THE INFLUENCE OF SOCIO-PHYSICAL ENVIRONMENT ON THE QUALITY OF SECONDARY EDUCATION IN MFANGANO ISLAND IN MBITA DISTRICT, HOMABAY COUNTY, KENYA

MASIWO JOSEPH

E55/CE/11850/2008

A PROJECT SUBMITTED TO THE SCHOOL OF EDUCATION IN PARTIAL FULFILMENT FOR THE REQUIREMENT OF THE AWARD OF DEGREE OF MASTER OF EDUCATION (CURRICULUM STUDIES) OF KENYATTA UNIVERSITY

JUNE, 2015
DECLARATION

This project report is my original work and has not been presented in any other university for consideration for any other award.

Masiwo Joseph        Date

This project report has been presented with our approval as the university appointed supervisors:

Prof. John Aluko Orodho,   Date
Associate Professor,
Department of Educational Management,
Policy and Curriculum Studies,
Kenyatta University.

Dr. Levi Libese,   Date
Senior Lecturer,
Department of Educational Management,
Policy and Curriculum Studies,
Kenyatta University.
DEDICATION

The project report is dedicated to my Late, loving, step-mother, “Oroba Nyar Msungu” (Alipo), whose sacrifice saw me and my siblings attain High school and University level of education.
ACKNOWLEDGEMENT

The preparation of a project needs great team work from several key stake players and institutions. It may not be possible to list all the institutions and people who assisted in this exercise. However, let me take this opportunity to give minimum credit to a few of them.

The researcher would like to convey great gratitude to Kenyatta University for admission and training at Post Graduate level. A lot of appreciation goes to the supervisors: Prof. John Aluko Orodho, and Dr. Levi Libese, of the department of Educational Management, Policy and Curriculum Studies, School of Education, Kenyatta University. They devoted great amount of time and patience to this study and manuscript preparation. Their expert advice, guidance and great concern enabled the project to succeed. Secondly, sincere gratitude is expressed to the Board of Governors and the Teachers of Uozi Secondary School in Mfangano Island, for support and participation in piloting. Third, the Ministry of Education, through the D.E.O Mbita, is thanked for consent. Fourth, Equity bank- Mbita branch is also thanked for support. Sincere acknowledgement also goes to Mrs. Margaret Nyaboke Ntabo for neat typing of the project. Lastly, great appreciation goes to my beloved wife, Suslia A. Asego; my sons: Daddy, Len, Wiltod, Sean and Junior; my only daughter, Victory. Their support enabled me to complete the project.

For errors of omission, commission and or interpretation identified herein, the researcher absolves the institutions and individuals already named; they remain absolutely the author’s responsibility.

Thank you all and may God bless you.

-JOM-
# TABLE OF CONTENTS

DECLARATION .................................................................................................................. ii  
DEDICATION .................................................................................................................... iii  
ACKNOWLEDGEMENT ...................................................................................................... iv  
TABLE OF CONTENTS ....................................................................................................... v  
LIST OF TABLES ............................................................................................................... viii  
LIST OF FIGURES ............................................................................................................ ix  
ABSTRACT ........................................................................................................................ x  

## CHAPTER ONE: INTRODUCTION ................................................................................. 1  
1.1 Introduction ................................................................................................................ 1  
1.2 Background to the Study .......................................................................................... 1  
1.3 Statement of the Problem ....................................................................................... 6  
1.4 The Purpose of the Study ....................................................................................... 7  
1.5 Specific Objectives .................................................................................................... 7  
1.6 Research Questions ................................................................................................ 8  
1.7 Significance of the Study ......................................................................................... 8  
1.8 Limitations of the Study .......................................................................................... 9  
1.9 Delimitations of the Study ....................................................................................... 9  
1.10 Theoretical Framework of the Study ................................................................... 10  
1.11 Conceptual Framework ......................................................................................... 12  
1.12 Operational Definitions of Central Terms ............................................................. 14  

## CHAPTER TWO: REVIEW OF RELATED LITERATURE ............................................... 15  
2.1 Introduction .............................................................................................................. 15  
2.2 Influence of Lake Victoria on Accessibility to Secondary Schools ....................... 15  
2.3 Efficiency in Curriculum Implementation in relation to Landscape ....................... 17  
2.4 Religious Affiliation and Qualitative Curriculum Implementation ....................... 18  
2.5 Home – School Partnership ..................................................................................... 19  
2.6 Summary and Gap Identification ............................................................................ 20
REFERENCES ...............................................................................................................45

APPENDICES ..........................................................................................................53
APPENDIX I: STUDENTS QUESTIONNAIRE ..........................................................53
APPENDIX II: TEACHER’S QUESTIONNAIRE ..........................................................59
APPENDIX III: INTERVIEW GUIDE FOR PARENTS AND FISHERMEN ..................61
APPENDIX IV: RESEARCH BUDGET .......................................................................63
APPENDIX V: WORK SCHEDULE ..........................................................................65
APPENDIX VI: AUTHORITY LETTER ........................................................................66
APPENDIX VII: RESEARCH PERMIT .......................................................................67
LIST OF TABLES

Table 3.1: Sample Size........................................................................................................ 24
Table 4.1: Teachers’ Arrival Time.................................................................................... 34
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1.1</td>
<td>Conceptual Model for analysis of contributions of socio-physical environment, on quality secondary education</td>
<td>12</td>
</tr>
<tr>
<td>Figure 4.1</td>
<td>Students transportation means to school</td>
<td>29</td>
</tr>
<tr>
<td>Figure 4.2</td>
<td>Teachers Transportation Means to School</td>
<td>30</td>
</tr>
<tr>
<td>Figure 4.3</td>
<td>Means of Transport for School Materials</td>
<td>31</td>
</tr>
<tr>
<td>Figure 4.4</td>
<td>Students’ Punctuality status during Dry Season and Wet Season</td>
<td>33</td>
</tr>
<tr>
<td>Figure 4.5</td>
<td>Teachers’ Residential Status</td>
<td>34</td>
</tr>
<tr>
<td>Figure 4.6</td>
<td>Institutions Sponsoring Schools in Mfangano Island</td>
<td>36</td>
</tr>
<tr>
<td>Figure 4.7</td>
<td>Stakeholders’ Contribution to School Operations in Mfangano Island</td>
<td>38</td>
</tr>
</tbody>
</table>
ABSTRACT

The study examined the influence of socio-physical environment on the quality of secondary education in Mfangano Island, Mbita District in Homa Bay County. The objectives were to investigate the influence of Lake Victoria on accessibility to learning institutions, to find out landscape factors influencing curriculum implementation, to determine the contribution of religious institutions on the quality of secondary education and to identify the contribution of home-school partnership to quality secondary education in Mfangano. The study used the Classical Liberal Theory and employed descriptive survey research design. The target population was 2,544 people. A sample size of 346 people was investigated. One hundred and sixty-three parents, twenty teachers and one hundred and sixty-three students participated. Interviews, observation guidelines and questionnaires were used to collect data. Reliability was determined using test retest procedure. Validity was tested through piloting on small school and expert advice from the supervisors. Secondary data was collected from documents in schools and Education offices. Primary data was gathered from the field. The data from the questionnaires was edited, coded and broken down with the aid of Statistical Package for Social Sciences to generate descriptive statistics. Data presentation and interpretation was done using line graphs, bar graphs, tables, and pie-charts. The main findings were that access to schools is affected by Lake Victoria, landscape has shaped the frequency and access to schools, religious support has been available with the Seventh Day Adventist Church dominating. Parental support to schools has been lukewarm. It was concluded that denominational conflicts in schools had interfered with fair access to education and curriculum implementation. The challenge of school drop outs, orphaned learners and terminally sick students and parents owing to socio-economic activities along the lakeshore had impacted negatively on education. There was need to strengthen parental roles in access to education and curriculum implementation. Inaccessibility to secondary schools owing to the ragged landscape, and great distances covered to reach the secondary schools, had impeded meaningful access to education and quality curriculum implementation. Therefore a general rescue plan was needed for this disadvantaged environment. Based on the findings, it is suggested that further research should study areas such as the availability of learning/teaching resources and the quality of school management, for they are also influenced by the environment. This has not been adequately studied by this research.
CHAPTER ONE

INTRODUCTION

1.1 Introduction

The chapter gives a brief background to the study, a precise statement of the problem, purpose of the study, study objectives as well as research questions, significance of the study, locale of research, theoretical as well as conceptual framework and lastly, the operational definition of central terms.

1.2 Background to the Study

Wikipedia, the Free Encyclopedia, defines social environment as one’s immediate physical area, a group of people with whom one resides and their culture as well as the facilities an individual mingles with in life. Casper and Barnett (2001) refer to social environment as the immediate Geographical area, a group of people and time period identified with specific interactions and functions of a people.

In this study, Social Environment meant the immediate geographical location of an individual, a group of people in that location, their culture and time period identified with their specific functions. Operationally, the following areas were examined under social activities: fishing lifestyle, community beliefs and practices as well as religious institutions and home-school partnership.

Fishing as an activity has had serious effects on education and its quality. Allison (2003) observes that communities that engage in the activity are usually marginalized from the development initiatives by the government. However to the fish folk and the fishing community, the incentive to remain in fishing remains
stronger (West away, 2009). Mfangano is a fishing community. It is therefore vital that the quality of education offered is assured in terms of quality owing to the disadvantaged background associated with fishing environments.

According to the Free online Dictionary, religion refers to the belief and respect for a supernatural power or powers governing the universe. An environment that has a lot of religious conflicts and discrimination, denies access to and inclusion in total quality education. The International Institute for Educational Planning (2009), notes that denial of religious rights has always been a source of conflict. According to Yambo, et al (2012), managing time for religious enterprises in school, both for the teacher and the student as well as other users has always been a challenge.

Home-school partnership at a narrow level would refer to parental involvement in the education of the children. More generally it may mean community involvement. The involvement goes beyond attending Parents’ Teachers’ Association (P.T.A.) or Board of Management (B.O.M) meetings. It encompasses outreach efforts, opening up school systems to community participation in various ways. Rutherford and Billing (1995) recommend that this creates a united front, which is a powerful tool for availing quality education. It motivates students and teachers, ensures security to the teachers and contributes resources necessary for quality education.

According to the Wikipedia Free online dictionary, physical Environment consist of physical features that occur naturally such as water, natural vegetation, landforms and rocks, weather and climate. Davison and Lawson (2006), define it to be the objective or perceived characteristics of the physical context in which children
operate. Stankovic’ and Tanic’ (2006) summarize it as structures, personnel and spatial organization.

In this study, physical environment referred to physical features that occurred naturally; on which people functioned in and out of school. It included aspects which are people-made as well as scenic qualities such as safety and criminality. The study investigated the effect of Lake Victoria on accessibility to learning institutions and the effect of local landscape on efficient curriculum implementation in secondary schools. However, from the definitions, it was clear that the social environment included much more than just studying the natural environment. The terms were viewed together as Socio-Physical Environmental Effects on the Quality Secondary Education in Mfangano Island.

Stankovic (2006) states that the Physical Environment of a school may either enhance learning or serve as a distracting agent. Sunday and Olufunmilayo (2008) observe that in Nigeria, the neglect of effective and efficient management of the Physical Environment has ruined quality education. According to krop (2013), Physical Environment in Kenya, is reflected in unmanageable distances to secondary schools compounded by harsh terrain, boundary related scuffles, which occasionally and drastically disrupt learning, learners and schools. Ruto, et al (2009), observe that it is also shown in very unfriendly weather patterns. Added to these include limited nutritional scope of school going children, great teacher transfer requests accelerated by the tutors’ desire to run away from places perceived deplorable, among others. These entire have in one way or the other, affected the quality of secondary education in Kenya, especially on enrollment, retention and completion (Lloyd,
Mensch and Clark, 1998). For example, Fin Access Survey (2009) shows access to High School Learning in North Eastern province is at 40%, compared to 80% in Central province. Glen nester (2011) indicates that the percentages are even dismissal when the female gender is studied. Ariko and Simatwa (2011) observe that the notoriety of teacher transfers in Suba, which is greater than Kenya’s national average (Approximately 2000 out of 4000 teachers – 5 %.), has been heavily shaped by the inaccessibility of certain sections of the region. Common awful diseases have also had a fair share in disrupting the continuity of teaching and learning. Odada, et al (2004), notes that the capacity of Lake Victoria has grown immensely in waterborne diseases during the last thirty (30) years.

Lake Victoria is the largest fresh water lake in the World. This aspect of the physical environment has created cross border conflicts that interfere with teaching-learning processes. Wood (2014) and Bandura (1986) affirm that where the lake provides restrictions, group diversity and teacher value depreciates, while the students’ horizon is trapped. Displacement of learners from their teachers and from schools and vice versa, resulting from itinerant fishing, not only interferes with teaching but also learning.

Mfangano’s physical environment includes Lake Victoria. Existing literature displays general research on Mbita district, with only lip service paid to Mfangano, possibly as a result of phobia for the lake.
The terrain of any area determines the teaching and learning quality in educational institutions. Okuwa (2012) stresses that implementation of policies and strategies both in academic and co-curricular areas are hampered by difficult terrain. Mfangano is largely hilly and rocky. Curriculum implementation has reflections of practical deficits because of the hilly and rocky nature of great sections of the Island. According to Jethro (2006), quality as a mechanism, refers to the process of judging performance against a criterion and making decisions on the “warrant” of an institution or programme. Quality is concerned with excellence, being exceptional, distinctiveness, perfection or consistency; being fit for the intended purpose so as to enable recipients be assured of the value for money invested in schools and children. Chilgren (2008) observes that quality means exceptional service delivery to customer or client satisfaction. The study adapted Professor Jethro’s definition.

Education has been defined by Oluoch (1982) as the process of acquiring and developing appropriate and relevant knowledge, skills and attitudes required in making one fit in the society. Shiundu and Omulando (1992) define it as “a comprehensive exposure to opportunities of life, through schooling, aimed at achieving an all-round individual for the challenges and roles awaiting him as a member of his or her immediate society.”

In a merger of the two definitions, education is the process of adequate exposure to and the acquisition and development of knowledge, skills and attitudes deemed appropriate and relevant to life with an aim of molding an all-round person, for the challenges and duties awaiting him or her as a member of the immediate society. Therefore Quality of Education means the excellence of performance in our schools in
the comprehensive process of acquiring and developing appropriate and relevant knowledge, skills and attitudes, required for relevance or adaptability in the immediate society.

1.3 Statement of the Problem


West away (2006) states that religious harmony reduces conflicts in learning institutions and therefore creates room for quality teaching and learning. Ramani and Zhimin (2010) contend that Religious affiliation differences are a major cause of disharmony in teaching and learning institutions. Religious organizations participate in the management of secondary schools as a Board of Management. They take part in teacher transfers, appointments and school syllabus development. According to Wabwoba (2010), in as much as these areas are for co-existence, they are equally potential conflict zones.
In Mfangano, some learners are lured from education by the fish folk. Students, who feel uncomfortable due to the location of the Island, out of curiosity or the pursuit of what they think is superior education, seek schools outside the Island. The teachers are torn apart because of the inconveniencing geography of the Island. The fish folk heavily invest their focus on fishing at the expense of education. It is against this background that this study sought to document the influence of Socio-Physical environment on the Quality of Secondary Education in the nine secondary schools within Mfangano Island.

1.4 The Purpose of the Study
The purpose of this study was to determine the influence of socio-physical environment on the quality of secondary education in Mfangano Island using descriptive survey design.

1.5 Specific Objectives
i) Investigate the manner in which accessibility to secondary schools in Mfangano is shaped by the presence of Lake Victoria.
ii) Find out landscape factors influencing curriculum implementation in Mfangano.
iii) Determine the contribution of religious institutions and religious affiliations to the quality of secondary education in Mfangano Island.
iv) Identify the contribution of home-school partnership to the quality of secondary education in Mfangano Island.
1.6 Research Questions

The study sought to answer the following research questions:

i) How has accessibility to secondary schools in Mfangano island been influenced by the existence of Lake Victoria?

ii) How has efficient curriculum implementation in secondary schools been controlled by the local landscape of Mfangano island?

iii) What is the contribution of religious institutions and religious affiliation on the quality of secondary education in Mfangano Island?

iv) What has been the contribution of home-school collaboration to the quality of secondary education in Mfangano Island?

1.7 Significance of the Study

The study released vital knowledge on the socio-physical environment role on the quality of education offered in secondary schools in Mfangano Island. The knowledge generated by this study continues to form an area of reference in the world of academia.

Through the study’s recommendations, significant policy statements were issued on how accessibility to secondary education is shaped by the existence of Lake Victoria, how the local terrain influences curriculum implementation, the influence of religious institutions and affiliations as well as the contribution of home-school partnership. The recommendations are vital to policy makers in shaping the quality of education in Island regions, Mfangano in particular.
The Ministry of Education, through the office of the Sub County Director of Education- Mbita district, reaped from the recommendations of the research. The practice of management of quality education in the district, needs to study the research on how socio-physical environment in Mfangano, influences the attainment of excellence in educational performance.

The targeted population was given valuable insights on the state of education and the challenges towards full realization of quality education in the secondary schools in Mfangano Island. This is a pointer to the contribution each one of them needs to make, to turn around the quality of education in Mfangano division.

1.8 Limitations of the Study
The study examined the influence of socio-physical environment on the quality of Secondary Education and was limited to Mfangano Island in Mbita district, Homabay County of Nyanza province in Lake Victoria Region. There were nine (9) secondary schools on the Island: eight public and one (1) private. Of the eight public schools, two were officially registered Mixed Day and Boarding secondary schools; one was pure Girls’ Boarding secondary school while the rest were Day secondary schools. The private secondary school is also an orphanage, and mainly catered for students whose parents died of HIV/AIDS. The findings of the study may not be generalized to other communities.

1.9 Delimitations of the Study
The study was delimited to heads of secondary schools, heads of departments, classroom teachers and students. In addition, sampled parents were involved. The
research was conducted when schools were on in July, 2013 using descriptive survey design. There were other factors influencing the quality of secondary education such as politics. However, the study restricted itself to socio-physical factors namely: accessibility, efficiency of curriculum implementation, religious institutions and affiliations and home-school partnership. Data for the study was collected by research assistants. Questionnaires, face-to-face interviews and clear observation guidelines were used for data collection.

1.10. Theoretical Framework of the Study

The study was guided by the classical liberal theory of equal education opportunity. The theory was advanced by an American educational reformer, Horace Mann (May 4, 1796-August 12, 1859). Orodho (2010) notes that the theory reveals that all human beings are born with ability and potential. Education develops or triggers these potentials. This implies that all are equal. Resources in the environment must therefore be apportioned equally. This indicates that there must be a process for assisting all children, to reach a point in life where they can all make choices about how to live and be properly held accountable(maturation stage). Gidley (2010) and Alstott (2007) affirm that appropriate and adequate education is the process capable of shaping the lives of the young.

Curren(2009) states that Education is a social right. Orodho (2010) observes that primary and secondary education are therefore, very vital. Consequently, access to basic and high school education should be on merit, and not based on where one is born.
It is clear from the theory that people from low socio-economic backgrounds should not be discriminated against. Everybody has the ability to benefit from education and achieve the desired social status. According to Orodho (ibid), this is why the government of Kenya has introduced universal free primary education and subsidized secondary education. As was adopted in this study, socio-physical barriers in Mfangano, which is a declared hardship area, were assessed and their influence on the provision of quality secondary school education, accurately captured. Kenya is in open competition for social mobility. Orodho (ibid) observes that access to quality education would increase the children’s chances “on the run”. However, in using the classical liberal theory of equal education opportunity, inherent bottlenecks cannot be wished away. Equitable choice on education as a vehicle can and has always been constrained by personal, regional and even national resources. Reconciliation with the ideal in availing equal opportunity in education has not always been easy. Alstott (2007) observes that such reconciliation has always been compounded by logistics and the national income.
1.11 Conceptual Framework

Figure 1.1 Conceptual Model for analysis of contributions of socio-physical environment, on quality secondary education

Physical Environment

- Landscape
- Lake Victoria

Curriculum implementation

- Differential implementation
- Full implementation

Quality Education

- Quality KCSE Grades
- Other Outcomes
- Completion

Intervening variable

Social /economic environment

- Religious institutions
- Home-school partnership

Dependent variable

Source: Adopted and modified from Keaveney and Young 1997

In this study, the conceptual framework included how the socio-physical environment influenced the quality of secondary education in Mfangano Island. This is clearly illustrated in figure 1.1a. Socio-physical environment showed it in
terms of how ease of accessibility to education in the learning institutions was influenced by the existence of Lake Victoria, the extent to which the local landscape affected efficient curriculum implementation and the influence of religious environment, parental involvement and community partnership in education. For instance, flat but flooded areas were viewed as inaccessible. Hilly slopes experiencing heavy rainfall were detrimental to road transport and so enhanced isolation. The roads were difficult to grade because the lake compounded the transport of heavy machines meant for such works. Religious issues obstructed or accelerated the development of school infrastructure. Dominance of a religious institution was explained by terrain and it shaped staffing and school programme. The terrain sieved out potential donors.

The classical liberal theory of equal education opportunity revealed that all people are born with abilities and potentials. Education was the best instrument of identifying, nurturing and developing these innate abilities and potentials. Resources must therefore be channeled towards education fairly. Any form of Education provided needed to be adequate, appropriate and merit based. Disadvantaged areas such as Mfangano did not need to be discriminated against. A deliberate effort needed be put in place by the government to ensure that adequate and appropriate quality education was availed to persons in disadvantaged zones. Landscape that impeded curriculum implementation, Lake Victoria which created socio-physical disadvantages, lackluster home-school partnership and educationally debilitating religious convictions required to be investigated. This would ensure that adequate and appropriate quality secondary school teaching and learning was provided in the nine secondary schools in Mfangano Island.
1.12 Operational Definitions of Central Terms

*Education*: Adequate exposure, acquisition and development of knowledge, skills and attitudes appropriate in molding an all-round person for society related duties and challenges.

*Physical Environment*: Natural presence of Lake Victoria surrounding Mfangano Island, the rocky and hilly terrain of Mfangano Island, increased number of low quality teaching and learning centers.

*Quality Education*: Institutional excellence in performance on national exams, programmes, internal management, and consistent achievements and set purposes.

*Quality*: Standard of educational performance, level of internal management of secondary schools, justification for the foundation of teaching- learning centers, intended learning ends, institutional excellence and consistency

*Social Environment*: Contribution of Lake Victoria on lifestyle, religious practices, home-school involvement.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The chapter shows a review of both social and physical environments. Literature review is examined from the touch points expressed by the objectives of the study. This includes an analysis of how accessibility to secondary schools is influenced by the existence of Lake Victoria, an assessment of the extent to which efficiency in curriculum implementation is controlled by the local landscape in Mfangano division, determination of the influence of religious affiliation on the quality of secondary education and an identification of the contribution of Home-school partnership to secondary education in Mfangano Island.

2.2 Influence of Lake Victoria on Accessibility to Secondary Schools

According to Oriol et al (2013), accessibility refers to locational advantage of a region. It is evaluated based on the benefits an area accords its households and companies. Regions with locational advantage to required materials and markets are seen to be more productive, more competitive and more successful. Stephen, et al (1998) observe that physical boundaries of Islands break flow of traffic, shaping social discontinuity and generating distinct lifestyle patterns for regions.

Lake Victoria surrounds the Island of Mfangano stretching to approximately 6800 km$^2$. The lake is shared by the three East African countries. Its depth is approximately 84 meters and it has about 3500km shoreline (Omom, 2009). The lake is crossed by the Equator, existing between 0° 21” N and 3° 0” S (Opondo, 2011). The lake has limited income generating opportunities majorly to fishing. This
activity controls patterns of group and individual behavior that hinder accessibility to quality learning in the already physically isolated secondary schools. Abdullah, et al, (2012) define patterns of individual and group behavior as lifestyle. The individual and group behavior traits are visualized by Odegard, et al (2011) as comprising dietary patterns, physical activity, leisure and relative weight. Kardeli, et al (2011) adds wealth creation and time management. According to Nam et al (2011), it also includes patterns of interests and opinions. Law (1998) explains physical activity as occupation which refers to involvement in diverse sections of daily living- “self-care productivity and leisure. Occupations fuel the machine of education using the platform of community interaction with the instructors and the school plant (Law, Ibid).It is worth sighting that for the islands ,the fueling is characterized by a degree of seal and separateness from interaction with other individuals, agencies and mainland regions (Stephen, Ibid).

Fishing as an occupation involves fish folk and the fishing community. Okech (2004) defines fish folk as “people in fish-catching operations” and allied fishing operations such as fish processing, fish trading, carpenters and net weavers. The fishing community includes people whose livelihoods depend on fisheries. Itinerant fishing has not adequately supported learning financially or otherwise (Lew, 2005). It has been observed that the fish folk and fishing communities suffer cruel cycles of illiteracy which cause the perpetuation of poverty (Maddox, 2007). The educational disadvantage emanates from lifestyle and marginalization.

According to Maddox (Ibid), fishing communities In Sub- Saharan Africa suffer educational disadvantage. Okech and Zaaly’embikke (Ibid) confirm that the
educational disadvantage is true for island fish folk and fishing communities in Lake Victoria. This is confirmed by Opondo (Ibid) when he asserts that quality education on fishing Islands of Rusinga and Mfangano has been sparsely studied. Ohiokpehai (2007) while capturing the low literacy level reveals that 56% of youth aged 6 - 59 are in primary, while 18% are in secondary and a paltry 5% in tertiary education in Mbita district. There is need to investigate adequately how the presence of Lake victoria which encages Mfangano Island, influences lifestyle patterns of the inhabitants of the Island and by extension, how the water mass, influences the quality of secondary education. Little research has been conducted on this. The influence of transport to and from the island, and within the island on quality education in high school has also been sparsely conducted.

2.3 Efficiency in Curriculum Implementation in relation to Landscape
Olwig (2005) defines landscape as scenery or place for use by human characters. The council of Europe (2000) speaks of it as an area where nature and the human person interact. According to Pedroli (2000), landscape is a home of a community. Cosgrove (2000) refers to landscape as “land owned and organized by a people.” This implies that an area’s value is dependent on how meaningful it is able to add value to its users, based on formal and non-formal interaction. Where transport and communication networks are pathetic, traffic is impeded and accessibility is a pipe dream (Cosgrove, Ibid). Agents of education not only stay far from learning centers, but they also find discouraging, consistent efforts to reach school in time (Cosgrove, Ibid and Ariko, 2012). Lack of vital services because of the ragged landscape and the lake impedes sound management. The strain to attain standards achievable to others with ease is debilitating enough (Ariko, Ibid).
Lug (2005) re-iterates that contextual landscape leads to both staff and student increased turnover which impairs quality education. It is important to note that an investigative study on the influence of road network, communication network, the plateau of Mfangano division as well as its zigzag slopes and the remoteness of certain areas, has not been conducted and especially, the relationship between such a landscape and education implemented in secondary schools in the Island. This study intends to bridge the gap.

2.4 Religious Affiliation and Qualitative Curriculum Implementation

According to Longman (2008), Macmillan (2002), and Cambridge (2008) dictionaries, affiliation refers to the connection a person has with a political enterprise, religion or an organization. Operationally therefore, religious affiliation would mean the connection or involvement someone has with religion.

Institutions of learning are initiated and eventually opened by diverse forms of religious faith. Enrollment gains or losses are shaped by the faith of the initiators and management. Cross-school losses in enrollment (turnover) are connected to religious faith (Card, 2008). Quality of teaching and learning is in a way related to the might of an institution’s sponsor. A community endemically firm on a particular religious faith, has been known to possess a given literacy level. This is vital in shaping the literacy drive for their children (Card, Ibid). Foundation of a school of a given religious faith should be dictated by the ability of the institution to remain impartial in the delivery of market driven skills and knowledge to learners, especially in developing countries (Niaz, 2008). Existing literature does not reveal an investigative study on the various types of denominations in Mfangano, and their role in
promoting quality teaching and learning in the few secondary schools in the island. This study intends to identify the dominant denomination and its role in ensuring quality curriculum implementation in Mfangano.

2.5 Home – School Partnership

Sheridan (2012) views home school relations in terms of parent involvement and family-school partnership. She defines parent-involvement as the taking part of very important “care givers” in strategies which enhance the teaching and learning of their children, establishing home structures, home practices and school programme which facilitate education. According to her, those to be involved include grandparents, parents, guardians, step-parents and even foster parents. On family and school partnership, Sheridan sees a learner centered focus. Here, “professionals and families co-operate, co-ordinate and collaborate to avail and enhance opportunities as well as desired ends for the learners.” Based on these perceptions, the home environment as well as the school of learning should be molded by care givers for them to shape children to desired ends. Rutherford and Billing (1995) assert that it would be of value when community diversity is understood by teachers. The instructors should be aware of social factors shaping entry level. This leads to the identification of appropriate classroom pedagogy. Home-school relations are crucial in personnel and financial mobilization. It enables parents to initiate, maintain and appreciate home education, provide leadership support, appreciate the academic programme and participate in it. This leads to higher levels of institutional excellence integrally (Heers, et al, 2011). No study has been conducted on how parent-involvement and how in appropriate home-school partnership has affected the few secondary schools in Mfangano Island.


2.6 Summary and Gap Identification

It became clear from the existing literature that Lake Victoria has great influence over the locational advantage of the Island. It provides entry and exit to Mfangano. It determines whether required appropriate and adequate materials, personnel and markets are availed for the process of education. Yet despite its enormous value to education, existing literature has largely dwelt on relating its existence largely with HIV/AIDS prevalence. Little research has been done to relate the water mass with quality education in Mfangano. Second, it was also true that ragged landscape hindered transport and communication. These are key drivers of quality education. However limited investigation existed on the effects of the zigzag landscape of the Island. Moreover, certain religious practices had helped enhance teaching and learning. The only worry was heavily dogmatized institutions that deviated from curriculum implementation to spreading church doctrines. Very little literature tackled obsessive religious participation that completely alienated adherents from quality education. The literature studied praised parents’ involvement in education as well as home-school partnership. Very little literature covered the influence of dysfunctional families ravaged by violence and itinerant fishing on quality teaching and learning. As a result, gaps of knowledge were found to exist which this study sought to bridge.
CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The chapter presents the study design, locale of study, target population, sample size and sampling procedure, types of data collection instruments, pretesting, how reliability measurement, how content validity was tested, techniques of data collection, data processing and data analysis.

3.2 Research Design

3.2.1 The Study Design

The study adapted a descriptive survey research design. Orodho (2010) notes that descriptive survey design is quite useful in preliminary and exploratory studies to allow researchers to assemble information, summarize, present and interpret for purposes of clarification on aspects of education which interest policy makers and educationists. Oso and Onen (2009) observe that a survey design provides numeric description of events the way they appear. It is also suitable for extensive research. It presents a methodology useful in investigating populations by selecting samples for analysis and discovery. These are the reasons why it was chosen for the study.
3.2.2 Locale of the Study

The study was carried out in Mfangano Island. According to Obiero (2013), Mfangano Island is found on the Eastern side of Lake Victoria and West of Rusinga Island covering an area of approximately 65 km squared. The Island’s highest point is Kwitutu (1,694 meters). It is one among the four divisions in Mbita district with a demographic population of approximately 19000 people who are mainly fishermen and subsistence farmers. The largest numbers of Olusuba speakers live in it as well as a few Luos. A dirt government sponsored ring road came into existence in 2007. In 2009 electricity powered by generators was installed at Sena (main town). The main means of transport include bicycles, motorcycles and outboard wooden engine boats. An outboard engine boat ride to the Island from Mbita is approximately two (2) hours and could painfully be longer and traumatizing in canoes. Mbita ferry was launched in 2012 by a private company and now links Mbita mainland and Mfangano. It is a declared hardship area and has one of the severest concentrations of HIV/AIDS of about 30% in Kenya. Scaling up quality education Infrastructure has presented great challenges due to the Island’s remoteness.
3.2.3 Population of the Study

The study was conducted in nine (9) secondary schools in Mfangano division which had a total teacher population of 144; student capacity of 1200 and 1200 parents. The respondents comprised teachers, students and parents of the nine secondary schools. The involved teachers were drawn from different ranks and roles. The students and parents were also drawn from various ranks and roles. Fishermen and women of varying levels of income and diverse participation in the fish business interviewed from the parents’ group. According to Ott and Larson, (1992), sample sizes were related to size of population of specific group of respondents. Therefore, a total sample population of 2544 was targeted. The teachers shed light on aspects of inaccessibility and curriculum implementation. The parents helped in availing crucial social data on lifestyle on the beaches and fish landing sites. Also, the parents availed data on aspects of inaccessibility and religious affiliation.

3.3 Sample Size and Sampling Procedure

Orodho (2012) states that sample size, refers to a few items or people selected for study, from all the items or people under consideration in any area of investigation. The target group was made up of 2,544 people. This was classified in strata and items selected from each stratum. The strata were made up of 144 teachers, 1200 students and 1200 parents. According to Fisher (2007), sample size may be calculated based on 95% confidence level and where 50% of the target population is assumed to possess characteristics of interest using the formula.

\[ n = \frac{N}{1+Np^2} \]

The calculation:

\[ n = \frac{2544}{1+2544\times (0.05)^2} = \frac{2544}{7.36} = 346 \]
Stratified random sampling was used to derive sample sizes of the various strata. Each stratum was represented in the following manner:

\[ n = 346 \]

\[ n = \frac{346}{2544} = 0.13 \text{ (sample fraction)} \]

Each stratum was multiplied by the sampling fraction. The table below illustrates the calculation:

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Population</th>
<th>Sample size per stratum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>144</td>
<td>0.13 \times 144</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Students</td>
<td>1200</td>
<td>0.13 \times 1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>163</td>
</tr>
<tr>
<td>Parents</td>
<td>1200</td>
<td>0.13 \times 1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>163</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,544</strong></td>
<td><strong>n = 346</strong></td>
</tr>
</tbody>
</table>

The nine schools formed the target population. Purposive sampling was used to identify categories in students and schools. This ensured inclusiveness within the sample size. All the four mixed day and boarding secondary schools had two teachers selected for the study. The three pure day schools produced two teachers each. The single public girls’ boarding school as well as the single private school had two teachers each involved in the study. Two principals were also involved. The selection procedure was based on simple random sampling technique using folded papers. Simple random sampling was also used to select students and parents. Parents were sorted out based on lists provided by the schools after which they were reached in their areas of residence. The teachers shed light on aspects of inaccessibility and curriculum implementation. The parents helped in availing
crucial data on lifestyle on the beaches and fish landing sites. Also, the parents availed data on the aspects of inaccessibility and religious affiliation.

3.4 **Types of Data Collection Instruments**

Two categories of data were used: quantitative data from documents and Primary data from field work. Primary data was gathered using questionnaires which were employed on teachers, students and literate parents. Interview Guide was used to gain clear interview responses from the respondents who were unable to write.

3.5 **Piloting of the Study**

Before the administration of the questionnaires to the various stratums in the sample size, they were pretested on a selected sample identical in traits to the actual sample to be used in the study. Purposive sampling was used to identify a small-size day school with the smallest student population to be used for piloting. It was important to pretest the questionnaire to ensure clarity, quality and accuracy of questions. It also ensured the availability of quality spaces left for responses and the appropriateness of the analytical techniques which were employed. Similar procedures were used during pretesting as well as during actual data collection. This guaranteed that meaningful observations were attained. The numbers used during pretest were 7% of the total sample size. This involved approximately twenty five (25) students, one (1) head teacher, two (2) teachers and two (2) parents. The smaller population made pretesting easy and ensured meaningful observations and a speedy conclusion of the exercise.
3.6 Reliability of the Study

According to Orodho (2012), reliability refers to the ability of a measuring instrument to produce consistent results on repeated trials. In this study consistency was measured using test-retest procedure. A questionnaire was developed and given to a small sample of twenty five respondents. These respondents were not included in the main study. They scored their responses manually. The same questionnaire was administered to the same group of respondents after two weeks. Again, the respondents scored their answers manually. When the scores of the two tests were co-related using Pearson’s product moment formula, a correlation coefficient of 0.8 was found. The instrument was therefore proved reliable.

3.7 Validity of the Study

Orodho (2012) observes that validity deals with the extent to which the questionnaires’ content accurately measures what is expected to be measured. This was ensured through piloting and valuable reviews from the supervisors during the development of the instrument of measurement. The experts commented and the comments were used to improve the final document. Through piloting, the questions were tested and proved to be focused and clear. The informal discussions during piloting also produced comments which were used to improve on the clarity of the measuring instrument.

3.8 Data Collection Collection Procedure

Before the study was conducted, reconnaissance was done for familiarization. Informal discussions were held for clarification of issues arising from the questionnaire. Protocol was upheld to minimize conflicts with the respondents and
established levels of authority. In addition, interview guidelines were issued out. Quantitative data was tracked using the pretested questionnaires.

3.9 Data Processing and Analysis

Information received from the interview schedules and questionnaires was gathered, processed and analyzed. The questionnaires were numbered, edited and coded. Statistical Package for Social Science analyses (SPSS) was used to organize data so as to generate descriptive statistics. Various types of descriptive statistics were used such as, tables, line graphs, bar graphs, and pie charts.
CHAPTER FOUR
DATA ANALYSIS, PRESENTATION OF FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents data analysis, presentation of key findings, and discussions originating from the study. The objectives of the study involved an investigation on the manner in which accessibility to secondary schools in Mfangano Island is shaped by the presence of Lake Victoria, finding out how landscape factors influenced curriculum implementation in Mfangano, a determination of the contribution of religious institutions and religious affiliations on the quality of secondary education in Mfangano island and lastly, an identification of the contribution of home-school partnership to the quality of secondary education in Mfangano Island. The findings were presented in the form of frequency tables, bar graphs, histograms and pie charts.

4.2 Demographic Characteristics of Respondents

The characteristics of respondents analyzed included leaders of public and private secondary schools, parents, the fisher folk of diverse fishing activities and secondary school students from form one to four.

4.2.1 Effect of Lake Victoria on accessibility to Secondary Schools in Mfangano Island

The intention of the study was to investigate the influence of Lake Victoria on accessibility to secondary schools within the island. Towards this course the study
investigated all possible means of transportation of students, teachers and goods to and from the schools and the findings are shown in the following line graph:

**Figure 4.1: Students transportation means to school**

From figure 4.1, more than a half of the student population frequently used boats to access the school during opening days. This implies that these student homes are located far from the secondary schools and that travelling on water is the most convenient or main means of reaching schools from within or outside the island. Also, many students who resided within the island or those who landed in Mfangano on the opening of schools frequently used motorcycles. However, a few students still trekked to school. These may be those from within the island or are accommodated by relatives, who are day school learners or are those who are unable to raise fare. This point indicates that within the Island, great distance is covered to schools by learners, on risky and inconvenient means of transport. Quality teaching and learning occurs when both the student and the teacher are comfortable. These inconveniences in Mfangano reduce comfort and by extension the attainment of
excellence in educational outcomes. This reduces the benefit Mfangano accords its households and by extension students academically. Investigative recent research in Mfangano Island has not covered this area of knowledge. This revelation supports a generalized position taken earlier by Oriol, et al (2013); that institutions in such Island areas are disadvantaged in terms of access to input materials, personnel and markets required for their success.

Figure 4.2: Teachers Transportation Means to School

The means of transport used by the tutors to schools was also investigated. The study found out that more than half of the teachers used motor boats as their means of transport during opening days. This is an indication that such teachers either travel far from the secondary schools from within Mfangano, or they ail from the mainland. Slightly less than half of the teachers used motor cycles. This shows that even the tutors are subjected to great, risky and inconvenient distances to their stations of work. This confirms positions taken earlier by researchers. Cosgrove (2000) notes that where transport network is pathetic, traffic is impeded and
accessibility made difficult, agents of education not only come far from the learning centers, but they also find discouraging, consistent efforts to reach the institutions in time. Lugg (2005) observes that such contextual landscape enhances both teaching staff and student turnover. The turnover which was discovered in the various secondary schools in Mfangano was partly attributed to landscape. This revelation has also not been fully covered in recent research in Mfangano Island.

On transporting the necessary requirements to the school, the study unveiled the following finding as shown in the bar graph below.

**Figure 4.3: Means of Transport for School Materials**

The introduction of affordable motor cycles has been a big relief to a number of Kenyans. About a half of the goods transported to schools were done by the use of motor cycles. The use of bicycles, a traditional means of transport in the island for a long time, was still realized even though slightly below the use of motorcycles. Motor cycles and bicycles were used after the goods had been ferried to the island.
via the Mbita ferry or outboard engine boats and canoes. About one tenth of the day to day requirements were brought in by use of the Mbita ferry. Services easily achievable to others who stay and work in advantaged areas are strained. According to Ariko, (2011), this can be so debilitating.

From the findings, the use of ferry and boats; both motorized or otherwise, played a major role in the transportation of students, teachers and school materials into and from the Island. This would not possible without the presence of Lake Victoria which in any case houses the island. The lake was found to roughen on certain periods of the year and during specific periods of the day. This limits the number of teachers and students on transit as well as the amount of goods to be delivered to schools. Consequently, Lake Victoria was found to exert a lot of influence on accessibility of students, teachers and materials to the few secondary schools in Mfangano.

4.2.2 The Influence of Landscape Factors on Effective and Efficient Curriculum Implementation in Mfangano Island

According to the Oxford Advanced Learners Dictionary (2006), the word “curriculum” means “the subjects that are included in a course of study or taught in a school, college etc.” Given the broad and extensive curriculum in Kenyan secondary schools, punctuality and proper time management is a key role for effective implementation. The study sought to investigate the influence of landscape on efficient curriculum implementation. From the findings of this study, the main means of transport for both students and teachers once inside the island are motor cycles and bicycles. This study investigated the reporting times or the punctuality
status of both students and teachers during both wet (rainy) and dry seasons. During dry weather, nearly two thirds of the students arrived in school relatively early and only about one eighth arrived late. About one third of the learners arrived in mid-morning. This may be attributed to the ease in terms of movement via motorcycles and bicycles, especially when the ungraded non-all weather roads and bushy path lets are useable. During dry period, Lake Victoria is also calm from rough waves.

**Figure 4.4: Students’ Punctuality status during Dry Season and Wet Season**

![Bar chart showing students' punctuality during dry and wet seasons.]

The study investigated students’ punctuality during wet season. More than three quarters of the students reported late during the wet season. About one tenth arrived early. A possible reason for late arrival during dry or wet periods of the year, may be attributed to the challenge of maneuvering the ungraded not–all-weather roads, the steep unfriendly and bushy path lets in the Island. The challenge may be gigantic during wet periods of the year. Cosgrove (ibid) in an earlier position notes that pathetic transport networks, are a common occurrence in disadvantaged areas and that they influence the quality of education offered in such areas.
The study also determined the residential status of the teachers in order to correlate it with their punctuality. Bar graph 4.6 shows the number of teachers who reside inside and outside the school compound.

Figure 4.5: Teachers’ Residential Status

A few teachers stayed outside the school compound. Majority of the teachers resided in the school compound. In this case landscape was not be a determining factor influencing punctuality, especially for those who stayed in school. This is corroborated by the findings in table 4.6

Table 4.1: Teachers’ Arrival Time

<table>
<thead>
<tr>
<th>Teachers’ arrival time</th>
<th>frequency</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>131</td>
<td>77.1</td>
</tr>
<tr>
<td>Late</td>
<td>39</td>
<td>22.9</td>
</tr>
<tr>
<td>Total</td>
<td>170</td>
<td>100.0</td>
</tr>
</tbody>
</table>
The tutors’ arrival times was investigated. From table 4.7, about three quarters of the teachers were recorded as attending their classes early, while nearly one third were late arrivals. It can be assumed that majority of the teachers who arrived late to school are those who resided outside the school compound. This may be explained by difficulties encountered trying to manage the unfriendly roads, path lets and terrain.

It can therefore be concluded that if effective and efficient curriculum implementation is dependent on students’ and teachers’ punctuality, and landscape factors shape promptness to schools, then landscape factors and punctuality directly or indirectly influence curriculum implementation in Mfangano Island. This position is new considering the fact that existing literature does not indicate research on this in Mfangano Island.

### 4.2.3 Influence of Religious Institutions and Affiliations on Secondary Education in Mfangano Island

The objective was to determine the contribution of religious institutions and religious affiliations to the quality of secondary education in Mfangano Island. To address this particular objective, the respondents were subjected to various questions on matters of religion. The fundamental issue was to identify the main sponsors of the available secondary schools in the island. The following pie chart describes what the respondents answered in relation to the influence of religious organizations in the operation of schools in the island.
The Seventh-day Adventist Church (SDA) sponsored nearly a half of the secondary schools in Mfangano Island. The other religious sponsor, the Catholic Church sponsored about one third. The implication is that the Seventh Day Adventist church has many adherents in the Island. This implies that the Seventh Day Adventist Church widely affects school programme in the Island than any other denomination they sponsor and manage schools in areas they inhabit. Card (2008) had earlier noted that when a denomination widely sponsors institutions of learning, its impact on curriculum implementation is visible. The influence of the other churches was negligible. It was uniquely discovered that in Mfangano, most of those who paid school revenue had an inclination with the Seventh Day Adventist church. This is particularly unique considering the fact that elsewhere; it would have been the Roman Catholic Church. Existing literature does not locate any significant research on the influence of the SDA church on education in Mfangano Island.
When asked whether the school has benefited from religious participation and affiliation, about three quarters of the respondents indicated that indeed the sponsoring churches played a significant role in ensuring quality secondary education in the Island. This they do through pastoral care and payment of school fee revenue by parents and donors whose children learn in the secondary schools.

Respondents also indicated that about one third of the secondary schools in the Island were sponsored by Mbita Constituency Development Fund, while 36% reported that the Government of Kenya through the various Sub County Education Boards sponsored other schools in the Island.

### 4.2.4 The Influence of Home-School Partnership on the Quality of Secondary Education in Mfangano Island

The issue of home-school-partnership led to an investigation on the influence of parents, teachers and donors to the effective and efficient operation of the various school activities. The respondents stated that the stakeholders voluntarily influenced educational outcomes in the schools through various non-monetary items like fencing, buildings, books, uniforms and paying PTA teachers; all geared towards a smooth and sustainable operation of the secondary schools. Bar Graph 4.9 depicts various contributions made by the teachers, parents and donors. It was clear that the parents gave monetary contributions or contributions in kind to support secondary education in Mfangano Island. This unity of purpose was noted earlier on by Rutherford and Billing (1995), who recommended that it ought to be supported as it ensured teamwork which is a powerful tool in availing quality education. What was worrying was that in Mfangano, the partnership was still below that played by the
government implying dependency on government contributions on education. The dependency has been noted by other researchers who have investigated development initiatives by the government of Kenya in Suba region in Homa Bay County (Glennerster, Kremer and Mbiti, 2011).

Figure 4.7: Stakeholders’ Contribution to School Operations in Mfangano Island

From the bar graph, nearly all the fencing work was done by the parents. The government contributed about one tenth. The government was fully responsible for electricity, more than a half of the teachers and slightly less than a half of the total number of the books. Donors contributed about one third of the books and less than one tenth of the uniform. Teachers gave about less than one third of the books.
CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the major findings from the study based on the research objectives, conclusions from the findings and recommendations derived from the conclusions.

5.2 Summary of Findings

Based on the study objectives and data analysis; the following major research findings are presented:

i) Access to schools and other academic institutions is affected by the presence of Lake Victoria. Students in Mfangano Island find it difficult to access schools in time because of the distance they must cover to and fro school as they endeavor to access education. The low number of secondary schools in the island confirms this. This scenario may be contributing to the low literacy levels also unveiled earlier in a study by Ohiokpehai (2007), which studied literacy levels in Mbita and revealed that: 56% of youth aged 6-59 were in primary, while only 18% were in secondary school. The influence of distance to and from schools is a finding which could probably explain the low literacy levels in the Island.

ii) The landscape and general topographical factors have shaped the frequency and access to schools by students, workers (teachers) and even parental participation in curriculum implementation. Mountainous and hilly slopes of the island contribute a lot in the manner that determines time taken and transportation means. The students’ arrival time during wet season indicated a huge number in lateness which may impede effectiveness of curriculum implementation. This is
corroborated by Lugg, (2005), who re-iterates that contextual landscape drives teachers and students away. In this study, it further affects regularity in school which impairs adequate curriculum implementation.

iii) It was found that, religious institutions have greatly assisted in construction and the maintenance of educational facilities such as construction of classes, dormitories, laboratories, donation of books and other related learning materials. The Seventh - day Adventist and the Catholic churches have the first and the second largest share respectively, with a combined contribution of more than half sponsorship of secondary schools in the island. Being significant stakeholders, the schools’ effectiveness and efficiency in operations and curriculum development is either directly or indirectly influenced by these religious institutions. This is in agreement with Card (2008) who asserts that enrollment gains or losses are shaped by the faith of the initiators and management. In this region, efficiency and effectiveness in operations and curriculum implementation is largely controlled by the seventh Day Adventist Church and then the Roman Catholic Church. Other institutions have also partnered to support in hiring and paying of teachers and other staffs in such schools.

iv) It was also discovered from this study, parents, teachers and other external donors or well-wishers gave monetary contributions or contributions in kind to support secondary schools in the island. This is supported by other findings that revealed that home-school relations are crucial in personnel and financial mobilization. Heers (2011) notes that these contributions lead to higher levels of institutional excellence.
5.3 Conclusions of the Study

It was discovered that the Socio-Physical Environment of Mfangano Island influenced secondary education in various ways. To begin with access to schools and other academic institutions is affected by the existence of Lake Victoria. Reaching schools is cumbersome because of the lake let alone discouraging distances to such learning areas. Second, the landscape and general topographical factors control rate of presence in schools for virtually all curriculum adopters. Third, it was found out that religious institutions and religious forms of faith greatly contribute in the construction and or maintenance of educational facilities. In Mfangano, the Seventh Day Adventist Church had the greatest influence. Lastly, the study discovered that parents, teachers and other external well-wishers gave monetary contribution or contributions in kind to support secondary education in Island. However, parental role was still below the role of the government.

From the foregoing, the following conclusions were arrived at:

i) The presence of Lake Victoria poses an ultimate negative effect of and a challenge in implementation of curriculum especially in secondary schools. Fishing and fish business seems to be the reason for the increased number of school drop outs who end up engaging in such activities ranging from fishing, beach activities and search for tourists’ company along the lake shores. Further, an increase in levels of HIV/AIDS is attributed to the presence of the lake.

ii) Challenges related to transportation and communication can really contribute a great share in regard to curriculum implementation and access to quality education and other related services. Mfangano Island is faced by poor transport and communication infrastructure. This is because of the Island’s ragged
landscape. The roads are ungraded, the path lets are bushy, narrow and steep. Further to this, other subordinate facilities and other social amenities are rare; for example, hospitals and equipped dispensaries are not easily reachable by students, teachers and parents- great shareholders in curriculum implementation. This is a challenge indeed.

iii) Challenges related to transportation and communication can really contribute a great share in regard to curriculum implementation and access to quality education and other related services. Mfangano Island is faced by poor transport and communication infrastructure. This is because of the Island’s ragged landscape. The roads are ungraded, the path lets are bushy, narrow and steep. Further to this, other subordinate facilities and other social amenities are rare; for example, hospitals and equipped dispensaries are not easily reachable by students, teachers and parents- great shareholders in curriculum implementation. This is a challenge indeed.

iv) Challenges related to religious institutions and affiliation can really impact on the presence and quality of educational facilities which has a bearing on curriculum implementation and therefore the quality of education. In Mfangano Island the Seventh Day Adventist church has a wider influence followed by the Roman Catholic Church. They control to a big extent the efficiency and effectiveness of curriculum implementation. Where church dogma has conflicted demands from the Ministry of Education, conflicts have emanated that sometimes lead to the disintegration of schools. This has been a challenge.

v) Home-school-partnership, as investigated, indicates that there is the contribution of parents, teachers and donors to the effective and efficient operation of the various school activities with the main objective of ensuring quality education is
offered to their students. Indeed, the stakeholders can voluntarily contribute to the schools various non-monetary items like fence, buildings, books, uniforms and teachers all geared to a smooth and sustainable operation of the schools. Such partnership should be encouraged elsewhere.

5.4 Recommendations for Policy and Further Research

5.4.1 Policy Recommendations

In view of the above conclusions, this study makes the following recommendations about the influence of socio-physical environment:

i) Home-school partnership should be encouraged and supported so as to improve quality access to secondary education and proper and efficient implementation of the curriculum. Knowledge empowerment to parents, guardians and other care givers in Mfangano should be encouraged to enable them participate actively in supporting the implementation of secondary education curriculum.

ii) The present study looked at the implementation of the curriculum and the relationship with the socio-physical environment, but it seems that the next step would be to look at those other types of schools situated elsewhere with different socio-physical environment to find how they are implementing the education curriculum. This will provide a base for comparing curriculum implementation in the other different categories of secondary schools in Kenya.

iii) As well, such a study should look at schools with good results and compare the methods used in teaching (beyond resources, teacher qualification etc.) in an attempt to find what good teachers do to get around lack of resources. The primary sources of data in the case study were the teachers, parents and students. Extra information that would shed more light into the implementation process
could also be obtained from the students in particular about the problems they are faced with as they (students) try to comprehend the concepts being presented to them by their teachers (in-house and personal difficulties). In addition, probing the role of the parents and the board of governors could provide a more detailed picture of the process of implementation.

5.4.2 Suggestions for Further Research

The subject of school drop outs due to in-school, personal and out of school factors should be investigated deeply. The following is a suggestion for further research emanating from this study:

Future research should examine other educational performance factors that can also be affected by the environment: availability of learning /teaching resources and the quality of school management i.e. school heads and chairpersons of Boards of management. This has not been investigated fully by this study. This will enable a holistic approach in curriculum implementation.
REFERENCES


Abdul Poverty Action Lab at MIT (J-PAL) and Innovations for Poverty Action (IPA).


Paul, W., (n.d). *The social cultural environment*

http://www.oup.com/uk/orc/bin/97801992203055/Wetherlych 05 ndf


Woodin, T. (2014). An Introduction to Cooperative Education in the Past and present, Co-operation, learning and Co-operative Values: contemporary issues in education, 1

APPENDICES

APPENDIX I: STUDENTS QUESTIONNAIRE

This questionnaire is meant to help find out the influence of socio-physical environment on the quality secondary education in Mfangano Island. It is part of greater research that is carried out by scholars at the post graduate level in Kenya’s public universities. The response expected from you will assist shed light on the status of secondary school education in Mfangano Island; with a view to determining practical ways of improving it. You have been selected for the study because you are a crucial curriculum stakeholder. Therefore, your response will be vital. Kindly respond accurately and feel free to make comments which you may feel valuable. Your response will be treated with great confidentiality and utilized only for research purposes. You may not be compelled to show your name on the questionnaire.

SECTION A. ACCESSIBILITY TO SECONDARY LEARNING INSTITUTIONS AND THE FISHING LIFESTYLE ON MFANGANO ISLAND

1. In which division is your school located?

<table>
<thead>
<tr>
<th>Zones</th>
<th>Tick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mbita</td>
<td>[    ]</td>
</tr>
<tr>
<td>Central</td>
<td>[    ]</td>
</tr>
<tr>
<td>Mfangano</td>
<td>[    ]</td>
</tr>
<tr>
<td>Gembe</td>
<td>[    ]</td>
</tr>
</tbody>
</table>
2. How many times have you been absent from school this term?
   Once [ ] Frequently [ ]
   Always [ ] Not at all [ ]
   Why? .................................................................................................................................
   ........................................................................................................................................

3. Who pays your school fee?
   Mother [ ] Mother and Father [ ]
   Guardian [ ] Relative [ ]

4. (a) Is the school fee paid in time? .................................................................
    (b) How many of your siblings are in primary school?.................................
    (c) How many wives is your daddy married to? .............................................

5. Do you have school fee balance?
   Yes [ ] No [ ]

6. (a) Have you been absent from school? .............................................................
........................................................................................................................................
    (b) Explain your absence .........................................................................................
    ........................................................................................................................................

7. Are your teachers present in school always?
   Yes [ ] Somehow [ ] None [ ]
8. Tick the most appropriate one for you
   
   (a) In our area, we go to school seven days in one week
       
       Yes [ ] No [ ]

   (b) I do not go to school when I am committed
       
       Yes [ ] No [ ]

   (c) State your most regular commitment if any and say the source..................

       Commitment [ ] Source [ ]

9. (a) Are there students you know who learn in schools out of Mfangano island?

       Yes [ ] No [ ]

   (b) Give by ticking in the boxes, a reason for your answer

       Ignorance [ ] Attitude [ ] Parental Influence [ ]

SECTION B. CURRICULUM IMPLEMENTATION VERSES LANDSCAPE

1. At what time do you reach school when it has not rained?

       Early [ ] Mid morning [ ] Generally late [ ]

       Tell why? ...............................................................................................................................

2. When it rains, is it cheaper to reach school, tick the right answer

       Yes [ ] No [ ]

3. (a) Do the teachers in your school reside in the school compound?

       Some [ ] All [ ]
(b) Would you prefer that all your teachers to reside in school?

Yes [ ] No [ ]

(c) Why? .................................................................................................................................

4. Tick the right answer. My teachers are always prompt

True [ ] False [ ]

5. Majority of the teachers in our schools are born in Mfangano

True [ ] False [ ]

6. All the teachers are in class during the weekend

True [ ] False [ ]

7. The teachers main means of transport to school on opening and during school term

<table>
<thead>
<tr>
<th>Means</th>
<th>Main</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boat</td>
<td></td>
</tr>
<tr>
<td>Motor cars</td>
<td></td>
</tr>
<tr>
<td>Motor cycles</td>
<td></td>
</tr>
</tbody>
</table>

8. The students main means of reaching the school

<table>
<thead>
<tr>
<th>Means</th>
<th>Main</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boat</td>
<td></td>
</tr>
<tr>
<td>Motor cars</td>
<td></td>
</tr>
<tr>
<td>Motor cycles</td>
<td></td>
</tr>
<tr>
<td>Bicycles</td>
<td></td>
</tr>
</tbody>
</table>
8. School items mainly reach our school using the following means

- Ferry [ ]
- Motorcycles [ ]
- Bicycles [ ]
- Motor vehicles [ ]

9. When do you wake up at home to reach school in time?

- Early [ ]
- Others [ ]

SECTION C. RELIGIOUS PARTICIPATION AND AFFILIATION

1. State your Religious denomination

- Muslim [ ]
- Catholic [ ]
- S.D.A [ ]
- Protestant [ ]

2. Does the school allow you to worship freely?

- Yes [ ]
- No [ ]
- Sometimes [ ]

3. Tick any of the following that interferes with your faith

- C.A.Ts
- School Routine
- Non
- Both

4. Give how the interference is realized

5. Who is the sponsor of your school?

6. (a) The school has benefitted from the sponsor

- True [ ]
- False [ ]

(b) Give a reason for your answer
SECTION D: HOME SCHOOL PARTNERSHIP

1. State what you like about your fee payer .................................................................

2. Show by ticking what you are convinced, has been contributed by the following in your school

<table>
<thead>
<tr>
<th>Actors</th>
<th>Fence</th>
<th>Electricity</th>
<th>Books</th>
<th>Teachers</th>
<th>Uniform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Donors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Are you visited during school days?

   Yes    [ ]    Rarely    [ ]    Not at all    [ ]
APPENDIX II: TEACHER’S QUESTIONNAIRE

This questionnaire is meant to help find out the influence of socio-physical environment on the quality of secondary education in Mfangano Island. It is part of greater research that is carried out by scholars at the post graduate level in Kenya’s public universities. The response expected from you will assist shed light on the status of secondary school education in Mfangano Island; with a view to determining practical ways of improving it. You have been selected for the study because you are a crucial curriculum stakeholder. Therefore, your response will be vital. Kindly respond accurately and feel free to make comments which you may feel valuable. Your response will be treated with great confidentiality and utilized only for research purposes. You may not be compelled to show your name on the questionnaire.

1. Please give the name of your school

..........................................................................................................................

..........................................................................................................................

2. How frequent are the students in school

Always [ ]   Rarely   [ ]

Give a reason for your answer..................................................................................

..........................................................................................................................

3. After work, how do you steam off?

..........................................................................................................................

..........................................................................................................................

Comment on the diversity of leisure outlets on the island

..........................................................................................................................

..........................................................................................................................
4. Do the students come to school during the weekend?
   Yes [ ] No [ ]

5. Comment on your students focus on education in your school
   ..........................................................

6. Do you find it convenient to work in school all days of the week
   Yes [ ] No [ ]
   Explain ..........................................................

7. Tick the most appropriate means of transport to school during dry season and wet season

<table>
<thead>
<tr>
<th>Transport means</th>
<th>Dry season</th>
<th>Wet season</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorcycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking on foot</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Assess the contribution of religious participation and affiliation in your school on quality teaching and learning

<table>
<thead>
<tr>
<th>Denomination</th>
<th>Good</th>
<th>Very Good</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roman Catholic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.D.A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protestant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cults</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Rate parents involvement, home-school partnership in your school

<table>
<thead>
<tr>
<th>Poor</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX III: INTERVIEW GUIDE FOR PARENTS AND FISHERMEN

This questionnaire is meant to help find out the influence of socio-physical environment on the quality secondary education in Mfangano Island. It is part of greater research that is carried out by scholars at the post graduate level in Kenya’s public universities. The response expected from you will assist shed light on the status of secondary school education in Mfangano Island; with a view to determining practical ways of improving it. You have been selected for the study because you are a crucial curriculum stakeholder. Therefore, your response will be vital. Kindly respond accurately and feel free to make comments which you may feel valuable. Your response will be treated with great confidentiality and utilized only for research purposes. You may not be compelled to show your name on the questionnaire.

1. Tell briefly the various fishing activities on the lake

2. Tell the various human activities at the landing sites

3. Tell how the fishing and beach activities have shaped secondary school education quality in schools

4. a) Do you agree that the shape of land in Mfangano is a problem to the achievement of excellent education standards?
   I Agree [ ] Do not agree [ ]

   b) Comment briefly on your response above
5. Identify various denominations in the neighborhood

- Catholic [ ]
- S.D.A [ ]
- Pentecostal [ ]
- Others [ ]

6. Give the contribution of denominations to teaching and learning in secondary schools

7. (a) Do you visit the school where your child learns?
   (b) Why?
   (c) As a parent tell your contribution to your school

Thank you a lot for participating in this exercise. May God reward you.
# APPENDIX IV: RESEARCH BUDGET

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEM</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>a. Photocopying paper 4 reams @ 50</td>
<td>2000</td>
</tr>
<tr>
<td></td>
<td>b. foolscaps 2 reams @ 500</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>c. 10 Pens @ 25</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>d. Photocopy 35 copies, 50 pages @ 3</td>
<td>5250</td>
</tr>
<tr>
<td></td>
<td>e. Binding 35 copies @50</td>
<td>1750</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>10250</strong></td>
</tr>
<tr>
<td>2.</td>
<td><strong>EQUIPMENT</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Digital camera 12. 1 pixel @ 12,000</td>
<td>12000</td>
</tr>
<tr>
<td></td>
<td>b. Memory card 4 G.B @ 2500</td>
<td>2500</td>
</tr>
<tr>
<td></td>
<td>c. Acer Laptop @ 71,000</td>
<td>71000</td>
</tr>
<tr>
<td></td>
<td>d. HP 4200 Printer @ 11,000</td>
<td>11000</td>
</tr>
<tr>
<td></td>
<td>e. Safaricom modem 2@3500</td>
<td>3500</td>
</tr>
<tr>
<td></td>
<td>f. Safaricom Airtime – Phone call &amp; Bundles 5000</td>
<td>5000</td>
</tr>
<tr>
<td></td>
<td>g. Printer 121 Ink Cartridges @2300</td>
<td>2300</td>
</tr>
<tr>
<td></td>
<td>h. Lodging in Guest Houses for Research 1000x20</td>
<td>20000</td>
</tr>
<tr>
<td></td>
<td>i. Meals</td>
<td>20000</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>148,000</strong></td>
</tr>
<tr>
<td></td>
<td>FIELD DATA COLLECTION</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>a. 100 Copies Questionnaire (students)</td>
<td>5000</td>
</tr>
<tr>
<td></td>
<td>b. Interview Guide photocopy 100 copies</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>c. Stationery</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>d. Field notebooks 10 @ 100</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>e. Mfangano – Nairobi Return Trips</td>
<td>20000</td>
</tr>
<tr>
<td></td>
<td>f. Meals for field assistants @400</td>
<td>60000</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>87300</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>DATA ANALYSIS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. SPSS Version 15.8 @ 2500</td>
<td>2500</td>
</tr>
<tr>
<td></td>
<td>b. Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>GRAND TOTAL</strong></td>
<td><strong>248050</strong></td>
</tr>
</tbody>
</table>
## APPENDIX V: WORK SCHEDULE

<table>
<thead>
<tr>
<th>Years</th>
<th>Months and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Development of Concept Paper</td>
</tr>
<tr>
<td>2012</td>
<td>January – April Development of Concept Paper</td>
</tr>
<tr>
<td></td>
<td>May - December Proposal Writing</td>
</tr>
<tr>
<td>2013</td>
<td>Proposal Writing</td>
</tr>
<tr>
<td></td>
<td>October Proposal Writing</td>
</tr>
<tr>
<td></td>
<td>December P. Writing</td>
</tr>
<tr>
<td>2013</td>
<td>October 2014 Data collection and Analysis</td>
</tr>
<tr>
<td></td>
<td>March 2015 Project report Writing</td>
</tr>
<tr>
<td></td>
<td>April 2015 Submission of project</td>
</tr>
</tbody>
</table>
APPENDIX VI: AUTHORITY LETTER

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

NACOSTI/P/14/6104/1561

Joseph Masiwo Masiwo
Kenyatta University
P.O.Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “The influence of Socio-Physical environment on the quality of secondary education in Mfangano Island, Mbita District, Homabay County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Homabay County for a period ending 31st December, 2014.

You are advised to report to the County Commissioner and the County Director of Education, Homabay County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

Said Hussein
For: Secretary/CEO

Copy to:

The County Commissioner
The County Director of Education
Homabay County.
APPENDIX VII: RESEARCH PERMIT

THIS IS TO CERTIFY THAT,

MR. JOSEPH MASIVO MASIVO

of KENYATTA UNIVERSITY, 0:40333

NYANDIWA, has been permitted to

conduct research in Homabay County

on the topic: THE INFLUENCE OF

SOCIO-PHYSICAL ENVIRONMENT ON THE

QUALITY OF SECONDARY EDUCATION IN

NEANGANO ISLAND, MBITA DISTRICT,

HOMABAY COUNTY, KENYA.

for the period ending
31st December, 2014

Applicant's Signature:

[Signature]

C.K. Ong'.

(date)

National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,
Technology and Innovation National Commission for Science,