowledges, these disqualified knowledges, that criticism performs its work.

Foucault was dissatisfied with the *totalitarian theories* that dominated research practice and advocated a non-scientific way to produce knowledge which was the re-emergence of low-ranking knowledges, not dependent on approval of the

established regimes of thought (totality, scientific research). The use of research as narrative to tell the girls' stories embraces Foucault's suggestion and shows the author's dissatisfaction with the traditional positivist way of disseminating knowledge. In that sense, the author saw the possibilities of the re-emergence of the '*disqualified*', '*naïve*' and '*low-ranking knowledges*' of the girls, which has the potential to reveal their *situational* world-views and experiences.

Coffey (2007: p. 57) asserts that:

Students and pupil experiences and testimonies can aid an understanding of student cultures and are identity-constructing processes in which people are routinely engaged.

The author views current research practice in Botswana as using power relations to discriminate against both the knowledge of practitioners (such as teachers) and 'localised' knowledge of non-academics. This contributes to further silence the voices of women and girls already devalued by the patriarchal attitudes. Writing the girls' stories, which is some form of research-as-narrative, represented a way of revolting against contemporary research practice, which emphasises academic standards (considered to be of high quality), limiting or even excluding other research possibilities. Writing up qualitative research is supposed to permit researchers to be:

[...] liberated from some of the conventions that inhibited their creative impressions (Bogdan and Biklen, 1992: p. 197).

This paper advocates an epistemological position that recognises the informants' participation in knowledge production. The research-as-narrative story-telling write-up style that the study adopted, challenges the traditional third person singular (the researcher) and replaces it with a more personal and conceptualised first person singular approach that characterised the study. Using singularity in this way is an acceptance that other people might interpret research stories differently depending on their subjectivities.

The social world of education has increasingly been seen, and 'told', in terms of personal narratives and individual experiences. These have been conceptualised in terms of identity and biographical work – and utilised to explore the social and cultural processes of schooling. Social actors within educational arenas (teachers, managers, students, pupils) have hence been the subjects of this kind of inquiry. Studies have been concerned with exploring the lived realities of education through personal biographies, located in a social context (Coffey, 2007).

Again, within the study's epistemological framework, the author preferred to listen to what the stories 'told him' rather than what they 'told us', the emphasis being on singularity rather than universality. The preference to investigate girls in Botswana schools was a contextual strategy to move away from the 'normal' Western cultural contexts, which have been swamped with research on gender differentials in mathematics. The girls' stories were contextualised and situational, and there was no attempt to universalise them. Coffey (2007: p. 56) advises on:

Respect for the (auto) biographical, and the teacher's (student's) voice. This recognises personal experiences and individual voices as valuable and insightful ways of understanding the everyday realities of education.

In the same spirit, Coffey advocates for understanding the relationships between learning experiences and the accounts students give of schooling. Hence the relationship between experience and narrative is key to understanding the process, practices and realities of education. This is to recognise that learning is replete with stories and narratives, which can help to reveal the complex and diverse experiences of learning and education more generally. This paper considers 'truths' to be more situational and contextualised in particular place, time and space, such as girls learning mathematics in Botswana. What constituted knowledge here were the girls' voices and the author's understanding and interpretation of their experiential frameworks.

The study is considered emancipatory by viewing knowledge from research as a story to be told from the experiences of those we want to investigate upon. This meant using the voices of those normally silenced in their cultural domain, in this case Botswana female learners, to gain knowledge of their experiences of social influences on their motivation in mathematics. Below are my interpretations of the girls' stories.

SOCIAL INFLUENCES ON GIRLS' MOTIVATION IN MATHEMATICS

In this section the author takes the reader through a descriptive analysis of the transcribed data. The author's interpretations of girls' stories, and the meaning derived therein, form the descriptions of the findings. For the reader to make sense of interpretations of the study results, the girls were given identification code names according to their abilities and the school they came from. The code names are: **Lojs**, **Mijs**, **Hijs** and **Loss**, Miss, Hiss, denoting Low, Mid (average) and High ability with 'js' and 'ss' representing the Junior Secondary and Senior Secondary school respectively.

The Family as a Social Influence

For the girls whose parents could be described as highly educated and affluent, socio-economic status positively impacted on their motivation to learn mathematics. However, it emerged that some of the girls' never got help from parents in mathematics while others relied heavily on parental support. Moreover, some were poor in mathematics yet they had attended the elitist private primary schools, suggesting that school type was not necessarily the motivation for good performance. Rather, the learners' abilities and experiences need to be explored in an effort to arouse their interests in mathematics.

Three of the girls (**Loss**, **Mijs** and **Miss**) came from less affluent and poorly educated families with no contribution towards their learning of mathematics. However, lack of support was not peculiar to the less affluent or poorly educated parents as some from high socio-economic status families reflected the same experiences (**Hiss**, **Lojs**). This suggests that for these girls, parental socio-economic status was not a clear determinant of their motivation in mathematics. Other factors such as the parents' occupation and attitudes towards mathematics might have played significant roles. Not all the parents involved could be contacted to explore these factors and their inclusion in this paper is inconclusive.

From Western social research, the family socio-economic status reportedly influences school performance (Keeves, 1972; Rosier, 1980; Ainley *et al.*, 1990). The concept of family in Western societies is, however, in contrast with that of African societies in many ways. African societies take pride in large family sizes and the tendency to prepare girls for household chores and training them for marriage, housekeeping and motherhood is very strong (Okojie, 2007). The choice of a sample from Botswana was to explore the motivational influences of girls from an African perspective where gender differentials in mathematics are underreported. Because of the differences in the levels of development between Botswana and the developed Western countries, there are bound to be differences in family socio-economic conditions such as parents' occupation, level of education, number of siblings and the availability of books in homes. There are lower numbers of siblings in developed Western families and the prospect of having books in homes is higher and the opposite is true for African families.

The study identified the separation of spouses due to employment demands as worrisome and serving to exacerbate the problem of inadequate parenting. **Hijs**'s performed poorly after her father was transferred, exemplifying the problems that this phenomenon inflicts on families, and calling into question its relevance. The other problem of inadequate parenting caused by "leaving children unsupervised for long periods" Okojie (2007: p. 10) leads to breakdown in moral standards which affect girls' learning. Okojie blamed inadequate parental supervision for the increasing teenage pregnancy in Botswana, reportedly a major cause of dropout from school by girls. The inability of the local market to absorb unskilled and semi-skilled job seekers makes people seek jobs far from their families. Unemployment remains high in Botswana and those traditional trends have hardly changed.

In relation to the girls in this study, the parents of **Hiss** and **Lojs** were separated by employment. **Hijs**'s father was transferred to another town at the beginning of her final year in the junior secondary programme. **Mijs**'s mother had left to care for her ailing grandmother in their home village. **Loss** had a single parent and due to inadequate family support she sought help and support in mathematics from colleagues, which was not forthcoming. Only **Miss**'s parents lived together, but she was in boarding school in another town and her case was no better. The data suggested that the girls did not have quality time with both of their parents, let alone direct physical help with mathematics homework. Hence, they were socially disadvantaged since they lacked the parental support necessary for the development of fundamental skills needed for grounding them in the further study of mathematics.

The issue of parental support or lack of it could also be linked to the involvement of different social class structures. The theoretical implications from a Marxian view are that it is economic and material relations that determine, to a large extent, the rest of social life. In other words, larger forces such as economic power and level of education determine the basic structure of society. From a Bourdieuan perspective, this is not just about looking at capitalist mode of production, it is actually looking at the ways in which groups of people such as in Botswana

organise and determine the patterns of their existence. Although socio-economic status was not a clear indicator of differences in mathematics success, further research is required due to the sample size limitations.

As Ryan, Connel and Grolnick (1992: p. 167) found out, the girls' motivation to learn mathematics could be enhanced:

If parents took the initiative to create conditions (at home) that facilitate learning, support, guide, inspire and promote the learning process... through understanding... what is inside the learner that leads him/her to focus on something, take interest and assimilate it.

The parents put pressure on the girls to perform in mathematics, in the form of incentives and demands for high grades. **Hijs's** and **Lojs's** parents wanted their daughters to emulate their respective successful elder sisters. **Mijs's** father demanded that she emulated her mother who had been good at school. Furthermore, **Hijs** was promised a cell phone if she passed, while **Lojs's** cell phone was to be taken away from her if she failed. **Lojs**, **Mijs** and **Miss** claimed being given pocket money as incentives and the threat to withdraw it if they did poorly. In addition, **Miss** got study guides to encourage her to improve in mathematics. All these suggest tensions between the girls struggling to learn mathematics and their parents applying control strategies to influence their learning behaviours.

These parental pressures were ideological manifestations of their culture, which point to the importance of learning mathematics. Although the application of incentives is imbued with tensions between the girls and their parents, the girls did not seem to consider such control strategies as problematic. Eagleton (1976) described ideology as that complex of beliefs, values and habits which make the existing power relations of society seem 'natural' or 'invisible'. The girls resolved the tensions by viewing their parents' behaviours as natural. As Shumway (1994: p. 153) observed, *ideology* is what the culture makes us accept without reflection.

The case of **Hijs** being promised a cell phone at a time when she was successful in mathematics could have led to the *overjustification effect* (Lepper, Greene and Nisbett, 1973) where rewarding students for engaging in activities they inherently enjoyed caused a loss of interest in that activity. Moreover, with regard to the parents' use of incentives, Deci (1971) discovered that when external rewards or other controlling strategies are used, behaviour is no longer seen as self-determined, and the individual's interest in pursuing the activity in his/her free time declines. The addition of extrinsic controls to a learning or problem-solving situation tends to limit people's creative, conceptual and flexible engagement with the activities.

In all the cases examined there was a tendency to work towards earning parental approval due to the pressures and seemingly high expectations that the parents placed on their daughters. The girls had to show loyalty to their families by meeting those expectations, which was not necessarily easy or possible in every case. The reason being that these pressures usually deprive children of the intrinsic pleasure of creative activity. Goleman *et al.* (1992: pp. 61-62) explain:

Establishing grandiose expectations for a child's performance... often ends up instilling aversion for a subject or activity... Unreasonably high expectations often pressure children to perform and conform within strictly prescribed guidelines, and, again, deter experimentation, exploration, and innovation. Grandiose expectations are often beyond children's capabilities.

The influence of the family is imbued with factors related to family dynamics, such as how family members relate and interact with one another, family changes such as caused by death or separation and other changes. The family is a central structure of society and the source of one's morality, norms and values. In this study, the family makeup, dynamics and changes impacted on the girls' motivations in different ways. The limited interaction between parents and their children in terms of helping with mathematics and the separation of spouses due to employment or loss of a parent impacted negatively on the girls' motivations. The theoretical implications are that the concepts of social structure and social change influence and even determine not only basic characteristics of human social life, but also certain ideals and preferences.

As it is the case in most of Africa, Botswana children are not exposed to mathematics as play or through interactions with parents. The parental pressures and expectations exerted on children result from the traditional cultural values that Botswana families adhere to. In contrast with Western European countries where children tend to have a variety of opportunities for their future, the poor economic conditions in Africa make education of paramount importance to parents. The desire for families to influence their children to learn mathematics is partly in response to the realisation of its global role in modern technology, which has become an aspect of their cultural values. Parents

have high hopes that the education of young members of the family will contribute towards the better livelihoods of other family members. This translates into high parental expectations and puts pressure on their children to perform well.

Schooling as a Factor of Influence

The school environment poses a complex web of several motivational influences including the girls' attitudes towards schooling; their experiences of the nature and learnability of mathematics; their experiences with mathematics teachers, textbooks used, and the power relations between school authorities and the students. The girls expressed affinity with each other towards school, an understanding that school provided them a platform to better careers and livelihoods. Even **Hiss**, who argued for a private tutor-dependent learning, lamented that she had no choice but to think positive about school. *'If you don't like something and you can't do anything about it, what's the use of disliking it? ... It's just ok, it's school, it's there, yeah'* she protested (23 July 2008). This demonstrates her conformity to cultural mores and the suppression of her radical thoughts to gain social approval.

It is through school most of all that society expresses the importance of learning mathematics. The school as a social institution is, in Foucauldian terms, an example of how some discourses have shaped and created meaning systems that have gained the status and currency of 'truth' and dominate how we define and organise both ourselves and our social world. The girls' views are expressions of their social discourses on the value of 'school', which is accepted as reality in their society and bears no peculiarity to gender. In this sense, their utterances might be described as expressions of their pre-dispositions, their *habitués*. They see the concept of school as a right idea, but this is due to cultural conditioning; they socially acquired this discourse, which is manifested in their opinions, through enculturation. Their participation in school is largely due to having no option and therefore it makes sense to them through cultural adjustment. Hence, school does not make sense in and of itself but in the context of their *habitués*.

People, with alternative opinions on schooling are in a dilemma and are forced to conform to social norms. **Hiss** suggested preference for a private tutor and expressed dislike of everything about the formal school, but she could neither publicly voice nor sustain such radical ideas. This reflected tensions between school as a social institution and her idealised form of learning. Her ideal thoughts were beyond her family means and expectations and fell outside their cultural beliefs and traditions. Her voice on the matter had to remain silent for the sake of social harmony. This exemplifies Belenky *et al.*'s (1986) proposed women's silence perspective of knowing. The study gave the girls a voice to say the things they would otherwise not dare talk about. There are cultural constraints, which subtly forbid them to say certain things, and this is how free will is constrained in a social structure. This exemplifies how discourses impose limits on what people can say, think and do in their social milieu.

The Influence of Teachers

The girls' discourses on school were inundated with tensions between students and teachers, and expressed experiences of conflicts that dominate the ethos of schooling. The junior secondary group was very vocal on the teachers' excessive use of corporal punishment which is sanctioned in Botswana with regulations guiding its use in schools. According to the girls: *'... if you get low marks they beat us very hard, but it's not like you failed deliberately'* (**Mijs**, 6 August 2008); *'... but they should stop beating us'* (**Lojs**, 18 September 2007); and *'They also beat us, but they overdo it'* (**Hijs**, 8 August 2007). The junior school mathematics teacher acknowledged the occasional use of corporal punishment to control the students. Ironically, the girls defended corporal punishment as justified: *'... but they don't do it intentionally, they do it for a reason... if you do something wrong you have to be punished'* (**Hijs**, 5 August 2008). They resolved the tensions arising from the hegemonic behaviour of teachers by legitimising corporal punishment in order to apportion blame accordingly.

The legitimisation of corporal punishment poses a challenge and a cultural difference between the Botswana (and/or African) context and Western societies where it is unlawful. This cultural differentiation has educational implications for girls learning mathematics in Botswana. The girls in this study worried, not only about the fear of failure in mathematics to which they attach high value, but also about the possibility of being punished if they failed. Furthermore, the junior secondary school data suggest tensions due to favouritism: *'Some of the teachers... they favour*

other students... they like certain students and it's unfair' (Hijs, 5 August 2008); '... she focuses basically on the people who pass mathematics. People who fail mathematics, she doesn't really bother... she won't promote you' (Lojs, 8 August 2008). Learners get discouraged or indeed demotivated if teachers ignore their efforts but reward their classmates.

The senior secondary group reported corporal punishment being used less partly because the student community is more mature. Both the junior and senior mathematics teachers observed never used corporal punishment during lessons. This indicates that the teachers are faced with the dilemma of whether or not to use corporal punishment even though it is sanctioned. It seems that, although they admit using it, their consciences suggest that it is not necessarily desirable and acceptable. To that end, there seems to be room even in this cultural context, to question the validity of such punitive methods.

The junior secondary group alleged that their teacher was incapable of teaching: 'Our teacher just displays mathematics and go, she can't teach' (Lojs, 18 September 2007); 'Our teacher, she doesn't influence us in any way... but anyway she's not capable of teaching us' (Hijs, 9 August 2007); and 'Yea, our teacher, she comes to class and leaves us to do work and she goes out' (Mijs, 24 September 2007). This suggested tensions between the teacher trying her best to make students learn, and learners who devalued her efforts, making it difficult for the teacher to motivate students to learn. On the contrary, the senior school group had no qualms about their teacher's capabilities; 'My mathematics teacher in Form 4 is very good' (Hiss, 8 August 2007); 'My teacher is good in mathematics' (Miss, 26 September 2007); 'I would say, yea, my teacher is good' Loss concurred (20 September 2007). The classroom observations did not reflect distinctively the differences between the two teachers as suggested.

There were tensions resulting from students' perceptions of the junior secondary teacher as uncooperative and keen on using coercion and favouritism, and their dissatisfaction with her teaching style. Lojs was particularly blunt: 'One other thing is that people who teach mathematics should be a little jolly. They should be fun to be with, that is, mathematics is one subject which is difficult, so, to make our lives easy as students, teachers should make it fun to learn mathematics, but they don't' (6 August 2008). Such feelings have a profound effect on the learner's motivation since the liking or not liking of a particular class is based in part on a student's feelings of success within that class – feelings based not just on academic achievement, but also on their felt experiences in the class (Lockheed *et al.*, 1985).

Overall, the girls portrayed their mathematics teachers as having had no contribution to their hard work regardless of whether they had been 'good' or 'bad' teachers. They attributed their successes in mathematics to their own interests and efforts despite most of them describing mathematics as difficult, tricky and unrelated to their everyday experiences. Their experiences with mathematics teachers seemed to have led to *separation* (Griffin, 1980) where learners valued teachers for what they could do for them rather than in and of themselves. In the end it would seem that the girls felt they were not inspired by their teachers in mathematics, which suggests that the teachers did not fulfil one of their objectives of motivating students to want to learn. The separation of teachers is deceiving because it suggests that the girls felt effective and competent at mathematics, and therefore personally responsible for their successes. But most of them were not, and there was no evidence or justification for this separation.

From the girls' expressed social experiences, the teachers appeared marginalised, which was surprising given the high status that teachers occupy in the African context. The girls viewed mathematics teachers as uninteresting and uninspiring, perhaps partly due to the hegemonic means of control that the school imposes through teachers, which overshadows the sense of value for the teachers' worth. McNeil (1986) described the sort of shallow disconnected teaching seen by students in the classroom which seemed entirely consistent with Foucault's view of power. According to McNeil (1986), the institutional arrangements, in ways no one quite seems able to pin down, makes even the most able and intellectual of the teachers generally tone down their teaching to the level of the approved curriculum materials.

Many teachers have personal interest in real political, economic and social issues which they leave at the classroom door. Seeing their job as controlling their students, they seek to do this through control of the curriculum. This is why students find subjects such as mathematics uninteresting and feel that teachers do not contribute to their learning. This relates to women's ways of knowing as Belenky *et al.* (1986: p. 113) argued:

Connected knowing builds on the subjectivists' conviction that the most trustworthy knowledge comes from personal experience rather than the pronouncements of authorities. Among extreme subjectivists this conviction can lead to the view that they can know only their own truths, access to another person's knowledge being impossible.

This in part gives a sense of why the girls tended to marginalise and undervalue their mathematics teachers.

Influences of the Nature and Learnability of Mathematics

Some of the girls were confident in mathematics and regarded it as their best subject whereas others were struggling and more likely to perform poorly at the end of their respective programmes. To some, mathematics was tricky and challenging (**Loss** and **Miss**) and to others difficult but interesting (**Mijs** and **Lojs**). All of them, however, attached high value to the attainment of mathematics success. They regarded it as a gateway to higher education (**Hijs**, **Loss**, and **Miss**) and thought it gave them prestige and high expectations (**Lojs**, **Mijs**). For **Hiss** it was a way of gaining approval from her mother who '*places a lot of importance in it*' (8 August 2007). One would anticipate that because they valued the attainment of success in mathematics, they would choose to spend more time on schoolwork which involved mathematics than, perhaps, in other subject-matter areas. However, there was no evidence that this was the case, which points to the workings of discourse that Foucault and others ascribed to.

Discourse according to Foucault refers to:

Ways of constituting knowledge, together with the social practices, forms of subjectivity and power relations which inhere in such knowledge and relations between them. Discourses are more than ways of thinking and producing meaning. They constitute the 'nature' of the body, unconscious and conscious mind and emotional life of the subjects they seek to govern (Weedon, 1987: p. 108).

This entails how people use language to share ideas and feelings to influence others, to define and maintain communities, and to make sense of the world.

The girls attach a discourse of high value to mathematics success, yet in practice, they are not living that discourse. There is a tension between the discourse of high value and its effect, which is that one would expect them to live that discourse by working harder in mathematics. The tension arises because this discourse of high value is not the girls' own discourse. There is a tension between whose discourse it is and how it affects them. From their perceptual frameworks, it is affecting them because they tend to join in and say mathematics is important, but it emanates from the socialising and stratifying power of mathematics. In a Foucauldian sense, the girls' views are aspects of their discourses, derived from power relations. Their utterances are situated in their social, cultural, historical and linguistic contexts. This is the way in their culture that people are responding to the high value discourses. To an extent they cannot say anything else – that is unthinkable, but they are then forced to justify their positions.

There was a tendency among the girls to seek evidence of connections between success in mathematics and good future careers or connections between mathematics concepts and everyday life experiences. They tended to question the applicability of some concepts to their lived experiences and felt they had to learn them solely for academic advancement. It seems that the girls experienced the learning of mathematics as either peripheral or irrelevant to their central interests and development despite its high value. These tensions between the mathematics concepts learned and the students' negative perceptions of the applicability of such concepts in everyday life posed a hindrance to the girls' motivation.

The girls sought to see the field of mathematics come alive, to have a sense of its practical role in their lives. Belenky *et al.*'s (1986) demonstrated how women used constructed knowledge and Tobias (1990: p. 10), in support of this view, argued that:

Women ... would respond better to science if ... scientific knowledge were closely and explicitly linked to important societal issues.

The girls in this study valued good grades in mathematics for various reasons. Some felt grades determined being good or poor in mathematics, earned them respect and raised expectations. Others portrayed the importance of good mathematics grades as a requirement for *the best courses* in further education. Thus, everyone strived to get the best results in mathematics despite their varying abilities, attitudes and performances with the hope of doing 'the best subjects' at respective higher education stages. This relates to the value they attach to mathematics success and demonstrates how social discourses operate. Society, through schools, has made them to believe that mathematics is a special subject in the national curriculum and they were therefore echoing a socially accepted educational discourse.

According to Skovsmose (1994: pp. 5-6), mathematics is connected to our technological culture and its importance is generally accepted far outside the mathematics and technological community:

Mathematics education is paid an enormous amount of attention by all institutions in society. It is taken up globally – in the highly technological societies with reference to the importance of keeping pace with social development, and in the developing countries with reference to the demands of making technological progress.

Because of this enormous attention, the girls acquired its *high value discourse* in subtle ways within their social contexts. Governed by Marxist theories of social totality, discourse is used here to extend the theory of ideology - that part of the ideological instance in which the subjects represent the imaginary relationships of individuals to their real conditions of existence. Ideology refers a system of ideas that aspires both to explain the world and to change it. Gates' (2000) argued that ideologies may be more covert systems of ideas that may achieve their expression through engaging in discourses. The girls have been disposed to value mathematics in ways that in the end feel commonsensical. In this way mathematics functions as a practical political force that society uses in an effort to promote technological development. Consequently, mathematics is used as a tool to 'weed' the student population of the weak, with implications on their future trajectories.

Mathematics grades, which are the result of tests and evaluations, are experienced as controlling (Grolnick and Ryan, 1987; Amabile, 1983). Controlling events pressure people to think feel and behave in particular ways and serve to motivate behaviour extrinsically (Deci *et al.*, 1981). The girls in this study were moved by the need to achieve success in mathematics as the achievement theorists would argue (Atkinson and Feathers, 1966). But, this need for success is driven by social goals (technological development) whose achievement rests on success in mathematics. This way mathematics is used ideologically in subtle ways to prescribe students' actual behaviours and to define or 'naturalise' possible ones.

Influences of the Peer Group Environment

The girls expressed a high value discourse for their peers as socialising was a prominent feature highlighted as motivation for attending school (apart from the lack of choice), and this extended to cooperative work in mathematics. All the girls expressed an enthusiasm for collaborative work, but some benefited immensely from it than others.

Loss acknowledged the importance of working with others: '*... you get ideas from other people and understand much better if you work together*' (19 September 2007), yet her colleagues were allegedly unwilling to cooperate: '*I never work to help friends because they refuse to work with me in mathematics*'... '*Each time I ask... them they will just tell me that they are too busy, both boys and girls*' (19 September 2007). Having a single parent, who could not help her, seemed to exacerbate her desperation for peer support in mathematics and emotionally.

Hijs expressed difficulties working with others in the final year of her school programme. From class observations, her own confessions and accounts of her colleagues, she no longer worked with others and had lost concentration, found it hard to cope in mathematics, and could no longer figure things out for herself anymore. It seemed her working relationship with others was based on personal confidence in mathematics and the fear of failure lowered her cooperative spirit. She had previously declared: '*I don't want to work to help my friends, I want to work with them*' (9 August 2007). Later, she was despondent: '*No, not anymore. I can't work with them because I don't know what to say, I can't teach them anything. I am in the dark and they are in the dark, so, they can't help me*' (5 August 2008). Her case represents a circumstantial shift from cooperation to individuation due to family social change leading to failure experiences.

On the other hand, **Miss** described a loose working relationship with friends indicating limited commitment to collaborative work. **Hiss** and **Lojs** claimed to work with friends often to help each other out, emphasising collaboration based on sharing ideas with others. They both valued their friends' cooperation and seemed to benefit from it. **Lojs** claimed that her cooperative relationship with others was based on her expressed lack of confidence in mathematics. These cases suggest the confirmation of an important feature in girls' learning – co-operation or collaboration that gender and mathematics research studies emphasised (for example, Eccles, 1987; Tobias, 1990).

The above give credit to the discourse of high value that the girls attach to peer relationships. Peers are valued for socialisation, which extends to collaboration in mathematics and other subjects. There seemed to be a tendency among the girls to rely on the peer group for support and help in mathematics than on their family members. This is a tendency to "connection and relatedness to others" confirming Belenky *et al.*'s (1986: p. 8) assertion that:

The responsibility orientation is more central to those whose conception of self are rooted in a sense of connection and relatedness to others, whereas the rights orientation is more common to those who

define themselves in terms of separation and autonomy... it is clear that many more women than men define themselves in terms of their relationships and connections to others.

There is no conflict between the discourse of high value attached to peer relationships and the acts of socialising that follow. According to Abbott (2007: p. 137):

Research indicates that young people are highly influenced by their peer group... Perhaps conformity to peer groups is a prerequisite to achieving independence and autonomy as an adult... as the young person struggles to become independent from their parents, they use the security provided by the peer group and the self-confidence that comes with it, to take that final step towards independence.

The girls live the discourse of high value for peer relationships and this has become a fundamental reason for both attending and liking school. Building friendships and having fun with peers at school seemed to blur the real social reason for attending school - the lack of choice. For many, it reduces the burden of feeling coerced into schooling against their will and gives them the confidence and impetus to confront the everyday demands of schooling.

TOWARDS A SENSE OF MOTIVATIONAL ORIENTATION: IMPLICATIONS OF THE SOCIAL INFLUENCES

Analyses of the case studies revealed several social factors, which underlay motivational orientation towards mathematics. Each girl's ideas about mathematics and her way of applying them were coloured by her particular social aspirations in life. The girls' envisaged career goals suggested their perceptions of the role of mathematics in their future lives and allowed them to define how they identify themselves in relation to the field. Despite expressing a discourse of high value for the subject, none of them envisaged a mathematics-related career, but rather, they expressed a desire *to work with people*.

Hiss, **Loss** and **Mijs** expressed interest in studying medicine or becoming medical doctors. Moreover, **Hiss** and **Lojs** showed a desire to become lawyers while **Hijs** desired to become a psychologist - all based on the discourse of '*helping other people*'. For the strugglers in mathematics, their preference for jobs unrelated to mathematics is, perhaps, understandable. However, there was no exception even for those who proclaimed high ability and self-confidence in mathematics such as **Hiss** and **Hijs**. It could be that, as **Hiss** put it, '*girls would prefer to be nurturing*'. But this is conformity to cultural values, that is, the way girls are brought up in Botswana society, which has implications for their identity formations. The girls seemed less interested in pursuing mathematics to higher levels beyond passing their respective secondary school examinations. This, however, owes in part to the limitation of the study sample, which was not meant for generalising.

The girls tended to view mathematics as functional only in so far as it helped towards developing their non-mathematical careers in short-term. In other words, its functional significance did not seem to extend to helping them develop interests in the study of the most demanding mathematics courses offered and to persist with mathematics to the highest degree level (Forgasz and Leder, 1998). There were contradictions between the discourse of high value in mathematics success and its functional significance. Because these girls could not make tangible connections between mathematics and everyday experiences, this undermined the functional significance of mathematics in the face of the importance they attached to the subject. Perhaps the contradictions are due to the fact that the discourse of high value in mathematics success was not the girls' own discourse, and did not emanate from their own judgements of the function of mathematics. Rather it was imposed on them by society in response to the demands for mathematics in the modern world of work.

Society has made these girls to believe that success in mathematics guaranteed a better future due to the recognition of technology as the basic condition for modern development, which depends on the application of mathematics (Skovsmose, 1994). Over the years the employment structure in Botswana has adjusted to accommodate modern technology, particularly information technology. Many traditional jobs, which in the recent past required manual labour, now employ the use of microelectronics (computers). Yet, despite attaching a discourse of high value to mathematics success, the girls in this study did not seem to have an articulation of the function of mathematics in such jobs.

The case scenarios indicated further that the girls' affiliative and affectionate relationships with their families and peers, contributed to their identity formations in relation to mathematics. They were keen on co-operative work as they struggled to form working relationships with their friends. Some, such as **Lojs** felt they could not do mathematics

on their own and needed friends to help them cope. Others wanted to be as good as their friends who passed mathematics and worked with them to '*share ideas to try to help each other understand*' (Mijs: 20 September 2007). Although **Hiss** expressed a desire to share work with others, she seemed to undervalue the influence of her friends in mathematics causing a tension between the discourse of high value for peer collaboration and her self-confidence. Because of her experiences of success and self-determination, sharing work with others did not amount to peer social influence. In contrast, **Loss**'s expressed lack of co-operation from peers seemed to affect her negatively in that she hoped to benefit from their contributions and support.

The girls were socialised to identify themselves and to be identified by others as either 'good' or 'poor' in mathematics, and the 'good' were associated with intellect. They internalised these social beliefs, which became self-fulfilling prophecies. For instance **Mijs** and **Lojs** claimed the need for special talent to do well in mathematics. Formal education is a social entity built on academics by intellectuals in which good students such as **Hiss** are socially accepted and rewarded, whereas poor students such as **Lojs** are socially rejected by the system. Having little opportunity to discover or develop their natural talent, they receive the label of 'low ability', which leads to the self-fulfilling prophecy. According to Coffey (2007: p. 53), "Identities are negotiated and biographies constructed through school processes, learning encounters and curricular engagement". Students who don't fit in, want out, their learning personalities are incompatible with the intellectual world, which mathematics does so well to project. This is the 'filtering' or *weeding* power of mathematics referred to earlier. It demonstrates how practical ideologies address and shape subjects (students) through discourses that point out what exists, what is good and what is possible (Berlin, 1993).

The girls' descriptions of mathematics as *easy, difficult, tricky, challenging, dull* and *problematic* are features of their social discourses constructed through their engagement in the social field. They lead to motivational traits imbued with their ideological positioning derived from the everyday practices. According to Gates (2000: p. 195):

Michel Foucault raises the significance of focusing on the everyday practices as these are more fundamental than theory (Foucault, 1976)... is less interested in uncovering such unnoticed everyday interpretations and more interested in analysing historically situated systems of institutions and discursive practices... in which he avoids getting embroiled in debates about whether what is said is true or meaningful focusing instead on the ways in which discourses are formed and sustained.

Foucault attempted to analyse the *discursive practices* that lay claim to revealing knowledge in terms of their history or genesis rather than in terms of their truth. He embraced the idea that language and society were shaped by rule-governed systems, but disagreed with the structuralists on two accounts. He did not think there were definite underlying structures that could explain the human condition, and thought that it was impossible to step outside of discourse and survey the situation objectively. For Foucault, there is no answer waiting to be uncovered. The *discursive practices* of knowledge are not independent of the objects that are studied, and must be understood in their social and political context. In this view, both the formation of identities and practices are related to or are a function of, historically specific discourses.

"It is imperative that the everyday realities of schooling more generally are grounded in their social and cultural, and historical contexts" (Coffey, 2007: p. 56). In this study, **Hiss** and **Hijs** whose learning personalities were in harmony with the mathematics environments were labelled 'high ability' and the others 'average' or 'low ability'. But the reality is that everyone wants to be considered of high ability, for success yields confidence, more success and acceptance. Many will seek social environments that will give them that feeling. The girls' expressed learning experiences suggested that most of them did not find the mathematics environment socially satisfying. Yet all recognised the significance of doing well in mathematics even without a sense of its practical value.

Some of the girls in the study said some things without necessarily living out what they were saying. For instance, they made connections between success in mathematics and 'good jobs', as well as it being a prerequisite for 'the best subjects'. However, there was no evidence that they worked very hard to succeed in mathematics, which means they talked certain discourses that did not necessarily impinge on their practical activities. This suggests that the discourses one uses in social structures do not necessarily influence one's practice. Their underlying *habitués* came in conflict with some of the discourses they encountered. On the one hand there is the '*mathematics is important*' discourse and the girls know it is important. But this is conflicting with some of the things they want to become such as their future careers imbued with the discourse of '*caring about people*.' They see mathematics as separate from this self-perception partly because the school portrays mathematics as separate.

The '*mathematics is important*' characterisation that the girls ascribed to is ideological. The importance of mathematics in the national curriculum is a *taken-for-granted*; everyone knows that to be the case. This discourse gives the girls the status of 'subjects' by the ideological constructions that tie them to fantasised functions and activities, not to their actual situation. This way the culture makes these girls accept the importance of mathematics without reflection, masking very real needs to organise societies in particular ways.

Mathematics is central to some of the professions and to technological development, they know this and they have to go through it. However, school teaches mathematics in ways that force a separation between the self and the family, placing the girls in a conflict situation. They have to do it because the family believes it is part of their development and they want to please the family. Yet they fail to find a connection between mathematics concepts and their future life trajectories. In a sense, school teaches mathematics in ways that separate it from everyday activity and from the humanities. Given the context in which the girls find themselves, where mathematics is not taught as play and where the language and terminology of mathematics are unrelated to their local languages (mother tongues), the separation of mathematics from everyday discourses is rather exacerbated.

Foucault's assertion that we are all tied in social discourses surfaced in this study. The '*mathematics is important*' discourse plays a role for parents and seems to have become an element of the repertoire of *habitués* for the girls. However, it causes conflict because of the girls' '*caring about people*' discourse. The girls tend to acknowledge the importance of mathematics, but they don't show it through hard work. On the other hand they show caring for other people through forming friendships, peer collaborations and even anticipate future careers that embrace this discourse. Their acknowledgement of the '*mathematics is important*' discourse bears witness to the construct of socialisation where people selectively acquire the values and attitudes, interests, skills and knowledge through power relations. This is the way practical ideology produces its ideological effect. Social practices such as learning mathematics with social conformity and difference to school authorities are ideologically legitimate in subtle ways. They are therefore hegemonic and give rise to the concept of *commonsense* knowledge. The '*mathematics is important*' discourse itself arises as a consequence of the stratifying power of mathematics referred to earlier.

In the final analysis, there were a number of forces acting on individual learners that led to their motivation or demotivation in mathematics. Some of these forces are the discourses of the family, the church, the school and peer groups, all of which have varying influences on the individual. The case scenarios suggested that the most positive influences were reflected in peer group social relationships. There was no conflict between the high value attached to peer friendships and the collaborations forged in learning mathematics. Peer relations emerged as motivation for many to attend school and it tended to blur the fact that students have no choice. On the other hand there were conflicts between the high value attached to mathematics success and the desire to work with people. Nevertheless, peer group influences did not seem to contribute to an increase in motivations towards mathematics.

Although the girls acknowledged the importance of mathematics, they did not seem to work hard to succeed in it; hence their parents used incentives to encourage success. The influences of the family are made complex by family dynamics and social changes, which have contextual implications. Cultural contexts, which differ between African and Western European societies, render certain family influences specific to Botswana society. The common phenomenon of separation of spouses due to employment is one such a social contextual feature. Family sizes, the availability of books in homes and level of education of family members are other common points of differences. The desire for education seems enormous in Botswana due to the economic hardships most people find themselves in, hence, the high expectations and pressure on the girls to succeed at school. Schooling is valued for its role in helping young family members realise their educational ambitions so they could improve the livelihoods of other family members. Demands for success in mathematics have been accelerated by its application in modern technology and this in turn has put pressure on social structures such as the school and the family to respond.

The conflicts and tensions that exist between socially valued discourses and students' personal interests can be traced back to Hegel's theory of dialectic which suggests that history progresses through the resolution of contradictions within a particular aspect of reality. The tensions, between the girls and social forces such as family values and teacher expectations represent the struggles within society that Marx referred to. These tensions result from the practical actions of the girls within their social milieus. It is through such practical actions that the girls acquire the *habitués* that Bourdieu ascribes to. Conflict is built into society as people (such as these girls) find that their expectations and ways of living are out of step with the new social position they find themselves in. The girls are, in a way, being forced to learn mathematics due to the '*mathematics is important*' social discourse. This conflicts with their humanities related '*caring about people*' discourse, which they act out through peer relationships and relates to their future careers. The '*mathematics is important*' social discourse does not seem to have practical significance for them despite its relevance to the modern world of work. Yet mathematics, itself a cultural production, has become a form of

ideology, one that legitimises the power of the state to 'filter' students for educational, political and economic purposes.

REFLECTIONS FROM THE CLASSROOM OBSERVATIONS

As part of the researcher's endeavour to locate teachers within the forms of power that Foucault and others espoused, the classes of the girls in the study were observed. During the observations the junior secondary teacher had problems managing the behaviours of some boys who were rowdy and at times disruptive. She allowed chorus responses and sometimes appeared to lose track of lesson objectives. She made efforts to control the class, but admitted that occasionally she used corporal punishment to quell the disruptions. The senior secondary class was orderly and well managed, but the teaching was no better. The teacher did the work and the students passively copied the examples or responded to the teacher as she worked problems on the board. Little attention was given to students' initiatives and investigative work that allowed them to figure things out for themselves.

In both cases no teaching aids were used during the entire observation period even on concepts requiring the use of such aids. None of the teachers attempted to explain the application of the concepts being taught. There were indications that the students viewed the teaching as 'dry' and uninspiring. For instance, the junior secondary group labelled their teacher as 'incapable' of teaching. The teaching seemed a bland, watered-down affair, which rather portrayed the teacher in total control of the subject matter. These observations echo those of Prophet and Rowell (1988) who reported teaching in Botswana as predominantly authoritarian and teacher-centred, and learning as passive and based on recall.

Teaching style, relevance, students' centredness, enthusiasm and expectations are elements of pedagogy - the art of teaching. In their pedagogy, good teachers work with students in a relationship rather than an authoritarian mode. Effective teachers don't create barriers by being dogmatic; understand that authoritarianism does not work and engage students in learning rather than the *'I teach you learn'* mode. During the observations the teachers involved did not use a variety of approaches such as having a good blend of verbal and written work, balancing writing, discussions and the use of books, as well as demonstrating with visual modelling. Furthermore, there was no indication they advocated curriculum planning around students' point of need and worked from what students knew. Cultural context requires teachers to relate to the knowledge and skills students bring with them, which are linked, to their 'world', and to include local (Botswana) elements in as much of what they teach as possible. The girls in this study would prefer teachers who understood and practiced the principle that *'what you teach needs to be relevant to this day and age'*, which calls for a link between the curriculum and everyday life.

The high value the girls attached to peer culture suggested their tendencies towards collaboration and co-operation. The researcher expected the teachers to vary their teaching strategies with group work where everyone shares the problem and shares the solution, interact and help each other. This mode provides teachers with flexibility and the leeway to adjust so students engage in learning; and they (teachers) adapt and set up lessons students can achieve success. This way, teachers manage time flexibly, do not expect things to be done immediately, and accept that the task will usually get done. The teachers involved complained of lack of time and teaching facilities as the major constraints on their flexibility. This suggests that it was largely the school system's bureaucratic controls which failed the teachers and it is unfair to direct all criticism squarely on them.

The classroom observations suggested that the school was functioning in a way that attempted to socialise students into consensus mathematics, into passive learner roles. However, there were no overt community pressures or external elites insisting that the school take this social control function. It stemmed from the way the school operates as an organisation, not from outside pressures. The forces that led teachers to teach mathematics as a watered-down subject are invisible, embedded as they are so deeply and pervasively in the very structure of the school in which they work, forces which themselves are embedded in the broader society. In serving the social control function, the teachers, themselves both transmitting and being acted on by power, become part of the process by which the young are disciplined, and they themselves are controlled by the same forces. The students are controlled by the teachers, but both the teachers and students are controlled and shaped in ways much more subtle and difficult to detect.

Power works such that conformity is not the result of an overt force that visibly bends the will of those subject to its operation; but from the constant working of invisible constraints that bring us all toward the same 'normal' range of practices and beliefs. But the position of the teacher vis-à-vis power is more complex than that. While Foucault uses schools as the paradigmatic disciplinary institutions, he ignores the extent to which they are also the last strongholds of sovereign power. From one perspective teachers are themselves subject to the web of disciplinary power, however, the teacher, as seen by the student, wields power in its sovereign form. As Willis (1977) describes in *Learning to Labor*,

and as Foucault would predict, the school becomes a site of resistance and outright rebellion precisely because it is a site of authoritative power. As the teacher act to impose control overtly on the students, the students can see that they are being forced to act in ways they would rather not.

The power relations that this analysis refers to are part of the construct of socialisation through which the girls acquire the values and attitudes, interests, skills and knowledge. It is from the practical activities of the girls within the power relations at school, in the family and within their peer groups that their motivation in mathematics emanates. The classroom (as observed) did not seem to cultivate a positive motivational atmosphere for the girls in this study.

REFLECTIONS ON THE QUESTIONS: SO, WHAT WAS ACHIEVED FROM THE GIRLS' EXPERIENCES?

The essence of conducting the investigation was to suggest possible solutions for the girls' perennial poor performance in mathematics education. For this reason, the study endeavoured to answer the following questions:

- 1. What is it within society or the culture that creates barriers to mathematics success for Botswana girls?*
- 2. How do girls' experiences in mathematics as a social event impinge upon their motivation in the subject, which has implications for their life trajectories?*
- 3. What could be done to encourage girls' participation in mathematics in Botswana in view of their social experiences given the important role of mathematics in the modern world of work?*

These questions do not require easy answers and the case studies were an attempt at addressing some of the issues they raised. The themes that emerged from the interviews offered 'social environments' as the main sources from which the barriers to success in mathematics could be influenced. Social influences, as the stories indicated, impinge upon the girls' motivational orientations and impact on their performances.

The stories indicated one distinct aspect – that the girls were discursively positioned in a somewhat unhealthy situation with respect to learning mathematics. There is the '*mathematics is important*' discourse, which is not the girls' own discourse. This discourse is ideologically entrenched in their culture – they know mathematics is important and they have to join in and say 'yes it is'. This discourse, however, is in contradiction with the other things that the girls would like to do in life – they '*would prefer to be nurturing*' (Hiss: 23 July, 2008) or to '*help people*' in their future careers. This resonates well with their cultural preparedness – "their marital and maternal obligations to their families" (Okojie, 2007: p. 12).

Because of the gap between valuing success in mathematics and the failure to link mathematics to future plans, the tendency among the girls was lack of intrinsic effort. Parents, acting out of desperation, use extrinsic incentives – such as items of luxury (cell phones) and money - in an effort to lure their children to want to learn mathematics. At the same time the parents are not actively involved in helping their daughters with mathematics homework. Their culture promotes tensions between the girls and their teachers (school authorities) by sanctioning hegemonic means of control such as corporal punishment in schools. This puts teachers in a dilemma situation of whether or not to use corporal punishment, and further creates tensions between teachers and their superiors.

The downside of external incentives and corporal punishment is that learners may feel controlled. Research studies have shown that learners who perceived their achievement related behaviours to be controlled by external forces, such as teachers' use of highly controlling behaviours, are less likely to initiate and explore (Bandura, 1982). Furthermore, the *cognitive evaluation theory* states that when external rewards or other controlling strategies are used, behaviour is no longer seen as self-determined, and an individual's interest in pursuing the activity in her/his free time declines (Deci, 1971). There were clear protests against corporal punishment and suggestions of tensions from pressures disguised as parental support in mathematics.

These girls also have the disadvantage of mathematics as alienated from their indigenous languages and other forms of early learning. They therefore see it as belonging to the school. They live in a culture that condones the separation of parents due to employment demands, which may be detrimental to the child's education. Furthermore, the stories suggest that for this group of girls, social class was not a clear determinant of success in mathematics. This may be due partly to the cultural differences between African and Western societies. In the latter, social class was found to contribute to mathematics success. It may also be due to the limitations of the sample size, and further investigations would be appropriate. The author is careful to avoid generalisations, which were never intended due to the study's epistemological approach.

The girls in this study showed an affinity towards collaboration and co-operation. There were no tensions for peer affiliation, and even those who did not work with others felt denied that opportunity. This is within the parameters of their cultural upbringing, with emphasis on girls and women taking care of other family members (Okojie, 2007).

The stories also indicated that the girls could not make connections between concepts learnt in mathematics and everyday life. Confident and self-motivated girls such as **Hiss**, lamented, *'I go to school, I learn a whole lot of things which I don't know if they are useful in life. What do I need indices for? Nothing... I mean, having all the numbers in the world and knowing maths wouldn't get you anywhere...'* (23 July 2008). **Lojs** added: *'I don't know why it is given such importance'* (8 August 2008). The girls found it difficult to link mathematics to everyday activities. This lack of coherent connections causes tensions and dilemmas, as the girls ponder on why they should continue to learn a subject, which has no significant value for them in real terms.

In the end, these girls seem to be struggling on with mathematics out of lack of choice without any suggestion that they have any motivation for doing so. It seems that the knowledge that mathematics is important puts pressure on the girls to aim high in the subject. At the same time, the abstract nature with which mathematics is held in society, the way it is taught at school, the lack of connection to everyday activities and parental pressures, all lead to anxiety, which undermines their motivation. Their performance in mathematics is for reasons separate from its inherent satisfactions. By the end of the research most girls were relatively poorer in mathematics than at the beginning. In other words, there seemed to be a progressive decrease in intrinsic motivation for class work as the girls advanced through school.

The stories suggest that the girls' lives were being compartmentalised by regulating their behaviours according to situational and social needs. Mathematics has found a role in the compartmentalisation process because of its link to technology, the basic mode of development. This makes mathematics an ideological production which serves to *'filter'* learners for social and political purposes. The prevailing cultural attitudes, which undervalue the education of women in Botswana, have contributed in the construction of girls to feel in a 'normal' situation. Their motivational orientations appear as individual misfortunes or efforts, yet they emanate from influences ingrained in their acquired dispositions, that is, their *habitués*.

LIMITATIONS OF THE STUDY

Financial resources and other social events were constraining issues in this study. It was initially intended to be a longitudinal study over two years, but my sponsorship could not cover the financial costs involved. Data collection was divided into two phases each taking six months, but there were time constraints on the field due to the sample schools' timetables. In some cases meetings with students had to be re-scheduled as the schools demanded. Because there was a discontinuity between the two phases of data collection, the author relied on the girls' narratives of their learning experiences rather than on rich anecdotes that participant observations in a longitudinal study could have offered. This denied the author the opportunity to get a more comprehensive understanding of the issues raised in this paper.

A small group of six girls was selected with a view to get an in-depth view of the forces that most influenced their motivation in mathematics. As it turned out, the sample size became a limiting factor on the conclusions that had to be made. However, it should be understood that the aim was not to generalise findings, but to gain a better understanding of the issues under investigation.

The theoretical framework and literature review relied heavily on Western research which poses a limitation on the transferability to the African situation due to differing cultural trends and traditional practices. The author's experiences of having taught mathematics in both Botswana and England (Nottingham) showed a clear divergent classroom practices at work. The teaching of mathematics in Botswana, although itself an imported Western tradition adopted from the UK, poses some limitation in terms of the operationalisation of concepts as understood from a Western research perspective. A more traditionally Botswana or African theoretical approach if available could have shed more light on the impact of the social influences on the girls' motivational orientations, and this calls for a further grounded theoretical study to generate such a theory.

Some, particularly from the feminist approach, may view the research conducted by a male on female learners, as a limitation. The author does not consider it as such because the approach questions the disenfranchisement of female learners in Botswana and has personal as well as social implications.

CONCLUSIVE SUMMARY

The study that this paper refers to is unique in that it addressed a national problem of improving the image of female learners in mathematics, which is a contemporary issue in the African context and the rest of the developing world. The

problem of emancipating women and girls from social attitudes that tend to keep them in positions of subordination has become a concern for developing countries, who until recently viewed it as a Western phenomenon.

This study adds an emancipatory voice to the plight of girls in learning mathematics in Botswana, and Southern Africa. The case study project contributes to a journey that could expand research on gender differentials in mathematics education in the region and beyond. Women are a formidable force in economic development in all parts of the world, yet their efforts are still undermined through cultural and traditional means that relegate them to devalued social roles that most developing societies recommend for them. As the case study scenarios indicated, a number of social forces compete to influence girls' motivation in mathematics education.

Transformation of existing beliefs and attitudes towards girls and women is the ultimate aim. Since the principle sources of data are secondary school girls, to some extent, the education system of Botswana is subject to critical enquiry. To that end, the study critically examines the role of education in the motivation of female learners towards mathematics. Education in this context is part of a wider social structure and a vehicle for advancing the learning experiences of young members of society.

The nature of case studies is such that they focus on specific instances or situations and explore the various interactive processes at work within those situations (Hitchcock and Hughes, 1989). As Kilbourn (1999: p. 31) put it:

Theses are made of parts. Seldom are all parts outstanding. In this thesis, I'm holding, the data are fantastic, even though the analysis is not as strong as hoped. In that study, over there on the shelf, the analysis is penetrating, although the database is a bit thin.

The author recognises that there is no single complete *truth* but that there are multiple discourses of truth in a particular time, place and space. For the author, research is an ongoing process, and this research is an unfinished business, which enabled the researcher to grasp the partial realities in a particular spatial context. The conclusion of this paper became a difficult undertaking for the author who saw it in the form of a continuing enterprise and therefore preferred to describe it as a *'pause'*. The case study scenarios revealed issues related to further research. By revealing how the girls are discursively positioned to view mathematics as important, but with no sense of its meaningfulness in practice means further research need to be conducted to find out whether this is a general view in Botswana or Southern African sub-region.

The problem of story telling as a way of representing the silent voices is another issue of contention. The question of the voices of learners in general has not been fully addressed as it is beyond the scope of this paper. This research, however, attempted to represent the voices that are normally kept silent. Students' voices are not commonplace on educational matters that affect their learning. They are kept silent by the school culture with its wider social values. The voices of the study's informants only partially reveal the active silent voice. Most research projects are keen on asking students to fill questionnaires from which generalizations are made. This way, students are treated as sources of information without recognizing their human face. It would be fruitful to look at how learners are discursively positioned to keep silent in order to create channels for them to tell their own stories concerning their learning.

Through embarking on this study, the author was somewhat challenged and changed by it. Having been accustomed to research as proving whether a given theory stands or falls apart, through statistical anecdotes and generalizations, the study provided the experience of research as also about getting a deeper understanding of issues of interest. The author also learnt that research work is not an easy undertaking and cannot reveal only one *'truth'*, but that *'multiple truths'* may emerge depending on individual interpretations. One of the informants said: *'This tape recorder reminds me of the police'* which demonstrates how respondents may associate research with other aspects of their social lives, which may affect their responses.

The research helped the author to know more about Botswana and its attitudes towards women and girls, and that it is by standing back and trying to see things from a distance that one learns more about his/her own social contexts. Unless one has some issue to protest, it is difficult to see one's social structure as problematic. The author learnt how cultural attitudes were influencing the upbringing and education of girls in Botswana.

The author concedes that he does not possess the eloquence of reproducing his research endeavours by word of mouth and wish to align with Schon (1987: p. 49) who argued that:

When we go about the spontaneous, intuitive performance of the actions of everyday life, we show ourselves to be knowledgeable in a special way. Often we cannot say what it is that we know. When we try to describe it, we find ourselves at a loss, or we produce descriptions that are obviously

inappropriate. Our knowing is ordinary tacit, implicit in our pattern of action or in our feel for the stuff which we are dealing with. It seems right to say that our knowing is in our action.

The gender and mathematics problem remains a concern for Botswana as the BGCSE results continue to show that doing badly compared to boys. The Examinations, Research and Testing Division of the Ministry of Education (2007) Examination Summary of Results, p. 13) acknowledged that:

As in previous years, the overall performance of male candidates (as measured by the % of grades issued which are C or better) was significantly better than that of female candidates. For all subjects, 42.22% of the grades awarded to male candidates are grade C or better. For female candidates the corresponding percentage is 39.70%.

The significance of further research in this area cannot be in doubt.

POINTS OF DIRECTION: LESSONS FOR EDUCATION AUTHORITIES

This section raises issues that government as the custodian of the people of Botswana should take into account to help female learners in the face of a barrage of influences on their motivation in mathematics. This could foster an awareness campaign for education planners, curriculum developers, textbook authors and teachers on the problems faced by girls in learning mathematics. Ultimately, curriculum policy, syllabuses, textbooks and lessons could be designed to address girls' interests in mathematics education.

- Government should introduce infant schools where mathematics could be taught as play to prepare children for the appreciation of mathematics at later stages. The girls described mathematics as tricky, difficult, tough, boring, problematic, etc. partly because they view it as a school-based subject divorced from their everyday experiences. If they learn it early in their development, this could dispel some of the myths attached to the nature and learnability of mathematics.
- More resources should be put in schools to enable teachers to facilitate the learning process rather than dominate the classroom discourse. The classroom observations, the girls' and teachers' views suggest that teachers would do better with modern supportive teaching aids. This could improve teaching and boost the image of teachers who the girls regard as ineffectual.
- Gender awareness courses should be introduced in teacher education colleges to combat patriarchal attitudes that prevail in Botswana with negative impacts on female learners. Botswana still harbours such attitudes, which have detrimental effects on girls' efforts in mathematics and on their career choices.
- The integration of technology into education should be accelerated. Information technology should be part of the school curriculum since it has become a global driving force in career opportunities. The girls expressed awareness of the importance of mathematics in education and the use of ICT in learning mathematics could boost their interests and help their understanding.
- Corporal punishment should be abolished in schools. Teachers are viewed as hegemonic and controlling through its use. Teachers in this study seemed to be in a dilemma as to whether to use it (because it is sanctioned) or not to use it on moral grounds. The girls expressed feelings of being intimidated by the use of corporal punishment. Well-trained teachers can do their work without the help of such harsh methods of control, which often give students strategies to resist and lose focus on learning.
- Government should consider labour or employment legislation that attempts to consider the problems related to family dynamics that affect children's education. The case scenarios call into question the practical implications of the existing policy.

If government took these measures into consideration, the factors that negatively influence the girls' motivation and participation in mathematics could be minimised.

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Determining Mediating Effect of Information Satisfaction on International Students' College Choice: Empirical Evidence in Malaysia's University

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Abstract

This study aims to shed light on college choice satisfaction by examining the role information satisfaction may play when evaluating the relationship of college attributes with choice satisfaction. Previous research has successfully demonstrated the direct relationship between college attributes, information satisfaction and choice satisfaction; however, study on the possibility of variables having a mediating role on choice satisfaction has yet to be investigated. This study attempts to address this knowledge gap and seeks to serve a provocative role in explaining international students' college choice satisfaction. This study was conducted on 149 international students from a private university in Malaysia. Results suggested that college attributes and information satisfaction were essential predictors of students' choice satisfaction. However, more importantly the findings also highlighted that information satisfaction has a partial mediating effect in enhancing the relationship between college attributes and students' choice satisfaction. Hence this significant finding implied that the challenges of educational institutions are not only to focus on the vital attributes that are influencing students' college choice but also strategies on how information regarding the attributes should be disseminated appropriately. This is logical since students' satisfaction with their college choice is dependent on their satisfaction of the information they have acquired with regards to the college attributes.

Keywords: Information satisfaction, mediator variable, college choice, international students, Malaysia

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INTRODUCTION

The prospect of intense competition in college enrollments has generated tremendous pressure on college administrators and educators to find effective approaches to attract students (Ivy, 2001; Soutar & Turner, 2002). Therefore, understanding students' satisfaction is necessary because it reveals the voice of the customers. The notion of customer satisfaction takes up a vital position in marketing practices and it continues to attract the attention of researchers and marketers. In understanding customers' satisfaction, researchers have long acknowledged and recognized the importance of attributes in influencing customers' choice satisfaction (Churchill & Suprenant, 1982; Halstead, Hartman & Schimdt, 1994; Oliver, 1993; Oliver, 1997; Athiyaman, 1997; Kozak, 2003)

In the case of educational institutions, identifying and measuring satisfaction can tell us which aspects of the college attributes will have the greatest impact on the outcome called student choice behavior and eventually will lead to student retention. Previous findings indicate that college attributes such as tuition fees, availability of programs, academic recognition, quality of academics, quality of facilities and campus atmosphere among others are essential predictors of students' college choice (Chapman, 1981; Wajeih & Micceri, 1997; Joseph & Joseph, 2000; Mazzarol & Soutar, 2002; Burns, 2006; Ismail, 2008). Also, students mainly collect information on respective colleges prior to making a choice. These colleges will employ a wide range of communication devices such as promotional materials in their effort to inform and influence potential students. It is therefore natural that before a student chooses a college, he or she must foremost be satisfied with the information obtained regarding the college. Information satisfaction is therefore essential specifically in the early stage of the student's decision making process since it is an imperative in the assessment of a college to be chosen.

Moreover, the current study contemplates on information satisfaction since there have been no attempt made to relate all possible factors of college choice in one single setting. To fill the gaps, this study aims to shed more light on college choice satisfaction by examining the role information satisfaction may play when evaluating the relationship of college attributes with choice satisfaction. Specifically, this study attempts to answer the following research questions:

- Do college attributes positively influence college choice satisfaction?
- Do college attributes positively influence information satisfaction?
- Does information satisfaction influence college choice satisfaction?
- Does information satisfaction mediate the relationship between college attributes and college choice satisfaction?

Since education environment is becoming more competitive globally findings from this study will definitely provide significant input on how Malaysian educational institutions can successfully attract more international students to pursue their education in Malaysia. In addition results of this study serve as a guide to other industries with reference to information satisfaction having a mediating role on choice satisfaction.

LITERATURE REVIEW

Importance of Choice Satisfaction

Customer satisfaction is referred to as the customer's state of being sufficiently contented in a purchase situation for the sacrifice the customer has made (Loudon & Bitta, 1993). Previous researchers have indicated that satisfaction is highly linked to customer retention and loyalty (Hallowell, 1996; Athiyaman, 1997; Helgesen & Nasset, 2007). In addition, it has also been pointed out that the ability to build up loyalty in customers and hence retention is perceived as a key feature in sustaining and improving market share and enhancing the value of the organization (Rust & Zahorik, 1993; Beerli, Martin & Quitana, 2004). Winning new customers is good but it is cheaper to hold on to existing customers. As indicated in earlier studies, loyalty reduces the need to incur customer acquisition costs (Reichheld, 1996) and the cost of acquiring customers may be five times more costly than that of retaining them (Peters in Rust & Zahorik, 1993). Therefore, making certain that customers stay loyal and satisfied with its service is of importance to an educational institution. More than ever in the current situation, where competition is intensive, it is important that educational institutions search for resourceful cost effective ways to persuade and retain their customers. As businesses become more aggressive and as many services become commodities, customer satisfaction is even more rigid than ever to uphold. Hence, for an educational institution to be successful in the long run, it must satisfy customers, at the same time making a profit. Indeed, it can be argued that satisfying students should be the prime

obligation of a college and virtually all its activities, programs and policies should be evaluated in terms of their contribution towards satisfying students. Hence, students' satisfaction is so critical for educational institutions that any educational institution interested in the delivery of superior service must start with a comprehensible understanding of its customers, not forgetting the impact it will generate as satisfied customers over time will come back and bring more friends.

Hypothesis 1: College attributes has a positive significant influence on college choice satisfaction

College Attributes

One of the major predicaments faced by service customers is the uncertainty about the consequences of the choice decision that they cannot anticipate (Iglesias & Guillen, 2002). Due to service distinctive characteristics namely, intangibility, inseparability, heterogeneity and perishability (Parasuraman, Zeithaml & Berry, 1985) customers usually associate service with high level of risk (Gultinan, 1987; Murray & Schlacter, 1990; Murray, 1991; Iacobucci, 1992). More so for education as the whole process will definitely take years to complete even after the decision has been made (undergraduate study will take up to three years minimum) and as such the process of student's assessment of a service is to a certain degree dependent on credible information regarding the attributes of an institution. Halstead, Hartman and Schimdt (1994) supported that educational institution represents an unfamiliar first time experience for students, therefore, students' evaluation of their expectations and performance are attributes or characteristics based. In education, students may not be able to sense the college's intrinsic quality immediately and hence for students the utilization of college attributes (acting as physical cues to enhance the tangibility of college) in appraising choice satisfaction is critical. Previous studies have indicated that college attributes do have strong impact on students' satisfaction in their choice of college (Oliver, 1997; Athiyaman, 1997). These attributes among others include lecturers' quality, availability of desired programs, international recognition, quality of college facilities (library services, computing facilities and recreational facilities), class size and subject difficulty and availability of financial support (Chapman, 1981; Wajeeh & Micceri, 1997; Joseph & Joseph, 2000; Mazzarol & Soutar, 2002; Burns, 2006; Ismail, 2008).

Hypothesis 2: College attributes has a positive significant influence on information satisfaction

Satisfaction with College Information

The important issue of concern for a service provider is to understand customer evaluation process of service. In addition to post purchase satisfaction, it is also relevant to recognize that satisfaction with information may also occur before a choice is made. During the initial stage of the decision making process, the customer will evaluate potential service through information acquired hence, the expectations that a customer has pertaining to a service will be highly dependent upon information collected from a selection of sources. In the process of choosing a college, it is essential that students are able to acquire all information needed from different sources as they could make a better judgment and be satisfied with their choice of college. It is quite logical that before a student can be satisfied with the choice, he must foremost be satisfied with the information obtained regarding the college. Hence information satisfaction is essential since it is an imperative in the assessment of college performance.

As elaborated by Spreng, Mackenzie and Olshavsky (1996) and Bruce (1998), the feeling of satisfaction is not only reliant on the performance of the service alone but the feeling of satisfaction will also be contingent on the information that an individual has acquired prior to choice decision and on which his expectations are based. Satisfaction with the information is defined by Ismail (2008) as an individual agreement and contentment of the information used in choosing a service.

Information gathered regarding respective colleges will be the basis of students' primary evaluation in their pursuit of selecting a college to study. Generally students will search and evaluate information from up to five colleges in their process of deciding their choice of college (Ismail & Leow, 2008). In their study it was also suggested that in students search process, market dominated sources of information (for examples college printed materials and college websites) were more widely used compared to personal sources of information (for examples family members and friends). It is thus very necessary for educational institutions to ensure that students are satisfied with the information they acquire during this initial stage of decision making process as this feeling of satisfaction could lead to a choice behavior.

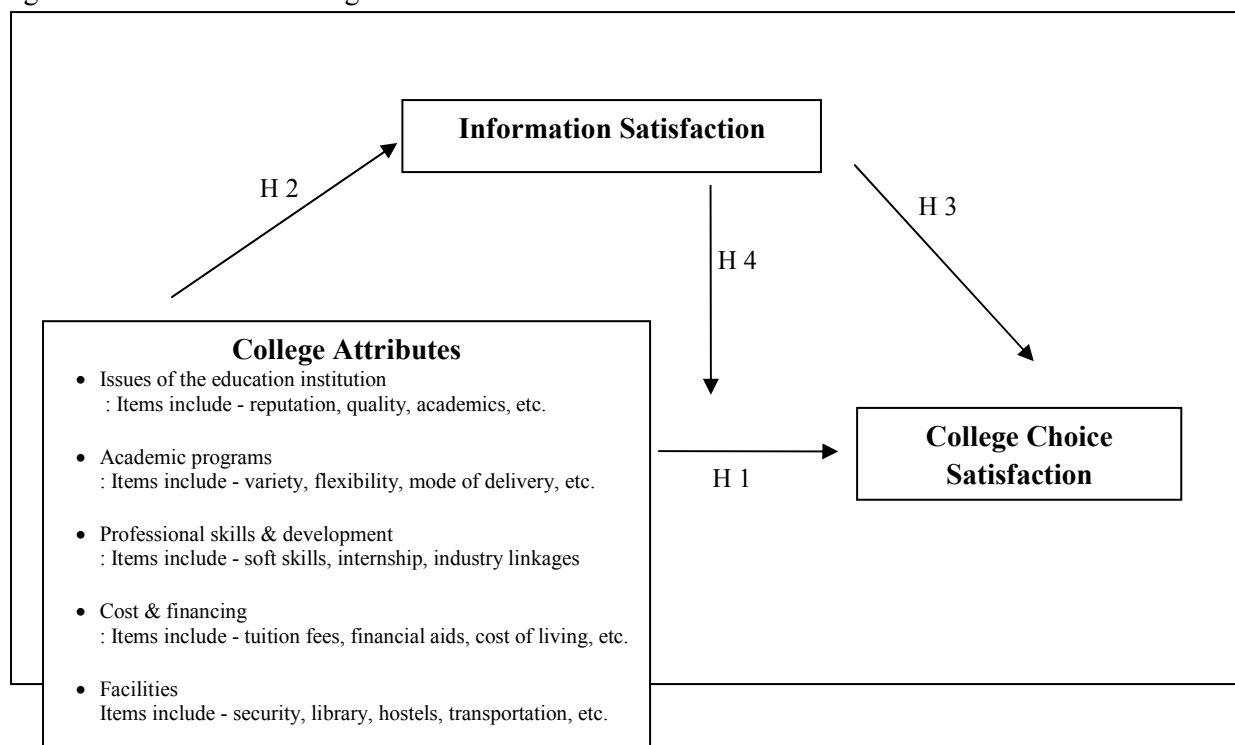
As mentioned earlier, services such as those provided by educational institutions are perceived as risk associated due to their intangible offerings, therefore, students would most probably use information cues to assess and confirm their choice satisfaction. For the purpose of this study, information satisfaction is characterized as students' satisfaction with the information they have acquired regarding the attributes of the college that they are currently enrolled in. The term attributes is described as the various characteristics or features of the college.

Hypothesis 3: Information satisfaction has a positive significant influence on college choice satisfaction

Hypothesis 4: Information satisfaction has a partial mediating effect between college attributes and college choice satisfaction

The theoretical framework of the current study is shown as follows; (see Figure 1)

Figure 1: Framework of college choice satisfaction



The basic concept of the above framework was based on studies by Spreng, Mackenzie and Olshavsky (1996) and Bruce (1998), where results revealed that information satisfaction and attributes have a significant effect on choice satisfaction. This study however attempts to make a contribution by examining the mediating effect that information satisfaction might have on the relationship between attributes and choice satisfaction in the context of educational institutions.

METHODOLOGY

Sampling Procedure

The sample frame comprised of undergraduate international students, these being defined as non – Malaysian citizens. International students should be identified as a niche market as these students have a different disposition of college choice. For these students their college choice decision making process definitely requires extra effort and is riskier as compared to local students. As such a study on international students' college choice is much warranted for. Moreover, competition for international students' enrolment among higher educational institutions has necessitated the need to understand these students' college choice satisfaction. Satisfied students will become walking advertisements as they will inform others of their positive experience. In addition, the enrolment of international students will not only result

in significant economic returns but will contribute positively to the globalization of Malaysian education. This is in line with the Government's objective of making Malaysia as the "Education Hub".

Respondents were first year international students pursuing their degree program in the field of business of a private higher educational institution in Malaysia. They were selected randomly from a student listing provided by the institution. In order to improve the response rate, survey was conducted during lecture and permission was obtained from the lecturer. 149 out of 201 students participated showing a response rate of 74 percent.

Survey Questionnaire Development

The measurements for satisfaction were based on the general feelings about respondent's college choice decision and information obtained. Respondents were asked to give an indication of satisfaction levels in connection with information sought and their choice of college employing a five-point Likert rating scale from "strongly agree" to "strongly disagree" with "somewhat agree" as the midpoint. Oliver's (1980 and 1997) scale of satisfaction was adapted in this study for both college choice satisfaction and information satisfaction. Adjustments and modification to Oliver's scale had to be made to suit the purpose of this study. Several different constructs of college attributes from previous researchers have been identified and employed (Chapman, 1981; Halstead, Hartman & Schimdt, 1994; Pooch & Love, 2001; Cubillo, Sanchez & Cervino, 2006). In addition, students were also questioned on the number of colleges they searched for before deciding on their college choice so that the frequency of number of colleges searched by the respondents can be analyzed.

To begin with data reduction process a simultaneous run was conducted on both the dependent and independent variables to demonstrate the inter-construct convergence and discriminant within the three constructs, namely college choice satisfaction, information satisfaction and college attributes. Principle Component Analysis (PCA) was employed as the extraction method for validity testing to show convergence and discriminant of all variables within the constructs. PCA with varimax rotation was carried out on 42 variables; suppressed at 0.50 and as a result 16 variables survived. For college choice satisfaction six out of ten variables were maintained. Eight items were retained for college attributes and only 2 items continue to exist for information satisfaction.

Data Collection and Preparation

SPSS (version 16) was used to analyze data from the survey. Based on Cronbach's alpha (for reliability), all items were maintained for the three constructs, namely: college choice satisfaction (0.88), college attributes (0.92) and information satisfaction (0.71) as this is consistent with Nunally's (1967) suggested reliability estimates of 0.70 (minimum) as the cut-off value. In addition, the Kaiser-Meyer-Olkin (KMO) was used to measure the adequacy of the sampling and a cut-off result greater than 0.5 (threshold) was used for a satisfactory factor analysis to proceed (Hisham & Norzaidi, 2009). And finally Barlett's Test of Sphericity was used to establish its significance that is, its associated probability should be less than 0.05.

Establishment of Mediation

Utilizing Baron and Kenny's (1986) and Judd and Kenny's (1981) steps, the following regression equations were observed in establishing mediation:

- Step 1: Regressing the dependent variable (DV) on the independent variable (IV) and the IV must be shown to affect the DV
(Equation 1: $CS = b_{01} + b_{11} Att$)
- Step 2: Regressing the mediator (M) on the IV and result must show that IV is correlated with the M.
(Equation 2: $IS = b_{02} + b_{12} Att$)
- Step 3: Regressing the DV on the M and again the relationship must be significant.
(Equation 3: $CS = b_{03} + b_{13} IS$)
- Step 4: Regressing the DV on both the IV and M.
(Equation 4: $CS = b_{04} + b_{14} IS + b_{24} Att$)

Where: CS = College Choice Satisfaction, IS = Information Satisfaction and Att = College Attributes

Full mediation holds if the IV no longer affects the DV after M has been controlled and so the relationship between IV and DV is zero. Partial mediation occurs when relationship between IV and DV is reduced in absolute size but still different from zero when M is controlled.

RESULTS

Respondents' Profile

Analysis of basic demographic information reveals that the sample size is representative of the student population in terms of gender with approximately 42 percent males and country-of-origin with reasonable diversity of international students from 17 different countries. In addition, it was discovered that approximately 72 percent of the students searched for information of three to five colleges prior to choosing a college.

Table 1: Descriptive statistics of respondents' profile

	Frequency	Percentage
Gender:		
Male	63	42%
Female	86	58%

Measurement evaluation

The result for the KMO test for the variables is 0.793 which indicates that the sample data is good and therefore fit for factor analysis. The Barlett's Test of Sphericity result reveals that this test is significant ($p = 0.000$). A final run on remaining variables was conducted to evaluate internal consistency. The final value of Cronbach's alpha for college choice satisfaction is 0.90, college attributes alpha value is 0.85 and value for information satisfaction is 0.60.

Table 2: Convergence and discriminants of variables measuring college choice satisfaction, college attributes and information satisfaction

	Component		
	College Choice Satisfaction	College Attributes	Information Satisfaction
collsa 5: Comfortable with choice	.851		
collsa 4: Satisfied with choice	.827		
collsa 3: Selection was accurate	.814		
collsa 6: Choice was a wise one	.798		
collsa 7: Contented with preference	.782		
collsa 1: Made right decision	.709		
attributes 20: Soft skill development		.824	
attributes 14: Appropriate exemption		.761	
attributes 13: Affordable tuition fees		.750	
attributes 21: Internship opportunities		.680	
attributes 16: Reasonable cost of living in studying abroad		.643	
attributes 23: Financial aids		.624	
attributes 8: Campus atmosphere		.610	
attributes 19: Transferability to wider selections		.596	
infossa 5: College websites information was beneficial			.807
infossa 4: Made better decision on information acquired			.690
Eigenvalue	4.11	3.90	1.76

% of explained variance		25.70%	24.40%	11.00%
Cumulative explained variance		25.70%	50.10%	61.10%
Cronbach's Alpha		0.90	0.85	0.60
Kaiser-Meyer-Olkin Measure of Sampling Adequacy				0.793
Bartlett's Test of Sphericity	Approx Chi-Square			1166.205
	df			120
	Sig.			.000

Mediation Establishment

Results indicated that information satisfaction plays a significant role in mediating the relationship between college attributes and international students' satisfaction on their choice of college. Based on Baron and Kenny's (1986) and Judd and Kenny's (1981) steps, the following results were established:

Step 1: College attributes has a positive significant influence on college choice satisfaction

Table 3: Relationship between college attributes and college choice satisfaction

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	17.781	1.543		11.527	.000
College Attributes	.150	.056	.218	2.695	.008

The result above reveals that college choice satisfaction is found to be notably influenced by college attributes ($t = 2.695$; $p = 0.008$; $b = 0.150$). This indicates that college attributes do play an important role in international students' college choice. The result reported in this study is consistent with previous research findings. Corresponding to this result, in the case of higher educational institution, Athiyaman (1997) observed that college attributes such as quality of faculty members and college facilities are consequences of students' satisfaction.

Step 2: College attributes has a positive significant influence on information satisfaction

Table 4: Relationship between college attributes and information satisfaction

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5.599	.576		9.716	.000
College Attributes	.048	.021	.189	2.320	.022

It was hypothesized that college attributes has a positive correlation with information satisfaction. Result of this study is in tandem with the hypothesis where $t = 2.320$; $p = 0.022$; $b = 0.048$. Oliver (1997) suggested that one way of evaluating one's information satisfaction level is to evaluate a product on the basis of its attributes. In this situation, since education is a service, hence intangible, students will search for tangible cues (college attributes) in making their college choice. It can be concluded that satisfaction judgment in this situation is resulting from the evaluation between information gathered and students' observations of attribute performance. The more the attributes meet the expectation of these students based on information gathered, the higher will be their level of satisfaction towards the information sought.

Step 3: Information satisfaction has a positive significant influence on college choice satisfaction

Table 5: Relationship between information satisfaction and college choice satisfaction

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	15.536	1.478		10.515	.000
Information satisfaction	.912	.210	.337	4.338	.000

It was postulated that information satisfaction is a positive function of college choice satisfaction. The result of this study supported this hypothesis. Information satisfaction is found to exert a significant positive influence on college choice satisfaction ($t = 4.338$; $p = 0.000$; $b = 0.912$). The result has reinforced the findings of Spreng, Mackenzie and Olshavsky (1996) and Bruce (1998) which suggested that information satisfaction is an important variable in the evaluation of the performance of product used or service employed.

Step 4: Information satisfaction has a partial mediating effect between college attributes and college choice satisfaction

Table 6: The effect of information satisfaction between college attributes and college choice satisfaction

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	13.212	1.892		6.984	.000
College attributes	.111	.054	.161	2.043	.043
Information satisfaction	.816	.212	.303	3.854	.000
	Sum of Squares	df	Mean Square	F	Sig.
Regression	256.233	2	128.117	11.403	.000
Residual	1629.064	145	11.235		
Total	1885.297	147			
Adjusted R Square					.124

The result of the Multiple Linear Regression (MLR) from table 6 above revealed that information satisfaction has a mediating role on the relationship between college attributes and college choice satisfaction. Information satisfaction and college attributes are found to exert a significant positive influence on college choice satisfaction. In additional partial mediation occurs since the relationship between college attributes and college choice satisfaction is reduced in absolute size but is different from zero (referring to table 3 and table 6 respectively, beta value reduced from 0.218 to 0.161) when information satisfaction as mediator is controlled. This finding provides a new prospective in understanding the nature of the relationship between college attributes and college choice satisfaction.

DISCUSSION AND IMPLICATIONS

According to Hirschman (1970) the inability of a service organization to satisfy its customers will result in two negative feedback mechanisms: customers will stop buying the service and customer complaints express their dissatisfaction. As such, customer satisfaction is paramount as it is highly linked to customer loyalty and retention (Rust & Zahorik, 1993; Hallowell, 1996; Athiyaman, 1997; Beerli, Martin & Quitana, 2004; Helgesen & Nettet, 2007). Hence for service organizations such as educational institutions where competition is intense there is a growing need for a deeper understanding of customer satisfaction requirements.

This present study has examined the association of college attributes and information satisfaction with college choice satisfaction and in doing so, has validated the hypotheses using the data collected. The findings from the present study provide strong support of the four hypotheses identified earlier and help clarify the role of college attributes and information satisfaction in the international students' choice of college. It is perhaps not unusual to find that the data collected from this empirical study reveal that students' choice satisfaction may not only depend on attributes of the college (Oliver 1997; Athiyaman 1997) but what is more important is the satisfaction surrounding the information acquired with respect to those attributes on which their college choice was based on. Consequently their satisfaction with the information resulted in their satisfaction acquired with their choice of college (Spreng, Mackenzie & Olshavsky, 1996; Bruce, 1998). In other words, it can be suggested that the more the information meets the requirement of the students' choice criteria (based on attributes of the college), the more the students will be satisfied with their choice of college.

In addition this study also attempts to examine the mediating effect of information satisfaction towards the relationship between college attributes and college choice satisfaction. As clarified by Baron and Kenny (1989): "Mediators explain how external physical events take on internal psychological significance. Whereas moderator variables specify when certain effects will hold, mediators speak to how and why such effects occur." (p.1176). An important finding involves the effect that information satisfaction holds in explaining the relationship between college attributes and college choice satisfaction.

With reference to Baron and Kenny's (1989) explanation, a very important contribution of this study is the revealing of information satisfaction as a mediator variable that enhances an understanding in explaining why there is a correlation between college attributes and college choice satisfaction. The rationale in college choice satisfaction among the students is due to their satisfaction of the information they have acquired regarding the attributes of that particular college on which their evaluation was based upon.

Information satisfaction may be implied to function as a mediator to the extent that it accounts for or serves to clarify the nature of the relationship between attributes (independent variable) and college choice satisfaction (dependent variable). In other words, rather than hypothesizing a direct causal relationship between college attributes and college choice satisfaction, a mediational model hypothesizes that college attributes cause information satisfaction, which in turn causes student's choice satisfaction.

This association is quite logical since information satisfaction as the mediating variable is the one actually causing the satisfaction in student's college choice. Hence, based on this study, it can be implied that firstly, students will initially seek for relevant information of few colleges and will make their college choice based on the attributes that are of importance to them. Secondly, in confirming their satisfaction of their choice, they will evaluate the college performance against the information acquired. Students will be satisfied with their choice of college if college performance conforms to the information regarding the attributes of the college. Their satisfaction with their choice of college is therefore dependent on their satisfaction of the information they have acquired with regards to the college attributes.

Another important finding was obtained through the MLR results regarding the association between information satisfaction, college attributes and college choice satisfaction. Based on the standardized Beta value, information satisfaction is the more important predictor of choice satisfaction as contrasted to college attributes. This further supports the fact that students' college choice satisfaction is not totally reliant on attributes of the college but what is more important is the agreement encompassing the information acquired with respect to those attributes on which their college choice was based upon. In view of that, students satisfaction with the information acquired is the actual reason for their satisfaction with their choice of college. Hence, it can be implied that the further the information meets the prerequisite of the students' choice criteria (based on attributes of the college), the more will the students be satisfied with their choice of college.

Results of this study indicate that students are satisfied with their choice of college based on their information satisfaction with respect to certain attributes of the college and among others are career development provided by college, financial factors and academic recognition. Items under career development include internship opportunities and soft skill development. The financial factors consist of affordable fees, cost of living and financial aids. Academic recognition comprises appropriate exemption and wider transferability selections.

Results also reveal that the majority of students will search and evaluate between three to five colleges prior to their choice decision. This corresponds to previous research where it was proposed that when the customer perceived there are large differences between brand features/ attributes, they will be critical about which product/ service meets their needs and hence the search for information of a few alternatives will be greater (Ducan & Olshavsky, 1982; Urbany, Dickson & Wilkie, 1989; Iglesias & Guilen, 2002).

Recommendations

As clearly indicated by previous researchers, choice satisfaction is an important critical success factor to all organizations. Satisfaction will result in customer loyalty and the impact of customer satisfaction will lead to improvement in market share. There are a number of factors that have significant influence on students' college choice satisfaction. While administrators, marketers as well as educators of educational institutions cannot control which potential students eventually choose their respective colleges, they may be able to increase their likelihood of student enrollment. This study, therefore, recommends that there are a few proactive actions and measures that could assist these educational institutions.

First, involve marketers in their promotional process. This study may assist marketers of educational institutions in appraising their promotional effort and recruitment approach as the findings may be of help to them to understand the multiple influences affecting student's satisfaction. As such these institutions might be able to come up with better and more successful marketing strategies to attract and retain students. The result of this study does indicate that students' information satisfaction is vital to students' choice satisfaction. However, due to availability of colleges to choose from, many prospective students will experience an information overload and may not be able to effectively compare and contrast college offerings within their choice set. It is recommended that rather than providing general information of their respective college, just as any other college generally does, marketers can be more effective by focusing on their strengths or attributes that students find to be of importance and are satisfied about. Marketers need both sensitivity and sophistication in their promotional strategy. For example, based on this study it was found that the students of the particular college are satisfied with the career development (internship and soft skill development) provided by the college. With such valued information college could definitely use it as part of its promotional approach.

Next, involve college administrators in providing financial assistance to the students. With respect to financial factors, it is a common reality that international students pay higher tuition fee than local students. Previous literature has established that financial factors (tuition fees and cost of living) seem to be one of the most critical factors in determining students' choice and the result of this study further confirms their work. It is recommended that in addition to providing affordable fees for tuitions and hostels, administrators could provide supplementary alternatives to assist and attract students. Some possible options are for the college to offer grants, scholarship or part-time jobs in campus (such as library assistants or research assistants). Alternatively college could collaborate with financial institutions from various countries in supporting these students. In fact as a recommendation it would be good if college itself could offer interest free loans to deserving students. As a requirement for the loan, these students can in turn serve the institution.

Subsequently, due to its intangibility and the element of risk, it is natural that students would choose a college that is highly regarded and widely accredited. Students would prefer colleges that confer degrees acceptable either by other colleges (if they wish to transfer or pursue their studies) or by employers (if they decide to work upon completion of their degree). Hence it is very important for marketers and administrators to convince students by putting an emphasis on the college reputation when promoting it. It would be of competitive advantage if the college could provide credible testimonial of their recognition, for example, in addition to the partnership programmes with international universities, institutions could provide listing of their association with top ranked universities where their students have been transferred to. Students' achievement (either in their career or in world class competition) could also be another excellent testament to college reputation. These are information that colleges should focus in their marketing promotion.

In conclusion, the education environment has become increasingly competitive and this research demonstrates that educational institutions need to demonstrate sensitivity in students' choice satisfaction. Marketers and administrators should be cautious and should have appropriate knowledge regarding students' feedback with respect to their satisfaction. Identification of college attributes that are important to students' satisfaction could be used by these institutions in their promotional strategies. By identifying these attributes educational institutions will be able to strengthen their image and reduce or eliminate their weaknesses and thus be able to improve their possibilities of being chosen as a choice of education destination among international students. As pointed out by Maringe (2006), promotional messages should put accent on issues or information students find very important to them and not issues educational institutions think are important to students.

This study should be interpreted with some concern as it is directed only to the relationship of college attributes towards students' satisfaction in information and choices hence there is also a necessity to recognize other

variables or constructs that may possibly have an impact on customer satisfaction. It is anticipated that this will stimulate future research considering the importance of customer satisfaction, For example, variables such as student's profile (gender, parental income, previous education etc.) could be studied to better understand customer satisfaction.

Additionally, future research could also be done on dissatisfaction aspects of the customer. It would definitely provide an interesting insight if one could ascertain the dimensionality of satisfaction in opposition to dissatisfaction.

Finally, it would be interesting if this study could be replicated. A comparative analysis could be done involving other educational institutions. This would ascertain whether there are significant differences between these institutions with respect to students' college choice satisfaction.

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The Impact of Instructional Media on the Education of Youths on HIV/AIDS in Nigeria Urban Communities

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Abstract

This study examines the impact of instructional media on the education of youths on HIV/AIDS in Nigerian urban communities with specific focus on Port Harcourt City. The sample of the study comprised of three hundred in-school and two hundred out-of-school youths selected through random sampling process. A structured questionnaire tagged Instructional Media and HIV/AIDS Questionnaire (IMHEAQ) served as the main instrument for data collection. Three hypotheses and a research question guide the study. Data on hypotheses one and two were analysed with Pearson Product Moment Correlation while hypothesis three and the research question were analysed with t-test and percentage respectively. The findings revealed that there is a significant relationship between instructional media usage on HIV/AIDS education and improved knowledge of youths on the disease. The study therefore recommends that educators and programme planners should create enough roles for instructional media when planning and implementing HIV/AIDS education programmes.

Keywords: Impact, Instructional Media, Education, Youths, HIV/AIDS, Urban Communities

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INTRODUCTION

Instructional media are important elements of teaching and learning activities. The term instruction according to Adekola (2008) is a deliberate arrangement of experiences within the learning space, classroom, laboratory, workshop etc aimed at helping learners to achieve desirable changes in behaviour or performance. Media according to Vikoo (2008) is used to think about Television, Satellite Communication, Computer and other sophisticated modern technologies. Attempt to precisely define instructional media generates divers opinion among scholar. For instance, Gbamanja (1991:212) described instructional media as:

Any device with instructional content or function that is used for teaching purposes, including books, supplementary reading materials, audio-visual and other sensory materials, scripts for radio and television instruction, programme for computer-managed sets of materials for construction and manipulation.

To Onyeozu (1997), instructional media are resource materials which help to facilitate teaching and learning. The term instructional media as described by Adekola (2008) means all available human and material resources which appeal to the learners' sense of seeing, hearing, smelling, tasting, touching or feeling and which assist to facilitate teaching and learning. Instructional media are channels of communication through which information passes for usage in

educational situation in conjunction with the instructor. Going through the descriptions of instructional media, it would be observed that the understanding behind the use of instructional media is to aid learner in his learning.

For effective usage of instructional media, they are often classified into various classes, so that relevant media would be adopted for a particular situation. Though Nzeneri (1996) advocated for classification of instructional media based on convenience, Vikoo (2003) believed that the classification should be based on some criteria. Such criteria he noted include:

- The degree of expertise/technical skills required for the production.
- The nature of the material (Media)
- The physiological parameter or sensory modality required
- Whether or not projection is involved
- Place produced
- Miscellaneous characteristic

Classifying instructional media based on convenience, media can be classified into:

Durable and Non-Durable Media: Durable materials are those that last for very long time. Such media include Computer, Projectors, Television, Radio, Cameras etc. They are hardware and high technology materials. Non-Durable media as the name implies are materials that have short life span or those that cannot be stored for a very long time. These media include pictorial and graphic representations such as posters, maps, charts etc; projected pictures such as film strips, transparencies, motion pictures etc.

Audio-Visual Media: Media under this classification appeal to the sense of hearing and seeing. Examples include video, television, computer motion pictures etc.

Print and Non-Print Media: Print media include books, newspapers, journals pamphlets etc while the non-print media are maps, charts, postal, graphs etc.

Projected and Non-Projected Media: The projected materials require other equipments especially projectors to function. In most Instances, they require electricity. Examples according to Nzeneri (1996) include slide and film strips, video cassette, transparencies, motion pictures, computer soft ware etc. The non-projected media are those that do not require any other equipment to function. Materials like poster, flash cards, charts, pictures etc fall under this category.

Based on the criteria, instructional media can be classified as low and high technology media, print and non-print media. Based on physiological criterion, Romiszowski (1995) classified media as shown in table I below.

Table I: Classifications of Media

Class of Media	Sensory Channel	Instructional Media
Auditory materials	Sense of hearing	Radio
Visual materials	Sense of vision	Still Pictures
Audio-visual materials	Sense of hearing and vision	Television
Tactile materials	Sense of touch	Braille
Olfactory materials	Sense of smell	Some gasses
Gustatory materials	Sense of taste	Foods
Kinaesthetic materials	ense of muscular co-ordination	Games materials like football

Source: Adapted from Romiszowski in Vikoo (2003:140)

No matter the classification, the benefits of instructional media usage are not in any way hidden. Adekola (2008) summarised the benefits by saying that usage of instructional media increases the rate of learning by the learners, makes learning to be real and permanent, saves teacher’s time which would have been wasted on oral presentation and explanation of subjects contents, promote learners participation in learning activities, makes learning available to wider audience and helps teacher and learner overcome physical difficulties in teaching and learning. However, despite the enormous benefits of instructional media usage in the teaching learning situation, Usha (2003) observed that up till 1998 only 0.6% of Nigerian population own personal computer, 6.7% own television while only 14.6% own radio. Also, there are only about 410 internet host in the country. The statistics as presented by Usha (2003) revealed that majority of Nigerians lack access to electronic instructional media.

The Immuno-Deficiency Virus (HIV) and the Acquired Immune Deficiency Syndrome (AIDS) are Sexually Transmitted Diseases (STDs). Sexually transmitted diseases as observed by Achalu (2008) constitute one of the major health problems in the world today, causing serious illness, disability and even death. Sexually Transmitted Diseases are a group of communicable diseases caused by germs which are primarily spread from one person to another mostly through sexual intercourse. Though, there are many STDs, the HIV is the most serious of them. This is because as noted by Fasokun (2006), all over the world HIV/AIDS is causing devastation by its destructive effects on families and communities. According to the World Health Organisation's report, Fasokun (2006) stated that about 37 million adults (15-49) and 2.5million children (0-14) were living with HIV in different parts of the world. During this same period about 3million death from HIV/AIDS were recorded.

Akaranta (2008) revealed that about 10% of the world population resides in Sub-Saharan Africa. He however noted that 70% of HIV/AIDS, 90% of AIDS orphans and 80% of AIDS death occur in Africa. Reporting the HIV/AIDS situation in Ghana, Adoo-Adeku (2007) stated that HIV/AIDS prevalence as at 2004 was 3.1% and that the population of people living with HIV/AIDS was about 600,000. His findings revealed that the people within the age range of 30-34 constitute 45.5% while 35-39 constitute 31.8%.

In Nigeria, the National Planning Commission in (2008) while presenting the 2005 Millennium Development Goals (MDGs) report revealed that HIV/AIDS among the adults is 5.8%. The report further revealed that an estimated 3.45million people are living with HIV/AIDS and over 1.5million Nigerians have died of AIDS. The Nigerian Television Authority (NTA) news of 24th March, 2009 reported that the HIV prevalence in Nigeria is about 4.6%. Fasokun (2006) noted that the epidemic hit those between 15-24 years of age particularly hard.

The AIDS virus belongs to a group of viruses known as retrovirus. Achalu (2008) explains that the AIDS virus can be found in blood, semen, vaginal secretion, saliva and breast milk; can only replicate in host cells; can exist in the body for 2-8 years before manifesting any symptom; takes 2weeks to 6months before a person develop anti-body; capable of changing its outer coat protein as it wishes; can not survive outside the body for long and causes a breakdown of the body's immune system. Reporting on the spread of AIDS virus, Bernell, Hyde and Swainson cited in Oyebamiji and Adekola (2008b) identifies three basic ways through which HIV can be spread. They are

- i. Sexual intercourse with infected person.
- ii. Contact with contaminated blood.
- iii. Transmission from infected mother to her child during birth or through breast feeding.

Achalu (2008) and Jackreعه (2008) summarised the socio-cultural factors that promote the spread of HIV/AIDS in Nigeria as: polygamy, wife sharing, wife inheritance, widowhood, early marriage, superstitious beliefs, ignorance, circumcision, offering of women to guests and sirah syndrome (practice of father forbidden their first daughter from getting married. The first daughter stays in the family and can have sex with any man in the community. The resultant child/children bear the name of the mother's father). This practice can be found among the Ogonis in Rivers State, Nigeria.

With the fast spreading of HIV/AIDS in Nigeria, the National Action Council on AIDS (NACA) mounted public education programmes especially among the youths to bring down the trend of HIV/AIDS transmission in the country. HIV/AIDS initiatives have also been supported by non-governmental organisations, schools, and religious bodies, with the aim of reducing HIV/AIDS in Nigeria. Various approaches including the use of instructional media are being adopted. All hands are on deck and this work is one of the efforts.

The urban and rural communities co-exist in all countries of the world since no country is entirely rural or urban. Oyebamiji and Adekola (2008a) revealed that in East Africa, the proportion of urban population is about 9%. In Nigeria, it is about 21% while in Ghana, it is about 30%. The term urban according to Otite (2002) is a human congregation in a relatively large area. Urban communities therefore are a relatively large, densely populated settlement of heterogeneous people. Being densely populated and heterogeneous, Oyebamiji and Adekola (2008b) observed that the urban people are generally anonymous and this gives them opportunity to freely enjoy their freedom on almost every aspects of life, especially the social aspect. As a result of this, most urban dwellers interact and enjoy their social life without much caution and attention to health related matters. This carefree attitude of the urban dwellers promotes the rapid spread of various sexually transmitted diseases including HIV/AIDS among them. According to Balogun (2005) the Nigerian urban communities are mostly inhabited by adolescents and young adults of age 18-55years. This supports the view of scholars that HIV/AIDS is more prevalent among the youths and young adults.

Fasokun (2006) noted that about 63million men, women and children worldwide have been infected with HIV and about 2.1million people have died. He specifically noted that the epidemic is prevalent among youths between 15-24 years of age. Globally, HIV/AIDS is causing devastation by its destructive effects on the families and communities. WHO (2007) reported that 33.8million people world-wide were living with HIV/AIDS and that 2.1million people have died of AIDS. In fact, 68% of the global HIV/AIDS figure is recorded in Sub-Saharan Africa. Wikipedia (2009) noted that Africa occupies the most unfortunate position in the HIV/AIDS epidemic world-wide. It posited that 19 African countries are among the nations with the highest prevalence of HIV and that more than 24.5million (60%) of HIV/AIDS infected people live in the region. Wikipedia further noted that South Africa and Nigeria recorded the highest figure of 756,000 and 170,000 HIV/AIDS deaths respectively, as at 2008.

Today's young people belong to the AIDS generation. They have never known a world without HIV/AIDS. Millions have died, yet the HIV/AIDS remains invisible to the adults and young people alike. According to Akaranta (2008) youths aged 15-24years constitute 10% of the global population and that 10% of the world population reside in Sub-Saharan Africa. Consequently, 70% of HIV/AIDS cases, 90% of AIDS orphans and 80% of AIDS death occur in the region. With 7000 of the worlds 4billion youths infected daily worldwide, it becomes obvious that to successfully combat HIV/AIDS, youths must be central to the programmes.

Fasokun (2006:127) and Akpan (2008:74) reported on the spread of HIV/AIDS and how to conquer it, brought-forth various suggestions and recommendations. Prominent among the strategies recommended for curbing the scourge of HIV/AIDS is education. According to Oyebamiji and Adekola (2008a:30), is because it has been discovered that education possesses the ability to shape and modify human behaviour and develop desirable habits, skills and attitudes for adequate adjustment in the society. Omolewa (2001:1) noted that education has great potentials for transforming the individuals and the society. Supporting education as a major instrument for solving serious societal problems, Christian (2006) stressed that education is a human right and it is the key to poverty alleviation, disease control and human development.

Despite the strength of education in solving societal problems, its effectiveness in imparting knowledge on its recipients depends largely on a number of factors. Such factors as noted by Adekola (2008) include the suitability of the contents for the learners, the teacher or facilitator and the media used to drive the points home. With the advancement in Information and Communication Technology (ICT), Vikoo (2003) posited that instructional media have occupied more significant position in the process of passing new knowledge and information to the people. Today, teaching and learning through the use of instructional media, sometimes without the presence of a teacher or facilitator, has been accepted in almost every society of the world. It is for this reason that this study examines the impact of instructional media on the education of youths on HIV/AIDS in Nigeria.

This study is focussed on Port Harcourt city, Nigeria. The city is not only the capital of Rivers State; it is one of the emerging mega cities in Nigeria. The rate of HIV/AIDS prevalence in Port Harcourt according to Okoli (2008) is 7.7%. Achinwendu in Okoli (2008) noted that about 162,322 persons are living with HIV/AIDS in Rivers State. Port Harcourt as an oil city attracts people from all over the world. It is estimated that 1.5 million people move in and out of the city daily through the east-west road only. The International Airport and the Sea Port bring in both foreigners and nationals. The presence of six tertiary institutions with large populations of youths who display indiscriminate sexual behaviour compounds the problem. It is not surprising therefore that the youths in Port Harcourt are terribly affected by the HIV/AIDS epidemic and this attracted the attention of this researcher to carry out this study in the city.

The Human Immuno-Deficiency Virus (HIV) and its effect of Acquired Immune Deficiency Syndrome (AIDS) have been depleting the Nigerian human resources for years. In spite of the serious effects of HIV/AIDS on individuals and the nation, many Nigerians are still daily infected by the disease. To reverse the trend of the disease in Nigeria, government had put in place various bodies and strategies. Among such strategies is the provision of HIV/AIDS education through the formal and non-formal education. In the formal education, HIV/AIDS related topics are taught to school age youths at the schools. In the non-formal education, HIV/AIDS information and knowledge are being passed to out-of-school youths and adults through various instructional media. In both ways instructional media seem to occupy important position in HIV/AIDS knowledge dissemination. This is because learners learn better and can easily recall what has been learnt when learning is supported by instructional materials. It is to this end that this study examines the impact instructional media would have on the education of youths against HIV/AIDS in Nigeria urban communities.

Purpose of the Study

This study intends to achieve the following objectives:

- i. To find out the extent to which instructional media are used to educate Nigerian urban youths on HIV/AIDS.
- ii. To examine the extent to which instructional media impart knowledge of HIV/AIDS on Nigerian urban youths.
- iii. To determine the difference in impact (if any) of instructional media usage on the knowledge of in-school and out-of-school youths on HIV/AIDS.
- iv. To identify the hindrances against effective use of instructional media on the education of Nigerian youths on HIV/AIDS
- v. To make recommendations for improved usage of instructional media on the education of youths on HIV/AIDS.

Hypotheses

To guide and give direction to the study, the following null hypotheses were formulated:

- i. There is no significant relationship between instructional media usage in HIV/AIDS education and improved knowledge of the disease by youths in Nigerian urban communities.
- ii. There is no significant relationship between instructional media usage and positive change in HIV/AIDS related behaviour among youths in Nigerian urban communities.
- iii. There is no significant difference in the impact of instructional media usage on HIV/AIDS education between in-school and out-of-school youths in Nigerian urban communities.

Research Question

What are the hindrances to effective usage of instructional media on HIV/AIDS education in Nigeria?

RESEARCH METHODOLOGY

Nworgu (1991) asserted that the choice of research design adopted in any research or investigation depends on the relevance of the proposed design to the nature and purpose as well as the economy of the research. Given the above, this study adopts the descriptive survey design. This design according to Abu and Oghenekowho (2003) provides a descriptive analysis of a phenomenon as distinct from the tendency to manipulate variables.

The population of this study comprised of all in-school and out-of-school youths (age 18-39) in Port Harcourt city, Rivers state, Nigeria. The random sampling technique was used to select two hundred out-of-school youths from the city. The same method was used to select one hundred respondents from each of the three tertiary institutions in Port Harcourt (University of Port Harcourt, Rivers State University of Science and Technology and Rivers State College of Education). Thus, a total of five hundred youths were randomly selected to participate in the study.

The main instrument used for data collection was a structured questionnaire tagged Instructional Media and HIV/AIDS Education Questionnaire (IMHAEQ). This instrument was complimented with oral interview. To ensure face and content validity of the instrument, it was exposed to scrutiny and judgement of experts in the area of instructional media and HIV/AIDS. Their criticism led to the removal, substitution and restructuring of some items in the instrument. The test-retest method was used to determine the reliability of the instrument. Data collected were analysed with Pearson Product Moment Correlation. A correlation co-efficient of 0.815 was obtained. The main instrument was administered with the assistance of five trained research assistants selected from among post graduate students of the Department of Adult and Non-Formal Education, University of Port Harcourt. Data collected for the study were collated and analysed using the Statistical Package for the Social Sciences (SPSS). Hypotheses one and two were tested with Pearson Product Moment Correlation Method, t-test was used to test hypothesis three while percentage analysis was used to answer the research question.

RESULTS

Ho1. There is no significant relationship between instructional media usage in HIV/AIDS education and improved knowledge of the disease among youths in Port Harcourt.

Table 2: Correlation between instructional media usage and improved knowledge of HIV/AIDS among youths in Port Harcourt

Variable	N	r.cal	r.tab	α	Remark
Instructional Media Usage in HIV/AIDS Education Improved Knowledge of the Disease among youths.	500	0.841	0.098	0.05	Ho. Rejected

The result of analysis of data on hypothesis one revealed that correlation co-efficient (r) of 0.841 is very significant; with tabulated value of 0.098, the null hypothesis is rejected. This implies that a relationship exist between instructional media usage in HIV/AIDS education and improved knowledge of the disease among youths. Improved knowledge in this study refers to “all that can be known” in terms of facts, ideas, policies and information on HIV/AIDS.

Ho2: There is no significant relationship between instructional media usage in HIV/AIDS education and positive change in HIV/AIDS related behaviour among youths in Port Harcourt.

Table 3: Correlation between instructional media usage and change in HIV/AIDS related behaviour among youths in Port Harcourt city.

Variables	n	r.cal	r.tab	α	Remark
Instructional Media Usage in HIV/AIDS Education Positive Change in Behaviour Among Youths.	500	0.771	0.098	0.05	Ho. Rejected

The analysis of data on hypothesis 2 as contained in table 3 shows a Correlation Co-efficient (r) of 0.771. With tabulated value of 0.098 the null hypothesis is rejected. This implies that there is a significant relationship between instructional media usage on HIV/AIDS education and positive change in behaviour among youths in Port Harcourt, Nigeria. Positive change in behaviour is measured by what the respondents claim to know and do through items picked from the main instrument and information gathered from the oral interview.

Ho3: There is no significant difference on the impact of instructional media usage in HIV/AIDS education between in-school and out-of-school youths in Port Harcourt city.

Table 4: T-test on impact of instructional media usage in HIV/AIDS education between in-school and out-of-school youths in Port Harcourt city.

Groups	n	x	t.cal	t.crit.	α	Remark
In-School Youths	300	64.17	1.96	3.44	<0.05	Upheld
Out-of-School Youths	200	58.57				

Information from table 4 above reveals that there is no significant difference in the impact of instructional media usage on in-school and out-of-school youths. Since the calculated value of t = 1.96 is lesser than the critical value of 3.44 at 0.05 level of significance the null hypothesis is upheld.

Research Question

RQ1: What are the hindrances to effective usage of instructional media on HIV/AIDS education among youths in Port Harcourt City?

Table 5: Percentage analysis of hindrances to effective usage of Instructional media for HIV/AIDS education among youths in Port Harcourt City.

Hindrances	Response			
	Agree	%	Disagree	%
Poor programme funding	390	78	110	22
Illiteracy	180	36	320	64
Inadequate power supply	405	81	95	19
Weather	281	56	119	44
Poverty	260	52	140	48

Data in table 5 reveals that inadequate power supply and poor funding of programmes are the major hindrances to usage of instructional media in HIV/AIDS education. While 81% of the respondents agree that inadequate power supply is a hindrance, only 19% disagree. Also, 78% of the respondents agree that poor funding of programme is a hindrance only 22% disagrees. This very high percentage of respondents who agree portends that the two items are major hindrances to effective use of instructional media on HIV/AIDS education. For other hindrances, 56% and 52% of the respondents agree that weather and poverty respectively are hindrances to effective use of instructional media on HIV/AIDS education. Illiteracy is not seen as a hindrance to effective usage of instructional media on HIV/AIDS education. Only 36% of the respondents agree while 64% disagree that illiteracy is a hindrance to HIV/AIDS education. This finding shows that illiterates can also learn and acquire knowledge through the various instructional media if they are effectively used.

DISCUSSION OF FINDINGS

The analysis of data on hypothesis one as shown in table 2 reveals that there is a relationship between instructional media usage in HIV/AIDS education and improved knowledge of the disease by youths in Nigeria. This finding supports Adekola (2008) who posited that instructional media usage increases the rate of learning and also make learning to be real and permanent. The finding also corroborates the position of Vikoo (2003:47) that instructional media usage in teaching and learning situation extends the range of learning experience available to learners and that media usage makes teaching and learning easier and more effective. The finding is also in line with Nzeneri (1996) that instructional media usage induces greater acquisition and longer retention of information and that media usage promotes reality of experience and assist in proper interpretation of facts and ideas. This means that the usage of instructional media in the education of youths on HIV/AIDS would expose them to the realities of the disease, assist them in interpreting risky behaviours and make knowledge acquired more permanent.

The findings from hypothesis two revealed that there is a significant relationship between instructional media usage in HIV/AIDS education and positive change in behaviour among youths in Nigeria. This finding is in line with the view of Akaranta (2008:6) that education propelled by instructional media provides knowledge and dispels myths, strengthen life skills, facilitate/support responsible behaviour and enhance basic value systems among youths. Similarly, the finding corroborates the believe that education generally is meant for a positive change in behaviour of the recipient. Thus scholars recommending education as a way out of the HIV/AIDS pandemic among youths are of the view that it would promote positive change in behaviour on stigmatisation of the infected, attitude of the affected and those not yet to be infected or affected. However, Okoli (2008) believed that education would achieve this aim better when it is supported or passed through the instructional media.

Information on hypothesis three as revealed in table 4 shows that there is no significant difference in the impact of instructional media on the education of in-school and out-of-school youths on HIV/AIDS. This finding supports Nzeneri (1996) that instructional media makes learning available to wider audience and takes care of individual differences. Also Vikoo (2003) asserts that instructional media cater for individual differences. Such differences could be personal differences that have to do with age, sex, location etc. This finding is also in line with the view of Adekola (2008) that instructional media allows for equalisation of learning opportunities. This implies that all learners in a specific learning situation have almost equal opportunities to learn; since instructional media especially audio-visual takes care of individual difficulties and disabilities. In HIV/AIDS education, the in-school and out-of-school youths would benefit equally, without any retard, from information passed through media such as Television,

Films, Postal, Bill Boards etc, since they combine sound and picture, colour and picture which youths can easily interpret at their own level.

The study further revealed that inadequate power supply and poor funding of HIV/AIDS programmes rated high among the hindrances to effective usage of instructional media for HIV/AIDS education. This finding is in line with Oyebamiji and Adekola (2008b) who recommended improved programme funding especially at the grassroots level as one of the solutions to the spread of HIV/AIDS. The effects of inadequate power supply on the economic and social system of Nigeria has been established at different fora in and outside the country. Since instructional media include sophisticated technological materials that heavily rely on electricity to function, adequate power supply is very necessary for their effective usage. Media like Television, Computer, internet and Satellite images, Electronic Bill Boards, Projectors etc, cannot function without power. Adequate provision of electricity therefore becomes important element for effective usage of these instructional media for the education of youths on HIV/AIDS.

CONCLUSION AND RECOMMENDATIONS

The central focus of this study is the impact of instructional media on the education of youths on HIV/AIDS in Nigeria urban communities. It discovers that education more than any other factor is a very useful instrument in combating the scourge of HIV/AIDS. This study concludes that though education correlates with improved knowledge on HIV/AIDS, it would only be effective in the fight against spread of HIV/AIDS among urban youths when it is backed-up with relevant functional instructional materials. It is further concluded that more radical media-oriented approach should be adopted in the education of youths, especially the out-of-school youths, on HIV/AIDS.

Based on the conclusion, this study recommends that:

- Educators and programme planners should always create enough room for the use of instructional media when planning and implementing HIV/AIDS education programmes.
- Adequate fund should always be set aside for the acquisition and maintenance of instructional media in Nigerian educational institution.
- Government should redouble her efforts at ensuring adequate power supply in Nigeria.
- Efforts should be made to develop open-space instructional media that can withstand the adverse effects of weather for a long time.
- Efforts should be made by government and non-governmental organisations to attract the attention of Nigerian youths to HIV/AIDS information and knowledge by providing more open-space HIV/AIDS instructional media in secondary schools, campuses of tertiary institutions and public places.
- The timing of HIV/AIDS education programmes on electronic media should be made fairly permanent and made known to Nigerian youths through other instructional media like handbills and public advert. Such programmes should be highly interesting and presented outside the school hours.

Policy Implications

The Nigeria National Policy on Education is silent on development, production and usage of instructional media in formal and non-formal education; policy makers in education therefore need a re-examination of the policy to input issues of instructional media in the national policy on education. Similarly, the curriculum and subject contents of health related subjects especially at the basic education level should be reviewed to merge them with the level of instructional media development in the country.

The National Agency on HIV/AIDS need to create a partnership with the National Education Research and Development Council (NERDC) and the National Mass Education Commission (NMEC) in the development of HIV/AIDS education programmes for adequate integration of ideas on instructional media production and usage into formal and adult education HIV/AIDS programmes.

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The Rationality of Rotational Presidency: Multi-ethnicity Hampers Smooth Educational and Political Development

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Abstract

This study was initiated to examine the idea of rotational presidency with a view to ascertaining its suitability or adoptability as a model for any country where multi-ethnicity hampers smooth educational and political development. The decision to pursue this course of inquiry follows the failure of broad conflict reduction mechanisms to work in the governance of Nigeria. This pursuit is undertaken so as to develop new insight into the concept of federalism and how it might be practiced in Nigeria in a way that would enhance education, socio-economic, and political development, justice, equity and fairness for each of its component parts. This however cannot be realized until problems pertaining to the failure of political leadership are resolved. This study argues that the solution lies in democracy through the building of lasting democratic institutions and structures of power. This is what rotational presidency represents as it would produce an effective cross cutting of political parties and a political leadership that is legitimated by the willing consent of the governed. Rotational presidency, as a social re-engineering of Nigeria's federal system both in terms of political arrangements and economic management, and educational development is predicated on these premises.

Keywords: Rotational Presidency; Rationality; Education; Political Development; Nigeria; Federalism; Regionalism.

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INTRODUCTION

Nigeria as a state had attempted to establish harmonious co-existence as a framework for governance. This includes two broad conflict reduction mechanisms, the structural and the distributive. Structural approaches to conflict management include the use of confederal and federal relationships, separation or “radical surgery”, and regional autonomy (Horowitz, 1985, p. 18). According to Horowitz, the distributive approaches involve differential allocation of government positions and resources to less advantaged groups.

Nigeria has adopted some of these measures with questionable results. Although ostensibly a federal state, federalism has been largely abandoned by political leaders in favour of strong central government (Eresia-Eke, 2002, p. 128). This is the root of many of the contemporary conflicts of the Nigerian state. ‘Radical Surgery’ in the form of

the Biafran secession, was tried and rejected, principally because it was not by mutual consent (Rothchild & Olorunsola, 1983, p. 83). Attempts at a distributive policy from the 1970s onwards, following the principle of 'federal character' whereby national resources and public offices were meant to be allocated in such a way as to reflect the plural nature of the Nigerian society, have also failed. This is, in part, due to a lack of proper implementation and the way it was seen by most southerners, as a system that favours those groups already in power (Okpu, 1977, p. 68).

Southerners and radical "progressives" see restructuring towards an ethnic confederation or variants of regional autonomy as the answer to present educational, political and economic inequalities. Nigeria, as a country struggling to enthrone democracy and development, is confronted with the choice of entrenching democracy through the wholesale regurgitation of foreign political systems or from rotational presidency – a variant of an indigenous system (Akinola, 1996, p. 13). While globalization does not push a people towards mimicry it does make the information and experiences that have positively affected lives in other societies more readily available for examination. In addition, according to Ololube (2010), National economies, and even national cultures, are globalising. Everything, including relations among family and friends, are rapidly being organised around a much more compressed view of space and time. These ideas can then be harnessed and aligned to meet the needs of specific circumstances. From this perspective, globalization is the preservation rather than the loss of identities. It is this variant that we urge Nigeria, and by extension other African countries, to adopt as it aligns with their realities.

The biggest issue facing Nigeria today is the so-called "National Question", which has been described as 'code name for all controversies, doubts and experimentation that surround Nigeria's search for stability' (Sklar, 1963, p. 24). A critical aspect of this 'national question' is the problem of ethnic domination. A broad section of Nigerian society remains profoundly dissatisfied with the country's education and political administrative structure and generally, the way it has been governed (Eresia-Eke, 2002, p. 143). Thus, the "National Question" cannot be addressed through the unwholesome adoption of foreign cultures or political systems but must be dealt with in a home-grown system. Fortunately, federalism (and not the variant presently operating in Nigeria) is malleable.

Demands for political restructuring by means of a national conference range from the cautious to the radical. It has been claimed, and not unreasonably, that leaving the issue unresolved endangers the very cohesion of the Nigerian state (Amuwo, et. al, 1998 p. 189). This view reflects a trend in popular opinion across the country. It is partly in recognition of this, that the government of late General Sani Abacha, declared as one of its priorities the convening of a constitutional conference. Following its deliberations, the constitutional conference recommended rotational presidency proviso amongst the six geo-political zones of the country (Eresia-Eke, 2002, p. 111). While this particular proviso has been since expunged from the 1999 Constitution, the manifestos of political parties do contain provisions for power sharing in the country. It is in this regard that this study undertakes examining the rationality of rotational presidency and its implication in Nigeria.

The relevance of this study can be seen to the extent that the tenants of rotational presidency are congruent with the principles of federalism – the political system adopted by Nigeria as its medium of governance. It may further be seen in the capacity to address the critical issues of Nigerian politics, namely, nation building, ethnicity, constitutionalism, political instability and political leadership. Nigerian politics today suggest a national consensus around the fact that the lopsidedness of political leadership in the country (since independence) must not continue. As a result, the findings of this study serve as a medium for providing the statutory arrangements needed to end this lopsidedness and as a deliberate political strategy for ensuring that every section of Nigeria produces political leadership.

This latter objective is important because ethnic conflict has been identified as a basic threat to education and democracy in Nigeria. Nigerian societies are notable for their primary group loyalties and multi-nationality, which constitute sources of potential conflict, especially when exploited as a political strategy by the urban elite who engage in ethnic balancing acts to remain in power. One panacea would be to democratically domesticate ethnicity with sufficient guarantees to address the fears and anxieties of marginalized groups. A democracy defined by the will of the masses on the basis of equity, fairness, social justice and self-determination would make the productivity of ethnic domination less attractive. Such a democracy will produce a highly accessible and enhanced political participation anchored in equality and national cohesion through a reach that transcends all ethnic barriers.

METHODOLOGY

This study adopts three approaches to the examination of philosophical problems namely: the analytical, prescriptive and speculative methods. The analytical method or philosophical analysis is concerned with the proper use of language in any discourse; hence, our understanding of philosophical issues as well as their intelligent examination depends

largely on our ability to understand the proper use of language. It is in light of this, that attempts are made to analyze and clarify the central concept of this work, i.e. rotational presidency and its implication in Nigeria.

The prescriptive method seeks to establish standards for assessing values, judging conduct and appraising situations. The prescriptive method enabled this study to appraise the practice of federalism in Nigeria vis-à-vis other countries where it is also the preferred medium of governance. The usefulness of this can be seen in the fact that the introduction of the rotational presidency proviso into Nigerian federalism would neither alter the standard practice nor change the value of the system.

The speculative method employs or dwells on the construction of coherent views on everything that humanity contemplates. It tends to see the world as a conglomeration of systems with the universe representing the largest system of which all others are a part. This method provides a systematic thinking which attempts to account for events that occur in or on systems that exist as part of a larger whole. It is not interested in probing the meanings of words or setting and making value judgments. Instead it tends to observe events or phenomena and recommend solutions to them and other societal problems. Using this method, the study was able to recommend solutions that will help the Nigerian polity overcome the pitfalls of the model of federalism currently operating in the country.

The materials used in this study were largely adopted from the works of experts in the area of education, social and political studies, especially those with relevance to the Nigerian situation. In addition, some commentaries on the social realities of Nigeria were used in order to arrive at a correct and adequate representation of the facts as they are. In the analysis, insights into the current state of affairs of the Nigerian state proved useful in situating the facts in their proper context. On the reliability of the materials used, it should be noted that no statistical procedure was employed in the study thereby making the use of quantitative research instruments irrelevant. The research materials and approaches used can be considered to the extent that they are analytically consistent with the exigencies of Nigeria.

THE RATIONALITY OF ROTATIONAL PRESIDENCY

Nigeria has often been described as a colonial creation. To this effect, according to Young (1988, p. 144), it acquired the character of an imposed state 'lacking in normative acceptance by the society'. This view was further revealed when after independence in 1960 it dawned on Nigerians that Arthur Richard was indeed right when he notes that:

It is only the accident of British Suzerainty, which has made Nigeria one country. (That) it is still far from being one country or one nation socially or even economically. (That) socially and politically there are deep differences between major tribal groups. They do not speak the same language and they have highly divergent customs and ways of life and they represent different stages of culture (Amuwo et. al., 1998, p. 191)

The above configuration highlights the need to transform the state from its origins of imposition into a living, viable, and normative state with a national unifying appeal and institutional framework. Indeed, the history of the Nigerian state, from the commencement of the decolonization process, has been geared towards establishing a basis for the emergence of a true Nigerian state that enjoys the widespread support of its diverse people and is able to function effectively over its territory. This effort somewhat contradicts the real drive of state building, which is concerned primarily with the consolidation of the existence of the state.

State building efforts in Nigeria, particularly before independence, peaked with the nationwide debate preceding the Macpherson Constitution in 1951, a debate which, in the words of Awolowo (1970, p. 141), was designed to elicit the true feelings of Nigerians on how the Nigerian state should operate and be administered. This was followed by a series of constitutional conferences in the lead-up to 1960 so as to usher in the independence constitution, which endorsed a federal, west-minister system of government and a three-region structure for Nigeria. This system collapsed in 1966 given enormous strains and dislocations and prompted military intervention (Dudley, 1978, p. 146).

The political contests under the First Republic demonstrated a brazen lack of unanimity on the rules and institutions governing the Nigerian state. These contestations were to continue even under military rule. In general, military governments rely on force and order to elicit compliance instead of the more ideal political norms of consultation, bargaining and compromise needed in meaningful state-building efforts. The result in Nigeria was a thirty-month civil war (Joseph 1987 p. 189). Other state-building efforts, including the change to a presidential system of government and a provision on the emergence of national political parties for the Second Republic in 1979, also did not produce appreciable results. The republic collapsed under intense strain through another military intervention on December 31, 1983. The subsequent political transition programme, supervised by the Babangida military government

and seeking the introduction of a compulsory two-party system and the creation of new states, lead the country down a dead-end road with the annulment of the June 12, 1993 presidential election. This annulment precipitated a dire political crisis out of which Nigeria is yet to emerge.

It was against the background of this political crisis that the Abacha military government convened a constitutional conference, with full constituent and plenary powers, to fashion a new basis for the existence of the Nigerian state. It was a response to the crisis which has brought with it questions of the perpetual marginalization of some segments of the Nigerian polity in the political and power equation in Nigeria. The essence of June 1993 presidential election debacle is the perception of a deliberate ploy to deny a segment of the population access to and control of the Nigerian presidency after victory in a national election. The task before Nigerians, therefore, is to devise a framework for the operations of the Nigerian state that would give all segments of the polity a sense of belonging through real access to all-important state positions and offices. There is the need to ensure balance in filling political offices, especially the presidency, which stands as the arrowhead of the institutional representation of the state.

If the Nigerian state is to be assured of its continued existence, the complaints raised by the presidential election debacle must be addressed by a formula that assures significant segments of the Nigerian polity access to important state offices. According to the 1995 constitutional conference reports, these segments have come to associate their continued participation in the Nigerian enterprise and a sense of belonging with access to state offices, particularly the presidency, such that it becomes imperative to conceive of a framework of rotation in which all segments of the polity are guaranteed access. As a matter of fact, state-building efforts, in addressing the issues raised by the June 1993 presidential election imbroglio, have of necessity, to initiate a process of rotational presidency since it is clear that only guaranteed access to this state office will assuage the feelings of marginalization responsible for the vocal questioning of the existence of the Nigerian state. It is against the background of the collapse of the existing framework for the institutional functioning of the state, under pressure of complaints of marginalization, particularly with respect to control of important state offices like the presidency, that the idea of rotational presidency becomes imperative, rational and highly desirable in the Nigerian situation.

The Premise and Practice of the Federal Character Principle

Although the British Colonialists dominated and exploited what came to be known as Nigeria through the colonial state under Lord Lugard, the Northern and Southern protectorates were administered differently. While in the North, the British employed a system of indirect rule and incorporated the Emirs into the colonial administrative structure, in the South, particularly among the Igbo, colonialism depended on its appointees – the warrant Chiefs. As Afigbo (1989, p. 9) rightly notes, the policy of indirect rule, which was premised on the principle of divide and rule:

Provided a strong argument for keeping the course of development in the Northern and Southern provinces rigorously apart, for reducing all contacts between the peoples of the two groups of provinces to the absolute minimum and for excluding the former group of provinces from the sphere of the Legislative Council.

The growth of British commercial and colonial interests in the 19th century led to British Christian missionaries establishing institutions for formal education in order to create understanding between the colonial rulers and native Southern Nigerians to perpetuate their economic, political, social and religious imperialism. Nearly all of today's developing countries were once colonies. That is, they were under the direct administrative rule of one or more European power. For example, America broke free from European rule in the late eighteenth century, but most countries in Africa, the Near East, and Asia won their independence only in the past 50 to 60 years. Between 1945 and 1968, 66 countries gained political independence from colonial rule (Ololube, 2009, pp. 6-7). According to Brint (1998, p. 67), most of the developing world consists of rather new states of which Nigeria is one. Brint further contends that colonial rulers were mainly interested in raw materials, cheap labor, and acquiescent subjects, thus schooling for the masses was considered helpful, but it was a comparatively low priority. In the absence of strong official support, Christian missionaries often introduced formal education as a way of evangelizing the indigenous populations.

After independence in 1960, Nigeria's federal government had little influence on education matters at the primary and secondary school levels because that was the constitutional responsibility of the regions. This resulted in a multiplicity of educational policies and practices and varying standards of education which gave rise to uneven development. Prior to the coming of the British, various regions and people of Nigeria had their own educational system, as is the case in other countries of the world (Ololube, 2009, p. 7). According to Fafunwa (1991), the young

were taught how to conform to social customs and traditions of the community and to learn a trade or vocation to make them good citizens. Such education was aimed at maintaining continuity in various vocations (especially in medicine, arts and crafts) and the continuity of culture by transmitting to successive generations not only accumulated knowledge but standards of belief, norms and values (Ololube, 2009, p. 7).

The pattern of uneven development was exacerbated not only at the political level, but also in the educational sphere. Raufu (1987, pp. 81-96) notes that while Christian missions were allowed to establish schools in the Southern provinces, they were curtailed from doing so in the North under the pretext that the North was Islamic in its religious practice. The disparity in educational advancement between the North and South widened and brought with it a magnitude of prejudices which widely exist and will continue to exist. Afigbo (1989, p. 9) again affirms the above trend in writing:

...the Colonial administration passed on the Nigerian wards the prejudices which had enabled them to think and act in the belief that this "informal federation" was a marriage of convenience between incompatibles. The North looked down on the South as uncivilized, pagan, indiscipline, rowdy and nakedly materialistic. The South returned this contempt with compliments, regarding the North as feudalistic, conservative, uneducated... And as the pliant tools of the imperial master

The Colonial policy of indirect rule not only exacerbated the North-South dichotomy but introduced regionalism via the 1946 Richards Constitution. Tom Forest in his book, *Politics and Economic Development in Nigeria*, aptly argues that British colonial policy entrenched a tripartite regional system of government in which the major ethnic groups – the Hausa-Fulani, Igbo and Yoruba – respectively dominated the three regions of North, East and West. Forest (1993:39) sees the underlying competition between the ethno-regional groups as:

... the struggle for economic advancement by individuals and communities and the fear of political and economic domination accentuated by the uneven development of disparate communities. These fears were strikingly evident in the bitter controversy over census and in the aggressive ethnicity that came to the surface. Despite the operation of a federal system of government that ensured considerable decentralization of powers, there was too much at stake at the centre for a compromise to be struck.

The constant desire by the diverse ethnicities of Nigeria to either control the federal centre or ensure access to "national cake" has been at the heart of the national question and federal character debates. During Gowon's military administration, Nigeria not only endured a bitter and destructive civil war, but the federation was also restructured from four regions into twelve states. As the pressure for more states persisted, the Murtala-Obasanjo regime increased the number to nineteen and introduced far-reaching reforms at the grassroots level by giving autonomy to local governments. To return the country to civil rule, the regime set up a Constitution Drafting Committee (CDC). It was at the 1975-6 CDC debates that the concept of federal character as a political lexicon emerged in Nigeria's search for a stable democratic order.

The tragic history of Nigeria's First Republic greatly influenced the perceptions and attitudes of the CDC sub-committee that examined the powers and functions of the Executive and Legislative arms of government in a multi-ethnic or plural society. According to Afigbo (1989, p. 4), it was in an effort to promote national unity and integration that the sub-committee proposed the adoption of the Federal Character Principle which, according to the framers of the 1979 Constitution, is anchored in the:

...distinctive desire of the peoples of Nigeria to promote national unity, foster national loyalty and give every citizen of Nigeria sense of belonging to the nation notwithstanding the diversities of ethnic origin, culture, language or religion which may exist and which it is their desire to nourish, harness to the enrichment of the Federal Republic of Nigeria.

Simply put, therefore, the Federal Character Principle seeks to create a sense of belonging and participation among the diverse ethnic groups and political groupings in the governance of the post-colonial state. It is an outcome of the anxieties and fears of domination that characterize ethno-regional relations in Nigeria. Furthermore, the Federal Character Principle, and its application in the governance of Nigeria, is symptomatic of the desire by the different ethnic groups, especially in the North, to ensure access to both civil service and political positions.

Based on the dimensions of the Federal Character Principle and its practice, we can observe that the situation necessitating such a framework for the accommodation of diverse peoples of Nigeria in public life, still exists. Rotational presidency is another variant of that principle touted to take care of areas of public life not considered in the adoption of the Federal Character Principle. To reject the rotational presidency proposal when its variant, the Federal Character Principle, is enshrined in the constitution amounts to the use of different standards in relating to peoples of the same country under the same circumstances.

Social Justice and Reverse Discrimination

The concept of justice, like many social science concepts, remains a contested one among scholars. According to Rawls (1973, p. 10), at various times and under different historical, cultural and ideological influences, justice has been variously interpreted. Despite these discrepancies, the fact that justice is a distributive term is generally agreed on. In the view of Frankena (1976, p. 433), this means that justice has to do with the “allotment of something” to persons. Frankena suggests that these things may include duties, goods, offices, opportunities, privileges, roles, status and so on. It is important to note here, however, that justice, “has to do, not so much with the quantity of good and evil” that is being distributed, but more “with the manner in which it is distributed (Frankena 1976, p. 432). Likewise Miller (1979, p. 19) suggests, “the subject matter of justice (is) the manner in which benefits and burdens are distributed among men”. He goes on to describe a just distribution as that in which “each individual has exactly those benefits and burdens which are due to him”. This is supported by Bodunrin (1989, pp. 303-324) when he states that a society is considered just “if everybody is treated fairly in respect of the distribution of the society’s goods”.

Not surprisingly, the question of what treatment should qualify as fair treatment, and by implication, what distribution a just distribution, is not a settled one. Following Rawls (1973, p. 5) position, it could be said, if only tentatively, that even people who hold different views or conceptions of what justice is, can “still agree that institutions are just when no arbitrary distinctions are made between persons” in the assignment of “basic rights and duties and when the rules determine a proper balance between competing claims to the advantage of social life”.

One way of interpreting Rawls’ view is that justice entails the avoidance, as much as possible, of discrimination in the distribution of social benefits and costs. To achieve this, Rawls (1973, p. 60) suggests that every society should be organized so that:

1. Each person has equal rights to the most extensive basic liberty compatible with a similar liberty to others.
2. Social inequalities are to be arranged so that they are (a) one’s advantages, and (b) attached to positions and offices open to all.

It is important to note that in some circumstances Rawls recognizes the unequal distribution of social costs and benefits as leading to the attainment of justice. In other words, he foresees a situation whereby “an unequal distribution of any or all of (liberty, opportunity, income and wealth and the bases of self-respect) is to every one’s advantage” (1973, p. 83). This is possible he continues, when “an unequal distribution” is to “the advantage of the least favoured groups in the society”.

The implication of this is that an unequal distribution is not necessarily unjust. It is the principle inherent in this type of position, which protagonists of reverse discrimination or affirmative action have used to justify their claims. The argument being that some social and/or historical circumstances could be the basis for giving preferential treatment to some groups without compromising justice.

A closer examination of preferential treatment and more importantly, the justifications for it, are called for at this point. First, preferential treatment means giving to somebody what she might not have, under a prevailing circumstance, obtained on her own. As noted, preferential treatment is usually justified on the ground of historical antecedents and the inequalities, this had created. As Thompson (1973) argues, “if we have wronged ‘A’, we must make amends, justice requires it and failure to make amends is not merely callousness, but injustice”.

Preferential treatment therefore, can be seen as reparation paid for a past wrong. Affirming this view, Johnson (1971, p. 66) noted that “you do not take a person who, for years has been hobbled by chains...and then say you are free to compete with all the others and still just believe that you have been completely fair”.

One argument used to justify affirmative action or reverse discrimination in the United States has been that certain state policies were, in the past, biased against certain groups and that it is not enough to simply stop such policies. Conscious efforts must be made to correct some of the disequilibrium created by these policies. With respect

to slavery in America, for example, racism became semi-institutionalized and Blacks and other minority groups suffered considerably as a result. In the light of the above, Moge kwu (1992, p. 215) agrees that the objective of affirmative action is first, recognition of this kind of discrimination. Second, it is applied as compensation for the past misdeed. Put differently, reverse discrimination, especially as it is being pursued through the principle of affirmative action in the United States, is based on the need to achieve the following objectives (among others):

- a. To ensure that past discrimination against Blacks and women does not continue.
- b. To offer officially and explicitly a symbolic denunciation of past racism and/or sexism in America.
- c. To provide role models for victimized blacks and women.
- d. To compensate victims of discrimination by preferring them over the beneficiaries of injustice (those who gained/gain from the status quo).

From whatever perspective the matter is viewed, affirmative action is based on a sense of collective guilt and the moral obligation to pay compensation to the group wronged in the past. This is one sense in which rotational presidency could be applied and as such acquire relevance in the Nigerian state system. In this way, the rotational presidency becomes a socially engineered (preferential) institution to stop the wrongs and denials of the past. At the same time, rotational presidency is more than “preferential treatment” for a group. It is a general institutional structure being fashioned to ameliorate the deficient socio-political foundation of the Nigerian state. It seeks to strengthen the ability of the Nigerian state to effectively command the respect and loyalty of its diverse people through an institutionalized system of social justice.

Rotational presidency is not the same thing as the Federal Character Principle. The latter does imply preferential treatment for a group and this entails the denial of another groups’ rights. This is only justifiable in instances where the preferred group can be shown to have suffered wrongs or denials in the past through a policy or policies that were beneficial to the group that will now “suffer”. Conversely, if a group “A” cannot be shown to have been the cause (or beneficiary) of “B’s” present predicament, or better still, where “B’s” denial did not in anyway benefit “A”, the basis for preferential treatment in favour of “B” can hardly be sustained on any principle of social justice. In fact, to do that would amount to injustice against “A”.

CONCLUSION

The analysis above has been undertaken to illuminate the inherent contradictions in the principle and practice of the federal character policy in Nigeria even though it has long been pursued as state policy. It becomes pertinent at this juncture to ask: “if the federal character principle is being implemented as a state instituted system of governance, then why not the rotational presidency with its superior framework for governance based on social justice.” After all, contemporary global evidence has shown that ethnicity is more enduring and self-reinforcing than scholars in the past were prepared to admit. This is not peculiar to under-developed societies, as the recent experiences of Eastern Europe, with its long exposure to industrialization and socialist ideology, demonstrates. Advanced western societies, among them Britain, the USA and France, also show evidence of persistent ethnic allegiances. A more helpful approach would be to recognize this reality and search for ways in which plural societies can co-exist harmoniously within a larger state and benefit from its advantages.

Federalism, plainly understood, is a form of government where the component units of a political organization participate in sharing powers and functions in a cooperative manner though the combined forces of ethnic pluralism and cultural diversity among others, tend to pull people apart (Ministry of Information, 1995). Arrangements of this type, though delicate, if carefully planned ensure sufficient grounds for the co-existence of “centre-seeking” and “centre-fleeing” forces. Peace is the reward for fortunate communities able to achieve and sustain this measure. Where people sometimes agree and sometimes disagree on the goals and means of cooperative governments, friction and conflicts do occur, and should the system work as planned, conflict-resolution is quite possible. This conflict-resolution is best realized through the timely and effective intervention of accredited authorities and organs of government.

As there are “strong” and “weak” forms of federalism according to Wheare (1963), there are also periodic variations, which permit “strength” or “weakness” within the same system to be measured differently. This is the case with Nigeria as with other federations. The lack of harmony between the “strength” and “weakness” periods of Nigerian federalism provoked the search for an alternative means of achieving it. This can be achieved through a constitutional provision for a zoning system and power sharing (rotational presidency). It is a political arrangement and

an adequate power structure with the capacity to balance the conflicting claims and demands of national stability. The need for such an arrangement arises from the fact that power sharing lies at the root of all political systems and structures. It has been responsible for much of the tension, conflicts, stresses and strains in most politics, at least in the case of Nigeria. It has triggered most of the group confrontations and the resultant distrust, suspicion and instability in many countries.

Rotation of the presidency as a principle adopts a holistic rather than a monolithic conception and view of power, which would not confine it to a consideration of political power alone or that ability to control, act, exercise authority and influence for the benefit of a geo-polity. Rather, power sharing is seen as invariably touching on the question of equity, fairness and justice in the allocation of fundamental indices of power, which are identified as economic, military, bureaucratic, media and intellectual.

This recognizes that in a country like Nigeria, with its diverse peoples, and corresponding diverse political, social, cultural and economic endowments and interests, true federalism must be a genuine attempt to regulate relationships among groups as well as a reflection of these identifiable divergences within a framework of national unity. National unity in a federation does not imply national uniformity. It is for this reason that federal systems vary from one country to another and each federal society devises its own unique federal form congruent with its peculiar socio-economic and political challenges. The particular complexion of a country's federal system reflects the diversities, historical experiences and the disposition of its people at a particular point in time. Each unit in a true federal system has its powers and functions demarcated and guaranteed in such a way as to strike a compromise between local particularisms and national integration. Essentially, in the context of the clamour, rotational presidency has come to mean evolving our own power-sharing formula, making our own decisions and developing our own institutions anchored in our historical experiences.

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