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Aid Effectiveness for Belize's National Health Insurance (NHI) Scheme's Sustainability

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"Effective aid better health!"

Abstract

Belize is faced with the challenge of alignment of development aid with national health development priorities; and harmonization of international strategic collaboration and partnership as it relates to the sustainability of its National Health Insurance (NHI) Scheme. The objectives of this paper is to examine the degree/magnitude of harmonization of international technical and financial cooperation on the design and implementation of the National Health Insurance Scheme in Belize; and then to make recommendations on mechanisms to enhance the harmonization of technical and financial cooperation among international development partners and alignment with national priorities for future NHI roll-out. The study employed a qualitative approach with a comprehensive literature review buttressed by interviews conducted with the Ministry of Health, Social Security/NHI, and other relevant stakeholders in order to aid data collection. The results indicate that in fact there was minimal financial cooperation but greater technical cooperation as it relates to the National Health Insurance Scheme. The study concluded that whilst Belize has exposure to and experience with international cooperation, Belize's national health priorities have remained goal-oriented and whilst technical and financial cooperation has been engaged, it has not allowed for priority shifts to align with these funding.

Keywords

Aid effectiveness, technical cooperation, financial cooperation, international cooperation

Introduction

Belize's public health care system is predominantly funded by tax revenues and it encompasses three main institutions: the Ministry of Health (MoH), the Belize Social Security Board (SSB) and National Health Insurance (NHI). In Belize, the government is the main provider of health services. The Ministry of Health operates a network of facilities, which includes the Karl Heusner Memorial Hospital (KHMH) a national referral hospital in Belize City, **6** District Hospitals, roughly 40 Health Centers, 30 Health Posts, and a mental health facility. Services provided in these facilities are complemented by national programs for maternal and child health, public health and water safety inspection, health education and nutrition, disease (vector) control, and STD/AIDS. The public system also includes a nursing school, national laboratory, national equipment maintenance center, and various other central support services.

In terms of private sector health care, there are two private hospitals with about 73 private doctors offering general medical practice, and 38 specialists who provide outpatient services (mostly in Belize City), private laboratories and radiology services, numerous private pharmacies, and many midwives, traditional birth attendants, and nontraditional healers. NHI is the purchasing arm of the MOH and is housed within the SSB. Hence, the cost of care is considered "free" in most instances and only incurs a symbolic "price" in others (Health Systems Profile, 2009, pg. 21).

Belize's National Health Insurance Scheme is a derivative of the Belize Health Policy Reform (BHPR) Project which began in 1996. It encompasses four major policy areas for reform: (1) financing of the health sector; (2) allocation of health sector resources; (3) public and private sector roles; and (4) improving quality and equity of health services. The Ministry of Health and Government of Belize envisioned:

> *A national health care system which is based upon equity, affordability, accessibility, quality and sustainability in effective partnership with all sectors of government and the rest of society in order to develop and maintain an environment conducive to good health (Health Policy Reform Project, 1998, p. 3)*

Social Security was established in 1981 (immediately after Belize gained its independence) as a contributory scheme. It served for a long time as the country's national health insurance (NHI). The legislative framework (1999) was developed, financing strategies and mechanisms for the purchasing of services from the public and private sector was proposed (Health & Life Sciences, p. 18). Later, as part of Belize's Health reform initiative and Belize's social development plan, the National Health Insurance entity was established in April 2001. The embryonic evolution of this national insurance scheme focused on satisfying the health gap that existed in the country. The National Health Insurance (NHI) scheme is pitched as a decentralized model.

The 1998**,** Belize's population was estimated at **236,975** with about **50%** of the population living in the two central Districts of Belize and Cayo; 31% in the two northern Districts of Coroza1 and Orange Walk; and the remaining 19% living in the two southern Districts of Stann Creek and Toledo. Sometime in the late 2000's, NHI scheme was rolled out as a social initiative for the purpose of developing a universal health insurance system which would be established as a separate branch of the SSB (Impact Evaluation – Terms of Reference). It was piloted on the Southside of Belize as part of a comprehensive poverty alleviation strategy. Later, the NHI was rolled-out in the Southern part of the nation, and NHI health services are available in Stann Creek and Toledo Districts (Mid-term Review of Belize Country Cooperation Strategy PAHO/WHO, 2010).

Breadth of package: The range of services included in the current NHI package, includes: (1) Clinical detection and monitoring of patients with HIV/AIDS, (2) pre and post natal monitoring, including consultations with a general practitioner (GP), (3) iron and folic acid supplementation, (4) 1 ultrasound exam, and (5) basic laboratory and blood test (including HIV and VDRL first trimester). High risk cases are referred for management by specialist according to protocols mutually agreed to by

NHI and Primary Care Provider (PCP). Mental health services, dental services and health promotion/education are not in the package of services and service protocols and contracts need improvement.

Impressionably, the scheme was established with funding from the Social Security Board (contributory scheme). Before 2006, all the NHI revenues were transferred from the SSB, but the situation changed in 2006 when three sources of funds started financing the NHI (the SSB, MoH and the Government/Ministry of Finance). From the B$10.2 million received in 2006, the participation of the SSB dropped to 49 percent of total NHI revenues while the Government contributed with 40 percent and the MoH with 11 percent of total income. Transfers from SSB remain practically stable since 2003 ranging from B$4.5 to B$5 million with an average growth rate of 3 percent per year. The Belize SSB board approved disbursement of a total of B$15 million over a 3 year period to the NHI Fund. This represents the last authorized transfer of funds from SSB to NHI (*Sanigest Solutions, 2007).*

NHI is the financing portion of the Health system in Belize; however, it is restricted to a proportionate sector of the population. The service delivery model currently being adhered to is reflective of the national health reform structure of the country. NHI is also a financing mechanism that purchases services on behalf of the Ministry of Health and therefore has no direct relationship with international organizations for funding or technical efforts.

The focus on sustainable development for a nation like Belize is pivotal in securing improved quality of human life. Belize, like other untapped nations, has experienced inherent conflicts of exploitation and even today, when commercial quantities of oil are being exported, we continue to experience modern forms of exploitation. In the context of this paper, a comprehensive examination of the areas covered from a health diplomacy and international cooperation perspective will be examined as it relates to addressing the country's Primary Health Care goals, health sector reform and for Belize, the NHI.

Hypothesis

International technical and financial cooperation has detracted from efforts to implement the National Health Insurance Scheme in Belize due to lack of harmonization among international agencies.

Purpose of the study

The study aims to determine if international technical and financial cooperation has detracted from efforts to implement the National Health Insurance Scheme in Belize due to lack of harmonization among international agencies.

Results

The study employed a qualitative methodology. A questionnaire with 12 open-ended questions was developed. The questionnaire was piloted by a small group of prospective persons to complete the questionnaire and then further adjusted.

In collaboration with PAHO, a list of seven (7) persons to be selected and interviewed was identified and agreed upon. These include the following:

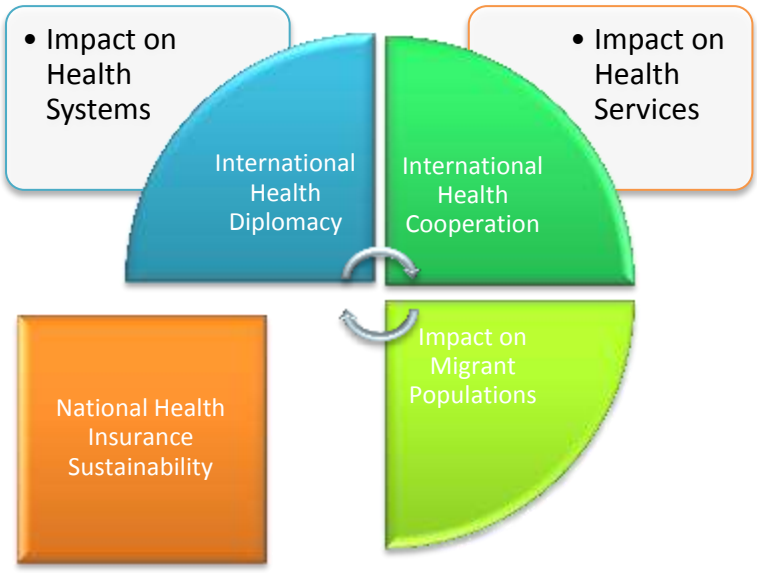
1. Representatives (2) from National Health Insurance
2. Representatives (3) from Ministry of Health. Persons who are knowledgeable of Health Reform and the NHI implementation and initiative.
3. PWR from PAHO
4. Representative from an International Cooperation Agency (IADB)

Some or all questions from the interview questionnaire were posed to the interviewees based on the particular areas of expertise. The persons were contacted first by email which notified them of the study and which solicited their participation. Thereafter, a formal letter of request along with the project's complete concept paper was sent to these persons. All individuals were then contacted by phone to secure their participation.

Interviewees had two weeks to respond to the interview questionnaire. Follow-up calls were made to ensure participation and in some cases a phone interview was completed. Some respondents submitted response via email and phone interviews elucidated their responses.

There was a 71 percent response rate which represents five (5) out of a total seven (7) persons (Appendix I).

The Conceptual Model



Conceptual Model for Country Project/ The Framework

Interest in models of development and its national impact is of great importance in the context of sustainable development, as well as the quest of developing global partnership for this development. Much emphasis has been placed on strengthening the national health system and

continued efforts have been placed on health reformation. With the use of the conceptual model (LIHP2010), the model above was developed as it relates to this study.

This project reviews the following forces in international health:

a) International Cooperation/Health Diplomacy
b) Models of Development (inclusive / exclusive)
c) Human Rights

In reviewing the above forces, the following issues related to the National Health Insurance will be looked at:

a) National Health Reform
b) Impact on Health Systems and Services
c) International Cooperation
d) Migrant populations

The international health cooperation dimension of the conceptual model encompasses the management of health cooperation and the effective means of advocacy and negotiation. Through this dimension, the technical cooperation between Belize and other countries will be reviewed, as well as the impact of these relationships on health. One such agreement is the Declaration of Alma- Ata 1978 - Primary Health Care which outlines the ultimate goal for PHC is for better Health for All through:

- reducing exclusion and social disparities in health (universal coverage reforms);
- organizing health services around people's needs and expectations (service delivery reforms);
- integrating health into all sectors (public policy reforms);
- pursuing collaborative models of policy dialogue (leadership reforms); and
- increasing stakeholder participation.

For Belize, the attainment of the Millennium Development Goals (MDGs) has resonated in the efforts aimed at the Health Sector Reform Project (HSRP). The HRSP addresses four of the MDGs directly related to health namely MDGs 4, 5, and 6. This includes the notion of Global Health - improving health and achieving equity through Health for All.

Q1: Belize's International Cooperation Strategy

Participants were asked to respond to six (6) open-ended questions. Their responses were captured by thematic areas and outlined below under various subheadings as it relates to the questions.

In response to the first two-part question of: Does Belize’s International Cooperation Strategy include supporting the NHI Scheme? If yes, what are the main elements/components mentioned for strengthening/supporting? Most of the respondents indicated that a comprehensive document such as the Belize International Cooperation Strategy did not exist. For the particular project of the NHI and National Health Reform, a project document was developed, complete with strategies to harmonize international cooperation for this particular deliverable of establishing the NHI scheme.

The international cooperation was done on an individual donor/country level. The technical and financial components addressed were made possible through commitment from the government to IADB that the budgetary responsibility to the NHI remains with the Government of Belize. In addition, detailed specifications were drawn out that proposed strategies, contracting mechanisms and review of package of services, more specifically for areas that were considered high risks due to poverty (Southside Belize City and the southern region).

Table 2.1 below outlines the components that were supported through the MIF of IADB.

Components	MIF	GOB	Total
Developing a regulatory framework for the private sector	$ 127,500.00	$ 55,500.00	$ 183,000.00
Improvement of private sector standards and market organization, including the corporate and organizational development of private providers as contractors	$ 165,000.00	$ 290,000.00	$ 455,000.00
Developing and institutionalizing private sector purchasing and contracting tools and skills	$ 360,000.00	$ 81,290.00	$ 441,290.00
Support of the National Health Insurance Fund: Technical Development	$ 555,000.00	-	$ 555,000.00
Support of the National Health Insurance Fund: Innovation Fund	$ 420,000.00	-	$ 420,000.00
	$ 1,627,500.00	$ 426,790.00	$ 2,054,290.00

Source: Draft National Health Insurance Innovation Fund - Belize Pilot Project Operational Manual

Table 2.1 MIF Project Components and Funding

There was great intention in universalizing coverage (Homedes, 2009). Overall, an estimated 20 percent to 25 percent of the population in LAC (200 million people) does not have regular and timely access to health systems (PAHO Strategic Plan 2008 -2012). For Belize, extending the coverage of the NHI scheme seems to be an essential step towards improved coverage and access to healthcare for the population.

Q2: International Financial and Technical Cooperation and NHI

In response to the second question: To what extent has international technical and financial cooperation (both bilateral and multilateral) been provided in formulating the design & implementation of the NHI? How has this cooperation evolved over time?

After 2004 and through an IMF funded consultancy, the only other identified input has been within the scope of the last two years. This has been part of the Government's Policy-based loan with IADB. Admittedly, much of the input has been technical input through the IADB loan agreements that assessed the contractual model to evaluate the efficiency of contracting process and to assess coverage and benefit packages.

Q3: Harmonization among the international technical cooperation partners

Question 3 asked: Are the efforts of the various international cooperation partners harmonized in terms of their approach to NHI design and implementation? If not, what are the differences? Do they have competing interests? If so, what are they?

The various efforts of international cooperation partners have been country-led initiatives. In the period of early 2000 – 2004, the conceptual framework for the NHI Scheme was formulated and was exclusively implemented, developed, financed and monitored by the country's key stakeholders. Harmonization of the UN agencies/donors is evident and though most of these agencies boast commitment to the development of Belize, much of their work done was in SILOs. One such example is the individualize Country Cooperation Strategy of PAHO. This strategy involves the participation of national counterparts such as community-based organizations, non-government organizations, civil society and trade unions in an effort to strengthen national capacity but it does not include other international funding agency and can form a part of the much needed Belize International Cooperation

Strategy. Whilst there remains an indigenous demand for aid and technical cooperation, this is successfully matched by an indigenous supply of aid and technical expertise.

By the end of the 2007/2008 fiscal year, only 73,000 people, or 23 percent of the population, were covered by the NHI (Sanigest Solutions, 2008). Historically, the National Health Insurance project had been mostly financed with funds from the Social Security Board (SSB). Between August 2001 (when the project was launched) and 2006, NHI received B$32.3 million in total, out of which 84 percent (B$27.4 million) came from SSB. Total funds increased at an average 54 percent annual rate, but this figure is highly biased by outlying rates in 2002 and 2006. The high rate in 2002 is the result of comparing a full fiscal year (2002) with 8 months of revenues in 2001, given that the project started in August.

Over the last ten years, the trend in aid for health appeared relatively fragmented and did not focus on large projects. In 2009, Net Overseas Development Assistance for Belize per capita was **$83.6**[1] (2009), compared to LAC: $15.9, Europe & Central Asia: $20.0, East Asia & pacific: $5.3 and Sub-Saharan Africa: $53.0.

Year	Donortype	Donorcode	Donor	CPA disbursement - Current USD million	CPA disbursement - 2009 prices
2007	DAC countries	701	Japan	0.135	0.167
2007	Multilateral	963	UNICEF	0.013	0.013
2008	DAC countries	701	Japan	0.125	0.137
2008	Multilateral	963	UNICEF	0.008	0.008
2009	DAC countries	701	Japan	0.094	0.094
2009	Multilateral	963	UNICEF	-	-

Source: Development Co-operation Directorate (DCD-DAC) 2007-2009

Table 1.1 Donor Disbursements

Efforts of International Partners and alignment

Since the Government has prioritized its health initiatives as set out by Ministry of Health's Strategic Plan, alignment of international partners' efforts have been relatively targeted. Health remains a litmus test for broader aid effectiveness efforts. The health system displays great versatility in that it tends to adopt global health trends with a sustained focus on national health priorities and goals. In addition, MoH through its comprehensive Health Operational and Strategic Plan managed to keep national health priorities focused and country-led. It was established, that national government has the primary responsibility for coordinating all external assistance – both technical and financial in nature. Strategic partners are kept abreast of all priorities by reference to this Health Operational and Strategic Plan and can align their programmatic funding with those of Belize's national health priorities.

Currently, the country remains dependent on short-term external funding and development aid for the advancement of health issues. Greater ownership and leadership in this area will ensure aid effectiveness for Belize. Critical to this is the notion that Belize has essentially made commendable strides to move away from the vicious cycle of donor dependency to a more virtuous cycle of national sustainability with prescriptive donor cooperation.

Q4: Contributing Factors/Obstacles to the lack of Harmonization (NHI)

The general response to Question 4: Are international cooperation efforts as they relate to the NHI aligned with national health decisions/priorities?

[1] (current US$)

Several obstacles and factors that have contributed to the lack of harmonization as it relates to international cooperation and the NHI implementation were cited. These included:

- Political interfacing
- Institutional capacity
- Lack of clear financial processes
- Lack of administrative accountabilities
- Rigid financial policies

Q5: Current Existing Mechanism to facilitate harmonization

Question 5 was posed as follows: What mechanisms currently exist (if any) which facilitate harmonization among the international technical cooperation partners and alignment with national decisions/priorities?

Belize has clearly articulated the following national health goal: **To raise the health status of the population by improving the efficiency, equity and quality of health care services and by promoting healthier lifestyles, through a health Sector Reform Project[2]. In addition the specific objectives[3] outlined were:**

- **Restructuring and strengthening the organizational and regulatory capacity of the central and regional level of the public sector to plan, organize, produce, procure and deliver a high standard of care on a cost efficient basis.**

- **Rationalizing and improving the coverage and quality of services of public and private sectors by:**
  a. restructuring public facilities,
  b. purchasing selected services from the private sector to support the public supply,
  c. providing mobile services and transport in less accessible areas,
  d. training community nursing aides and other health professional; and

- **Achieving an equitable and sustainable system of sector financing by helping to set up a National Health Insurance Fund and focusing public spending on the poor.**

All health-related cooperation is centralized through the Ministry of Health who has the responsibility to coordinate, mediate and support these efforts. The mechanism to purchase health services could be better harmonized with existing regulations and policies.

Q6: Mechanism to enhance harmonization

In response to Question 6: What are some recommendations on mechanisms to enhance the harmonization of technical and financial cooperation among international development partners and alignment with national priorities for future NHI roll-out?

The United Nations in-country agencies have demonstrated and continue to demonstrate a firm commitment to the provision of technical support for national health reform initiatives with a well

[2] Health Sector Reform Program (BL-0014)
[3] Health Sector Reform Program (BL-0014)

defined goal-based framework. However, these initiatives are country-led and remain the responsibility of the Government of Belize through the Ministry of Health. It was distinctly established that many key actors played a role in the Health Sector Reform implementation and as such, have remained committed to the government's efforts and strategies to roll-out the NHI nationally.

Discussion

In 2005, the Paris Declaration on aid effectiveness outlined five principles to improve the aid quality and its impact on developing countries. These principles include: ownership, harmonization, alignment, results and mutual accountability. The Paris Declaration requires that at the country-level, national Governments have the primary responsibility for coordinating external assistance and evaluating its contribution to national priorities; and mandated the United Nations system to promote national ownership and capacity development, and to make system-wide progress in harmonizing evaluation practices. The display of harmonization of international aid and effort to harmonize different donors has been profound in Belize's health arena.

The most important and urgent requirement for seeking international cooperation is to seize the opportunities presented by global collaboration on prioritizing health issues and harmonization of health agenda. Essential to this, is to ensure that there is no duplication of efforts, but rather enhanced efforts among partnering countries.

Socialist Model and the Belize Health Situation

There is much centralized planning of health care initiatives and the country's national health reform initiative is a good example of this type of centralized planning that is captured from the socialism theory. However, the national hospitals and polyclinics are not totally protected from competition of similar services from the private hospitals. In fact, the country also allows for migrant workers to obtain job positions within the hospitals and garner the same salary as locals. Ideally, a socialist society would be reflected as a society that is an equitable society and allows for health and environmental protection. Equity in health is an attainable goal the NHI scheme seeks to achieve.

Capitalist Model and the Belize Health Situation

The capitalist model seeks to strengthen governments particularly in developed countries. Belize has a sizable rural population of 156,400 and an urban population of 165,700[4] and is considered to be an economy based on agricultural exportation.

There is much to be desired and the health care system is characterized as striving towards equity, affordability and accessibility to all.

Global factors that affect the health care system includes: aligning the country's priority with aid and partners; harmonization of the country's national agenda with global concerns, and harmonization of international strategic collaboration and partnership that will help the country attain equitable, accessible and affordable health care. Other factors include: well being of the nation's population, financing, access to services, health care providers and per capita expenditure.

To date, the country has applied aspects of both the capitalist and the socialist models of development not attaching policies of development to any one particular concept. Much of the capitalist aspects can be viewed in the health care system where private hospitals are viewed as enriching the investors at the health expense of the nation. Private hospitals compete with national hospitals and polyclinics for the same services but at substantial price differences. To this type of enrichment, the economic growth and social health and well being of the nation is stunted.

[4] Health Statistics of Belize, 2009

Conclusion

Belize's national health priorities have not been guided by aid funding but in fact have been country-led. International technical and financial cooperation has enhanced efforts to implement the National Health Insurance Scheme in Belize due to country-led initiative, collaboration and substantial harmonization among international agencies. Whilst Belize has exposure to and experience international cooperation, the health priorities have not been donor-led. Priorities remained goal-oriented and whilst technical and financial cooperation has been engaged, the country has not allowed for priority shifts to align with these funding.

A key challenge that must be addressed includes the alignment of all intended developmental aid with national health development priorities and harmonization of partner actions to ensure aid effectiveness. A national development plan, Horizon 2030 exists but a comprehensive International Cooperation Strategy has not yet been formulated. Once this is in place, it will provide a clear and distinct road mapping of health priorities as outlined in the Health Strategic Plan which essentially demonstrates to prospective donors and development partners the national priorities that they can align with their programmatic funding. The Health Agenda 2007 – 2011 does this to the limited extent of health priorities but the development of an effective aid agenda that ultimately establishes the country's specific needs will be the enabling factor that fosters and cultivates collaboration and harmonization. Belize will then be able to direct funds into the key areas that require urgent attention and allow the Government to remain actively involved and committed to decision making as it relates to the influx of aid for health in Belize.

Improvements in the health care system will depend on how the government continues to view the nation's health priorities. Our nation is strategically placed in Central America and the Caribbean with several unofficial border crossings that allow for informal trade and migrant labor. Given this reality, it is imperative that Belize, in partnership with its regional counterparts, adopt common measures and norms for health. This approach will no doubt contribute to related social development in the first instance and to the nation's economic growth in the long term. This can be realized as a nation with strong cultural and family values. The sustainability of the nation's health insurance system is dependent on the political commitment to ensure health equity remains a priority. Ultimately, there is a direct correlation between health equity and NHI sustainability. Equity essentially means containing the health costs and making health care affordable and accessible to all.

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Effects of Emotional Learning System and Peer Mentoring on the Emotional Intelligence Skills of Senior Secondary School Students in Lagos, Nigeria.

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Abstract

The study investigated the relative effectiveness of emotional learning system and peer mentoring in enhancing emotional intelligence skills of senior secondary school students in Lagos, Nigeria. A sample of 156 participants randomly selected from three senior secondary schools was used. The schools were randomly assigned to the two treatment conditions (emotional learning system and peer mentoring) and control group. Questionnaire was employed to generate data for the study. Two research hypotheses were formulated to guide the study. The hypotheses were tested using descriptive statistical method and analysis of covariance (ANCOVA). The study revealed that both treatment techniques were efficacious in enhancing the level of emotional intelligence skills of the students. Further evidence revealed that emotional learning system was more effective in improving emotional intelligence skills than the peer mentoring technique.

Keywords : Emotional learning System, Peer Mentoring, Emotional Intelligence Skills.

Introduction

Secondary education, without doubt is supposed to be the basis and the foundation for pursuing higher knowledge in tertiary institutions. It is an investment as well as an instrument that can be used to accomplish a more rapid socio-economic, political, technological, scientific and cultural development in the country. The National Policy on Education (2004) stipulated that secondary education is an Instrument for national development. It fosters the development of the individuals for further education, and general development of the society. The role of secondary education is to lay the foundation for further education and if a good foundation is laid at this level, there is likely to be no problem at subsequent levels.

The increasing population of school going adolescents in Nigeria has revealed a variety of problems which contemporary Nigerian higher institutions are forced to put up with. Among the observable personal problems of Nigerian adolescents, particularly in secondary schools, are unhappiness, annoyance and anger, inability to meet needs, inability to get aspirations into fruition, anxiety neurosis, excessive frustration, lack of knowledge and information (Adediran, 1991). What the foregoing suggests is that there is a fundamental problem in the emotional orientation among secondary school students and very few people care to think of the 'student emotional factors' which cannot be divorced from the complexity of factors that determine the totality of a student's success in life. One such element of these complex factors is the student's level of emotional intelligence. Cherniss (2004) stated the importance of emotional intelligence as necessary to improving performance and psychological well-being in school works.

Abisamra (2000) averred that "Intellectual Intelligence account for only 20% of total success and the rest goes for emotional and social intelligence" and argued that "it is only logical that teachers begin to teach components of emotional intelligence to students at school". He then concluded that if emotional intelligence affects students' achievement, then it is imperative for schools to integrate it in their curricula and thereby raising the level of students' success.

The term 'emotional intelligence' was coined in 1990 by Yale psychologist Salovey and Mayer, who together developed a model of intelligence reflecting the connection of emotions to thinking (Salovey and Mayer, 1990). Emotional Intelligence is perceived as a type of aptitude that involves the ability to monitor one's feelings and that of others, to discriminate among them and to use this information to guide one's feeling and thinking (Salovey and Mayer, 1990). Emotional intelligence is the intelligent use of emotions—intentionally using them to help guide ones behaviour and thinking in ways that enhance one's ability to satisfy ones basic needs and to obtain ones wants. Impliedly, it is a learned ability requiring an intentional and active decision making.

Emotional intelligence is an all-round potential that is in some amount genetically present in every individual but developed in the course of life events and environment which aid one to manage oneself and relate effectively with others (Goleman, 1995). Every student already has a level of emotional intelligence. Therefore, every member of the school management, teachers and parents have a great role in improving and developing this potential in students.

Bar-On (1996) was of the opinion that Emotional Intelligence reflects our ability to deal successfully with other people and with our feelings. He developed the Bar-On Emotional Quotient Inventory (EQ-i) after seventeen years of research. And this inventory is the first scientifically developed and validated measure of emotional intelligence that reflects one's ability to deal with daily environmental challenges and helps predict one's success in life including professional and personal pursuits. Bar-on examined the effect of age, gender and ethnicity on EQ-i score. With respect to gender, they found no differences appeared between males and females with respect to overall emotional and social competencies (Bar-On and Parker, 2000).

However the effects of gender on Emotional Intelligence revealed that there was not enough evidence to say that there was an effect of the variable gender to the factors of emotional intelligence studied (Stottlemyer,2002; Ogunyemi, 2007).

Meanwhile, emotional intelligence where emotional competencies are closely linked, to gender differences have also been detected in childhood, adolescents and adulthood (Petrides & Furnham,2000; Sanchez-Nunez, Fernandez-Berrocal, Montanes & Latorie, 2008)

Goleman (1995) defines emotional intelligence as knowing what one's feelings are and using that knowledge to make good decisions. It is also the ability to maintain hope and an optimistic outlook in the face of disappointments and difficulties. He also defined emotional intelligence as empathy, which is awareness of the feelings of others. Goleman (1998) developed the Emotional Competence Framework model that is organized around personal and social competencies.

Finegan (1998) states that the concept of emotional intelligence is closely related to other theories which involved emotional identification, reasoning and behavioural response to environmental stimuli, all included in Weschler's definition of the nature of intelligence. Nelson and Low (1998) developed a model (Exploring and Developing Emotional Intelligence Skills) for assessing and developing emotional intelligence skills which organizes emotional skills into four areas of emotional competencies. The first competency area is the interpersonal communication under stress, which involves the importance of communication and emotion control in building and maintaining healthy and productive relationships. This competence includes emotional skills of (a) assertion (b) anger control and management (c) fear control and management. The second competency area is Leadership and it involves the importance of developing responsible leadership centred on the person and leading in positive ways when working with others. Emotional skills in this area include (a) Comfort (b) Empathy (c) Decision making and (d) leadership. The third area is Self-management in life and career which involves self direction and management to achieve meaningful personal and career goals. Emotional skills include (a) Drive strength (b) Time management (c) Commitment ethics and (d) Positive personal change. The fourth personal competency area is intrapersonal development which involves learning and developing positive beliefs, attitudes and views of self to achieve personal well-being and health. Emotional skills in this area include a) Self-esteem and (b) Stress management.

An understanding of the emotional intelligence helps people successfully meet the demands and challenges of each stage of life. The emotional intelligence provides a different, additive and critical sources of data to improve personal and career success. In emotional intelligence, the emotional mind works in concert with the cognitive mind to integrate and harmonize the person. It enables people to reduce negative stress in their life, build healthy relationships, communicate effectively, and develop emotional health.

This study was therefore designed to investigate the extent to which emotional learning system and peer mentoring techniques would enhance students' emotional intelligence skills.

Peer mentoring are mentoring relationships that consist of participants who are closer in age to one another or belong to similar peer groups (Kram, 1985). Chikering and Reisser (1993) assert that peers are the most powerful influence on students' development in schools. They also suggest that students engage each other at least twice as much as they engage with teachers and senior colleagues. Peer relationships are easier for students to maintain and establish due to students' close proximity with other students.

Emotional learning system is a model emotional and experience-based learning. It involves five steps which are systematic and sequential. The system is designed to ensure a learner-centred development process. The five steps are; step A- Explore, step B – Identify, step C – Understand, step D – Learn and step E – Apply and model.

Statement of the problem

Many adolescents in schools have been manifesting chronically low emotional intelligence skills in most parameters of measurement. This is observed in their academic, social and other areas of life.

The demands of today's world and the challenges of coping under serious emotional strain, coupled with uncooperative attitude of some parents who are most often engrossed with the provision of the family needs, may trigger negative emotions in students when not handled effectively. It is also apparent that a chronic pattern of emotional maladjustment destroys a student's sense of self and personal safety which may have adverse effect on their emotional health, social skills and learning.

Many factors may account for the negative impact on emotional intelligence skill. However, it is notable that little research and intervention to remedy the situation has been done in Nigeria, to the knowledge of these researchers. This is why emotional learning system and peer mentoring were isolated to determine how well they will improve the emotional intelligence skills of the students which will help those negative emotions to be transformed into positive behaviours that will enable them to better adjust in life.

Purpose of the Study

The primary purpose of this study was to determine the effect of emotional learning system and peer mentoring on the emotional intelligence skills of senior secondary school students in Lagos, Nigeria. To achieve this purpose it will:

1. Examine whether there is any difference in the post-test scores on emotional intelligence skills among participants exposed to Emotional Learning System, Peer Mentoring and Control Groups.

2. Establish whether there is any gender difference in post-test scores on emotional intelligence skills due to experimental conditions of participants.

Hypotheses

1. There is no significant difference in post-test scores on emotional intelligence skills among participants exposed to Emotional Learning System, Peer Mentoring and control group.
2. There is no significant gender difference in post-test scores on emotional intelligence skills due to experimental conditions of participants.

Methodology Design

The research design used for this study was quasi-experimental (pre-test/post-test control group design). It is difficult to randomly assign subjects to treatment conditions in a natural setting because it is not possible to control the influence of extraneous variables through other techniques hence the use of quasi-experimental design so as to ease out the influence of the treatment condition.

Sampling Procedure

Using stratified random sampling procedure, six intact classes were selected from 12 intact classes in the three secondary schools of the two education districts. A total of 240 participants comprising of both female and male SS3 students were selected by simple random sampling for the baseline assessment of the study .The sample comprised of eighty participants drawn from each of the 3 selected secondary schools in the ratio of forty participants per class. Using the baseline assessment scores, those who had below 50% on the Exploring and Developing Emotional Intelligence skills

questionnaire were selected to form the experimental groups with 156 participants. These 156 participants consist of 55 participants in school 1, 51 participants in school 2 and 50 participants in school 3. Schools were randomly assigned to treatment conditions and control group.

Instrumentation

The research instrument used to obtain relevant data for this study was an adapted version of the original version of the Exploring and Developing Emotional Intelligence Skills Questionnaire (EDEISQ)developed by Darwin B. Nelson, Ph.D. and Gary R. Low, Ph.D in 1998 (Stottlemyer 2002). EDEISQ was adapted for the study to make it more suitable for use in our secondary school setting. The adapted instrument had two main sections:

Section 1: This section obtained from the respondents their personal background data such as, class, gender, school, and identification number.

Section 2: This section was a 130-item scale that measured the respondent's emotional intelligence skills in four major dimensions: interpersonal skill, leadership skill, self-management skill and intrapersonal skill. The questionnaire was scored on a 3-point Likert scale.

A pilot study using 30 participants was carried out to determine the test-retest reliability index of the instruments .The interval between the first and the second administration was three weeks. The correlation between the two set of scores was determined using Pearson's Product Moment Correlation method. The reliability coefficient was 0.81.

Administration of the Instruments

The intervention programme was carried out over a period of 10 weeks. One week each was used for both the pre-test and post-test. The treatments consisted of Emotional learning system and Peer mentoring techniques. Participants in the two treatment groups were exposed to one hour thirty minutes of training/discussion once per week for 8 consecutive weeks. The control group did not receive any treatment.

Treatment

Programme 1: Emotional learning System

The aim of this treatment is to use its step-by-step process to help participants become more emotionally reflective and constructive in their thinking. Once an individual becomes emotionally reflective and constructive, the choice of behaviour is positive. The emotional learning system helps individuals to balance their feelings and thoughts to produce intentional behaviours that are called emotional intelligence skills. This system also uses person-centred assessment, reflection, constructive thinking, and skill development lessons to guide student learning. The five-step learning processes are: Step A (Self-Assessment: Explore) which requires that one develops an intentional self-assessment habit. Step B (Self-Awareness: Identify) which involves the process of identifying one's experience and labelling the emotion. Step C (Self-Knowledge: Understand) which involves insight and understanding of an emotion that allows one to make a choice about behaviours. Step D (Self-Development: Learn) which involves learning various ways to improve one's behaviour and experience positive outcomes. Step E (Self-Improvement: Apply and Model) which requires that one practice emotional intelligent behaviour to achieve personal success.

Programme 2: Peer Mentoring

The objective of Peer mentoring programme is to help both mentors and mentees, develop and advance their interpersonal, leadership, self-management and intrapersonal skills. Peer mentoring is also aimed at increasing participants' self-esteem and self-efficacy. Peer mentoring relationships involve a level of reciprocity and collaborative benefits for the both the mentor and mentee that may

be different than in traditional mentoring relationships (Kram, 1985b; Kram & Isabella, 1985; Zachary, 2006). Peer mentoring relationships have the power to be more impactful on students because of the students' proximity in age with one another (Astin, 1999). Research suggests that peers have a great level of influence over other peers (Newcomb, 1962; Astin, 1999).

Procedure for data analysis

The two hypotheses were tested using descriptive statistical method and analysis of covariance (ANCOVA).The level of significance was determined at 0.05 level.

Results

Hypothesis one :In the null form states that there is no significant difference in post test scores on emotional intelligence skills among participants exposed to emotional learning system, peer mentoring and control group. The data were analyzed using Analysis of Covariance statistic and the result of the analysis is as presented in Tables 1, 2 and 3respectively.

Table 1: Descriptive data on emotional intelligence skills across experimental groups.

		Pre- test		Post – test		
Group	N	$\bar{X}$	SD	$\bar{X}$	SD	MD
Emotional Learning System	55	148.32	18.74	172.26	19.79	23.94
Peer Mentoring	51	150.96	16.54	161.18	17.73	10.22
Control	50	148.68	17.35	148.58	17.65	0.10

Table 1 shows the pre-test and post-test scores of participants in the three experimental groups. It was noted that the participants exposed to emotional learning system had the highest post-test score on emotional intelligence (X = 172.26 and SD = 19.79) followed by participants exposed to peer mentoring (X = 161.00 and SD = 17.73) while the control group had the lowest post test score of X = 148.70 and SD = 17.65. As to whether significant difference exists in post test score in emotional intelligence due to experimental conditions; the result of the analysis is presented in Table 2.

Table 2: Analysis of Covariance on influence of experimental conditions on emotional intelligence skills

Sources of Variation	Sum of Squares	Degrees of freedom	Mean of Squares	F-ratio
Model	45153.51	3	15051.17	107.08
Covariate	364.65	1	364.65	2.59
Exp. Conditions	17856.14	2	8928.06	63.50*
Within Group	21510.39	152	140.59	
Total	66663.90	155		

*P <0.05; df = 2 & 152; Critical F = 3.05

From table 2, it could be observed that a calculated F-value of 63.50 resulted as the difference in emotional intelligence skills due to experimental conditions. Thus, calculated F-value is significant since it is higher than the critical F-value of 3.05 given 2 and 152 degree of freedom at 0.05 level of significance. Consequently, the null hypothesis was rejected and the alternative hypothesis which

states that there is a significant difference in post-test scores on emotional intelligence skills among participants exposed to emotional learning system, peer mentoring and control group.

Further analysis of data was done using Fisher's Protected t-test technique wherein pair wise comparison of the group means was done to determine whether significant difference in emotional intelligence skills exist across the groups and the trend of the difference. The result of the analysis in presented in Table 3.

Table 3: Fisher's Protected t – test on difference in emotional intelligence skills across groups

Group	EmotionalLearning n = 55	PeerMentoring n = 51	Control n = 50
EmotionalLearning System	172.26[a]	4.88[c]	10.20[c]
Peer Mentoring	11.26[b]	161.00[a]	5.19[c]
Control	23.56[b]	12.30[b]	148.70[a]

Group means are in the diagonal; [b]difference in group means is below the diagonal;
[c]Protected t-values are above the diagonal. $P < 0.05$

The result from table 3 shows that participants exposed to emotional learning system significantly have higher emotional intelligence skills than either those exposed to peer mentoring ($t = 4.88$; $df = 104$; critical $t = 1.98$; $P < 0.05$) or those in the control group ($t = 10.20$; $df = 103$; critical $t = 1.98$; $P < 0.05$) respectively. Similarly, participants who received peer mentoring treatment significantly have higher emotional intelligence skills than those who are in control group ($t = 5.19$; $df = 99$; Critical $t = 2.00$; $P < 0.05$).

Hypothesis two: In the null form states that there is no significant gender difference in post-test scores on emotional intelligence skills due to experimental conditions of participants. The hypothesis was tested using analysis of covariance statistics and the results of the analysis are as presented in Tables 4 and 5.

Table 4: Descriptive data on gender difference in the effect of experimental conditions on emotional intelligence skills.

			Pre-test		Post – test		
Group	Gender	N	$\bar{X}$	SD	$\bar{X}$	SD	MD
Emotional Learning System	Female	27	148.95	17.99	173.8	12.6	24.85
	Male	28	147.69	19.49	170.2	25.33	22.51
	Total	55	148.32	18.74	172.3	19.79	23.98
Peer Mentoring	Female	33	151.62	15.68	159.1	20.3	7.48
	Male	18	150.3	17.40	164.4	11.38	14.08
	Total	51	150.96	16.54	161	17.73	10.04
Control	Female	30	147.88	16.38	152.3	17.21	4.42
	Male	20	149.48	18.32	143.3	17.32	6.18
	Total	50	148.68	17.35.	148.7	17.65	0.02

Table 4 shows that among participants exposed to emotional learning system, females had the highest mean score of 173.82 and standard deviation of 12.60 while males had mean (X) score of 170.22 and standard deviation of 25.33. For those exposed to peer mentoring the males had higher mean(X) score of 164.44 and standard deviation of 11.38, while the females had mean (X) score of 159.12 and standard deviation of 20.30. For the control group, females had mean (X) score of 152.30 and standard deviation of 17.21 whereas, the males had the mean (X) score of 143.30 and standard deviation of 17.30.

To determine whether gender differences exist on emotional intelligence skills of participants, analysis of covariance was done. The result of the analysis is presented in Table 5.

Table 5: Analysis of Covariance to test gender difference in the influence of experimental condition on emotional intelligence skills of participants.

Sources of Variation	Sum of Squares	Degrees of Freedom	Mean of Squares	F – ratio
Model	16172.70	6	2695.45	8.01
Covariate	507.60	1	507.60	1.50
Exp. Conditions	14948.06	2	7474.03	22.20*
Gender	382.68	1	382.68	1.14
Exp. Cond/Gender	1235.88	2	617.94	1.84
Within Group(error)	50491.20	149	336.61	
Total	6666.39	155		

*P < 0.05; df = 2 & 149; Critical F = 3.05

From table 5, it could be observed that a calculated F-value of 1.14 resulted as the influence of gender on emotional intelligence skills of participants. Thus calculated F-value is not significant since it is less than the critical F-value of 3.05 given 2 and 149 degrees of freedom at 0.05 level of significance. This led to the acceptance of the null hypothesis.

Discussion

The results indicated that participants in emotional learning system group had the highest post-test scores followed by those in peer mentoring group and lastly, the control group. Further analysis was made to determine whether significant difference existed in post-test score in emotional intelligence skills due to experimental conditions. The result of the analysis shows a significant difference in the post-test scores. Consequently, the null hypothesis was rejected.

Further analysis was done using Fisher's protected t-test to determine if significant difference in emotional intelligence skills exists across the groups and the trend of the difference. The result shows that participants exposed to emotional learning system significantly had higher emotional intelligence skills than either those exposed to peer mentoring or those in the control group respectively. This suggest that this result is because emotional learning system is a better structured programme when compared with peer mentoring which has been successfully applied severally across socio-spatial and demographic spectrum.

The findings supports that of other researchers who found that emotional learning system helped participants make positive change in attitudes, conceive and apply behaviours that consequently bring about improvement in emotional intelligence (Nelson, Jin and Wang ,2002).

Also, Nelson et al (2007) affirmed the findings in a study on emotional intelligence: a transformative theory and applied model of positive personal change. The results revealed that emotional learning system had a significant positive influence on emotional intelligence skills and that there was no significant gender difference.

The results also showed that there was no significant gender difference in post-test scores on emotional intelligence skills due to experimental conditions of participants. The plausible reason for this outcome lies in fact that though, superficially men may differ from women emotionally; their innate capacity to respond to treatment aimed at enhancing specific emotional intelligence skills may be the same.

This finding of this study supports that of Ogunyemi (2007) which revealed among other things, that there is no significant effect of gender on participants that were trained through brainstorming and emotional mastering training to enhance emotional intelligent skills. This implies that participants' emotional intelligence skills are not gender specific. On the other hand the finding contradicts that of some other researchers which revealed that strong pattern in emotional intelligence competencies are closely linked to gender differences (Sanchez-Nunez, Fernandez-Berrocal, Montanes and Latorre,2008).

Conclusion and Recommendation

On the basis of the findings of this study it is concluded that emotional learning system and peer mentoring were efficacious in enhancing the level of emotional intelligence skills among participants although emotional learning system was more potent. Therefore, it is hereby recommended that:

1. Managers of education at secondary education level should consider emotional intelligence skills as a factor in predicting student's success and hence the need to assess this dimension of the student's overall assessment.

2. Educators at secondary level have often emphasised intellectual intelligence in preparing their students for life success. This has often produced suboptimal result. The suggestion here is for them to develop appropriate intervention programmes that will facilitate effective and seamless transition of their students to all round success at tertiary level of learning.

3. It is crucial that learning environments are student-centred and capable of nourishing the development of emotional intelligence skills that is considered the strongest predictor of student success.

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Essential Oil of *Ocimum gratissimum*; A Potent Antimicrobial and Inhibitor of Partially Purified and Characterized Extracellular Protease of *Shigella flexneri*

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Abstract

Antimicrobial and inhibitory effects of the volatile oil of three different parts of *Ocimum gratissimum* plant against enteric pathogenic bacterial and partially purified extracellular protease of *Shigella flexneri* had been established. There was an effective bacterial growth inhibition against all the enteric bacteria used in this work with average inhibitions of 46.94±13.0 mm and 113.97±9.7 mm for antibiotic drug and volatile oils respectively. Bacterial growth inhibition was significantly higher *($p<0.05$)* in volatile oils than the antimicrobial drugs. *Escherichia coli* and *Salmonella typhimurium* were the most sensitive pathogenic organisms whose growths were mostly inhibited by the volatile oils with the lowest MIC and MBC.

The optimal activity of the extracellular protease of *Shigella flexneri* was 6.25 x 10^{-2} μmol/min and 8.20 x 10^{-2} μmol/min at pH 8.0 and 44 ^{o}C respectively. The volatile oil from the root (VOROG), leaf (VOLOG) and stem (VOSOG) showed competitive, noncompetitive and noncompetitive inhibition respectively. The K_m and V_{max} were: the root (V_{max} of 8.33 x 10^{-2} μmol/min, K_m = 0.36 mg/ml (absence of inhibitor) and K'_m = 0.48 mg/ml (presence of inhibitor), leaf (V_{max} of 8.33 x 10^{-2}μmol/min (absence of inhibitor), V'_{max} = 8.0 x 10^{-2} μmol/min (presence of inhibitor) and K_m = 0.36 mg/ml, stem (V_{max} of 8.33 x 10^{-2} μmol/min (absence of inhibitor), V'_{max} = 7.46 x 10^{-2} μmol/min (presence of inhibitor) and K_m = 0.36 mg/ml. The highest purification was achieved by the use of Sephadex G-100 size exclusion chromatography with purification fold of 23.2 and percentage yield of 92.9%. The protease activity of the purified enzyme was 67.4 μmol/min/mg protein.

Antimicrobial and inhibition of partially purified extracellular protease of *Shigella flexneri* was established by the use of the volatile oils from three different parts (root, leaf, and stem) of *Ocimum gratissimum*.

***Keywords*:** volatile oil, antimicrobial, inhibition, extracellular protease,

Introduction

Ocimum is a genus of about 35 species of aromatic annual, perennial herbs, and shrubs in the family *Lamiaceae,* mostly native to the tropical and warm temperate regions of the whole world. *Ocimum gratissimum* (Labiatae), one of the species of this plant, is commonly used in folk medicine to treat different diseases such as upper respiratory tract infections, diarrhea, headache, ophthalmic, skin diseases, pneumonia, cough, fever, and conjunctivitis (Onajobi, 1986). Moreover, many works have been reported to show the antimicrobial properties of this plant against some selected enteric pathogens including fungi (Nwosu & Okafor, 2005; Nakaruma *et al.,* 2009), but no cited literature on its purpose as an inhibitor to the extracellular protease of *Shigella flexneri*.

Shigella is a genus of Gram-negative entero-invasive bacterium, non-spore forming rod-shaped bacteria closely related to *Escherichia coli* and *Salmonella typhimurium*. It causes shigellosis in man and dysentery in primates (Mims *et al.,* 2005), but not in other mammals (Ryan & Ray, 2005). It is only found naturally in humans and apes (Potter, 2006). *Shigella* infection is typically via ingestion (fecal-oral contamination); depending on age and condition of the host, as few as ten bacterial cells can be enough to cause an infection. *Shigella* causes dysentery that result in the destruction of the epithelial cells of the intestinal mucosa in the caecum and rectum. Some strains produce enterotoxin and Shiga toxin, similar to the verotoxin of *Escherichia coli* (Hale *et al.,* 2006). Both Shiga toxin and verotoxin are associated with causing hemolytic uremic syndrome. *Shigella flexneri,* which is one of the strains of *Shigella,* is the most common cause of the endemic form of shigellosis and eventual death. Some of these toxins have been proposed to be proteolytic in nature, which aided pathogenic specificity, adhesion, and invasion (Lantz & Ciborowski, 1994). Epidemiologically, *Shigella flexneri* is a major public health concern in developing countries (Nato *et al.,* 2007).

Proteases are proteolytic enzymes, which play a crucial role in a numerous pathological processes including microbial infections, arthritis, tumour invasion and metastasis, and a number of degenerative diseases (Brown, 1994). Microbial proteases have been proposed as virulence factors in a variety of diseases caused by pathogenic microorganisms. Some of them can also act as secretive membrane proteins for cell recognition, communication, and cell invasion (Robert *et al.,* 2006). Identification and characterization of microbial proteases are pre-requisites for understanding their role in the pathogenesis of infectious diseases as well as to improve their application in biotechnology (Lantz & Ciborowski, 1994).

There were several works on the antimicrobial properties of volatile oil of different medicinal plants. This work, apart from antimicrobial activity of this volatile oils against several pathogenic enterobacteriaceae, characterized and studied the inhibitory kinetics of extracellular protease of *Shigella flexneri* using the volatile oils of *Ocimum gratissimum* as potent inhibitors.

Materials and Methods

Plants Materials: *Ocimum gratissimum* plants were obtained at Ojo Local Government Area of Lagos State, Nigeria as green foliage and were air-dried for 5 days. The leaf sample was identified and authenticated at the Department of Botany, Faculty of Science, Lagos State University, Ojo Lagos State, Nigeria.

Microorganisms: The microorganisms used in this work were obtained from the Nigeria Institute of Medical Research (NIMR), Yaba, Lagos Nigeria and maintained on nutrient agar petri-dishes at 4^{o}C. These microbes were *Staphylococcus aureus* (a gram positive bacteria), while others were gram negative bacteria: *Enteroheamorrhagic Escherichia coli (EHEC), Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Salmonella paratyphimurium, Salmonella typhimurium, Shigella flexneri,* and *Shigella dysenteriae*.

Susceptible Antibiotic Drugs: A susceptible antimicrobial sensitivity discs was purchased from a Pharmaceutical store in Ojo Local Government of Lagos Nigeria. The antibiotic discs were coated with the following antibiotic drugs: *Ofloxacin* (Travid) - 5 µg, *Erythromycin* - 10µg, *Clindamycin* - 5 µg, *Ciprofloxacin* - 5 µg, *Gentamicin* - 10 µg, *Cephalexin* - 30 µg, *Cotrimoxazole* - 50 µg, *Ampicillin* - 30 µg, *Ceftriaxone* - 30 µg, *Augumentin* - 30 µg. Ceftriaxone, a third generation cephalosporin β-lactam base drug, was assigned as control antibiotic drug because of its wide spectral against both grams positive and negative infectious enteric bacteria.

Extraction of Volatile Oil by Hydrodistillation Method: The volatile/essential oil of *Ocimum gratissimum* was extracted by the method described by Lawrence & Reynolds, (1993). Briefly, the five-day-air-dried *Ocimum gratissimum* plant was separated into leaves, stems, and roots and each part was cut into pieces and packed into the 5 L 34/35 Quick fit round bottom flask containing 1.5 L distilled water with fixed Clevenger. The oil was extracted at a steady temperature of 80 ^{o}C for 3 hrs and the oil was collected over 2 ml *n*-hexane. The oil was kept tightly in a sample bottle and stored at 4 ^{o}C.

Antimicrobial Susceptibility Paper Disc Test for the Antibiotics and Volatile Oils: The sensitivity test of the antibiotics and the volatile oils was carried out using a diffusion technique method on solid agar. The nutrient agar petri dish was inoculated with each of the organism together with the antibiotic sensitivity disc and each of the sterilized paper disc soaked with volatile oil. The inoculates were incubated for 18-24 hrs at 37 ^{o}C. The diameter of a clear zone (inhibition) around the paper discs was considered sensitive.

Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC): The MIC and MBC of the volatile oil of *Ocimum gratissimum* were carried out using microbroth dilution method as described by Janssen *et al.,* (1989). A colony of each organism was added to 200 µl of susceptible test Muller Hinton broth containing two-fold serial dilution of the volatile oil using Tween 80 (0.5%v/v) as diluent in a microtitre plate (21.5 x 17 cm^2). The plates were covered with aluminium foil and incubated at 37 ^{o}C for 18-24 hrs. Each of the microwell on the plate was inoculated on a freshly prepared Muller Hinton agar where MIC and MBC were determined.

The MIC was the lowest concentration of the oil sample that prevented visible growth of the microorganism in the required medium. This is also called minimum lethal concentration (MLC). The MBC was considered as the lowest concentration of the oil that yielded no colonal growth of the subcultured microorganisms in the required medium under favourable conditions.

Extraction of Crude Enzyme: The extracellular protease of *Shigella flexneri* was extracted by the method described by Makino *et al.,* (1981). A colony of the microbe was inoculated into the *Salmonella-Shigella* broth and incubated for 24 hrs at 37 ^{o}C. The broth was centrifuged (using Kendros PicoBiofuge, Heraeus) at 9000 rpm for 10min at room temperature. The cell-free supernatant was stored in a sample bottle at 4 ^{o}C until it was used.

Determination of Total Protein and Protease Activity of the Crude Enzyme Extract: The total protein of the crude enzyme extract was determined using a method described by Lowry *et al.*, (1951) while the protease activity was assayed for by the method of Folin & Ciocalteu, (1927), using casein as the substrate. Total protein was determined by adding 5.0 ml of alkaline solution containing a mixture of 50 ml of solution A (20 g sodium trioxocarbonate IV and 4g sodium hydroxide in 1 L) and 1 ml of solution B (5 g cupper II tetraoxosulphate VI pentahydrate and 10 g sodium-potassium tartrate in 1 L) to 0.1 ml of crude enzyme extract and mixed. The reaction solution was allowed to stand for 10 min at room temperature and 0.5 ml of freshly prepared Folin Ciocalteau's phenolic reagent (50%v/v) was added. The solution was mixed thoroughly and the absorbance was read at 750 nm (using spectronic-21, Bausch and Lomb) after 30 min. BSA was used as standard protein (0.20 mg/ml)

Protease activity was carried out by adding 5.0 ml of casein solution (0.6%w/v in 0.05 M Tris buffer at pH 8.0) to 0.1 ml of the crude enzyme extract and the mixture was incubated for 10min at 37 ^{o}C. The reaction mixture was stopped by adding 5.0 ml of a solution containing 0.11 M trichloroacetic acid, 0.22 M NaCl and 0.33 M acetic acid mixed in ratio 1:2:3. The turbid solution was filtered and 5.0 ml of alkaline solution was added to 1.0 ml of the filtrate followed by 0.5 ml of freshly prepared Folin Ciocalteau's phenolic reagent after 10 min of thorough mixing. The absorbance was read at 750 nm (using spectronic-21, Bausch and Lomb) after 30 min. L-tyrosine solution (0.20 mg/ml) was used as standard for the protease activity. 1.0 Unit of protease activity was defined as the amount of enzyme required to liberate 1.0 µmol of tyrosine in 10 min at 37 ^{o}C. The specific activity was expressed in µmol/min/mg protein.

Determination of Optimum pH: The method adopted was described by Makino *et al.,* (1981) with little modification. Protease activity was assayed using 0.6% casein solution in 0.05 M Tris buffer solution (pH 6.0 - 9.0) at 37 ^{o}C.

Determination of Optimum Temperature: As described by Makino *et al.,* (1981), protease activity was assayed under varying temperature conditions (30-70 ^{o}C) using 0.6% casein solution in 0.05 M Tris buffer at pH 8.0.

Inhibitory Assay: The method used was described by Makino *et al.,* (1981) with a slight modification. Briefly, 0.1 ml of the crude protease extract and 0.1 ml of 3.5%v/v of the volatile oil (as inhibitor) in 0.5% v/v Tween 80 solutions were added concomitantly to different concentration of casein solution (0.2 - 1.0%w/v) in 0.05 M Tris buffer, pH 8.0 and the reaction mixture was mixed and incubated at 37 ^{o}C for 10 min. The reaction was stopped and the protease activity was assayed with the volatile oils of the three different parts of the plant. The procedure was repeated without an inhibitor.

Dialysis: Salting out technique was carried out on the crude enzyme extract. A 35% $(NH_4)_2SO_4$ saturated solution of the crude enzyme extract was dialyzed (using SIGMA Dialysis Tubing Cellulose Membrane, D9402) for 48 hours and thereafter centrifuged (using Kendros PicoBiofuge, Heraeus). Then, 50% $(NH_4)_2SO_4$ saturated solution of the sediment was dialyzed for 48 hours. This was followed by the dialysis of 55% and 65% saturated solutions of the sediment for the same number of hours. In each case both total protein and enzyme assay were carried out.

Gel Filtration: This was carried out by soaking 3.0g of Sephadex G-100 (BDH) in distilled water for 72 hrs. The gel was poured into the chromatographic column (28.0 cm by 1.5 cm column) and formed a bed length of 22 cm with a flow rate of 1.5 ml/min and this was used to separate 65% $(NH_4)_2SO_4$ dialysate. A total number of 50 elutions were collected. Each elution contained 3.0 ml of eluent and in each of the eluent, both total protein and enzyme assay were carried out as earlier discussed.

Statistical Analysis: Comparison of the antimicrobial activities of the volatile oils and antibiotic drugs was carried out using *t-test* analysis and the mean difference was considered significant at $p<0.05$.

Results

There was an effective bacterial growth inhibition against all the enteric bacteria used in this work with average inhibitions of 46.94±13.0 mm and 113.97±9.7 mm for antibiotics and volatile oils respectively, Table 1. Bacterial growth inhibition was significantly higher *($p<0.05$)* in volatile oils than the antimicrobial drugs. Several drug resistances were recorded especially in CLD, CX, CO, and AP. Augumentin did not inhibit any of the pathogenic organisms. CIP has the widest antibacterial spectrum. None of the enteric bacteria was not sensitive to the volatile oil, Table 1. Figure 1 showed the average growth inhibition of all the antibiotics and the volatile oils used. CLD, CX, CO, AP, and AU were statistically lower than the control (FX) *($P<0.05$)* but there was no statistical difference *($p>0.05$)* between the control and OF, ERY, CIP, GN, leaf, stem, and root oils. *Escherichia coli* and

Salmonella typhimurium were the most sensitive pathogenic organisms whose growths were mostly inhibited by the volatile oils with relatively low MIC and MBC values, Table 2.

Figures 2 and 3 showed the effects of pH and temperature on the activity of the extracellular protease of *Shigella flexneri*. The enzyme showed highest activity of 6.25 x 10^{-2} µmol/min and 8.20 x 10^{-2} µmol/min at pH 8.0 and 44 ^{o}C respectively. The inhibitory kinetic was shown in Figure 4 (a, b, and c) representing the effect of volatile oil from the root (VOROG), leaf (VOLOG) and stem (VOSOG) respectively. These accordingly showed *competitive* (V_{max} = 8.33 x 10^{-2}µmol/min, K_m = 0.36 mg/ml (absence of inhibitor) and K'_m = 0.48 mg/ml (presence of inhibitor)), *noncompetitive* (V_{max} = 8.33 x 10^{-2} µmol/min (absence of inhibitor), V'_{max} = 8.0 x 10^{-2} µmol/min (presence of inhibitor) K_m = 0.36 mg/ml) and *noncompetitive* (V_{max} = 8.33 x 10^{-2} µmol/min (absence of inhibitor), V'_{max} = 7.46 x 10^{-2} µmol/min (presence of inhibitor) K_m = 0.36 mg/ml) respectively. Sephadex G-100 elution profile of the purification of the extracellular protease of *Shigella flexneri* was shown in Figure 5. Each peak represented the total protein and enzyme assay. Table 3 showed the purification profile of the crude extract of extracellular protease of *Shigella flexneri*. The highest purification fold of 23.2 with percentage yield of 92.9% compared to the crude extract was obtained with the use of Sephadex G-100.

Discussion

The volatile oil of *Ocimum gratissimum* showed an effective growth inhibition against all the enteric-pathogenic bacteria used in this work, Table 1. The average total inhibition of the bacterial was significantly higher *($p<0.05$)* in the volatile oils as compared to the antibiotic drugs. There was no organism that was not inhibited by any of the volatile oils used. There was a resistance to Cephalexin, Cotrimoxazole, and Ampicillin because they only inhibited *Salmonella paratyphimurium.* No response was recorded for Augumentin. The highest bacterial inhibition, 99.0 mm, was recorded for Ceftriaxone, a cephalosporin drug family. Stem, root and leaf oils showed a more active zone of inhibition as compared to the antibiotic drugs with leaf and stem oils being more effective, Table 1. The lowest zone of inhibition recorded for the antibiotics was 1.4 mm, which was Clindamycin against *Salmonella typhimurium* while 2.0 mm was recorded as the lowest inhibition zone for the root oil against *Salmonella enteritis*. An effective inhibition of these microbes by the volatile oils of *Ocimum gratissimum* suggest that these oils may be a good substitute for synthetic antibiotic drugs. Adams, (2005) reported that daily consumption of basil leaves could kill gram-positive *Salmonella and Shigella* species and other harmful GIT bacteria. Also, it has been reported that the volatile oil of *Ocimum gratissimum* contained eugenol, bisabolene, terpinene, cymene, caryophyllene, thymol and others, and these constituents have been found to be potent antibiotics against series of both gram-positive and gram-negative bacteria, fungi and protozoans (Adams, 2005; Van, 2005). These compounds have been found to possess antibacterial and antiviral action as well as anticarcinogenic and antimutagenic properties.

The MIC and MBC results was shown in Table 2. The highest sensitivity was found in *Escherichia coli* and *Salmonella typhimurium* because they have lowest possible MIC and MBC values in all the three sources of oil. All the MBC results lied within two-fold MIC values. There were species similarities in the inhibition of growth by the volatile oil of *Ocimum gratissimum* probably because they shared almost the same biochemical components at their cellular plasma membranes or the same mode of pathogenesis and host invasion.

The extracellular protease of *Shigella flexneri* was found to have an optimum activity of 6.25 x 10^{-2} µmol/min at pH 8.0, Figure 2. This showed that the enzyme could withstand a slight alkaline environment and hence classified as alkaline protease. Most extracellular proteases of bacteria have been found to have their optimal activity in the range of pH 6-8 (Makino *et al.,* 2005). Extreme pH has been found to affect the enzymatic activity of enteric bacteria. Micro-acidic and micro-alkaline environments are one of the mechanisms designed by the hosts to destroy invading bacteria. The

protease has activity of 8.20 x 10^{-2} µmol/min at the optimum temperature 44.0 ^{o}C. This protease was stable between the temperature range of 50-65 ^{o}C suggesting that the extracellular protease of *Shigella flexneri* was thermostable. Optimum temperature of 55.0 ^{o}C has been reported for protease from *alkalophilic Bacillus* species KSM-K16, *Streptomyces* species, strain C5-A13, some *Bacillus* species and *Listeria monocytogenes* (Kobayashi *et al.,* 2005; Vinci *et al.,* 2005).

The kinetics of the extracellular protease *Shigella flexneri* was shown in Figure 4 (a, b, and c) with the volatile oils of the root, leaf, and stem of *Ocimum gratissimum* as potent inhibitor. The oil from the root showed a competitive inhibition, while both leaf and stem oils showed a non-competitive inhibition. The V_{max} in the absence of inhibitor was 8.33 x 10^{-2} µmol/min but this value was reduced to 8.0 x 10^{-2}µmol/min and 7.46 x 10^{-2} µmol/min in the presence of leaf and stem oils. The K_m value in the absence of inhibitor was 0.36 mg/ml, which was increased to 0.48 mg/ml in the presence of root oil. These results showed that the addition of the oil from any of the plant parts of *Ocimum gratissimum* was potentially capable of reducing the catalytic activity of the extracellular protease of *Shigella flexneri* and hence altering the vital mechanisms necessary for host adhesion and integration by the use of virulence factors. In any form of inhibition exhibited by the volatile oil of *Ocimum gratissimum*, the catalytic activity of the extracellular protease of *Shigella flexneri* was negatively modulated because the root oil reduced the K_m thereby reducing the catalytic torn-over rate of the proteolytic enzyme. Similarly, leaf and stem oils reduced the V_{max} and this directly lowered the reaction rate of the enzyme. Various components of the oil may have structural resemblance with the substrate or modulator of this proteolytic enzyme and this was accounted for by different inhibition models showed by the volatile oils. Structural competition for the active site existed when root oil was used while leaf and stem oils may have bound to the enzyme-substrate complex or occupying some modulatory sites in order to alter the formation of product(s) from enzyme-substrate intermediates.

Sephadex G-100 chromatogram, Figure 5, a peak each for total protein and total enzyme activity. This showed a monomeric protein unit and this may further be resolved by using other forms of Sephadex. The purification profile of the extracellular protease of *Shigella flexneri* was shown in Table 3. The purification folds increased from 8.6 to 16.3 when salt solution increased from 35% to 65% respectively. The highest purification fold of 23.2 with percentage yield of 92.9 as compared with corresponding purification fold of 23.2.

Conclusion

Volatile oil from any parts of the *Ocimum gratissimum* (Basil plants) was capable of inhibiting the growth of pathogenic enteric bacteria and negatively altered the catalytic activity of the extracellular protease of *Shigella flexneri*. It is therefore necessary to explore the unending advantages embedded in these natural plant resources for its potential ability to militate against the thriving of enteric and colonizing infectious pathogens.

Table 1: Antimicrobial sensitivity tests of the volatile oils of *Ocimum gratissimum* and antibiotic drugs

Microorganisms	Inhibition Zone (mm)												
	Antibiotics										*Ocimum gratissimum Oil*		
	FX	RY	LD	IP	N	X	O	P	F	U	eaf	tem	oot
Escherichia coli				1.0					1.0		0.8	0.1	.5
Enteroheamorrhagic E. coli				7.0					4.0		.4	.5	.1
Staphylococcus aureus				7.0	7.0				6.0		5.0	6.5	.5
Pseudomonas aeruginosa	6.0			6.0	4.0				5.0		1.2	1.0	1.0
Salmonella typhimurium		2.5	.4		2.0						5.2	8.9	2.0
Salmonella paratyphimurium	4.0	4.0		8.0	6.0	6.0	6.0	8.0	4.0		6.9	1.0	5.0
Shigella enteritidis	9.0		6.0		8.0						4.0	.8	.0
Shigella flexneri	3.0	6.0		7.0	7.5						4.3	6.0	.2
Shigella dysenteriae	7.0										3.1	7.0	.9
Total Inhibition	**9.0**	**2.5**	**7.4**	**6.0**	**4.5**	**6.0**	**6.0**	**8.0**	**0.0**	**.0**	**18.9**	**27.8**	**5.2**

*FX - Ceftriaxone (Control Drug), ERY - Erythromycin, CLD - Clindamycin, CIP - Ciprofloxacin, GN - Gentamicin, CX - Cephalexin, CO - Cotrimoxazole, AP - Ampicillin, OF - Ofloxacin, AU - Augumentin.

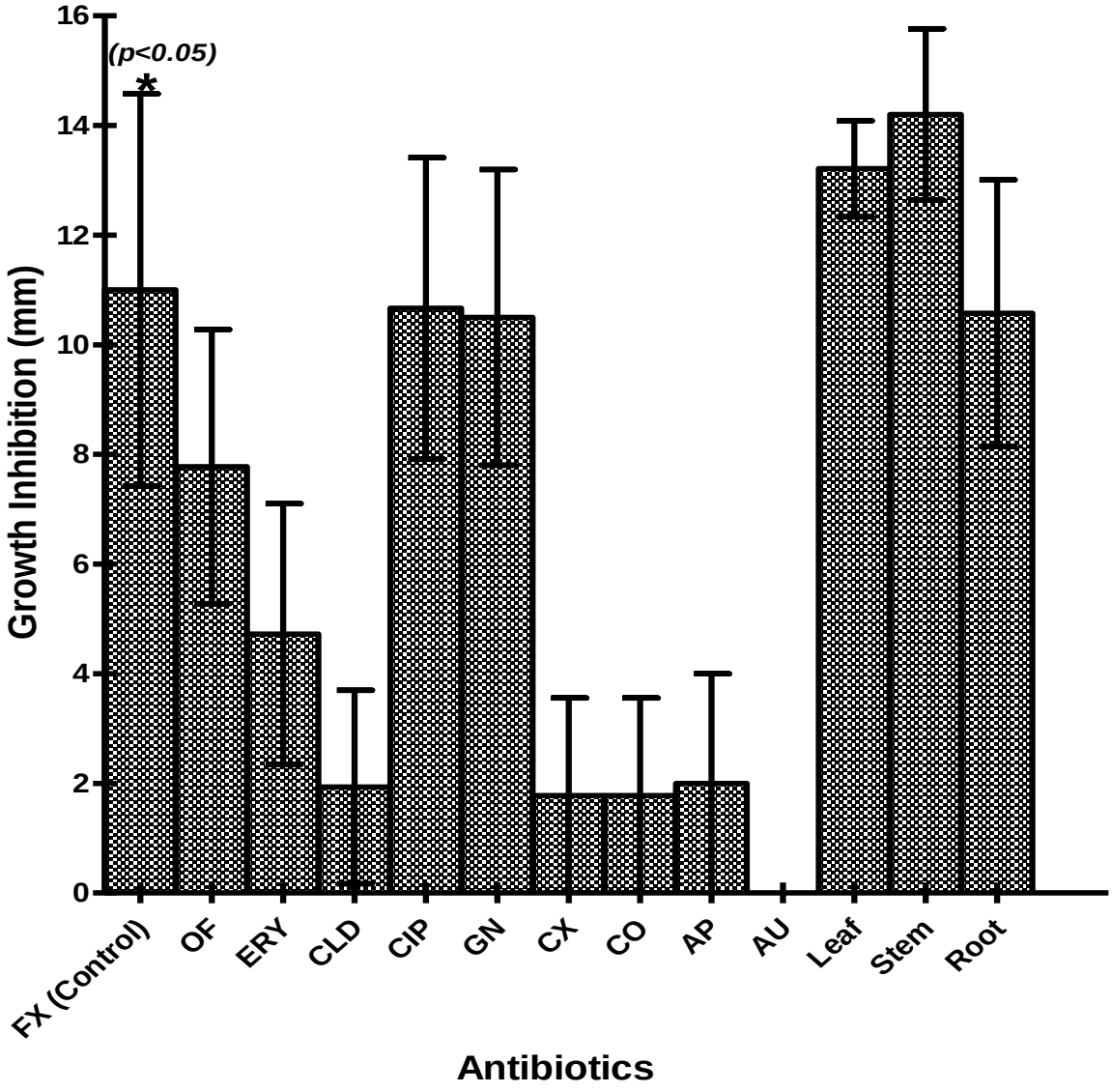

Fig. 1: Average growth inhibition of volatile oils of *Ocimum gratissimum* and antibiotics against enteric bacteria.

*Statistical difference was considered significant at P<0.05 when compared to the control**

Table 2: The MIC and MBC of the volatile oils of *Ocimum gratissimum* against nine pathogenic bacteria.

Bacteria	MIC (%v/v)			MBC (%v/v)		
	eaves	**tems**	**oots**	**eaves**	**tems**	**oots**
Escherichia coli*	.13	2.50	.25	6.25	25.00	12.50
Enteroheamorrhagic Escherichia coli	.13	2.50	2.50	6.25	25.00	25.00
Staphylococcus aureus†	5.00	5.00	5.00	50.00	50.00	50.00
Pseudomonas aeruginosa	5.00	5.00	5.00	50.00	50.00	50.00
Salmonella typhimurium*	.13	.25	2.50	6.25	12.50	25.00
Salmonella paratyphimurium	.25	.25	2.50	12.50	12.50	25.00
Shigella enteritis	.25	.25	.25	12.50	12.50	12.50
Shigella flexneri	2.50	2.50	.25	25.00	25.00	12.50
Shigella dysenteriae	.25	.25	.25	12.50	12.50	12.50

**Most sensitive microorganisms*

†Gram positive bacteria

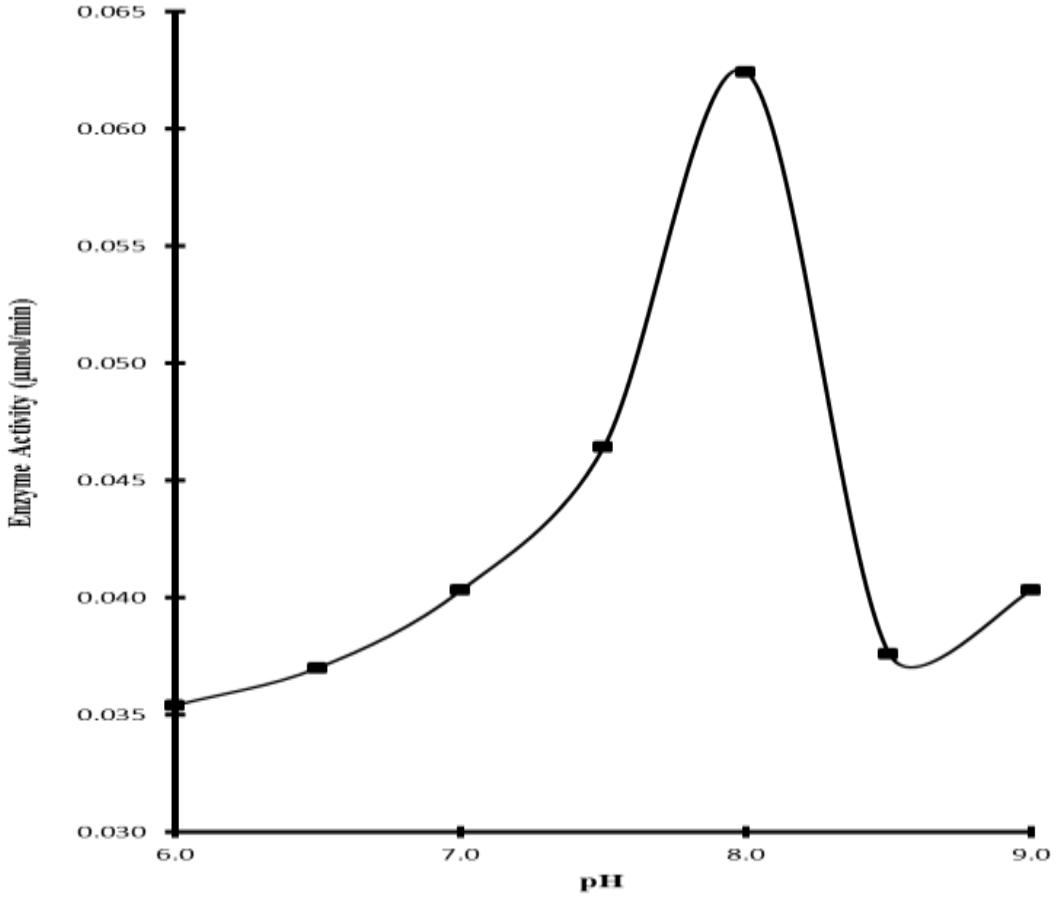

Figure 2: The effect of pH on the activity of extracellular protease of *Shigella flexneri*

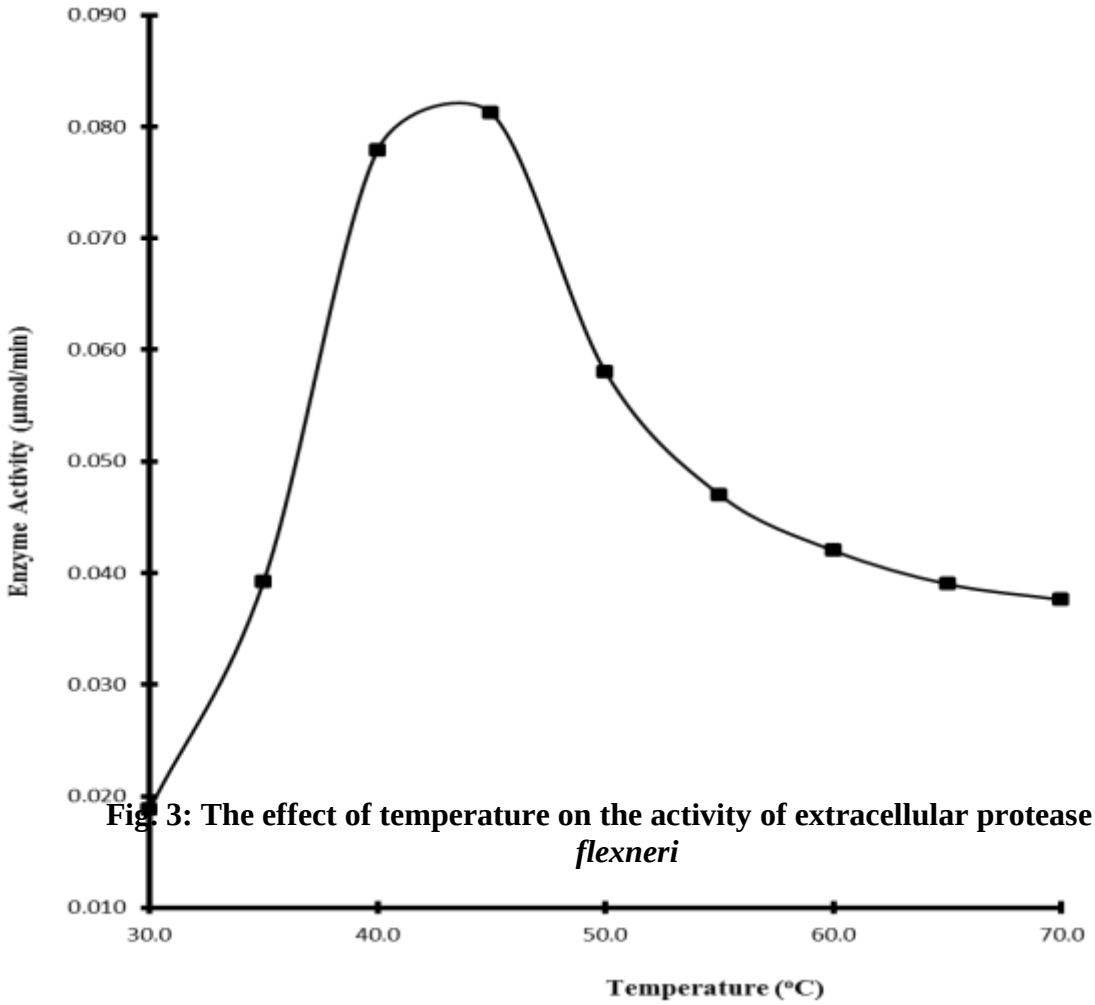

Fig. 3: The effect of temperature on the activity of extracellular protease of *Shigella flexneri*

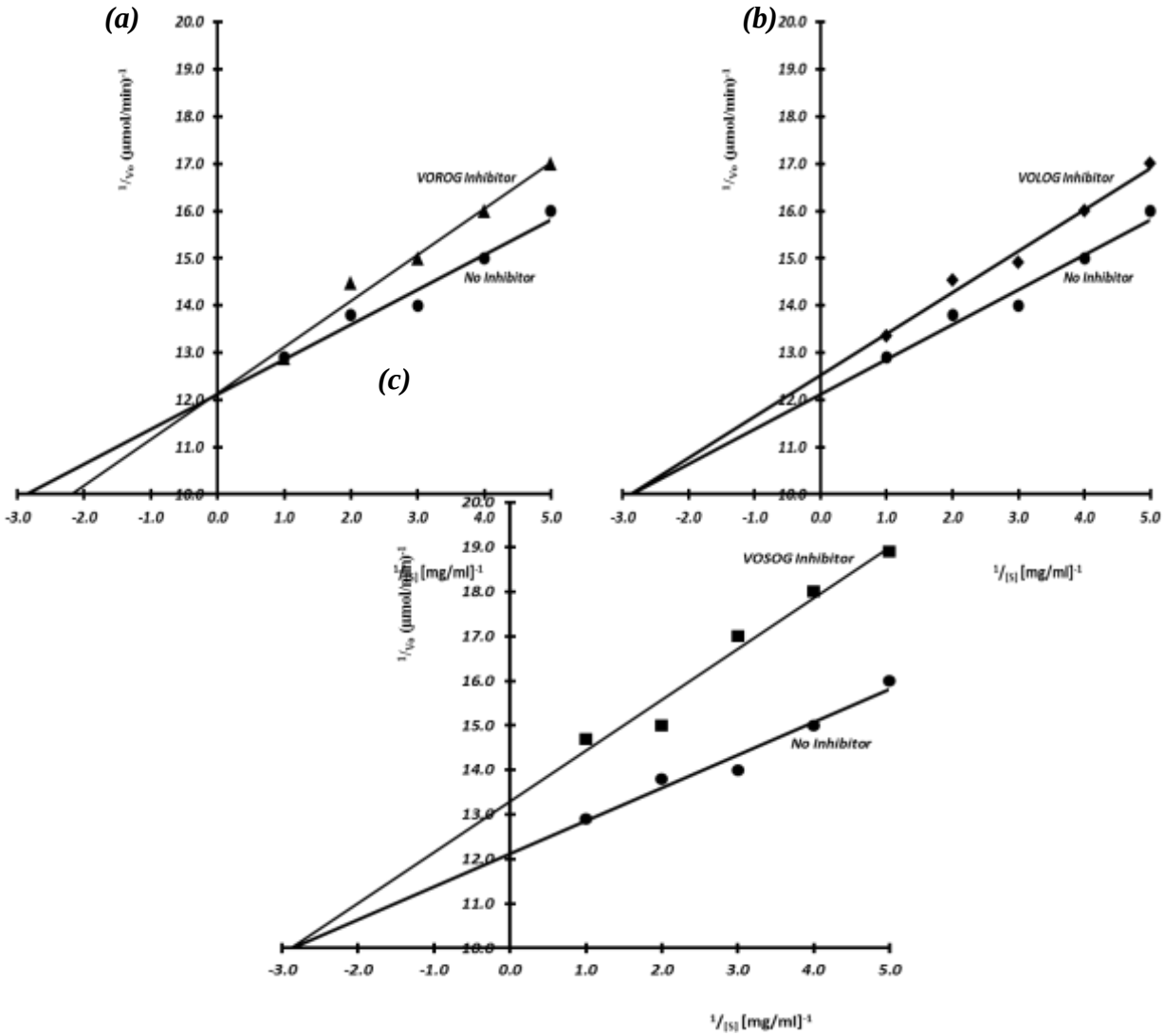

Figure 4: Lineweaver Burke kinetic plot of volatile oil of different plant parts of *Ocimum gratissimum* (VOROG - volatile oil of the root of *Ocimum gratissimum*; VOLOG - volatile oil of the leaf of *Ocimum gratissimum*; VOSOG - volatile oil of the stem of *Ocimum gratissimum*) against the activity of extracellular protease of *Shigella flexneri* (a) competitive inhibition (b) and (c) noncompetitive

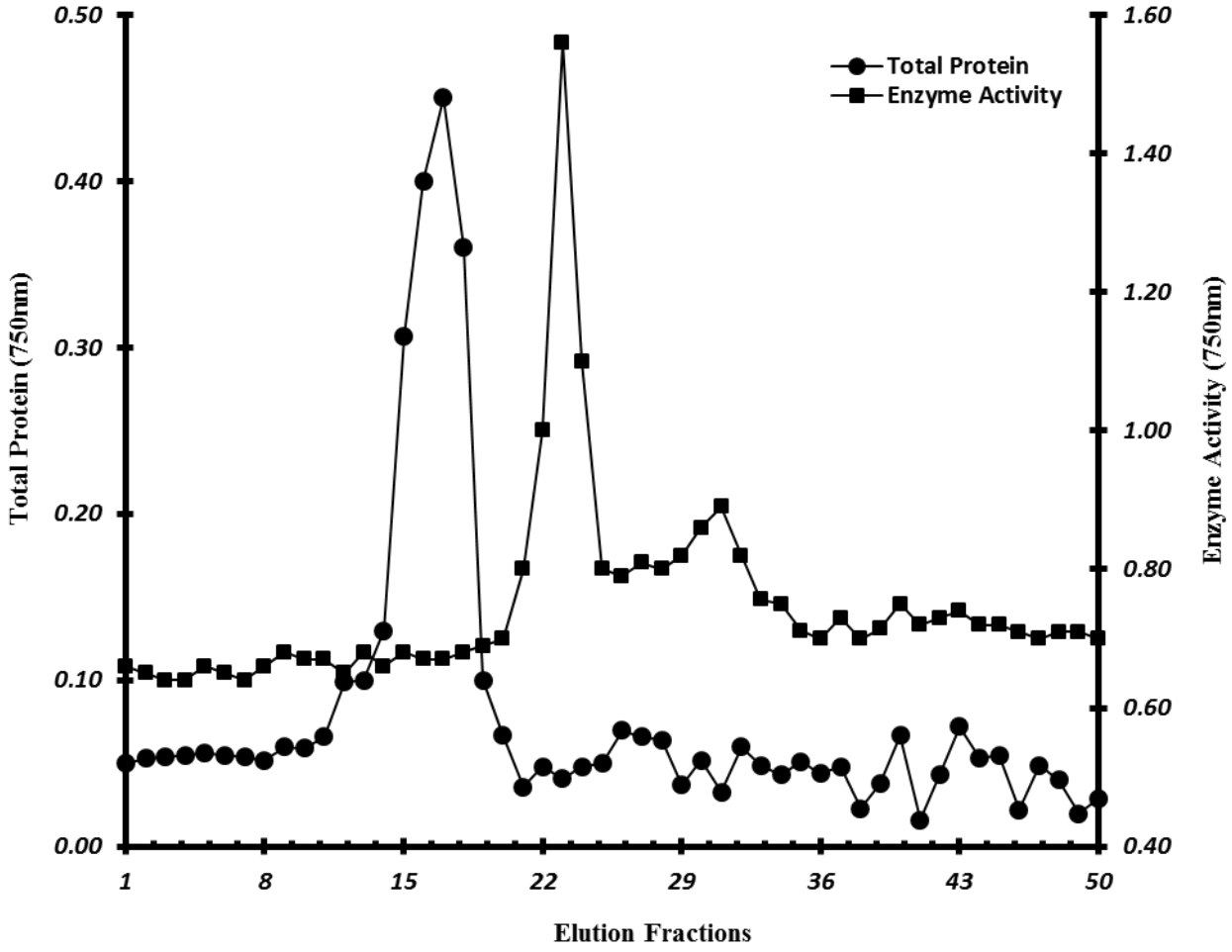

Figure 5: Elution profile of Sephadex G-100 purification of the extracellular protease of *Shigella flexneri*

Table 3: Purification profile of the crude extract of extracellular protease of *Shigella flexneri*

Purification Steps	Total Protein (mg)	Total Activity (µmol/min)	Specific Activity (µmol/min/mg protein)	Percentage Yield	Purification Fold
Crude Cellular Extract	0.686	1.957	2.9	100	1.0
35% $(NH_2)SO_4$ precipitation	0.077	1.908	24.8	97.5	8.6
50% $(NH_2)SO_4$ precipitation	0.059	1.724	29.2	88.1	10.1
55% $(NH_2)SO_4$ precipitation	0.037	1.589	42.9	81.2	14.8
65% $(NH_2)SO_4$ precipitation	0.025	1.180	47.2	60.3	16.3
Sephadex G-100	0.027	1.819	67.4	92.9	23.2

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Implications of Population Growth and Oil Production on CO_2 Emissions: Empirical Evidence from Nigeria

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Abstract

This study analyzes the impact of rapid population growth, oil production on CO2 emissions in Nigeria within the framework of the error correction model, using annual time series data from 1970 - 2010. The study reveals that C02 emission in Nigeria and its hypothesized determinant are generally I (1) series, with two co-integration equations existing among their linear combinations. Our results show that, the variables in the model, population, oil production and per-capita gross domestic product are positively related to increase emissions in the country. Overall the variables account for 64% of the variation in $C0_2$ emission and it is highly significant at 5% as shown by the F-statistic ($p < 0.05$). The coefficient of the ECM behaved, having its expected negative sign and is significant at 5%. However, the speed of adjustment is low. In order to mitigate $C0_2$ emissions, the following recommendations are made: diversification of energy sources, proper funding of the sector, and adequate maintenance of energy infrastructure among others.

Introduction

Over the years, there has been rapid world population growth due largely to net increase in birth rate precipitated by advancement in technology, improved health facilities and better living standards. Goujon et al (1995) asserts that increasing population has the possibility of exerting pressure on demand for energy for transport, power, industry, deforestation, that would ultimately lead to increase in carbon-dioxide (CO_2) or greenhouse gases (GHG) emissions. Carbon-dioxide emissions hold the sun radiation in the atmosphere and regulate the temperature of the earth/globe. Besides emission of CO_2 makes it impossible to achieve sustainable development – a situation where the needs of the present are met, without compromising the ability of future generation to meet their own needs. Thus, rapid population growth is likely to put more people at greater risk from climate change.

Global carbon-dioxide emissions due to human activities have grown since the industrial revolution in the 18th century, and have continued to increase at an excessive level into the 21st century. Precisely, global CO_2 emissions increased from 20 to 30 between 1970 and 2009. However, much of the focus on anthropogenic CO_2 emissions has been on the developed world and emerging economies in Asia. which together account for over 80% of the cumulative CO_2 emissions and growth (Raupach et al., 2007). Available data has shown that in Nigeria Co_2 emissions rose from 5,874 thousand metrics tons in 1970 to 95,756 thousand metric tons in 2008. During the same period, the population of Nigeria grew at about 2.3 percent, while oil production increased by about 672,565.1 barrels on the average (World Bank 2009). The literature is replete with studies that examine the impact of climate change on sustainable development in Nigeria. (Omojolaibi, 2011. Oniemola, 2011). However, very few studies have examined the impact of rapid population growths, oil production on carbon-dioxide (co_2) emissions. Thus, this study will contribute and extend the literature in this respect. Specifically, this study examines whether rapid population growth and oil production have a long-run impact on $C0_2$ emissions in Nigeria. Furthermore, the historical trend of growth in population, oil production and emission of carbon-dioxide (CO_2) in Nigeria are scrutinized in the study.

The rest of this paper is structured as follows: section 2 is on review of empirical literature, while section 3 focuses on some stylized facts on population growth, oil production and $C0_2$ emission. Conceptual framework and methodology are the focus of the exposition in section 4. Results and discussion are presented in section 5 while section 6 is on the policy recommendations and conclusion.

2. Empirical Literature Review

The relationships between population growth and carbon-dioxide emission have been a subject of discussion in the literature. Erlich and Holdren (1971) suggest a suitable framework to analyse the determinants of environmental impact known as the equation IPAT: $I=PAT$ where I represents environmental impact, P is the population size, A is the affluence and T denotes the level of environmentally damaging technology. The impact of human activity in the environment is viewed as the product of these three factors. Initially, this formulation was purely conceptual and could not be directly used to test hypotheses on the impact of each one of the factors on emissions mentioned above.

The IPAT model can be expressed as an identity where A could be defined as consumption per capita and T as pollution per unit of consumption. As stated in MacKellar et al. (1995), the IPAT identity is a suggestive approach that shows how environmental impact is not only due to a single factor. However, these authors outline the limitations of testing this identity in relation to the choice of variables and the interactions between them. They compare households (H) with total population levels, as the demographic unit used to forecast future world CO_2 emissions and they show how each

choice lead to different predictions in all the regions of the world, always being higher the impact on emissions for the *I=HAT* model, where households replaces population.

Cole and Neumayer (2004) refer to the utility of the tautological version of the IPAT model for decomposition purposes but also highlight its limitations to estimate population elasticities. For such estimation they use the model proposed by Dietz and Rosa (1997). Starting from the idea of Ehrlich and Holdren (1971), Dietz and Rosa (1997) formulated a stochastic version of the IPAT equation, with quantitative variables containing population size (*P*), affluence per capita (*A*) and the weight of the industry in economic activity as a proxy for the level of environmentally damaging technology (*T*). These authors designate their model using the term STIRPAT (Stochastic Impacts by Regression on Population, Affluence and Technology). Their results corroborate the Malthusian thesis in the sense that population growth has a more than proportional impact in CO_2 emissions. On the other hand, the study conducted by Cramer (1998), based on a similar model, shows a contamination-population elasticity less than unity for the five pollutants analysed in several areas of the USA. This discrepancy could be explained by the exclusion of carbon dioxide from among the pollutants considered by this author.

Dietz (2003) studied the impact of population on carbon dioxide emissions and energy use within the framework of the IPAT model. The results from these studies indicate that the elasticity of CO_2 emissions and energy use with respect to population are close to unity. The unity assumption for the population elasticity was embedded in the original IPAT formulation of Ehrlich and Holdren (1971) but not in the stochastic version of the IPAT (STIRPAT) formulated by Dietz and Rosa (1997). Using panel data, Shi (2003) finds a positive relationship between population changes and carbon dioxide emissions in 93 countries over the period 1975 to 1996. He finds that the impact of population on emissions varies with the levels of affluence and had been more pronounced in lower-income countries than in higher-income countries. In the same vein, Cole and Neumayer (2004) considered 86 countries during the period 1975 to 1998 and reveal a positive link between CO_2 emissions and a set of explanatory variables which include population, urbanization rate, energy intensity, and smaller household sizes. The authors assume that the effect of population and urbanization is equal for all income levels.

In addition, several studies have discussed and tested the existence of an Environmental Kuznets Curve (EKC) where the relationship between pollution and income was considered to have an inverted U-shape. These models frequently take emissions per capita for different pollutants as an endogenous variable, assuming implicitly that the elasticity, emission population, is unitary. A few of them considered population density as an additional explanatory variable (see, Cole et al., 1997 and Panayotou et al., 2000). However, their tests were not based on an underlying theory, and testing variables individually was subject to the problem of omitted-variables bias. According to Stern, (1998) and (2004), the results obtained within this framework were far from homogeneous and their validity had been questioned in the literature. Most of the criticisms are related to the use of non-appropriate techniques and the presence of omitted-variables bias. As Perman and Stern (2003) admitt, when diagnostic statistics and specification tests are taken into account and the proper techniques are used, the results indicate that the EKC does not exist. Borghesi and Vercelli (2003) consider that the studies based on local emissions present acceptable results, whereas those concerning global emissions do not offer the expected outcomes. Therefore the EKC hypothesis cannot be generally accepted.

Also decomposition methods have been applied to an increasing number of pollutants in developed and developing countries (for an extensive discussion on this, see, Hamilton and Turton,

2002; Bruvoll and Medin, 2003; Lise, 2005). Emissions are typically decomposed into scale, composition, and technique effects. Scale effects are measured with income and population variables, composition effects refer to changes in the input or output mix, and technique effects are proxied by energy intensity (the effect of productivity on emissions) and global technical progress. Hamilton and Turton (2002) conclude that income per capita and population growth are the two main factors increasing carbon emissions in OECD countries, whereas the decrease in energy intensity is the main factor reducing them. Bruvoll and Medin (2003) cover 10 pollutants and determine that in all cases, technique effects were dominant in offsetting the increase in scale. The authors conclude that, whereas structural change explains the increase in energy intensity during the period from 1913 through 1970, technical change was the main factor reducing energy intensity after 1970. Shifts in the fuel mix are the main factor explaining carbon emissions per unit of energy used. Stern (2002) use an econometric model to decompose sulphur emissions in 64 countries during the period 1973 to 1990 and reveals that the contribution of input and output effects on changes in global emissions is very modest, whereas technological change considerably reduced the increase in emissions.

3. Stylised Facts on Population Growth and $C0_2$ Emission.

It is currently acknowledged that global C02 emission has continued to increase. The United Department of Energy's Carbon Dioxide Information Analysis Centre (2010) notes that global C02 emission rose from 29,888,121 in 2008 to 33,508,901 in 2010. The top 10 countries in the world emitted 67.07% of the world total global C02. As shown in Table 1 below, as at 2010, China has the highest $C0_2$ emission with a value of 8,240,958 thousand metrics tones, followed by United States with 5,492,170 and India, Japan and Mexico with 2,069,958, 1688,688 and 1,138,432 thousand metrics tones respectively. Although Africa, particularly Nigeria, is not among the top ten countries emitting C02 in the world, available statistics has shown that C02 emission in Nigeria has continued to rise (see fig.1 below).

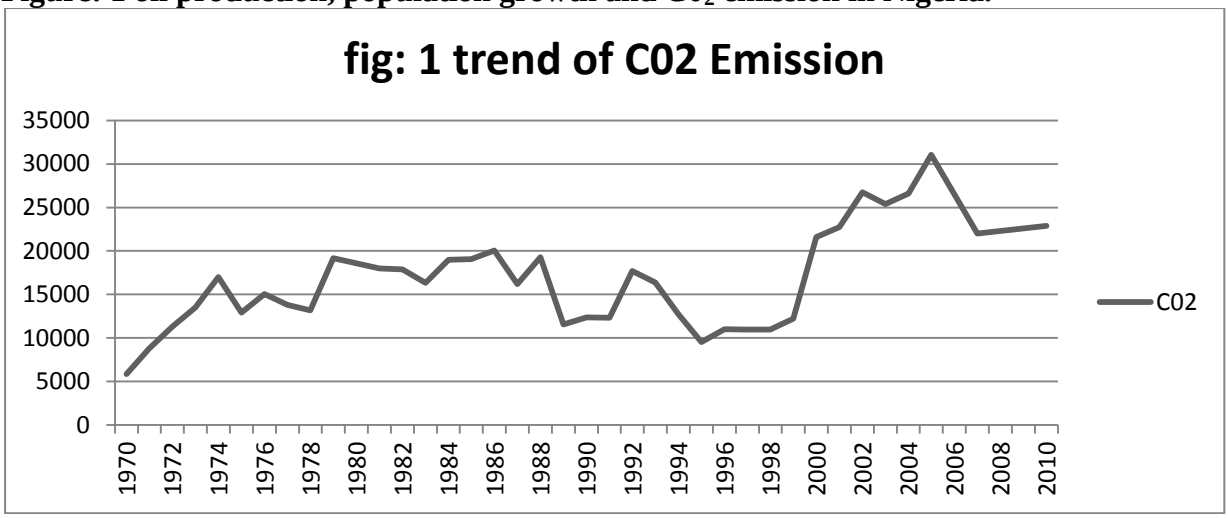
Table: 1 $C0_2$ emission and population growth

Country	C02 Emissions	Population
China	8, 240,958	1,339,724,852
India	2,069,738	1,210,193,422
United states	5,492,170	312,793,000
Indonesia	476,557	237,424,363
Brazil	419,537	190,732,694
Russia	1,688,688	142,946,800
Japan	1,138,432	128,056,026
Mexico	466,131	112,322,757
German	762,543	81,799,600
Iran	574,667	75,330,000
France	362,556	65,821,885
United Kindom	493,158	62,262,000
Italy	407,924	60,681,514
South Africa	451,839	50,586,757
South Korea	563,126	48,875,000
Saudi Arabia	493,726	27,136,977
Nigeria	224,872	158,259,000

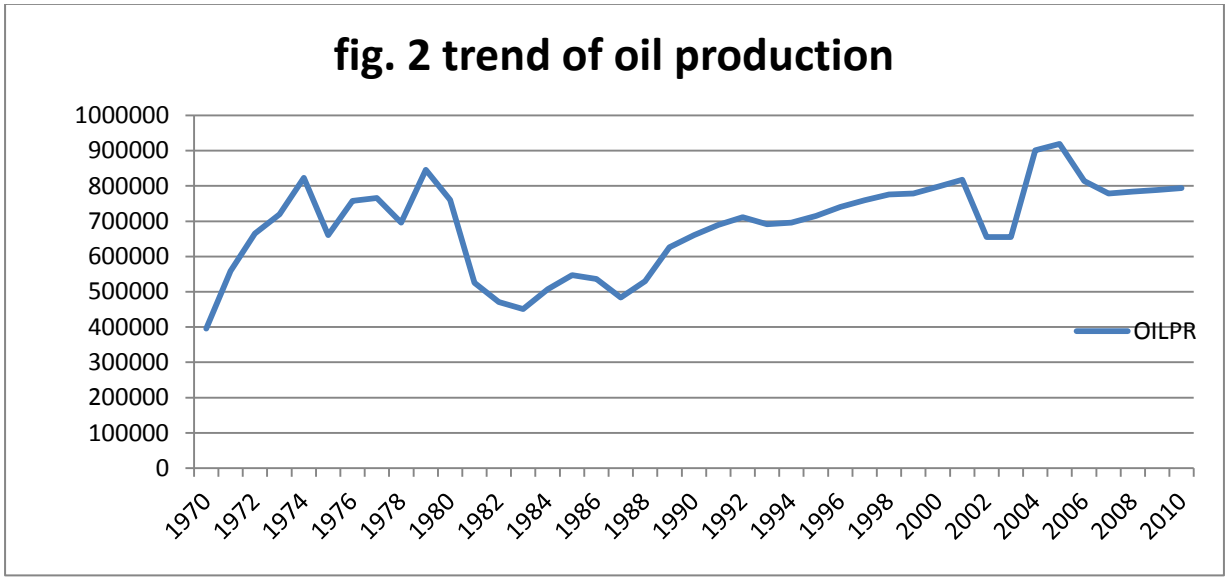
Source: United Department of Energy's Carbon Dioxide Information Analysis Centre (2010)

The details of carbon-dioxide emission in Nigeria for the period 1970 to 2010 are shown in Figure 1 below. C02 in Nigeria ranged from 5,874 thousand metrics tones in 1970 to 21,593 thousand metrics tones in 2000 and 224.872 thousand metrics tones in 2010. In the same vein, oil production has simultaneously risen. (See Figure 2 below). A major reason for this might not be unconnected with the gas flaring in the production of oil. Although the Nigerian government have put up the Gas Master Plan policy to avoid gas flaring, a large amount of gas is still flared. If this is not controlled, there is the evidence that $C0_2$ emission in Nigeria will continue to rise drastically in the years ahead.

Figure: 1 oil production, population growth and $C0_2$ emission in Nigeria.



Source; CBN (2010)



Source; CBN (2010)

3. Conceptual Framework and Methodology

We may intuitively state that mankind's activities and oil production influence the level of CO_2 emissions in the atmosphere. However, it is more difficult to determine what specific factors represent mankind's activities and to what extent each of them contributes to the increase or decrease in CO_2 emissions.

Following the IPAT equation: I= PAT by Erlich and Holdren (1971), and the STIRPAT model formulated by Dietz and Rosa (1997), we specify a linear version of the STIRPAT model. In order to test whether the factors considered in the STIRPAT model influence the level of CO_2 emissions. Thus the initial specification is given by the following equation:

$$I = \alpha P^{\delta} A^{\beta} T^{\gamma} e \quad \text{..... (1)}$$

Where I = carbon-dioxide emissions, P = population, A = gross domestic product per capital expressed in 1990 constant price and T = energy production since it required more technology to produce energy. α, δ γ β are parameters to be estimated and e is the random error. We form the empirical model by taking logarithms of equation 1 Thus:

$$\log I_t = \alpha + \delta \log P_t + \beta \log A_t + \gamma \log T_t + \varepsilon_t \quad \text{..... (2)}$$

Where P, T, A remain as defined above. On apriori, we expect $\delta\ \gamma\ \beta > 0$. Since the model is specified in natural logarithms, the coefficients of the explanatory variables can directly be interpreted as elasticities.

Before estimating the models, the dependent variable and independent variables are separately subjected to stationarity tests using the unit root test, since the assumptions for the classical regression model require that both variables be stationary and that the errors have a zero mean and constant variance. The unit root test is evaluated using the Augmented Dickey-Fuller test, which can be determined as:

$$\Delta Y_t = \alpha + \beta\tau + \delta Y_{t-1} + \sum_{t=1}^{m} \Delta Y_{t-1} + \varepsilon_t \quad \text{..... (3)}$$

Where α represent the drift, t represent deterministic trend and m is a lag length large enough to ensure that ε is a white noise process.

If the variables are integrated of order one I (1), we test for the possibility of a co-integrated relationship using the Johansen Co-integration Technique. The study employs the error correction model (ECM) because it is an appropriate estimation technique that captures the short run and long run effect of the differenced variables. It connects the short run and the long-run behaviour of the dependent and independent variables. The proposed long-run is in equation 2 above.

If the Y_t and X_t are found to be co-integrated, then there must exist an associated Error Correction Model (ECM), according to Engel and Granger (1987). The usual ECM may take the following form:

$$\Delta Y_t = \alpha_0 + \beta_t \sum_{t=1}^{m} \Delta X_{t-1} + \delta_i \sum_{t=1}^{m} \Delta Y_{t-1} + \gamma_1 \varepsilon_{\tau-1} + \psi_t \quad \text{.....(4)}$$

Where, Δ denotes first difference operators, ε_{t-1} is the error correction term, m is the number of lags necessary to obtain "white noise" and ψ_t is another random disturbance term. If /δ/ is significantly different from zero, then Y_t and X_t will have longer run relationship. The (ECM) error correction term (ε_{t-1}) depicts the extent of disequilibrium between Y_t and X_t. the ECM, reveals further that the change in Y_t not only depend on lagged changes in x_t but also on its own lagged changes. The estimate of the parameters of the ECM are generally consistent and efficient (Hendry and Richard, 1983). Inference about the long run Granger causality can be drawn from the ECM model. The presence of co integration will indicate at least, unidirectional long run causality from $\Delta X_{t-j,}$ If statistically significant will indicate a short run causality from $\Delta X_{t-j,}$ to ΔY_{t-j} . The statistically significant non-Zero co-efficient of ΔY_{t-j} will indicate feedbacks to ΔY_t from its own lagged values. It may be noted that even in the absence of co-integration, the error correction model may be estimated to detect if there is any short run granger causality.

The study used annual time-series data. The data of interest are amount of CO_2 emissions in tons, population, Gross Domestic Product (GDP) per capita expressed in 1990 constant price and oil production. These data are sourced from the Central Bank of Nigeria (CBN) statistical Bulletin (2010).

5. Results and Discussion

As a preliminary step to analyzing the result, we carried out the unit root test using the Augmented Dickey Fuller (ADF) test, since research has shown that regression coefficients with non-stationary variables may lead to spurious and misleading conclusion. The results of the unit root test are presented in Table 2 below.

Table 2: Result of ADF unit root test.

UNIT ROOT TEST FOR VARIABLES					
Variables		ADF test stat	1%	5 %	Order of integration
$LOGC0_2$	Level	-2.22784	-4.2092	-3.5279	I(1)
	1st diff	-4.11647	-4.2165	-3.5312	
PG	level	-2.0418	-4.2165	-3.5312	I(1)
	1st diff	-5.5128	-4.2242	-3.5348	
LOGPGDP	Level	-1.7624	-4.2165	-3.5312	I(1)
	1st diff	-4.2350	-4.2242	-3.5348	
LOGOILP	level	-2.9307	-4.2092	-3.5279	I(1)
	1st diff	-5.7855	-4.2165	-3.5312	

Source: Authors result using E-views 7

The result in Table 2 above indicates that the individual series for the variables are stationary at first difference i.e. they are integrated of order one, I(1) Thus, we proceeded to carrying out the co-integration test using Johansen Co-Integration test; this is presented in Table 3 below.

Table 3: Result of Co-integration test.

Hypothesize No. of CE(s	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.733100	84.36141	47.85613	0.0000
At most 1 *	0.515885	34.16786	29.79707	0.0147
At most 2	0.154676	6.601449	15.49471	0.6244
At most 3	0.005671	0.216110	3.841466	0.6420

Source: Authors result using Eviews 7

The co-integration result is presented in Table 3 above. As shown in the table, the null hypothesis of no co-integration is rejected as the trace test reveals that, two co-integration equation exists among linear combinations of C02 and its hypothesized determinants for test at 5% level of significance. The implication of the foregoing is that even though C02 emission in Nigeria and its hypothesised determinants are generally I(1) series, some stable long-run equilibrium relationship exists among the series, which could be given some error correction representations (Engle and Granger, 1987). It also shows that the possibility of the estimated relationship being spurious is ruled out.

Table 4: Estimated short –run result with ΔC02 emission as dependent variable

Regressors	Co-efficient	Standard error	T-stat	P- Value
C	-0.007479	0.034206	-0.218640	0.8282
ΔLOGPGDP	0.495414	0.244025	2.030180	0.0502
ΔLOGPG	1.018706	0.424438	2.400129	0.0214
ΔLOGOILP	0.499518	0.237375	2.104340	0.0428
ECM(-1)	-0.246429	0.119619	-2.060122	0.0471
R-squared	0.758770			
R-Bar-Squared	0.630754			
F-stat	3.430990 prob(F-statistic = 0.018477)			
DW-statistic	1.868567			

Source: Authors result using Eviews 7

The result of the short run determinant of carbon-dioxide emission is presented in Table 4 above. The results indicate that all of the variables included in the model are statistically significant (although at different level) and conforms to their expected signs. With respect to the estimated elasticities, the population elasticity is slightly higher than one, in line with previous research. The implication of this is that the reduction of global emissions will become a more challenging task as most developing countries are experiencing rapid economic growth. Rising per-capita gross domestic product, as revealed in this study, are associated with upward trend in emissions. From the result oil production also has a positive effect on CO2 emissions. However, estimated coefficient for oil production indicates a slight higher effect than per-capita gross domestic product on emissions. A reason for this might be the high amount of gas flaring during oil production in the previous years.

An examination of the F-statistic and the adjusted R^2, suggest that the variables in the error correction model significantly explain changes in carbon-dioxide emissions at $p < 0.05$, accounting for 63% of the short-run variation in the series. The coefficient of the ECM term captures the adjustment towards the long-run equilibrium. The coefficient of ECM also reveals the proportion of the disequilibrium in the differenced dependent variable in one period that is corrected subsequently during the next period. The result indicates that the speed of adjustment is low as only 0.2464(25%) of the error is corrected.

5. Conclusion and Policy Recommendation

In this study an error correction modelling of the determinants of carbon dioxide emissions in Nigeria during the period 1970 to 2010 was conducted. Following the STIRPAT model by Dietz and Rosa (1997), we specify a model which expresses carbon-dioxide emissions as a function of population (PG), per capita gross domestic product and oil production. The results showed that the variables in the model significantly affect the dependent variable as showed by the R^2 and F-statistic. The coefficient of the ECM is well behaved and significant; however, the speed of adjustment is low. On the basis of apriori expectation, the entire variables have their expected signs. On the basis of the result, the following policy recommendations are made:

- ✓ Increase energy efficiency of economic production in the country. As revealed in this study, oil production significantly contribute to C02 emission, thus, an increase in energy efficiency will lower the amount of C02 emissions. Alternatively, the use of clean energy should be encouraged.
- ✓ Proper maintenance of and additional energy infrastructure**:** This involves increment in energy infrastructure (particularly gas infrastructure). This will help drastically to reduce emission of $C0_2$ and will increase gas production and consumption which will, all things been equal, lead to economic growth. Also, there is the need to cultivate maintenance culture to avoid existing energy infrastructure from damaging.
- ✓ Diversification of energy sources**:** over the years, fossil fuels have been a major source in the provision of energy in Nigeria. However, because of the damage it cause policy makers and analysts everywhere in the world have shifted attention towards clean energy. It is necessary, therefore, for the Nigerian government to begin to encourage the use of this non-fossil fuel to drastically reduce $C0_2$ emission.
- ✓ Proper funding of the sector: The energy sector is capital intensive in nature, as a result, it requires huge amount of investments. Thus, the public and private sector could form a partnership to tackle investment problem. Also, government needs to increase the budgetary allocation to the sector particularly on clean energy infrastructure and make the release of funds as fast as possible without delays.

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Socio-Psychological factors determining workers' negotiation pattern in selected organisations in Lagos State, Nigeria

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Abstract

The study examined the combined and relative effects of interpersonal skill and emotional intelligence on workers' negotiation patterns in some selected work organizations in Lagos State, Nigeria. The study adopted survey research method and applied multi-stage sampling procedures. A sample of 250 respondents was purposively selected from ten randomly selected organizations in Lagos State, Nigeria. Three standardized scales: emotional intelligence (0.78), interpersonal skill (r=0.86) and negotiation patterns (r=0.79) were used as the instruments. Data were analyzed using multiple regressions at 0.05 alpha levels. The findings indicated that the two independent variables when taken together had significant joint effect on the negotiation patterns of the respondents (Adjusted R^2= 0.116). Also, the result revealed that emotional intelligence is a more potent predictor of workers' negotiation patterns with $\beta = 0.138$, $t = 2.316$, $p< 0.05$. Based on the findings, it was recommended among other things that government and employer of labour in the organized private sector could introduce intervention training programmes on the two skills with a view to enhancing the negotiation patterns of workers. By so doing, it is believed that the incidence of industrial conflict in work organisations would be reduced drastically.

Key words: Emotional intelligence, interpersonal skill, work organisation, negotiation pattern.

Introduction

Over the years, available records and personal experience had consistently indicated that the incidence of industrial conflict in Nigeria is persistently on the increase despite the operation of the existing machineries for conflict resolution (Fajana, 2000; CBN, 2005; FMLP, 2009). Apparently, this trend has impacted negatively on the socio-economic and technological development of Nigeria as a nation (Bankole, 2010).

However, recent studies (Hammed, 2002; Okhakhume and Durodola, 2002; Hammed and Ayantunji, 2002; Ajala, 2003; Akanji, 2005; Ogunyemi, 2005; Bankole, 2007) had traced the trend to the negotiation patterns of labour leaders and management representatives who seem to lack the required skills for effective conflict management.

Hammed and Ayantunji (2002), for instance, observed that the industrial conflict as is found in most organizations today bother on conflict-handling behaviour (negotiation patterns) of both labour leaders either elected or/and appointed officers and the representatives of the management. In line with the views of Hammed and Ayantunji (2002), Akanji (2005) asserts that work place conflicts are mostly due to interpersonal squabbles between trade union leaders and the management of organizations.

Negotiation, according to Fisher et al (2000) is a structural process of dialogue between conflicting parties about issues in which their opinions differ. In a more concise form, Miall, Ramsbothan and Woodhouse (1999) described negotiation as the process whereby the parties within the conflict seek to settle or resolve their conflict.

However, the University of Peace as cited in Miller (2003) sees negotiation as communication, usually governed by the pre-established procedures between representatives of parties involved in a conflict or dispute. In his contribution, Best (2007) sees negotiations as a direct process of dialogue and discussion taking place between at least two parties who are faced with a conflict situation or a dispute. He stresses further that negotiation implies that both parties in conflict have come to the realization that by talking to each other they can find possible solution that is acceptable to both parties on the issues over which they apparently disagree.

Moreso, since benefits of compromised solution outweigh the losses arising from refusal to negotiate, it goes without saying that the ultimate goal of negotiation is to reach agreement through joint decision making between conflicting parties (Jeong, 2000). Writing on the same subject, Hammed (2002) avers that negotiation typically contain four vital documents.

i. The two parties involved in negotiation demonstrate some degree of interdependence.

ii. Some perceived conflicts exist between the parties involved in negotiation.

iii. The two parties have the potential to participate in opportunities interaction with each party trying to influence decision to its advantage through various negotiation actions.

iv. The possibility of agreement exists.

However, previous studies (Hammed, 2002; Best, 2007) had identified two types of negotiation patterns namely: positional negotiation pattern and collaborative negotiation pattern. The positional negotiation pattern is based on the aggressive pursuit of interest by conflicting parties and is typically adversarial and competitive. Parties involved in conflict make demands that are inconsiderate of the interest and needs of others, and this makes it difficult for the interest to be met. Also, the positional negotiation pattern encourages conflicting parties to perceive themselves to be in competition. Thus, it assumes a win-loss outcome instead of working towards a mutually beneficial outcome. Positional negotiation pattern is characteristically confrontational and aggressive hence there is always deadlock whenever it is applied (Hammed, 2002).

Collaborative negotiation pattern ,on the other hand, is a process where conflicting parties attempt to enlighten each other about their needs and concerns, and both search for the best ways to solve their differences in such a manner that the interests and fears of both are met and allayed respectively. This pattern calls for trust and openness in expressing one's thought and feelings, actively listening to others and actively exploring alternatives together. Thus, each party has empathy and cares about the need of the other party. Unlike the positional negotiation, the collaborative negotiation pattern assumes a win-win outcome in which mutually satisfying solutions to the conflicting issues are found.

It is however, instructive to note that though, in principle, a collaborative negotiation pattern is based on mutual understanding and feeling, aimed at building a sustainable relationship between parties; in practice, the collaborative negotiations pattern may not be as simple as this model presents it. This is so because cultural peculiarities, preparatory stage, the actual interaction phase, and the follow up may render negotiation more complex than it is imagined (Best, 2007).

Nevertheless, research efforts in the field of behavioral sciences had identified some behaviour modification skills such as emotional intelligence, interpersonal skill, assertiveness, communication skill, critical thinking skill, social skill and host of others that have the capacity to stimulate general positive behaviour in individuals. Though the aforementioned skills were truly identified not much has been done to find out specifically the influence of such skills on negotiation pattern of workers' in Nigeria instead previous studies had concentrated mostly on economic factors affecting industrial conflict management.

Therefore, in an attempt to fill the aforementioned gap, the present study investigates the composite and relative effects of two of the identified behaviour modification skills, precisely interpersonal and emotional intelligence skills, on the negotiation pattern of workers in selected organization in Lagos State, Nigeria.

Interpersonal skills have been described by Young (1996) as the ability to read and manage emotions, motivations and behaviour of oneself and others during social interactions or in a social interactive context. In essence, interpersonal skill is required for working peacefully with others, conveying verbal and non-verbal messages, listening, giving and receiving feedback, communicating with diverse others and overcoming barriers to communication.

In a more concise but technical manner, Wikipedia (2006) describes interpersonal skills as mental and communicative algorithms applied during social communication and interaction in order to reach certain effects or results. In his view, Hammed (1999) describes interpersonal skill as the ability of an employee to effectively interact with the boss, co-worker or the customer to achieve organizational goals. He explains that for any organization or individuals to survive in the face of current complexities facing the world of work, such an organization needs people with distinctive interpersonal skills. Thus, Hammed identifies lack of interpersonal skill as one of the major problems militating against the effectiveness and efficiency of an average Nigerian worker including labour leaders and management representatives.

Corroborating Hammed's analysis on interpersonal skill, Akinboye (1999) posits that employees in modern organizations require lots of learning, thinking and practical day-today problem solving, planning and more importantly interpersonal skills to function properly and effectively. In the same manner, Ajala (2003) argues that with good interpersonal skills workers and management would be aware of and accept each other's feelings, even if they are `negative'. Opportunities will thus be provided for workers to give vent to their negative feeling in destructive ways while means will also be provided for expression of good feelings that will make workers and management to develop the ability to adapt to new problems and situations. `

Okurame (2000) echoes the same views on the importance of interpersonal skill as one of the 21st century generic skills when he declares that the most positive and confident employee obviously may not accomplish much at work without interpersonal skill which he or she needs to communicate and function co-operatively with others in a work group. In view of the fact that interpersonal skill of people influence what they say and how they say it, it can be inferred that the development of interpersonal values will further enhance workers with valuing process with which workers and employers, will sort out the available information, consider alternatives and consequences and finally make adequate choices thereby reducing the occurrence of industrial conflicts and where conflict occurs, the resolution will be 'more peaceful than violent.

Presenting interpersonal skills as multi-purpose skills, Southam (2006) divides interpersonal skill into three distinctive areas namely:

i. Communication skill which comprises literacy, verbal skills and listening skills.

ii. Social skills which include good eye contact, body language and ability to build rapport with other people.

iii. Emotional intelligence which has to do with self-awareness and emotional maturity. Reiterating the indispensability of interpersonal skills, Bellack, Hersen and Turner (1976) affirmed that interpersonal skills deficits have been implicated in many different forms, of psychopathology, including alcoholism, sexual deviation, heterosocial failure, explosive rage, and hyper aggression, depression and schizophrenia. Thus, negative social transactions are consequent upon negative aspects of interpersonal relationship skills (Finch, 1998).

Contributing to the analysis on interpersonal skills, Franzoi (2000) who queries on what makes a person socially skilled observes that people who are judged to have interpersonal skills usually direct more questions toward their conventional partners and make more positive personal statements about them. Meanwhile, Aremu and Adeyoju (1998) in their empirical study on interpersonal relationship of police offices discover that there is a significant improvement in the interpersonal relationship of police officers exposed to interpersonal skills training.

However, some scholars have equally identified some elements of interpersonal skills that can help to enhance the negotiation pattern of trade union leaders. These are:

i. The ability to listen and understand what others are saying

ii. The ability to contribute effectively in discussion

iii. The ability to deal with different situations successfully

iv. The ability to negotiate effectively

Emotional intelligence is one of the contemporary and topical concepts often referred to when discussing about management and effective leadership in organizations today (Ashkagnasy and Daus, 2002). It has been acknowledged that individual and ultimately organizational performance is influenced either positively or negatively by the emotional content of leadership behaviour (Macalcer and Shannon, 2002). Thus, the growth in interest in emotional intelligence is associated with increasing organizational change and organizational contextual volatility that is frequently attributed to emotional conflict or interpretive conflict (Downing, 1997).

The genesis of the term emotional intelligence is traceable to 1920 when Thorndike (1920) at Columbia University used the term "Social Intelligence" to describe the skill of getting along with other people. But at a later time, Gardner (1975) began the formulation of the idea for "Multiple Intelligence" in his work titled "The Shattered Mind"wherein he identifies eight intelligences which includes both interpersonal and intrapersonal intelligences (Wikipedia, 2007).

It is germane to mention that the general belief of notable psychologists such as Gardner was that traditional measures of intelligence (e.g. intelligence quotient) have failed to explain cognitive ability of individuals (Smith, 2002). However, the precise term of emotional intelligence appears to have originated with Wayne Payne (1985) but because research on the concept originated with Peter Salovey and John `Jack' Mayer (1990), the origin of the concept, is now attributed to Salovey and Mayer (Wikipedia, 2007: Aremu, 2007; Animasahun,.2007; Adeyemo and Ogunyemi, 2007). It is however noteworthy that the concept was popularized by Daniel Goleman (1995) who has published several.books and articles on the concept of emotional intelligence.

Nevertheless, a number of scholars had defined the concept in so many ways based on their understanding of the concept. For example, the pioneer researchers of the concept, Salovey and Mayer (1990) describe emotional intelligence as a form of social intelligence that involves the ability to monitor one's own feelings and emotions as well as those of others; to discriminate among them and to use this information to guide one's thinking and actions.

In line with the views of Salovey and Mayer on the concept of emotional intelligence, Goleman (1998:317) describes the concept as "the capacity for organizing our own feelings and those of others, for motivating ourselves and for managing emotions well in ourselves and in our relationships". Goleman (1999) is of the view that emotional intelligence is twice as valuable as technical skills and intelligent quotient for jobs at all levels. He emphatically asserts that a person's success at work is 80 per cent dependent on emotional intelligence and only 20 per cent dependent on Intelligence Quotient. Using the framework of Salovey and Mayer (1990), Goleman (1999:95) identifies five basic components of emotional intelligence at work:

Self-Awareness (SA) - It refers to the ability to recognize and understand one's own moods, emotions and drives, as well as their effect on others.

Self-Regulation (SR) - It refers to the ability to control or redirect one's disruptive impulses and moods.

Motivation (MO) - It refers to a passion to work for 'reasons that go beyond money or status. In essence, it has to do with the "gathering up" of your feelings and directing yourself towards a goal, despite self-doubt, inertia and impulsiveness.

Empathy (EM) - It refers to the ability to understand the emotional framework of others. In other words, it has to do with being sensitive to others' feelings and concerns and taking their .perspectives into considerations; appropriate the differences in how people feel about things.

Social Skill (SS) – It refers to profitability in managing relationships and building networks.

Drawing inference from the analysis of Goleman, Aremu (2007) describes emotional intelligence as the management of one's emotional in such a way that those emotions do not constitute a nuisance to the individual and significant others in and around him. He stresses that bringing emotional intelligence into the realm of academic acceptance has helped to dislodge the earlier position on Intelligent Quotient (IQ) as the main determinant of life success.

In agreement with the position of Aremu (2007) on emotional intelligence, Fajana (2009) describes emotional intelligence as the ability to accurately identify and understand one's own emotional reactions and those of others. This, according to Fajana, includes the ability to regulate one's emotions and to use them to make good decisions and act effectively. Thus, emotional intelligence is seen as providing the bedrock for many competencies that are critical for effective performance in the work place. He explains further that it is now widely acknowledged that a high performance at workplace requires people who have a solid foundation not only in literacy skills, computation, but also in personal qualities such as responsibility self-esteem, self-control, sociability, self-management, integrity and honesty, all of which are predicated on emotional intelligence.

In their contribution, Macaleer and Shannon, (2002) view emotional intelligence as a combination of emotional and interpersonal competencies that influence our behavior, thinking and interaction with others. The opinion of Macalcer and Shannon (2002) finds support in the work of Ciarrochi (2001) wherein he asserts that an objective measure of emotion management skills is associated with a tendency to maintain an experimentally induced positive mood which has obvious implications for enhancing conflict-handling behavior and preventing industrial conflict.

Dreyfus (1999) expresses the same view when she describes emotional intelligence as the ability to understand oneself and others as we relate to people and adapt and cope with our surroundings. She explains further that emotional intelligence reflects how knowledge is applied and developed throughout life. She reiterates that a well developed emotional intelligence distinguishes individual "Star Performer". Furthermore, in her analysis, Dreyfus considers emotional intelligence as non-cognitive intelligence which means that it is something that exists outside our skills and knowledge.

Considering the elements involved in emotional intelligence, Mertinez (1997) admits that emotional intelligence is a bigger predictor of workplace success than intelligent quotient. In his contribution, Young (2006) lists certain behaviors which he said are peculiar to people who have emotional intelligence:

i. Awareness of and abilities to manage their own emotions, strengths, and limits during both face-to-face and virtual interactions..

ii. Ability to manage their behavior during social interactions.

iii. Ability to align their goals to the goals of others during collaborative activities.

iv. Understanding and positive management of the emotions of others in both face-to-face and virtual environments; empathize with others; sensitive to the needs of others and to the forces that shape the way that others feel and behave; enhance the strengths and abilities of others.

v. Manage conflict effectively by devising win-win solutions; constructively influence the behavior of others; use effective communication and persuasive strategies; listen well.

In addition to the itemized emotional intelligence behaviours stated above Ciarrochi, Chan, and Caputi (2000) declare that emotional intelligence is positively correlated with such variables as empathy, verbal intelligence, extroversion, openness to feelings, self-esteem and life satisfaction. It is however observed that the behaviours exhibited by both labour leaders and management representatives especially during negotiation are often contrary to the virtues of emotional intelligence hence the need for them to benefit from emotional intelligence education.

Objective of the study

The objective of this study is to find out the joint and relative effects of interpersonal skill and emotional intelligence on negotiation pattern of workers.

Research Hypothesis

There is no significant joint and relative effect of interpersonal skill and emotional intelligence on negotiation pattern of workers.

Methodology

Descriptive survey research method was adopted. Multi-stage sampling procedure was employed to select 300 respondents, majority of who are labour leaders. The sample comprised male and female within the age bracket of 35-55 years. Three standardized scales were used. These are Interpersonal Skill Scale (r=0.86), Emotional Intelligence Scale (r=0.78) and Negotiation Pattern Scale (r=0.79). Out of the 300 copies of the questionnaire administered, 276 copies were retrieved but

only 250 copies were certified valid for analysis. Data collected were analyzed through multiple regressions at 0.05 alpha levels. The instruments were scored on four point Likert scales of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

Result

Hypothesis: There is no significant joint and relative effect of interpersonal skill and emotional intelligence on negotiation pattern of workers.

Table 1: Showing regression summary of two independent variables on negotiation pattern of workers.

R= 0.350

R^2= 0.123

Adjusted R^2=0.116

Std. Error of the estimate = 5.4861

Source of variation	Sum of squares	Df	Mean square	F	Sig
Regression	1038.972	2	519.486	17.260	.000
Residual	7433.928	247	30.097		
Total	8472.900	249			

Significant at $F_{(2, 247)}$ =17.260; P< 0.05

The above Table 1 shows that a combination of the two independent variables (interpersonal skill and emotional intelligence) in predicting the negotiation pattern of workers yielded a multiple regression co-efficient of R = 0.350 and a multiple regression R^2 adjusted of 0.116. Also, the table 1 reveals that analysis of variance of the multiple regression data produced an F-ratio of 17.260, significant at 0.05 alpha levels.

Table 2: Showing parameter of estimate of the relative contribution of each of the two identified independent variables to negotiation pattern of workers.

	Unstandardised Co-efficient		Standardized co-efficient		
Variables	B	Std Error	Beta	t	Sig
Interpersonal skill	0.102	0.044	0.138	2.316	.021
Emotional intelligence	0.163	0.029	0.332	5.555	.000
Constant	23.658	3.573		6.622	.000

Significant at P< 0.05

Table 2 shows the regression weights, the standard error of estimate, the t-ratio and the level at which the t- ratio is significant for each identified variable. The table shows that the Beta weight range from 0.138 to 0.332 and that the two variables were found significant at 0.05 alpha levels.

Discussion of Findings

From the result obtained in this study, it is evident that the two independent variables, acting together were able to predict workers' negotiation pattern in conflict situation. The observed F-ratio of 17.260, significant at 0.05 level supplied good evidence that the effectiveness of a combination of the two independent variables in the prediction of negotiation pattern of workers did not occurred by chance.

Added to this is the co-efficient of multiple regressions of 0.350 and a multiple R2 adjusted of 0.116 which indicates the magnitude of the relationship between negotiation pattern of workers and a combination of the two independent variables.

In essence, the result shows that the independent variables accounted for 11.6 per cent of the total variance in the criterion variable. Thus, it shows clearly that the independent variables have influence on the negotiation pattern of workers.

The findings of this study agree with the work of Samford (1993) and Wikipedia (2006) that interpersonal skill is the vehicle for attaining organizational goals and that with adequate interpersonal skills, workers would be able to maintain good links with the management of their respective organizations. Similarly, the result of this study finds support in the work of Okurame (2000) in which he reports that the most positive and confident employee may not accomplish much at work without interpersonal skill with which to communicate and function co-operatively with others at workplace. Okurame stresses that lack of interpersonal skill is one of the major causes of interpersonal and social problems at home and workplace.

Writing on the same subject, Ajala (2003) affirms that with good interpersonal skills, workers and management will be aware of and accept other feelings even if they are negative. He argues further that interpersonal skill provides opportunities for workers to give vent to their 'negative' feeling while means are also provided for expression of 'good' feeling that will make workers and management to develop the ability to adapt to new problems and situations.

Regarding the relative effect of emotional intelligence on negotiation pattern of workers, the result of this study is in line with the reports of Goleman (1998), Bar-On (2005), Ezeagulu (2005), Yu et' al' (2006), Aremu (2007), Adeyemo and Ogunyemi (2007) and Fajana (2009) that effective use of emotion is basic to the function of successful leadership and that a reasonable measure of emotional intelligence enables an individual to maintain an experimentally induced positive mood which has obvious implication for promoting good labour management relations and prevent industrial conflict in the workplace. Also, the finding of the present study agrees with that of Animasahun (2007) which indicated that training on emotional intelligence can correct the maladaptive behaviours noticed among the members of National Union of Road Transport Workers (NURTW) in Ibadan metropolis.

In view of the fact that the regression analysis of the joint and relative effects of the independent variables on negotiation pattern of workers was significant, the null hypothesis which stated that "there is no significant joint and relative effect of interpersonal skill and emotional intelligence on negotiation patterns of workers" is hereby rejected, which implies that there is significant relationship between the two independent variables and the negotiation pattern of workers.

Conclusion and recommendation

In view of the high frequent occurrence of industrial actions in work organizations despite the operation of the existing internal and external machineries for conflict management, it becomes necessary to shift research attention away from institutionalization of conflict to other alternative approaches. Thus, in response to the various empirical evidences that implicated the negotiation pattern of both workers and management for the incessant industrial crisis, this study examined two behaviour modification factors with a view to establishing that the effective use of the two variables could enhance the negotiation pattern of workers and consequently engender sustainable industrial peace and harmony in work organizations in Lagos State in particular and Nigeria in general.

Based on the findings of the study, it was suggested that government should encourage the use of the two factors in conflict management process by organizing training workshops on the two skills for workers representatives (labour leaders). Employers of labour could complement government efforts in that direction by sponsoring similar training programmes for members of their management that represent the management during negotiation. Also, the two existing federations of trade unions could organize either jointly or separately, training programmes on the two skills for the leaders of their affiliated trade unions.

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ALIU BABATUNDE FAFUNWA'S INFLUENCE ON NURSERY EDUCATION DEVELOPMENT IN NIGERIA: 1955-1998

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ABSTRACT

Nursery Education in Nigeria attracted much attention in the 20th century although some Christian missions had made attempts at providing this level of education. Fafunwa influenced the inclusion of nursery education into the nation's educational system. His ideas are reflected in the curriculum, teaching methods, instructional materials, teacher education and medium of communication in the classroom. As a result of his influence, nursery schools have spread from major cities to slums and suburbs of cities and to many rural areas which was not a feature of the 1950s, 1960s and 1970s. Fafunwa influenced nursery education from his various vantage positions as Senior Lecturer, Associate Professor, Professor, Dean, Director, Acting Vice Chancellor, member of the Joint Consultative Committee which was an Advisory body to the Federal Government of Nigeria on Education, member of Governing Council of some universities, Chairman, Governing Council of College of Education among others. Through interviews on radio and television, public lectures, seminars, workshops and conferences, Fafunwa's ideas on nursery education were expressed and advocated. The inclusion of nursery education in the educational system as found in the National Policy on Education was a landmark achievement. The same is true for the use of the pupil's mother tongue as a medium for teaching and teaching of basic science at this level. Several secondary materials, books, journal articles and personal interviews he granted were used for this study. From 1955 when Fafunwa returned from the United State of America where he studied, his interest in the development of nursery education in Nigeria did not wane. He pioneered the training of non-graduate teachers for nursery schools and the commencement of degree programmes in Universities and Colleges of Education. He was passionate about nursery education and advocated an adaptation of its content instructional materials used in Nigeria's nursery schools. The theory and practise of nursery education in Nigeria reflect a lot of Fafunwa's ideas that make his contributions and consequently his influence very remarkable.

Introduction

Nursery education in many parts of the world provides classroom education for children between the ages of three and five years plus, before commencement of primary school education. Consequently, it functions as a transition between the home environment where they are primarily involved in play and family based activities, to the more structured school environment with a larger group of peers and adults who are not their parents.

Several persons in different ways have also influenced the development of nursery education in many countries. For example, in Scotland Robert Owen opened an infant school in New Lanark in 1816; Samuel Wilderspin opened one school in London in 1819; Countess Theresa Brunszvik on May 27, 1828 in Hungary established a nursery in her residence in the city of Buda; Froebel, on June 28, 1837 established a Play and activity Institute in Thuringia, Germany but renamed it Kindergarten in 1840. In 1851 Margarethe Ronge and her husband Johannes established the first "England infant Garden" in Hampstead; Maria Montessori established a Children's House in a low-income housing area of Rome's San Lorenzo district, Italy in 1907. Bertha Schurz opened a nursery school in Watertown, Wisconson, USA in 1856, she taught in German but was well patronized. In 1859, Elizabeth Palmer Peabody opened the first English speaking nursery school in Boston, Massachusetts. Kindergartens (nursery schools) from then spread throughout USA. The first successful public kindergarten was established in 1873 by Susan Blow in the Des Peres School in St. Louis, Missouri. (New World Encyclopedia, 2008). Essentially, they stressed the social and emotional development of the child as well as encouraged self-understanding and development through play activities and creative expression.

This paper therefore examines Aliu Babatunde Fafunwa's contribution towards the development of nursery education in Nigeria, the aspects that have been greatly influenced and why he was able to generate this influence.

Fafunwa: Aim of Education and Nigeria Education Policy.

Education refers to all efforts, conscious and direct, incidental and indirect, made by a given society to accomplish certain goals that society considers desirable in terms of the individual's own needs as well as the needs of the society (Fafunwa 1969). Thus, education employs all necessary processes to develop a person's ability, attitudes and other forms of behaviour that are of positive value in the society in which we live. This concept of education underscored Fafunwa's contributions to various levels and facets of education in Nigeria from 1955 when he returned from the United States of America (USA) after his doctorate degree programme.

Following Nigeria's independence in 1960, many educators and concerned citizens expressed deep concern about the lack of relevance of the Nigerian educational system bequeathed to Nigeria by her erstwhile colonial master (the British) in meeting the economic, social and cultural needs of the nation, Nigerian children were educated to function outside their country but not to meet the needs of their own country. Buttressing this fact, Amucheazi (1986) wrote that as Nigerian nationalists took over some powers in the 1950's they took steps to correct the colonial system of education and insisted on an educational policy which produce "useful, self-confident and competent Citizens".

According to Fafunwa (1986), the criticism of the system by many educated Nigerians had made him hold several meetings with his staff in 1964 at the Institute of Education, University of Nigeria Nsukka, (where he was the Director) on the Nigerian educational system. They concluded that there was a need to review the education system and map out new directions for an independent Nigeria. The Institute therefore mandated Fafunwa who was a member of the Joint Consultative

Committee (JCC) on Education, the national advisory body on education, to present to the JCC a proposal for a review of the system of education in Nigeria then, and to state or determine the end to which education should serve in Nigeria (Fafunwa, 1986). A proposal for a "National Curriculum Conference" was therefore presented to the JCC at its 1964 bi-annual meeting at Enugu.

This proposal met with stiff opposition at this meeting but a plea by the Chairman, Chief S. O. Awokoya, and the Chief Federal Adviser on Education to the Federal Republic of Nigeria made members to defer a final decision on the issue so that they would have more time to study the proposal. At the 1966 JCC meeting at Kaduna, Chief S. O. Awokoya made a convincing case in a ten-page document titled 'Need for Curriculum Reform in Nigeria'. Moreover, he had raised funds for the conference from the Ford Foundation of America and the United Nations Education Scientific and Cultural Organization (UNESCO). Thus, the idea about the need for curriculum change was accepted.

Undaunted by JCC's reaction to his proposal at her Enugu meeting, Fafunwa was assisted by the undergraduate students of the Faculty and his colleagues in the institute to conduct an opinion survey on the primary and secondary education systems in Nigeria. The result of this survey was the unanimity of opinion among both literate and illiterate citizens across the nation on their dissatisfaction with these levels of education in Nigeria (Fafunwa, 1989). This survey result partly convinced Chief S. O. Awokoya who leveraged the acceptance of the Curriculum Conference that was also scheduled for 1966. Chief S. O. Awokoya, a Professor of Science Education, had in 1952 been a Minister of Education in the then Western Nigeria, and head of (Principal) of Federal Advance Science School, Lagos, before becoming the Federal Adviser on Education in 1956. His support of Fafunwa's proposal underscored his understanding and depth of experience in the field of education in Nigeria. Indeed change was imminent.

The conference, which held from 8th to 12th September, 1969, was delayed by the military coup and crisis of 1966 that eventually degenerated into the Nigeria Civil war of 1967-1970. It was a major landmark in the history of education in Nigeria, being also the first national attempt to change the colonial orientation of the nation's educational system. For authenticity and relevance to a wide spectrum of the citizenry, representatives of trade unions, farmers, women's organizations, religious bodies, teachers' associations, other professional organizations (medical, legal, engineering), University teachers and administrators, Ministry officials, youth club organizers, business men and representatives from the governments of most of the twelve states of Nigeria participated in the conference (Adaralegbe, 1972). Indeed the views of the masses were important in reconstructing the structure and content of the nation's education system.

It was during a national seminar titled "A National Policy on Education" and Organised by the Federal Commissioner for Education, Chief A. Y. Eke in June 1973 that the recommendations of the 1969 National Curriculum Conference (NCC) were deliberated upon. The product of this seminar was the National Policy on Education in 1977 (first edition). A major landmark in this publication was the inclusion of pre-primary (nursery) education as one of the levels of education accepted and recognized by Nigerians. This gave credence to the indigenization stance of the Federal Military Government of Nigeria after the civil war in January 1970. Post war reconciliation, rehabilitation, and reconstruction (3R's) efforts had been hinged on an indigenization decree enacted to give more control of the nation's economic resources to indigenes and this was predominantly reflected in the first National Development Plan of 1970 to 1974.

Fafunwa's role in ensuring that pre-primary education was integrated in Nigerian's educational system was influenced by his exposure in the USA where he studied for his first degree from 1947 to 1950 (Bachelor of Science degree in Social Science and English at Bethune Cookman College, Daytona Beach, Florida); a Master of Arts degree in English and Education at New York University, New York in 1951 and a Doctor of Philosophy in Administration and Higher Education from 1952 to 1955. It would be recalled that by the mid-19th century nursery education was

widespread in the USA, the critical foundation of any educational system for human development. Thus, by the mid 20th century for Fafunwa, pre-primary education was a sine-qua-non for the educational system of Nigeria. Its relevance, organization and implementation re-echoes Fafunwa's belief that "you cannot use yesterdays tools for today's work and still expect to be in business" (Fafunwa, 1986). Fafunwa's return to Nigeria in 1956, at a time when education in Nigeria was to become decolonized and his emphasis for a more 'holistic' functional educational system that emphasizes flexibility and usefulness to the society, as well as his rapport with influential education officers provided him a good stead to participate in educational planning and consequently influenced educational development through his innovative ideas that were germane for the times.

Fafunwa and Nursery Education in Nigeria

Policy on Nursery Education.

In 1967 Fafunwa advised that "All African countries south of the Sahara should develop a system of nursery education both in the village and urban areas". The foresight that informed this statement reflects a deep concern and understanding for access to nursery education not only in Nigeria but throughout Africa. This, especially, was because of the roles she was expected to play in the international arena given the fact that many African countries had gained political independence. A policy statement and formulation were unarguably necessary in this respect. For Nigeria, nursery education was referred to as pre-primary education in her National Policy on Education (NPE), the first of which was produced in 1977. Children between the ages of three and five plus, prior to their entering the primary school were to benefit from this level of education. The purpose was essentially to:

(a) effect a smooth transition from the home to the school;
(b) prepare the child for the primary level of education;
(c) provide adequate care and supervision of the children while their parents are at work (on the farms, in the markets, offices etc);
(d) inculcate social norms;
(e) inculcate in the child the spirit of enquiry and creativity through the exploration of nature, and the local environment, playing with toys, artistic and musical activities, etc;
(f) teaching co-operation and team spirit;
(g) teaching the rudiments of numbers, letters, colours, shapes, forms, etc through play; and
(h) teaching good habits, especially good health habits.

In order to achieve these objectives, the Federal Government of Nigeria undertook to:

(1) encourage private efforts in the provision of Pre-primary education;
(2) provide Teacher Training Institutions for student teachers who wanted to specialize in pre-primary education;
(3) ensure that the medium of instruction will be principally the mother-tongue or the language of the immediate community; and to this end will
    (a) develop the orthography for many more Nigerian languages, and
    (b) produce textbooks in Nigerian languages.
(4) ensure that the main method of teaching in the pre-primary institution will be through play and that the curriculum of teacher Training Colleges is appropriately oriented to achieve this;
(5) regulate and control the operation of pre-primary education as well as ensure that the staff of pre-primary institutions are adequately trained and that essential equipment is provided;

(6) review and enforce the educational laws which relate to the establishment of nursery schools to make sure that schools are well-run and that teachers are qualified and other academic infrastructure provided. Ministries of Education will make regular inspections to ensure maintenance of high standards

(Federal Republic of Nigeria, 1977).

Access To Nursery Education

The provision of access to nursery education as reflected in Article (1) of how Nigerian government intended to attain nursery education objectives was entirely for the private sector (religious organizations, individuals and other non-governmental organizations). Hitherto, Fafunwa had advocated that all villages should establish at least one nursery centre each. The village square, community centre or any other meeting place would be appropriate for the purpose but the Chief's compound could be used too. A variety of projects such as roads, bridges, primary and secondary schools, social centres, among others have been built in many rural areas through communal efforts. Consequently, Fafunwa advocated that nursery schools be also built by communities whose members would offset part of the financial outlay by providing human labour needed for the project.

Corona women society, comprised of British, Irish and Nigerian women, established the first nursery school in Ikoyi, Lagos, in 1955. For several years all workers served on voluntary basis (Corona Schools Trust Council, 2011). The First nursery school in Ibadan was established by Chief Mrs. Gladys Aduke Vaughn in October, 1962. The next in Ibadan was opened in January, 1966; Bodija International Nursery school by Mrs. Helen Aina Eso. In 1945 United African Company (UAC) established a nursery in Alinso Okanu, Ogba/Egbema/Ndoni Local Government for children and its staff. In Port Harcourt, the Young Women's Christian Association (YWCA) opened the first and only nursery school for more than twelve years before some attempts by others. Thus, there were very few nursery schools in the cities from the 1950s to 1970s. There were hardly any in the rural areas.

Fafunwa's thoughts on nursery education were popularized through radio, television interviews and discussions, print media, interviews, seminars, workshops and conferences. His long years of service in various capacities in the nation's educational sector made him influence educational planning, implementation and administration at various levels of education. From January to December, 1956 he was a senior tutor and later became Principal of the Ahmadiyyah College, Agege, Lagos. After a brief working experience as the Public Relations Manager of Esso Oil West Africa from 1957 to 1961, he left for the classroom again. This time at the University of Nigeria, Nsukka (UNN) in then Eastern Region, he started as a Senior Lecturer and head of Education and later became Associate Professor and Dean of the Faulty of Education in 1964. By 1965, he was professor, Director of the Institute of Education and Head, Department of Education. By 1966, he was acting Vice Chancellor of UNN but left UNN for the University of Ife (now Obafemi Awolowo University, Ile Ife) as a result of the Nigerian civil war.

From the mid 1980's, nursery schools spread to urban slums, suburbs and rural areas in many states of Nigeria particularly in the South –West, South-East and South-South. In the Northern States they were mainly in the large cities. It was not surprising to find nursery schools in mud houses, wooden classrooms (known as batchers), in town halls and other social centres, uncompleted buildings among others.

The provisions of the pre-primary level of education were not tampered with following the revision of the NPE in 1981 and 1998. For further development, the implementation Committee set up in September 1977 had the mandate to:

(a) translate the policy into a workable Blueprint and develop programmes for the implementation of the policy;
(b) co-ordinate and monitor the implantation of those programmes in the policy;
(c) advise Government on and assist in providing the infrastructural and other requirements for policy implementation;
(d) provide a continuous review and assessment of the aims, objectives and targets of the policy with a view to ensuring the adequacy and continued relevance of the policy (and those programmes developed under it) to our national needs and aspirations, and to propose modifications on any aspects as may be found necessary (implementation Committee, 1978).

Here again, Fafunwa actively participated in producing the NPE Blueprint because the Committee Chairman, Professor S. Onabamiro held meetings with education Commissioners and other officials of the nineteen States of the Federation, received memoranda from prominent educators and agencies and also from those who attended the 1969 National Conference and the 1973 national seminar on education. Late Dr. Archibald Callaway, a UNESCO expert also worked assiduously with the committee to produce the Blueprint.

In relation to pre-primary Education, the Guidelines for Implementation of the NPE, (a product of some recommendations of the Implementation Committee) and approved by the National Council on Education (NCE) from 1977 to 1987 provided that:

(1) State Governments should Legislate on and supervise pre-primary education. Individuals, private voluntary organizations, employers of labour and communities should establish pre-primary schools. Large employers of labour should see it as a social responsibility to establish pre-primary schools for the benefit of their worker's families (This should be an obligation enforceable by Law).

(2) Each State Government should encourage pre-primary education by providing relevant legislation and adequate guidelines.

(3) Pre-primary schools should be made to keep schools records as required by all other schools.

(4) The proprietors should be required to recruit their teachers. There should be provision for mobility of teachers from pre-primary schools into State schools and vice versa.

(5) Pre-primary school teachers should be registered by the State Ministries of Education like all other teachers in the State school system.

(6) The Head Teacher of each pre-primary school should be a specialist in this field. Adequate provision should be made in Teacher Training Institutions for student-teachers who may wish to specialize in Pre-primary Education. The preparation of teachers for this level should be such as to enable them to function effectively at the lower level of the primary school if they wish.

(7) The medium of instruction in pre-primary schools should be the language of the immediate community. In a multi-national school, English may be used as the medium of instruction but the language of the immediate community should be taught in the spoken form.

(8) The National Book Development Council and the Nigeria Educational Research Council should encourage the production of relevant books and materials for the very young since books with Nigerian background for pre-primary schools are not available in sufficient quantity and variety.

(9) The curriculum of pre-primary schools should provide for instruction in Religion, and Social Norms through stories and other appropriate activities.

(10) The production of teaching aids and education toys should be encouraged through the involvement of students in craft schools, vocational and Technical Colleges.

(11) Since a number of Koranic schools are now within State educational systems it follows that the State Ministries of Education should provide for the maintenance of standards in these schools.

(12) Each State Government should re-examine its Education Laws and legislate as appropriate to cover Pre-Primary Education.

(13) It should be the responsibility of each Ministry of Education to give guidance to Pre-Primary Schools, through regular visits and inspections at least once a year, until they are well established.

(14) The State Ministry of Education should set out the guidelines governing the establishment, running and closure of Pre-primary schools. Under normal circumstances boarding facilities should not be allowed in Pre-primary institutions.

(15) The guidelines, among other things, should stipulate the physical facilities to be provided, the fees to be charged, the books, curriculum, teaching aids, teachers' qualifications and other minimum requirements. For a one-teacher school the teacher must be professionally qualified.

(16) Pre-primary school children should be taught the National Pledge and the National Anthem and such schools should fly the National flag. (Implementation Committee, 1988).

By 1967, Fafunwa had articulated and documented his thoughts on nursery and other levels of education in his book titled, *New Perspectives in African Education.* His ideas are reflected in the Policy, Implementation Guidelines and practice of nursery education in Nigeria. Part of his influence was through his colleagues and students who occupied critical and influential positions as education officers.

Fafunwa's curriculum for the nursery school included indigenous music, dances, stories, painting and science. These however, were in addition to a knowledge of English alphabets, numbers, and reading of simple story books at age 5, identification of colours, construction of objects, and so on. He was concerned with activities that would develop the child's manipulative skills and creativity. The child at this stage, he stated, was highly imaginative and creative. Consequently, the child should be given a lot of opportunity for self expression as he/she matures into a new and rapidly changing world of science and technology (Fafunwa, 1967). In order to facilitate this development, he suggested that wooden educational toys such as motor cars, shovels, trucks, aeroplanes, counting beads and abaci (from bamboo trunk) dolls (from wood and rags), rattles, balances and other educational objects should be produced and used. Clay, that is abundant in Nigeria, should be exploited and used as a substitute for plasticine. Indeed most nursery schools in the slum, suburban and rural areas in Nigeria use these improvised educational toys. It is in the big cities and in high fee paying schools that expensive plastic unit blocks, plasticine, swings, ladders, ready-made playhouse, and so on as found in the western world are mostly used.

Fasokun (2000) corroborated Fafunwa's premium on the inclusion of science exploration in the nursery curriculum because children have a natural inclination towards natural science. Thus, a science corner should be created for children with the following objects found in the natural environment: a variety of rocks, sea shells, birds' nests, spiders, bats, tortoises. An aquarium constructed by using a large kerosene tin with one or two sides partially cut out and replaced by

transparent glass or plastic firmly held to the sides with water-resistant tape or tar (Fafunwa, 1967). Similarly children should be acquainted with the farm, stream, rivers or lagoon, village or town market, cattle ranch that are natural classrooms.

Fafunwa believed in adapting objects/equipment and facilities necessary for nursery education rather than being hindered and restricted by inability to acquire such imported objects. This was also an aspect of indigenization. Consequently, the teacher had to be eclectic and resourceful to provide these instructional aids. Nursery schools in Nigeria have many improvised natural objects and treated ones that are used for teaching.

The introduction of science into the curriculum at the nursery and primary school levels was one of Fafunwa's innovative programmes. The idea was challenged by scientists at UNN in 1964 because they averred that lecturers and professors of education were not competent to design a curriculum on science as well as introduce it at these very low levels of education without sophisticated equipment (Fafunwa,1986). Through a Primary Science workshop at the Institute of Education, UNN, in 1963 and the Nigeria Primary Science Programme (NPSP) this idea was accepted and implemented as reflected in the nursery curriculum.

Fafunwa also influenced the official use of mother tongue in teaching nursery and primary school pupils. English should be taught as a second language while the pupil's mother tongue should be the medium of instruction. This idea is reflected in Article 7 of the guidelines for implementation of the NPE and widely practiced in nursery schools in the rural areas, especially Yoruba land where the populace is homogenous. For Fafunwa, a child learns best in his/her mother tongue, which should start from early childhood for the acquisition of knowledge, social skills and development of attitudes, manual dexterity among others. His Ife six-year Primary Project (from 1970 to 1981) with Yoruba language as the medium of instruction and English as a second language provided empirical evidence that entrenched this idea in policy documents and practice.

In multi-lingual States of Nigeria, Fafunwa (1986c) suggested the use of any language used by more than a third of the population in that State. However, the adoption of an indigenous language in cosmopolitan cities nursery schools has been difficult.

Teaching Method

"Children should learn by doing" and through group activities, indoors and outdoors, which help them to develop a spirit of co-operation and provide an opportunity for social development (Fafunwa, 1967). This idea implies that children should participate in the process of learning, which makes it meaningful and impactful rather than being passive listeners. He emphasized that a good teacher 'shows' and not 'tells' the children all about a phenomenon. This is because children want to know how things work, how to make things, what things are used for and even why they are used at all. Children are curious, love freedom to explore their environment and develop their manipulative ability. Thus, the teacher serves as a catalyst instead of a gadfly (Fafunwa, 1967). Fafunwa, like John Dewey, believed in practical work, participation or learning by doing, which was not the practice in infant schools during the colonial period (Gabriel, 1987). Rote learning was prevalent then and is still practiced in many Nigerian nursery schools. High fee paying, nursery schools and those with moderate number of pupils in the class with a teacher ratio of 1:15 employ this method.

For children between two and five years old, the accent should be on playing not teaching; guiding not directing or instructing. Playing and acting are the child's most stimulating ways of learning and developing at this period (Fafunwa, 1967). Philosophers of education such as Maria Montessori and Froebel among others also stressed the play-way method. Children naturally enjoy play and through this they can be taught or guided to acquire knowledge, skills and attitudes desired by the society.

Children should be led from the concrete to the abstract, not the other way round (Fafunwa,1967). Jean Piaget, Lev Vygotsky and others who have studied children cognitive development have posited this fact. Children at this stage depend a lot on sensory perception, which concrete objects facilitate. Again, through repetition of tasks and interaction with these concrete objects, learning becomes easy and meaningful.

Nursery Teachers

The teacher is very important in the process of education, and without the services of a well-trained teacher, the nursery school would be more of a curse than a blessing. It is indeed better not to have a nursery school education at all than to have one governed by an incompetent, ignorant and unimaginative teacher (Fafunwa, 1967). It would be recalled in this regard that the FGN as found in the NPE (Article 2) accepted the responsibility of providing Teacher Training Institutions for those who wanted to specialize in pre-primary education.

There are few Colleges of Education and Universities in Nigeria that produce specialist nursery school teachers. Consequently, specialist teachers in this area are in high demand. UNN and University of Ibadan during Fafunwa's very active years in the 1960s and 1970s trained nursery school teachers. Following State Governments' legislation on nursery education and provision of guidelines proprietors of nursery schools who were also head teachers had to specialize in nursery education; this was one of requirements for establishing nursery schools. Many of these teachers studied in Britain and America.

Noting that Nigeria did not have many institutions and adequate staff to train nursery school teachers, Fafunwa (1967) strongly suggested that assistance be sought from UNESCO and other international bodies including countries where considerable work had been done in nursery education, such as the USA, the United Kingdom (UK), Denmark, Switzerland, Israel, the defunct Union of Soviet Socialist Republic (USSR), Australia and Mexico. Fafunwa wanted the best for nursery school pupils and Nigeria. Being mindful that they are at a very impressionable, inquisitive, highly imitative and receptive stage of life, the teacher should be adequately trained in the theory and practice of education, elementary science, mathematical processes, social science, health and physical education, language arts (language and literature), community development and a vocational or technical skill. The professional training should include study of the social foundations of education, the history of education, elementary psychology, child study, curriculum and methods, audio-visual aids, construction of instructional materials and practical teaching (Fafunwa, 1967).

As the first Nigerian with a doctorate degree in Education and first Professor of education with few colleagues at par, Fafunwa greatly influenced educational development. From 1967 to 1972, he was a Senior Lecturer and later Deputy Vice Chancellor at the University of Ife. He was a member of the University of Ibadan Governing Council from 1972 to 1975. Through these positions, he influenced the development of teacher education for all levels of the educational spectrum. Indeed, his suggested content for training nursery school teachers is well reflected in their curriculum, a landmark in the history of teacher education in Nigeria.

Parent and Community Education

Co-operation between parents and nursery teachers is important and should be forged through Parents-Teacher Association (PTA), regular visits to the school by parents and utilization of the parents' services as voluntary assistants to the nursery teacher. While the P.T.A. is found in virtually all nursery schools, parents are yet to serve as assistants in teaching nursery pupils.

Organization of Nursery Education

Fafunwa did not succeed in getting all his ideas on nursery education accepted and implemented. For example, there are no 'National Co-ordinating Committee on Nursery Education',

Regional, Urban and village committees for organizing and administering nursery education. A flexible time of 8.00a.m to 11.00a.m. and 11.00a.m. to 2.00p.m or 8.00a.m. to 11,00a.m and 4.00p.m. to 6.00p.m.was rejected. The NPE did not also reflect the teacher-pupil ratio of 1:15 or 1:25 that he suggested.

Conclusion

Fafunwa's ideas influenced nursery education development at a time Nigeria was in dire need of restructuring and transformation of her entire educational system. His career in education was also influenced by his education in USA. However, with a good knowledge of traditional education and the needs of Nigeria, his ideas especially on curriculum made for adaptation rather than outright copying of the West. His success was leveraged by his vision of the type of education that post–colonial Nigeria needed and the role Nigerians would be expected to play in the comity of nations. Consequently, nursery education in terms of future challenges and social changes he considered as an important starting point in the new educational process. Again, the axiom 'the child is Father of the Man' makes nursery education imperative. No wonder, he influenced the inclusion of nursery education in the NPE and guidelines for its implementation approved and provided.

From 1955 Fafunwa returned to Nigeria as the first doctorate degree holder, his passion for quality nursery education did not wane all through his career. From his vantage positions, as Dean, Faculty of Education; Deputy Vice Chancellor, Acting Vice Chancellor, member of University Governing Council, Minister of Education (1990 to 1993), among many others, he ensured that Colleges of Education and Universities mounted teacher education programmes for producing specialist nursery teachers. He pioneered education in the Mother tongue and the teaching of science (however rudimentary) in nursery schools. His stint as Chairman, Governing Council of Lagos State College of Education between 1981 and 1982 strengthened both theory and practice in teacher education for producing non-graduate teachers for nursery schools. He was also President, International Council on Education for Teaching (ICET) with headquarters, at Arlington, Virginia, U.S.A from 1990-1994. He was among the pioneers of the Nigerian Academy of Education, Vice President and later President.

Nursery education by the 1998 review of the NPE remained entrenched as part of the structure of Nigeria's educational system even though government at all levels did not establish any. The NPE Provisions and Guidelines for Implementation of nursery education also remained intact until 1998. By 2004 NPE review, Government was forced to provide nursery education.

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Species Composition, Length-Weight Relationships, Condition Factor and Sex Distribution Pattern of Palaemonid Prawns in The Ilaje Estuary, Nigeria.

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Abstract

The species composition, length-weight relationships, condition factor and sex distribution pattern of Palaemonid prawns in Ilaje Estuary were studied. The study revealed that three prawn species (*Macrobrachium macrobrachion, Nematopalaemon hastatus* and *Palaemon maculatus)* are important to the benthic community in this estuary. Assessments of length-weight relationship showed that male population of *Macrobrachium macrobrachion* assumed isometric growth ($b = 3$), as female population reflected an allometric growth ($b < 3$). Male and female populations of *Palaemon maculatus* exhibited positive and negative allometric growth pattern, with value of $b > 3$ for males, and $b < 3$ for females. The two sexes of *Nematopalaemon hastatus* maintained isometric growth ($b = 3$). William's equation showed that the condition factor(s) for the identified prawn species is sex dependent. Condition factor values are higher in *Macrobrachium macrobrachion* and *Palaemon maculatus* males than in females except in the case of *Nematopalaemon hastatus. Macrobrachium macrobrachion* population showed significant difference ($P < 0.05$) in the sex distribution pattern, as against the conventional ratio of 1male:2females, while *Nematopalaemon hastatus* and *Palaemon maculatus* showed no significant difference ($P > 0.05$).

Keywords: *Macrobrachium macrobrachion, Nematopalaemon hastatus, Palaemon maculatus, isometric growth, allometric growth*.

Introduction

Taxonomically, two subfamilies of the prawn family Palaemonidae are distinguished and they are the Palaemoninae and the Pontoniinae (Encyclopedia of Life, 2008). The Palaemoninae are less diverse phylogenetically, but more diverse ecologically and are mainly carnivores that eat small invertebrates and can be found in any aquatic habitat except the deep sea. The Pontoniinae have a higher evolutionary diversity, but almost all of them inhabit coral reefs, where they associate with certain invertebrates such as sponges, cnidarians, mollusks and echinoderms and could be free living forms, parasites or commensals (Encyclopedia of Life, 2008).

Some members of the sub-family Palaemoninae have been observed to have potentials for commercial development through aquaculture (Powell, 1982). Its fishery has also been reported along the mud coast of Niger Delta region in Nigeria with wide distribution of species across the many river tributaries and estuaries (Marioghae, 1987). This fishery seems to account for a source of livelihood and employment opportunity to many coastal rural women of the Ilaje community in Ondo State, Nigeria.

Unfortunately, there is uncertainty in the stock identification of the native species of Palaemonid prawns in Ilaje estuary, of which direct ecological effect of overfishing and environmental pollution still pose detrimental effect on its sustainability (Moses, 2006; Adebowale *et.al*, 2008). Also, scientific and management information on most fresh and brackish water fishes and prawns' in Nigeria are limited (Bello-Olusoji *et.al*, 2004; Fafioye and Oluajo, 2005; Abohweyere, 2008). However, since scientific and management information on Palaemonid prawns within this estuary are scare; this study aimed to examine the prawn species compositions, length-weight relationships, condition factor, and the sex ratio of the identified species. The study is also aimed to serve as a guide in stock management and wild seeds selections for commercial development of fresh water prawns' aquaculture, which is still in its infancy in Nigeria.

Materials and Methods

Experimental materials consisted of local prawn traps, translucent fish measuring board, sensitive weighing scale (model pl200w), hand net and a mixed population of adult and juvenile prawn sizes for each identified species. The prawns were transported early in the morning, in plastic containers to the Department of Fisheries and Aquaculture Technology Laboratory, Federal University of Technology, Akure. The prawns were kept in tanks filled with eutrophicated pond water and gently aerated throughout the period of the study.

The species identification of prawn samples were done by taxa to species level using taxonomic keys from the Food and Agricultural Organization Identification Sheets (F.A.O, 1981) and also Identification Sheet by Powell (1982). The weights (g) of the prawn samples were taken to 0 .01g sensitivity and the length measurements (mm) were taken using the measuring board.

The length-to-weight relationships for each identified species were then estimated using the equation $W = a L^b$, where W = weight (g) of prawns and L = Total length (mm) of the prawns (Pauly, 1983). The value of constants (a) and (b) were computed from the natural logarithm transformed values of length and weight. A regression relationship of the natural logarithm conversions of length and weight values were established for each of the species using Microsoft Excel package (2007). The condition factor was mathematically established by Williams, (2000) equation; expressed by $K = (100{,}000W)/L^3$ where K is Condition factor, W is Weight measurement in grams and L is length measurement in millimeter. The population size ranges of the identified species were characterized in accordance with previous works of Powell (1982) and Marioghae (1982), which classified the size ranges of 10-30mm length as juvenile prawns and size ranges of 30-120mm length as adults. The sex

determination was done using morphomeric features such as head and carapace size and the presence of eggs on the berried female.

The sex distribution pattern was mathematically derived by population ratio(s) observed from the sampled population (Gammelsrød, 1992). Chi-square was then used to test the significance difference from the expected ratio of 1 male : 2 females usually observed in most fishes (Abohweyere, 2008).

Study Area

The study was carried out in the Ilaje Estuary, around the Ondo State coastal community which lies within Lat. 50^0 50'N - 60^0 09'N and Longitude 40^0 45'E - 50^0 05'E and form an extension of the gulf of Guinea that transcend to the South Eastern part of Nigeria (Figure 1). This estuary consists of networks of rivers and streams which traverse different settlements and discharge into the coastal ocean. The adjoining waters at the deeper mouth of the tributaries are bounded by riparian vegetation with a proportionately higher profile of salt marshes and surface macrophytes that extend over vast area of brackish water along which prawn samples were collected for the study.

Results

Three species of Palaemonid prawns were identified within Ilaje estuary during the course of this study (Table 1). Findings on length- weight relationships of the three prawn species showed that male population of *Macrobrachium macrobrachion* exhibited isometric ($b = 3$) growth pattern while female population exhibited negative allometric growth ($b < 3$). *Palaemon maculatus* male population also exhibited a positive allometric growth ($b > 3$), while females exhibited negative allometric growth ($b < 3$). Both sexes of *Nematopalaemon hastatus* assumed isometric ($b = 3$) growth (Table 2). The condition factor varies between male and female populations of the identified prawns. However, male populations have higher condition factors except with *Nematopalaemon hastatus* (Table 2).

Furthermore, record on sex distribution ratio showed that *Macrobrachium macrobrachion* exhibited a sex ratio of 1 male : 5 females for population count and a ratio of 1g of male : 2.7g of female for population weight. *Nematopalaemon hastatus* and *Palaemon maculatus* exhibited sex distribution ratio of 1 male : 2 females for population count. The population weight ratio of male-to-female prawns for *Nematopalaemon hastatus* and *Palaemon maculatus* also stand at 1g male:1.7g female and 1g male:1.5g female respectively. Chi-square indicated that there was significant difference ($P < 0.05$) in the sex distribution pattern of *Macrobrachium macrobrachion* population in this area compared to the conventional ratio of 1male:2females in most fishes. Populations of *Nematopalaemon hastatus* and *Palaemon maculatus* in this area showed no significant difference ($P > 0.05$) to the ratio of 1male : 2 females distribution pattern.

Discussion

The stock identification of fisheries within the Ilaje estuary vis-a-vis rising pressure of environmental pollution, degradation and ecological modification around this coast is a relevant and important effort towards ensuring sustainability of its resources (FEPA, 2007; Adebowale *et.al,* 2008). Palaemonid prawns' fishery in this location accounts for a good proportion of artisanal fisheries landings, however, management records and statistics are scare. Records available on taxonomic classifications of prawns along this coast were of Powell (1982) and Marioghae (1982). Subsequently, this study showed that three of the prawn species identified by these earlier records (along the coastal stretch of Niger Delta) inhabit this estuary. The population structure of the three identified species as at study time were mainly juveniles and adult prawns and most female prawns sampled were ovigerous. This may be attributed to seasonal effect on population structure within the estuary as the samplings were done at the onset of rainy season; marking the onset of prawn breeding in the tropics (Nwosu and Wolfi, 2006).

Length-weight relationship of *Macrobrachium macrobrachion* in this study showed variation in the growth pattern between male and female populations, with male population having an isometric growth pattern (*b = 3*), the value of exponential *b* = 2.92, when tested (t-test) was not significantly different (*P > 0.05*) from *b* = 3. Female population assumed a negative allometric growth pattern (*b =2.49*). It is evident from this position that a significant difference (*P < 0.05*) exist in male to female growth pattern. These results conform to the findings of Deekae and Abowei (2010) on the population of *Macrobrachium macrobrachion* in Luubara creek, Niger Delta, Nigeria.

The two sexes of *Palaemon maculatus* also exhibited an allometric pattern of growth with corresponding value of *b* =3.20 for male population and *b* = 2.87 for female population which were significantly different (*P < 0.05*) from isometric limit (*b > 3* and *b < 3*). Male and female populations of *Nematopalaemon hastatus* were both observed to exhibit isometric growth pattern with *b* values of 2.99 and 2.98 respectively. These were not significantly different (*P > 0.05*) from isometry (*b* = 3) and agreed with the findings of Enin (1994) in the study of *Nematopalaemon hastatus* around Cross Rivers Estuary, Nigeria. Waribugo (2005) also reported the same length-weight isometric growth pattern for *Nematopalaemon hastatus* and *Palaemon maculatus* in the River Nun Estuary, Bayelsa State, Nigeria. However, Wootton (1992) in his rough explanation of length-weight relationship ($W = a\,L^b$) theory in fishes and invertebrates positioned that; the value of the exponent *b* is 3 when growth in weight is isometric (without changing shape). If *b* value varies from 3, weight growth is said to be allometric (fish changes shape as it grows larger). Allometric growth may be negative (*b* < 3) if the fish gets relatively thinner as it grows larger, or positive (*b* > 3) if it gets plumber as it grows larger.

The correlation co-efficient (*r*) for male and female populations of *Macrobrachium macrobrachion* are 0.9624 and 0.9443 while the co-efficient of determination (r^2) are 0.926 and 0.891 which are respectively high. *Palaemon maculatus* also exhibited a high (*r*) value of 0.9518 and 0.9361 for male and female populations. The r^2 value for male population is comparatively higher than that of the females', which are 0.962 and 0.876. *Nematopalaemon hastatus* male population exhibited higher values of *r* = 0.9682 and r^2 = 0.937 than the female populations which have *r* = 0.8797 and r^2 = 0.770. Deekae and Abowei (2010) explained that a high correlation coefficient (*r*) indicates a strong association between length and weight. He explained further that a high coefficient of determination (r^2) suggest that the model used for the analysis fits the data, confirming the fitness of the model and pointing to a strong association between length and weight.

The mean condition factor(s) for the population of each identified species in this study was sex dependent. Male prawns were found larger than the females for populations of *Macrobrachium macrobrachion* and *Palaemon maculatus*. This situation was not the same with population of *Nematopalaemon hastatus* because the mean condition factor for female prawns was higher than for the males. This perhaps might have resulted from the presence of berried females among the sampled population. Female populations out-numbered male populations for all identified species. *Macrobrachium macrobrachion* population maintained the highest condition factor values throughout the study and thus connote that it grows bigger than other two species identified within the estuary.

Sex ratio(s) in *Palaemon maculatus* (1:2) and *Nematopalaemon hastatus* (1:2) followed the convention of 1 male to 2 females sex distribution pattern in most cases. Conversely, sex ratio (count data) for *Macrobrachium macrobrachion* (**1: 5**) was far divergent in this estuary from the expected ratio of 1male:2females. Records from observations of other researchers on benthic invertebrates usually put the sex ratio of this species at 1:2. For example, Abohweyere (2008) observed sex ratio of *Macrobrachium macrobrachion* in Lekki lagoon to stand at 1male:2 females which were similar to finding of Edokpayi, (1989) for the same species in the Benin River. Howbeit, this ratio of 1:5 could have resulted from selective fishing and overfishing of male *Macrobrachium macrobrachion* simply because of her higher body size or condition factor index compared to other species. On the overall,

these ratio(s) could be found relevant in pairing male-to-female prawns for trial breeding in hatchery environment.

Conclusion

This study was designed to open up further research interests on the benthic ecology of this estuary. It also focused at bridging the knowledge gap on some domicile and economically important benthic invertebrates in this estuary. It is hoped that information provided will be relevant for management and development purposes including research into prawn aquaculture development in Nigeria.

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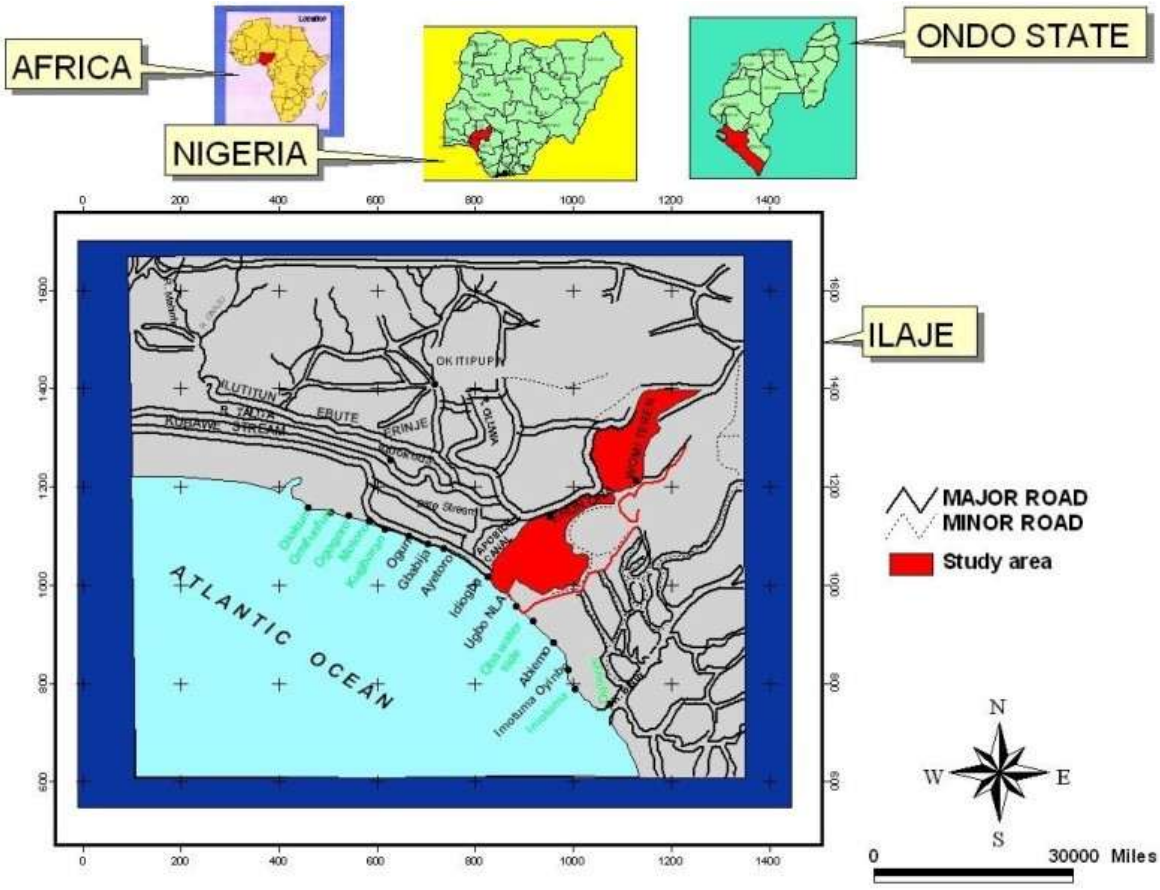

Figure 1: Map of the study area.

Table 1: Species Composition of Palaemonid Prawns in Ilaje Estuary

SPECIES COMPOSITION	DESCRIPTIONS			
	SIZE RANGE (MM)	**BODY COLOURATION**	**ROSTRUM**	**2ND CHELIPED**
Macrobrachium macrobrachion	32.0 – 90.0	Dark	Toothed and curved upward at the tip	Large with chela fur-like dense layer of hair
Palaemon maculatus	35.0 – 66.0	Transparent	Toothed and narrowing to tip	Slender with chela not bearing fur-like hair
Nematopalaemon hastatus	41.0 – 76.0	Reddish	Needle-like and tip upturned	Slender with chela bearing fur-like hair

Table 2: **Length-Weight Relationships and Condition Factor of Ilaje Estuary**

SPECIES	SEX	N	TOTAL LENGTH (mm)		MEAN TOTAL LENGTH ±S.E	WEIGHT (g)		MEAN WEIGHT ± S.E	$W = a\,TL^b$			Growth (t-test)	C.F ± S.D
			MIN	MAX		MIN	MAX		a	b	r^2	b = 3	
Macrobrachium macrobrachion	**M**	68	48	90	65.67± 1.77	1.52	10.14	4.65± 0.37	10.79	2.92	0.926	b = 3	1.61±0.059
	F	312	32	58	46.72± 0.83	0.65	2.82	1.59± 0.07	9.14	2.49	0.891	b < 3	1.56±0.648
Palaemon maculatus	**M**	88	37	66	48.42± 1.00	0.79	4.92	1.65± 0.14	10.67	3.20	0.962	b > 3	1.54±0.001
	F	161	35	56	45.15± 0.68	0.64	2.84	1.31± 0.06	10.69	2.87	0.876	b < 3	1.43±0.001
Nematopalaemon hastatus	**M**	89	40	76	50.62± 1.18	0.80	6.81	1.81± 0.16	11.25	2.99	0.937	b = 3	1.37±0.102
	F	173	40	57	46.05± 0.70	0.72	2.90	1.39± 0.08	11.12	2.98	0.770	b = 3	1.41±0.085

*S.E = Standard error, S.D = Standard deviation, C.F = Condition Factor,
N = Number of samples, *a* and *b* = factors of regression, r^2 = co-efficient of determination, *r* = Co-efficient of regression, *W* = Weight, M = Male, F = Female.

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Evaluation of the Performance of A - Type Stock Mutual Funds in Turkey With Parametric and Non-Parametric Methods

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Abstract:

Evaluation of the performance of a fund that is properly formed according to the expected return and risk tolerance measures, and also assessment of the fund's manager provide helpful information to investors. However, there are important points in fund performance evaluation that must be considered other than risk factors. When a fund's performance is evaluated, an investor demands to know not only the fund's relative performance to benchmark portfolios but also whether that performance is due to chance or the manager's expertise and foresight in decision making.

In this research, the biggest 12 A - Type Stock Mutual Funds registered at the Capital Markets Board (CMB) of Turkey have been chosen according to their asset under management (AUM) values and their weekly data for the period May 2007 - Sep 2011 has been used to evaluate their performances with parametric and non-parametric methods. In addition to the widely used performance indicators in the literature, different Jensen Alphas have been calculated with a new model based on the Fama-French 3 Factor Model. Quadratic regression method is used to evaluate the timing capability of the fund manager and the coefficients of the squared terms in the regressions are measured to evaluate the responses of the fund managers to sudden market moves. A non-parametric method called Data Envelopment Analysis (DEA) is also used in fund performance evaluation in addition to parametric methods. Unlike previous studies, commissions are also used as an input in the DEA together with other risk indicators.

Even though there are some slight differences in ranking the funds, it is observed that the newly calculated Jensen Alphas show similar results with the other parametric methods. DEA results are also in line with results from the parametric methods. The results of the quadratic regression analysis developed to assess the timing capabilities of the A Type Stock Mutual Funds' managers

showed that the fund managers are not successful in adapting to the sudden changes both in the bond and stock markets.

Keywords: Mutual funds, fund performance, Jensen Alpha, Data Envelopment Analysis

JEL Codes: G1, G23, C1

1. Introduction

Mutual funds are among the most important investment tools in capital markets. Mutual funds are financial institutions that collect many investors' savings in a pool and manage their portfolios. With the advantages of risk diversification, professional management and liquidity presented to the investor; mutual funds are increasing in importance in Turkey as well as other developing markets. The basic rationale behind establishing a mutual fund (portfolio) is reducing risk at a certain rate of return.

The first mutual fund in Turkey has been established by T.C. İş Bankası in 1987. Analyzing the number and asset under management (AUM) values of mutual funds registered to Capital Markets Board (CMB) of Turkey as of September 2011, the following figures are observed:

No of funds: 298
-A Type Funds: 115
-B Type Funds: 183
AUM Value: $15.3 billion
-A Type Funds: $0.9 billion
-B Type Funds: $14.4 billion

The measurement of portfolio performance is important for both investors and fund managers. Evaluating the performance of a portfolio and its manager is required for market efficiency and efficient capital allocation. When investors and portfolio managers are evaluating a mutual fund's relative performance to other funds, benchmarks and markets, their aim is to achieve the best return. The first indicator of a mutual fund's performance is its rate of return but it is also important to determine the level of risk and variability of this return. Evaluation of the portfolio's performance relative to another portfolio is not the only essential factor for the investor in performance evaluation. The investor also desires to know whether this performance is due to good or bad luck or management's accurate choices and insights.

Until the 1960s, investors were evaluating their portfolios' performances depending only on the rate of return because they were not able to measure the level of risk of within their investments. As a result, it was not possible to make decisions considering the risk or to avoid risk in portfolio choices. As the developments in portfolio theory enabled the measurement of risk regarding the ambiguity of the return, it became possible to measure the risk as well as the return and the performance evaluations could be performed in the light of this new information. Performance measurements are used for comparing the mutual fund's performance in different time intervals or performance of different funds in the same time interval. According to the portfolio theory's performance measurement methods, there is a functional relation between an investment's return and its risk. Investors expect higher returns for bearing higher risks.

The measurement of the portfolio performance starts with the evaluation of each of the financial instruments in the portfolio. Then, the return of the portfolio and the portfolio manager (selectivity ability, timing ability) are calculated. These results are compared to a market index or another example portfolio's returns. The risk of attaining these returns is calculated in both absolute and relative terms so that the returns are risk-adjusted and made comparable. The next step is

determining the contribution of the portfolio manager to the portfolio performance. Finally, the results are reported according to the legal regulations and announced to the saving owners.

2. Literature Review

The main method that is used in fund performance evaluation is calculating the risk adjusted return of the evaluated portfolio and comparing this return with a reference. Treynor (1965), Sharpe (1966), and Jensen (1968) have made the first studies related to fund performance evaluation and comparison of returns and they have established comparison measures which are at the present day referred to as traditional. These methods consider performance evaluation in two parts as return and risk. There are two types of risks in these evaluation methods: market risk (systematic risk) calculated by beta and total risk of the portfolio (non-systematic risk) calculated by standard deviation.

Fund performance evaluation methods are can be examined in four groups:
Methods based on total risk
Methods based on systematic risk
Methods based on maximum potential loss
Methods based on market timing

The traditional methods that depend on total risk are Sharpe ratio, M^2 Performance Measure, and Sortino ratio. The methods that depend on systematic risk are Treynor ratio, T^2 Performance Measure, Jensen Alpha, and Appraisal Ratio. These methods are referred to as traditional and are employed in many studies.

Sharpe ratio is adjusted according to CF VAR when using methods depending on maximum potential loss. This method is developed by Sharma (2006) to capture the higher moments of the distribution. Fama measure is employed for evaluating the market timing. This method helps to determine the fund performance depending on the timing and selecting capabilities of the fund manager.

Sharpe performance indicator (Sharpe, 1966) shows the additional return over risk-free rate that investors desire when compared with total risk of the portfolio. The increase in the ratio shows the increase in the risk-adjusted return. M^2 measure also depends on total risk but it provides easiness in the comparison since it is not a ratio like Sharpe. In order to overcome the problem of having asymmetric return distribution, downside risk is employed in the calculations instead of standard deviation in Sortino method (Sortino & Price, 1994). On the other side, Treynor ratio is the first model to evaluate portfolio performance and the calculations depend on systematic risk (Treynor, 1965). T^2 measure is defined as the difference between portfolio return and market return and a risk adjustment is made like in M^2 measure.

Jensen Alpha measure defines the difference between the expected return of the evaluated portfolio and the benchmark portfolio and it evaluates the fund performance with only one value (Jensen, 1968). This measure is the constant term which is called ‘alpha’ in the regression analysis between the fund returns as dependent variables and the market returns as independent variables. When the fund’s return is over the risk adjusted average return, alpha shows the amount of return which is due to the capabilities of the fund manager. If the alpha is positive, the fund is said to be well managed but if the alpha is negative, the fund performance is said to be poor. Jensen Alpha measure and Treynor ratio do not take non-systematic risk into account. Appraisal ratio also focuses on this deficiency by dividing fund’s alpha by non-systematic risk.

The above mentioned fund performance evaluation methods that rely on systematic and total risk assume that picking the right stocks is the only important determinant in the fund performance evaluation. If the fund manager follows a strategy that depends on market timing, these performance indicators and calculated alphas and betas would all be biased. Thus, two main components are

thoroughly investigated in the fund performance evaluation literature when the relative performance of mutual funds are assessed: fund manager's achievement in stock picking (manager's micro forecasting capability) and fund manager's timing capability (macro forecasting) (Cesari & Panetta, 2000). The most widely used method to assess the mutual fund manager's timing capability is using quadratic regression and analyzing the squared term in the equation as the previous models of Treynor and Mazuy (1966) and Admati et al. (1986) have suggested:

$$\tilde{r}_{it} - r_{ft} = \alpha_i + \beta_i(\tilde{r}_{mt} - r_{ft}) + \gamma_i^{TM}(\tilde{r}_{mt} - r_{ft})^2 + \tilde{\varepsilon}_{it}$$

The excess returns of the market portfolio over risk-free rate are chosen as independent variables and the excess returns of an individual stock or a portfolio over risk-free rate are chosen as dependent variables in the regression analysis and the coefficient of the squared term is analyzed in order to evaluate whether the fund manager's timing abilities are sufficient or not. If this coefficient is positive and statistically significant, it might be concluded that the fund manager's market timing capabilities are sufficient.

Meanwhile, Fama and French (1992,1993) stated that the excess return an individual stock or the overall stock market provides over a risk-free rate is explained by three factors: (i) The excess return of market portfolio over risk-free; (ii) The excess return of a portfolio consisting of stocks with small market capitalization over a portfolio consisting of stocks with big market capitalization[5]; (iii) The excess return of a portfolio consisting of stocks with high book-to-market ratio over a portfolio consisting of stocks with low book-to-market ratio[6].

$$\tilde{r}_{it} - r_{ft} = \alpha_i + \beta_{im}(\tilde{r}_{mt} - r_{ft}) + \beta_{iS}\mathrm{SMB} + \beta_{iH}\mathrm{HML} + \tilde{\varepsilon}_{it}$$

The β_{iS} coefficient provides the sensitivity measure for the excess returns of the fund over risk-free rate regarding the returns of the SMB portfolio whereas the β_{iH} coefficient provides the sensitivity measure regarding the returns of the HML portfolio. With the aid of using different portfolios like SMB and HML rather than using only the benchmark portfolio, different effects of different kind of portfolios to the fund manager's performance can also be evaluated and 'alphas' that consist of more information can be obtained using this kind of modification in the regression analysis.

Data Envelopment Analysis (DEA) can be defined as a linear programming based method in which the relative effectiveness of decision making points are evaluated using similar inputs to provide the necessary output/s. The advantage of DEA over other similar methods is its compatibility and easiness to evaluate when there are multiple inputs or outputs. The solution methods in DEA are input-focused or output-focused. If the outputs are held constant and the changes in the inputs are examined, the solution method can be defined as input-focused, whereas if the inputs are held constant and the changes in the outputs are examined, the solution method can be defined as output-focused. There are three main analysis methods that are widely used in DEA:

CCR (Charnes-Cooper-Rhodes) Method
BCC (Banker-Chaenes-Cooper) Method
Summation Methods

Basso and Funari (2001) have used the data of MIBTEL (Milan Stock Exchange) and 47 mutual funds in their performance evaluation based on DEA method and they have also used systematic risk in addition to total risk as an input in their analysis. In another study that used DEA analysis (Murthi et al., 1997), commissions and other fund expenses are also used as an input in the evaluation in order to provide a better definition for an efficient fund.

5 SMB, small minus big
6 HML, high minus low

The type of risk calculations and the nature of the widely used fund performance indicators are summarized below:

Table 1. Risk calculations and performance indicators of the funds

Fund Performance Evaluation Methods	Systematic ri	Non-systematic	Downside ri	Perf. Indicat with comparison	Perf. Indicat on its own	Fund manag performanc
Sharpe	X	X		X		
M^2 measure	X	X			X	
Sortino	X	X	X	X		
Treynor	X		X	X		
T^2 measure	X			X		
Jensen Alpha	X				X	X
Appraisal ratio	X	X		X		X
Fama measure	X	X			X	X
C	X				X	X
Three Factor Alpha	X				X	X
DEA	X	X			X	X

There are numerous empirical studies that examined the risk-return relationships and related performance levels for mutual funds in Turkey (Erçekin, 1997; Karacabey, 1998; Karacabey, 1999; Gürsoy and Erzurumlu, 2001; Kılıç, 2002; Canbaş and Kandır, 2002; Vuran, 2002; Arslan, 2005; Yıldız, 2005; Korkmaz and Uygurtürk, 2007; Akel, 2007; Teker et al., 2008; Eken and Pehlivan, 2009).

Karatepe and Karacabey (2000) calculated the performance of nine A-type investment funds for the period between 1997–1999 using Sharpe, Treynor, Jensen, Graham & Harvey methods. They have concluded that there is no significant difference between the results of traditional portfolio evaluation methods and the alternatively developed Graham & Harvey (GH1 and GH2) measures. In addition, no single one among the nine examined funds has been found to perform better than the market.

Gürsoy and Erzurumlu (2001) found the treasure bond as the best investment tool among all periods and sub periods analyzed, followed by ISE 100 index, B-type and A-type funds. The funds have been found to be performing worse than the market. Kılıç (2002) also analyzed the performance of investment funds and concluded that generally they don't perform better than the market.

Canbaş and Kandır (2004) have studied whether the performance of the funds are sustainable or not and concluded that in Turkey during the periods analyzed the performance of the investment funds in Turkey were not sustained. In addition to traditional methods, there are also other new methods used like the Quadratic Regression Analysis (Arslan and Arslan, 2010), variance analysis, univariate and multivariate regression analyses. Data Envelopment Analysis has also been used in various studies (Atan et al., 2008)

Arslan (2005) analyzed the performance of the managers' market timing performances using 45 A-type investment funds. In his analysis covering four years period (Jan 2002 – Dec 2005) using daily returns, Arslan (2005) concluded that the resulting rankings coming from different methods used didn't match each other, the β parameters measuring the risk were not stable and the fund betas didn't

approximate the market beta. Besides, as a result of the quadratic regression analysis performed to measure the fund managers' timing ability, only three funds' *C* parameters turned out to be positive so the other fund managers couldn't foresee the market changes. To sum up, the analyzed investment funds' managers' selectivity and timing abilities turned out to be lower than expected.

As the univariate regression is used for calculating the selectivity ability, quadratic regression analysis is used as a test for market timing (Arslan and Arslan, 2010). Different from the Jensen model, there is the *C* parameter in quadratic regression. the *C* parameter measures the fund manager's market timing, a positive value showing high ability versus a negative value showing lack of ability. This model tests the nonlinear relationship between the additional return of the investment fund and the additional return of the market.

Data Envelopment Analysis (DEA) is an optimization based technique that has the properties of multiple concepts and/or multiple inputs, allowing the evaluation of the relative performances of decision units. DEA has been used especially for revealing the relationships that were not discovered with regression analyses.

DEA had first been developed for the measurement of the relative efficiencies of economic decision units that are alike in terms of the produced products and services. This method has first been used in the performance evaluation of the decision units like banks or insurance companies and later been widely used to evaluate the performance of investment funds. Murthi (1997) first applied this method onto investment funds' performances.

As there is single input – single output in the portfolio theory performance evaluation methods; there is multiple input – multiple outputs in DEA. Thus, DEA can be called as a multifactorial efficiency measurement model. When compared to the traditional two dimensional performance evaluations, DEA performs multidimensional performance evaluation. One advantage of this method is not needing the analyzer to determine the weights of the inputs and the outputs as opposed to the other approaches. Another advantage is showing the reason behind the inefficiency of a fund and also how to approximate the inefficient fund to the optimum level.

Atan et al. (2008) conducted performance evaluation using the Treynor Index and the Sharpe Ratio, followed by a linear programming based nonparametric efficiency method (DEA) and comparing the results with traditional methods.

Teker et al. (2008) used the logarithmic returns method as opposed to other studies for calculating the returns and the predicated reference returns. Because many different investment tools have been used in the comparison calculations of the analyzed funds, similar investment tools have been grouped together in the calculation of the reference returns calculations.

Kurun et al. (2008) also calculated four additional ratios in addition to traditional methods and compared them. Those four ratios were: Information Ratio, Calmar, Cornish Fisher VaR, Up Percentage and Down Percentage.

Arslan and Arslan (2010) selected three funds among A-type variable funds, B--type variable funds, A-type variable funds, A-type stock funds and A-type traded funds and calculated the risk return ratios and relative performance levels using the data from the period of 2006-2010. In addition to the Sharpe Ratio, M^2 measure, Treynor index, Jensen index, Sortino Ratio, T2 Ratio and the Evaluation Ratio, univariate regression and quadratic regression methods have also been used to assess the selectivity and timing abilities. The average Domestic Government Bonds returns, investment funds returns and ISE-100 index returns have been analyzed using MANOVA and significant difference has been found in the average returns.

The indices or indicator portfolios that are used in the comparison of performance values should be comparable, appropriate to the structure of the funds or portfolios, reflecting the fund's investment goals and the fund manager's approach to risk. There have been various different

indicators used in different studies. Because the traded funds used in the analysis are stock dominant investment funds, the ISE National 100 index has been used as the indicator index. As the indicator index for B-type funds, three months Government Debt Securities' interest rates for the same period have been used in some studies (Eken and Pehlivan, 2009). But, Teker et al. (2008) mention that due to using different types of funds, different comparison measures that serve the best need to be used. For making up comparison measures, percentage distributions of the investment tools in the funds of a certain type have been used. Yıldız (2005) warns that using only the ISE index for fund performance is insufficient in reflecting the real analysis results when the stocks' ratio is relatively less in fund merging. Thus, he used the fund index indicator portfolio developed by the Turkish Institutional Investment Managers' Association and thought to be better suiting the structure of the funds.

There have also been some differences observed in the studies calculating betas. Even though there is no problem in calculating the betas for liquid funds, there are needs for correction in other funds. Since bonds and bills, B-type variable and A-type variable benchmarks' returns are reflected on fund prices in T+1 time period, the benchmarks' prices in the day of T have been compared with the prices in the day of T+1 while calculating the betas (Teker et al., 2008).

3. Data and Methodology

In this study, A Type Stock Mutual Funds that are registered with CMB have been sorted according to their AUMs and 12 A Type Stock Mutual Funds with the greatest AUMs have been chosen. Weekly closing prices of the funds between May 2007 – September 2011 have been retrieved from the official website of CMB of Turkey. ISE 100 National Index was not chosen directly as the benchmark portfolio that is used for comparison in the performance evaluation as the market index. A weighted market index which is more convenient for the comparison of A Type Stock Mutual Funds has been formed for the benchmark portfolio consisting of %70 ISE 100 National Index, %25 KYD O/N Interest rate, and %5 KYD TL Bond Index (182 days). KYD Index series have been retrieved from the official site of Turkish Institutional Investment Managers' Association and ISE 100 National Index closing prices have been obtained from Finnet Financial Data Service.

Closing market prices of the mutual funds at the end of each week have been compared with the previous week and logarithmic function has been used to calculate the weekly returns of the funds. The arithmetic average of these weekly returns have been used as the expected returns for these mutual funds in the performance evaluation calculations. The weekly returns and expected return of the benchmark portfolio has also been calculated similar to the calculations for mutual funds.

Regression analysis has been used for the calculation of the mutual fund betas. The regression line that represents the changes of a security's return relative to the market portfolio's return is called a security's characteristic line which is stated as below:

$$E(R) = R_f + (R_m - R_f) \times \beta$$

According to this characteristic equation, the excess returns of the mutual fund and the benchmark portfolio over the risk-free rate have been included in the regression analysis and the related beta and alpha values have been calculated accordingly.

The overnight interest rate of Central Bank of the Republic of Turkey (CBT) has been used as the risk-free interest rate in the calculations. The standard deviations of the weekly returns of the mutual funds and benchmark portfolio have been used as an indicator of risk in the performance evaluation calculations.

First, the expected returns (the average of the weekly returns) and risks (the standard deviation of the weekly returns) have been calculated for the 12 chosen mutual funds and the benchmark portfolio and used in the comparison methods that are widely employed in the literature. In addition to

comparison methods like Sharpe and M^2 which are based on total risk, performance evaluation methods that depend on systematic risk (beta) like Treynor, Jensen, Appraisal ratio and Fama have also been employed in the study. Quadratic regression analysis has also been used in order to evaluate the timing capabilities of the fund manager and a new alpha has been calculated in addition to Jensen alpha based on the Fama-French 3 Factor model to test whether the manager achieved higher return when compared with more than one factor portfolio. Moreover, other than these parametric methods, a non parametric method as Data Envelopment Analysis is also employed and the results are reported along comparison with other performance indicators.

4. Analysis and Results

Ticker symbols and the names of the mutual funds are listed in Table 1. The performance indicators are presented in Table 2. The '*' notation is used to state the statistical significance of the alphas, betas and C values which are calculated with least squares method (*: %5, **: %1). The ranking of the 12 A Type Stock Mutual Funds are presented in Table 3.

Table 2. The ticker symbols and the names of the A Type Stock Mutual Funds in the study

TH	STRATEJİ MENKUL DEĞERLER A.Ş. A TİPİ RİSK YÖNETİMİ HİSSE SENED FONU
K3	AKBANK T.A.Ş. A TİPİ HİSSE SENEDİ FONU
I2	T.İŞ BANKASI A.Ş. A TİPİ HİSSE SENEDİ FONU
HS	T.GARANTİ BANKASI A.Ş. A TİPİ HİSSE SENEDİ FONU
YH	TEB INVESTMENT MENKUL DEĞERLER A.Ş. A TİPİ HİSSE SENEDİ FONU
VS	HSBC BANK A.Ş. A TİPİ HİSSE SENEDİ FONU
AF	FİNANSBANK A.Ş. A TİPİ HİSSE SENEDİ FONU
HS	YAPI and KREDİ BANKASI A.Ş. A TİPİ HİSSE SENEDİ FONU
CH	ECZACIBAŞI MENKUL DEĞERLER A.Ş. A TİPİ HİSSE SENEDİ FONU
GH	ING BANK A.Ş. A TİPİ HİSSE SENEDİ MUTUAL FUND
FH	EFG İSTANBUL EQUİTİES MENKUL DEĞERLER A.Ş. A TİPİ HİSSE SENED F.
AH	TEKSTİL BANKASI A.Ş. A TİPİ HİSSE SENEDİ FONU
SA	ALTERNATİFBANK A.Ş. A TİPİ HİSSE SENEDİ FONU
AS	FORTIS INVESTMENT MENKUL DEĞERLER A.Ş. A TİPİ HİSSE SENED FONU
KP	GLOBAL MENKUL DEĞERLER A.Ş. A TİPİ KAR PAYI ODAKLI HİSSI SENEDİ FONU

Table 3. The performance indicators calculated for each fund in the study

	STH	AK3	TI2	GHS	TYH	HVS	FAF	YHS	ECH	TAH	ASA	FAS
Sharpe	12.90%	0.13%	-1.00%	-2.72%	-0.19%	1.93%	5.08%	1.90%	1.59%	0.48%	1.04%	-0.52%
M2	0.60%	0.19%	0.16%	0.10%	0.18%	0.25%	0.35%	0.25%	0.24%	0.21%	0.22%	0.17%
Sortino	16.56%	0.19%	-1.52%	-4.19%	-0.29%	2.78%	7.22%	2.74%	2.40%	0.73%	1.74%	-0.82%
Treynor	2.73%	0.01%	-0.04%	-0.12%	-0.01%	0.08%	0.22%	0.08%	0.07%	0.02%	0.05%	-0.02%
T2	12.21%	88.96%	79.00%	87.73%	93.31%	109.61%	93.16%	84.24%	80.31%	69.82%	58.47%	80.47%
Appraisal ratio	12.80%	-0.39%	-1.51%	-3.22%	-0.70%	1.42%	4.57%	1.38%	1.09%	0.02%	0.62%	-1.01%
Fama	0.32%	-0.02%	-0.06%	-0.13%	-0.03%	0.06%	0.17%	0.04%	0.03%	-0.01%	0.01%	-0.04%
Jensen alpha	0.0033*	-0.0001	-0.0005	-0.0012	-0.0003	0.0006	0.0018	0.0005	0.0004	0	0.0002	-0.0004
Beta	0.12*	0.89**	0.79**	0.88**	0.93**	1.1**	0.93**	0.84**	0.8**	0.7**	0.58**	0.8**
C	-3.60**	-0.29	-0.47	-0.24	-0.47	-0.14	0.45	-0.05	-0.72	-1.43	-2.56**	-1.68*
3 Factor Alpha	0.0061**	0.0008	0.0001	-0.0004	0.0007	0.0017	0.0027	0.0012	0.0015	0.0012	0.0022	0.0011
3 Factor betas												
benchmark	0.16**	0.91**	0.805**	0.897**	0.956**	1.123**	0.956**	0.858**	0.823**	0.732**	0.623**	0.832**
SMB	0.364**	0.146**	0.101*	0.137**	0.163**	0.18**	0.155**	0.114*	0.159**	0.209**	0.302**	0.216**
HML	0.028	-0.003	-0.005	-0.005	-0.006	-0.008	-0.012	-0.001	0.003	-0.019	0.004	0.003
DEA	1	0.308265	0.431841	0.150962	0.403507	0.502799	0.954527	0.801407	0.841716	0.825273	1.000001	0.800676

Table 4. The ranking of the 12 A Type Stock Mutual Funds according to the indicators

ranking	**Sharpe**	**M2**	**Sortino**	**Treynor**	**T2**	**App. r.**	**Fama**	**Alpha**	**Beta**	**C**	**3F Alpha**	**DEA**
1	STH	STH	STH	STH	STH	STH	STH	STH	HVS	FAF	STH	ASA
2	FAF	FAF	FAF	FAF	FAF	FAF	FAF	FAF	TYH	YHS	FAF	STH
3	HVS	HVS	HVS	HVS	HVS	HVS	HVS	HVS	FAF	HVS	ASA	FAF
4	YHS	YHS	YHS	YHS	YHS	YHS	YHS	YHS	AK3	GHS	HVS	ECH
5	ECH	ECH	ECH	ECH	ECH	ECH	ECH	ECH	GHS	AK3	ECH	TAH
6	ASA	ASA	ASA	ASA	ASA	ASA	ASA	ASA	YHS	TYH	YHS	YHS
7	TAH	TAH	TAH	TAH	TAH	TAH	TAH	TAH	FAS	TI2	TAH	FAS
8	AK3	AK3	AK3	AK3	AK3	AK3	AK3	AK3	ECH	ECH	FAS	HVS
9	TYH	TYH	TYH	TYH	TYH	TYH	TYH	TYH	TI2	TAH	AK3	TI2
10	FAS	FAS	FAS	FAS	FAS	FAS	FAS	FAS	TAH	FAS	TYH	TYH
11	TI2	TI2	TI2	TI2	TI2	TI2	TI2	TI2	ASA	ASA	TI2	AK3
12	GHS	GHS	GHS	GHS	GHS	GHS	GHS	GHS	STH	STH	GHS	GHS

Strateji A Type Stock Mutual Fund showed a greater performance when compared with other similar mutual funds during the examined 4-year period. When performance indicators that focus on the total risk (standard deviation of weekly returns) like Sharpe, M2, and Sortino are considered, Strateji fund seemed to benefit more from this total risk by achieving greater returns. Even though Sharpe indicator takes the portfolio diversification into account by focusing on total risk, it fails to show how much of the return is coming from the diversification since it is a ratio indicator. In order to overcome this problem, Sortino, which focuses only on downside risk, and M2 performance indicators are also employed and the ranking of the fund which was derived with Sharpe ratio did not change.

The ranking of the funds did not change again when Treynor and T^2 performance indicators, which focus on systematic risk, are used. Regression analysis is used to determine the extent of systematic risk of the mutual funds. The excess returns of the mutual funds over risk-free rate ($R_{mutual\ fund} - R_f$) are used as the dependent variables and the excess returns of the benchmark portfolio over the risk-free rate ($R_{benchmark} - R_f$) are used as the independent variables in the regression analysis. The analysis showed that the fund exposed to the least systematic risk is Strateji showing that *Strateji* is the fund least sensitive to the market risk. This result is an indicator of the fund manager's success in risk management since systematic risk is the portion of the risk that cannot be averted with diversification. The results also indicated that the most sensitive fund to the market risk in the study is HSBC's A Type Stock Mutual Fund. The alpha values retrieved from the same regression analysis are

the indicators of whether the fund managers achieved greater returns than the expectations. When the Jensen Alphas of the funds in the study are analyzed, it has been found out that Strateji A Type Stock Mutual Fund is the only one that have a significant alpha both statistically and practically. Treynor ratio and Jensen Alpha performance indicators disregard the importance of the fund manager's capability of portfolio diversification since only systematic risk is used in the calculations. This shortcoming is compensated by using Fama criterion in performance evaluation but the performance ranking among the mutual funds in the study did not change.

The excess returns of the benchmark portfolio over risk-free rate are chosen as independent variables and the excess returns of the fund returns over risk-free rate are chosen as dependent variables in the quadratic regression and the 'C' coefficients (coefficient of the squared term) are calculated. For the examined period and the 12 A Type Stock Mutual Funds, only Finansbank A Type Stock Mutual Fund has a positive C coefficient but that coefficient is not statistically significant. The remaining funds have negative C coefficients which are also statistically not significant and these results showed that the managers of the funds which are evaluated in the study during the regarding period lack the ability to time their decisions against the sudden moves in both the stock and bond market.

Similar with the previous regression analysis, the returns of the benchmark portfolio are chosen as the market portfolio returns for the first factor in the regression analysis based on Fama-French 3 Factor model that has been mentioned before. The SMB returns are calculated through forming small and big portfolios by sorting the stocks in the ISE National 100 Index according to their market capitalization and dividing them into two groups as small and big ones. Then, the difference of the returns of these two portfolios are used as SMB returns in the regression analysis. The HML returns are calculated similarly with SMB returns but this time the sorting of the stocks in ISE index are carried out according to their book-to-market ratio and the difference of the returns of the two portfolios are chosen as HML returns. All the portfolios in the SMB and HML calculations are equally weighted portfolios similar to the previous studies. When the newly calculated alphas are examined, all the funds except Garanti Bankası A Type Stock Mutual Fund have a positive alpha but only the alpha of the Strateji A Type Stock Mutual Fund seems to be statistically and practically significant. It is also observed that while all the β_{iS} coefficients are statistically significant for all the funds, β_{iH} coefficients are statistically insignificant. These results indicated that a high book-to-market ratio premium does not have a significant effect on the fund returns whereas small market capitalization has a significant effect during the examined period.

The DEA analysis in this study uses CCR method in order to evaluate the performance of A-Type Stock Mutual Funds in Turkey and uses CCR method and employs the funds' betas (systematic risk), standard deviation of funds' returns (total risk) and the fund manager commissions as inputs, whereas funds' expected returns are employed as outputs. The commissions are calculated based on the total AUM of the funds and the percentage of fees and commissions that are paid to the fund manager. After establishing each group of linear equations for each fund and determining which variables should be maximized, the coefficients are calculated with Microsoft Excel Solver Function and performance indicator for each fund is computed. Since a different approach which maximizes the ratio of the inputs and outputs is used in DEA besides other parametric performance evaluation methods, a different ranking of the funds according to their performances is observed. According to the DEA results, Strateji and Alternatifbank A-Type Stock Mutual Fund are the two successful and efficient funds.

These results indicated that considering the risk indicators and the commission amounts that the funds have, two funds are managed more efficiently than the other 10 funds that are evaluated in the study. Eken and Pehlivan (2009) also employed DEA in their study evaluating the Turkish Mutual Fund performances and used skewness and kurtosis as inputs in addition to fund alphas, betas and

standard deviations but they have not included the fund expenses and commissions as inputs. The DEA analysis they employed give the same ranking for the most and least efficient fund as parametric performance indicators do which is similar to the results in this study.

5. Conclusion and Further Study

It is known that the trading volume of the fund and the number of shares in the circulation also affect the returns of a mutual fund. Thus, determining a mutual fund's returns solely depending on the beta or standard deviation might be inadequate for performance evaluation. Another issue that must be considered in fund performance evaluation is survivalship bias since some funds might be in the market for only a specific period of time. In addition to performance indicators that focus on total and systematic risk, market timing model with quadratic regression and Fama-French 3-Factor Model are used in this study for the comparisons among the A-Type Stock Mutual Funds. Beside these parametric methods, a non parametric method as DEA is also employed and similar results to the parametric methods have been found. When the rankings of the parametric and non parametric methods have been compared by implementing a Spearman's Coefficient of Rank Correlation Test, the results can be examined on the Table in Appendix A as the correlation is 0.706 and statistically significant.

When monthly closing prices of A-Type Stock Mutual Funds since 2007 have been used to form an index relative the Market Index and examined empirically, it is found that Strateji A-Type Stock Mutual Fund achieved higher performance than not only the whole other funds but also the weighted average index according to the funds' AUMs as the graph in the Appendix B indicates. These results are in line with the results of the performance evaluation methods in this study. When the results in this study are compared with previous studies, it is observed that they are similar. When it is considered that Strateji A-Type Stock Mutual Fund did not exist before May 2006, it is an expected case that Finansbank A-Type Stock Mutual Fund is the fund with the top performance in the 2005 study (Yıldız, 2005) that examined the A-Type Stock Mutual Funds in Turkey during that period. With the aid of the new methods employed in this study, the underperformance of some of the funds examined in the 2005 study has been indicated with the performance evaluation analysis carried out in this study.

For further study, in addition to the performance evaluation methods used here, M^2 and T^2 performance indicators can be more generalized by considering not only the market portfolio but also other factors. GM^2 and GT^2 (generalized M^2 & generalized T^2) methods can be employed and the funds' performances can be evaluated with a much broader context. Additionally, Fama-French 3 Factor model can be improved in order to check whether other market anomalies have different effects on the fund performance and whether the fund manager is benefiting from these anomalies for getting higher returns. Other inputs which have direct effects on fund performance such as risk indicators and commissions can be researched for DEA. The performance calculations can be carried out again with new inputs and their effects on the fund performance can be compared with previously used inputs.

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Appendix A

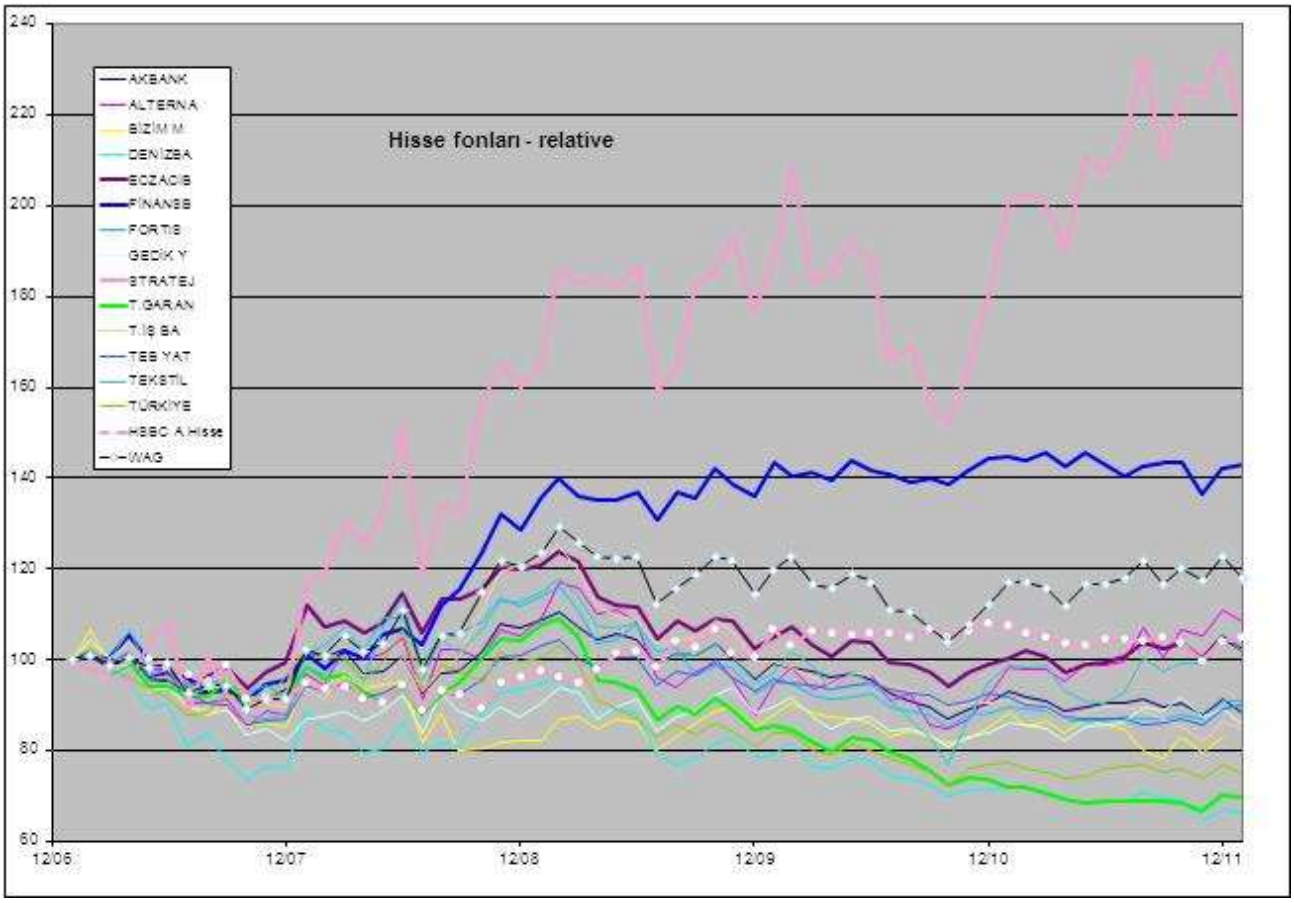
Spearman's Coefficient of Rank Correlation Test (Non parametric correlation)

Correlations

			Para	DEA
Spearman's rho	Para	Correlation Coefficient	1.000	.706(*)
		Sig. (2-tailed)	.	.010
		N	12	12
	DEA	Correlation Coefficient	.706(*)	1.000
		Sig. (2-tailed)	.010	.
		N	12	12

* Correlation is significant at the 0.05 level (2-tailed).

Appendix B


Hisse fonları - relative
AKBANK
ALTERNA
BİZİM M.
DENİZBA
ECZACIB
FİNANSB
FORTIS
GEDİK Y
STRATEJ
T.GARAN
TİŞ BA
TEB YAT
TEKSTİL
TÜRKİYE
HSBC A.Hisse
WAG
240
220
200
180
160
140
120
100
80
60
12/06
12/07
12/08
12/09
12/10
12/11

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Gender Difference and Marital Status in Organisational Role Stress Among Medical Doctors.

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Abstract:

This research investigates the relationship between Gender, Marital Status and Organizational Role stress among medical doctors in Goa. Ten types of role stress were measured using ORS scale. The total sample of 454 was divided on the basis of Men and Women Doctors for gender analysis, and Married and Unmarried for Marital status. Two hypotheses were tested using t- test. Results revealed significant difference in Gender and Marital status analysis.

Keywords: Gender, Marital Status & Role Stress.

Introduction:

Medical doctors, as well as dentists, are known to be groups of people with high stress occupations, along with other professionals such as pilots, police and mine workers (Cooper et al. 1989). The inclusion of responsibility for "people" and the fact that every action they undertake has a powerful impact on human life offers sufficient evidence of high stress (Caplan et al., 1975; Antoniou, 2001). Stress can be understood as the physical, emotional and mental strain resulting from a gap in the person –environment fit. This has a three way relationship between demands on a person, the persons feeling about those demands and their ability to use resources to cope with demands made. (Richards C 1989). Moreover since doctors are continually evaluated by clients, patients and colleagues, errors are highly visible with high embarrassment and mental turbulence for patients as well as doctors (Payne and Firth- Cozens 1987).

Review of Literature

Doctors have been shown to have relatively high levels of occupational stress in comparison with other professionals.The proportion of doctors and other health professionals showing above threshold levels of stress has stayed at around 28%, compared to 18% in the general working population. (Firth-Cozens,2003). Arguably, stress in medical professionals has potentially most serious consequences for the individual and the community. The doctor's role in the community is central, being the 'gatekeeper' to a wide range of medical provisions and services. The stress and strain in medical professionals is likely to affect their work performance, including the quality of patient consultations and prescribing, as well as adversely affect their own personal and family life.

Challenges like patient overload, loss of autonomy, loss of respect, lower reimbursements, and bureaucratic red tape create a hostile environment for medical professionals that are so intense that three-fourths of doctors report having stress-related problems. Symptoms like fatigue, emotional burnout, marital and family discord, and even clinical depression regularly afflict more than half of doctors. The problems are so pervasive that 60% of doctors report having considered leaving the medical profession (Grenmy 2006).There is a paucity of survey research on stress in the medical profession in India. (Pestonjee, 1999). The relationship of marital status and role stress and coping has been studied by Chaturvedi (2009) who in his study of coping behavior of female teachers found that married teachers in the 40 to 60 years group cope better with job stress. In a study of doctors occupying any level of the social roles i.e. unmarried, or married, they did not differ significantly from each other in terms of experiencing role conflict. (Malhotra and Sachdeva 2005).Gabbard et al (1987) investigating the sources of marital conflict in the traditional marriages of male physicians with female non-physician spouses, demonstrated that the time spent away from the family was the second most important reason for conflict.Although research has begun to identify the major stressors for health professionals, the majority of this research has failed to differentiate between the stressors of men and women, assuming occupational stress for each is synonymous. When gender is addressed it tends to be as an afterthought rather than as a critical variable which is built into the research design. This omission in research must be seen against a backdrop in which women in medicine can be found in rapidly increasing numbers. Today, women make up over 50 per cent of those entering medical school (Audit Commission, 1995).

Little attention has been given to the question of whether these women share the same experience of occupational stress as their male counterparts. Hendrix et al. (1994) claimed that working women are affected by stressors which are common to both sexes, but also others which are unique to women. Following a review of the literature, Firth-Cozens (1990) reported that studies which have focused specifically on female doctors have revealed increased stress arising from prejudice, lack of role models and career conflict. Conflict between their work and personal lives seems to have been particularly stressful for female doctors.(Chambers and Campbell 1996),(Bynoe 1994) and Rout (1996). Females experienced more stress than males from visiting during adverse

weather conditions, fear of assault on night visits, finding a locum, the working environment, lack of emotional support at home, and dealing with friends or relatives as patients. A survey by Swanson et al. (1996) found lower stress and higher job satisfaction levels in female general practitioners compared to their male counterparts. Yet female consultants were found to experience more work-related stress than their male colleagues. Consultants were also reported to be significantly more stressed than GPs on sub-scales of "extrinsic stressors, concerns about management structure, working relationships and achievement". Swanson concluded women were still experiencing difficulties with career advancement in hospital medicine. These reports must surely have strong implications for the future of hospital medicine. The differential pressures and motivators for women doctors across medical specialties can no longer be neglected. This is particularly true in the light of recent studies revealing women to be more strongly motivated to study medicine and placing a greater value on teamwork, clinical responsibility and being valued by patients, than their male colleagues (BMA, 1992).

More recently, Parkhouse and Ellin (1988) have suggested that gender-linked stress can lead women doctors to make important compromises between their personal lives and careers. He reported that women are more likely than men to enter a specialty which is not their first choice . Many women encountered a stage in which they contemplated leaving the rigid structure of hospital medicine for the greater flexibility of general practice. (White 1997).This must surely have unfavourable implications for the future of hospital medicine. As Godley (1990) claimed, "women have proved their intelligence, competence and commitment. Those who have reached the top are justifiably proud of their success in a 'man's world'. But more should be done to remove the additional barriers to women in medicine and to make it as easy, or as difficult, as it is for men". By contrast, according to Dasgupta and S. Kumar (2009), male doctors are more stressed than female doctors in the areas of Inter-role Distance and Role Inadequacy. They also found that Role Overload is the most significant source of stress in hospital doctors.In Scotland, male doctors in a sample of dual career families of doctors,perceived their work as more stressful and less satisfying than females (Swanson and Power,1999).

Hypothesis

H1 There will be significant difference between the stress level of married and single medical doctors in the organizational role stress.

H2 There will be significant difference between the stress level of male and female medical doctors in the organizational role stress

Methodology

The survey research design was utilized for this study. The sample for this study consisted of 454 doctors from Goa, consisting of public sector employees from Goa Medical College, Primary Health Centres and District Hospitals in Goa.. The questionnaire was divided into two parts; the first part was designed to capture the demographic responses. The second part was the ORSS (Organizational Role Stress Scale) questionnaire. Gender difference was calculated by dividing the sample based on men and women doctors, while marital status was analyzed between married and unmarried doctors.

Tool

Organizational Role Stress (ORS) was measured with the help of an ORS-scale (Pareek, 1983). The scale comprises 50 items. The respondents rate each item as 0, 1, 2, 3 and 4 depending on the item’s applicability to their organizational role (0 for rarely/not applicable and 4 for nearly always/very frequently applicable. The scale measures the following ten role stressors. The score for each role stressor (in the range 0-20) is obtained by adding the scores of five pre-assigned items.

1. **Inter-Role Distance (IRD):** is experienced when there is a conflict between Organizational and non-organizational roles.

2. **Role Stagnation (RS):** is the feeling of being stuck in the same role for long due to lack of opportunities or development.

3. **Role Expectation Conflict (REC):** arises out of conflicting demands originating from superiors, subordinates or peers.

4. **Role Erosion (RE):** arises when a role occupant feels that others are performing certain functions, which should have been a part of his role.

5. **Role Overload (RO):** is the feeling that one is required to do too much.

6. **Role Isolation (RI):** arises when a person feels that his role is isolated from the mainstream of organizational life.

7. **Personal Inadequacy (PI):** is created by the lack of adequate skills and the resulting inability to meet the demands of ones role.

8. **Self-Role Distance (SRD):** arises from a gap between one's concept of self and the demands of his role.

9. **Role Ambiguity (RA):** is experienced when there is a lack of clarity about the demands of the role.

10. **Resource Inadequacy (RIN):** arises when human and material resources allocated are inadequate to meet the demands of the role.

Results:

H1: There will be significant difference between the stress level of married and unmarried medical doctors in the organizational role stress.

Table 1 reveals the mean, SD and t- ratio between married and unmarried medical doctors from the public sector. There is significant difference between the means of married and unmarried medical doctors except for RS, RE, RO, RI, & PI, Hence the first hypothesis that "**There will be significant difference between the stress levels of married and single medical doctors" stands partially confirmed** for IRD, REC, SRD, RA, RIN and TRS.

Role Stressors	**Table 1: Role stress among married and unmarried medical doctors**				
	Married N=245		**Unmarried N= 209**		
	Mean	S.D	Mean	S.D	t-ratio
IRD	9.05	2.746	11.09	3.528	6.925**
RS	9.07	3.776	11.64	3.536	7.490
REC	9.16	3.183	9.91	3.366	2.420*
RE	8.92	3.238	10.37	3.290	4.708
RO	8.64	2.444	8.97	2.229	1.527
RI	9.68	2.409	10.64	2.481	4.170
PI	10.39	3.718	12.41	3.632	5.842
SRD	9.22	2.548	10.08	2.905	3.331**
RA	7.48	2.886	8.32	3.347	2.871**
RIN	9.20	3.362	9.27	2.712	.225**
TRS	90.79	20.976	102.6	19.95	.617*

			7	4	

**P<.05, **P<.01*

H2 There will be significant difference between the stress level of men and women medical doctors in the organizational role stress.

Table 2 reveals the mean, SD and t- ratio between men and women medical doctors from the public sector. There is significant difference between the means of men and women doctors except for RE, RI, and PI. Hence the second hypothesis that "**There will be significant difference between the stress levels of male and female medical doctors" stands confirmed** except for RE, RI and PI.

Role Stressors	**Table 2: Test of significant difference of Gender and role stress among medical doctors**				
	Male N= 233		**Female N=221**		
	Mean	S.D	Mean	S.D	t- ratio
IRD	8.64	2.776	11.76	3.150	-11.175**
RS	8.58	3.532	12.44	3.144	-12.326**
REC	7.95	2.443	11.26	3.242	-12.219**
RE	8.29	2.964	11.20	3.059	-10.299
RO	7.88	2.212	9.81	2.035	-9.636**
RI	9.50	2.465	10.94	2.305	-6.426
PI	9.27	3.130	13.82	2.962	-15.899
SRD	8.16	2.077	11.29	2.501	-14.490**
RA	6.71	2.667	9.22	3.150	-9.120**
RIN	8.91	3.420	9.57	2.512	-2.352**
TRS	83.83	18.463	111.31	13.458	-18.188**

**P<.05, **P<.01*

Discussion

The first hypothesis that "*There will be significant difference between the stress level of married and unmarried medical doctors in the organizational role stress stands confirmed except for RS, RE, RO, RI, & PI.*

The Second hypothesis that "*There is a significant difference in the organizational role stress among male and female doctors*" stands confirmed except for RE, RI and PI .

This implies that there is a considerable difference in the level of role stress among men and women doctors.Women doctors have a higher level of role stress.Also unmarried doctors have more role stress as compared to married doctors. While this is consistent with earlier studies (Abrol 1990; Olsson et al., 1990), it is noticed that men compared to women deal more patiently amidst crisis (Thoits 1995). Women generally tend to lose concentration and reveal their feeling and usually seek emotional and social support (Thoits, 1995) More stress among unmarried officers may be owing to their comparative lack of security, resulting in higher self esteem, autonomy, and self actualization needs. It may often lead to clashes and interpersonal conflicts (Sen – 1981).

Conclusion

The results of the above study point to the fact that stress affects all categories of doctors irrespective of their sex or marital status. However the study reveals that there is considerable difference in the role dimension between men and women medical doctors. It is further noticed that women doctors experience higher role stress compared to the men doctors.Also the study reveals that unmarried doctors have higher role stress than married doctors.With the emerging economic crisis as more and more unmarried doctors and women doctors add to the medical workforce, it is imperative to formulate appropriate measures to support a stress free work life.

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The Application of Podcasts and Vodcasts in English as Foreign Language (EFL) Listening Learning

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Abstract

The current study is based on an experimental study in investigating the integration of podcasts and vodcasts as supplementary materials into a traditional listening course. It aimed to investigate the effectiveness of podcasts and vodcasts compared to the traditional listening course60 students at the 2nd level in English at Hodiedah University in Yemen. The effectiveness was measured based on the participants' listening test performance and their level of acceptance or attitudes towards listening. It also aims to identify the variables which significantly affect the experimental group participants' perceived ease of use and perceived usefulness of listening with podcasts and vodcasts. The results revealed that the experimental group performed significantly better than the control group. This provides evidence of the effectiveness of podcasts and vodcasts in supporting learners with more exposure and more comprehensible input in listening. It was also found that the participants in the experimental group showed more significantly positive acceptance of listening with these supplementary materials compared to the attitudes of the control group who merely depended on the traditional listening classroom course.

Keywords: Podcasts & Vodcasts; Listening performance; Technology acceptance model; Attitudes; Perceived usefulness; Perceived ease of use

Introduction

The initial purpose of podcasting was to provide individuals with opportunities to distribute their own radio shows, but within the increasing technology advancement, podcasting and vodcasting have been increasingly playing a bi-sided effective role in enhancing learning and teaching in higher education in general and that of listening skill in English in particular. Moss et al. (2010) state that a large number of colleges and universities have increasingly adopted podcasting and vodcasting as supplementary learning tools to enhance learning and teaching. It is added by Schmidt & Brown (2004) that teachers address the challenge of making their teaching interactive and creative by integrating podcasts and vodcasts into the traditional classroom. The effective role played by podcasting and vodcasting in the area of L2 and FL listening and materials development is attributed to the fact that these tools can meet certain criteria. According to Gruba et al.(2009) that, podcasts and vodcasts, as effective learning tools, can meet three criteria; "input salience (rephrasing, repeating, key phrases are present and build the likelihood of acquisition), enhanced input (representations of concepts are presented both visually and verbally) and authenticity (consisting of an unscripted variety of voices, real life topics, and a range of perspectives" (Gruba et al. 2009: 403). Other three criteria are their flexibility, easiness (Meng 2005) and relevance (Campbell 2005 and Chan & Lee 2005).

The integration of podcasts and vodcasts into classroom can be of great benefits for both students and teachers as long as these tools provide effective teaching and learning opportunities and useful outcomes (Evans 2008). However, it is indicated by Schmidt & Brown (2004) that only little research exists on how the integration of podcasts and vodcasts can lead to successful and encouraging learning environment by combining such technological learning tools into traditional classrooms to enhance students' attitudes and motivation towards learning English as a Second Language (ESL) and English as a Foreign Language (EFL).

However, reflecting the Yemeni context, these practices of teaching and learning listening skill tend to neglect this skill or to make it nearly passive. As a result of this, the amount of exposure to listening is minimized and these practices do not help learners develop listening as a communicative language skill (Bose 2009).The materials used for learning and teaching listening skill in most of the EFL context in general lack visual support or aids accompanying the content or text (Fang 2008 and Wu 2010). Moreover, the input texts, in some cases, lack the organization of linguistic knowledge in terms of structure, grammar and other aspects (Eom 2008). Therefore, based on the previously mentioned issues encountered by the EFL Yemeni learners in listening skill, the need for carrying out this study by which the podcasts and vodcasts are integrated into the traditional listening classroom at Hodeida University in Yemen is stressed and justified. It is hoped that by conducting this study, these challenges faced by the Yemeni learners of English in learning listening skill will be overcome. This study attempts to fill the insufficient body of research in this particular interesting area. It focuses on the effectiveness of integrating podcasts and vodcasts in enhancing English listening skill for the Yemeni EFL learners which is based on technology as a powerful tool for EFL instruction. It aims to achieve the following objectives:

Research Questions and Hypotheses

The current aimed to achieve the answer for the following research questions:

What is the level of difference in the listening test scores between the experimental group and the control group by using podcasts and vodcasts as supplementary materials to the traditional listening course?

What is the level of difference in the learners' attitudes towards learning listening in English between the experimental and control groups by using podcasts and vodcasts according to the technology acceptance model?

Based on the two research questions as previously stated, these two main null hypotheses were proposed to be tested in the current study:

H01: There is no highly significant difference in the two groups' overall performance in the listening comprehension test.

H02: There is no highly significant difference in the two groups' overall acceptance of listening based according to the technology acceptance model (TAM).

Conceptual Framework

The three well-known theoretical models integrated in the conceptual framework are Krashen's Comprehensible Input, Mayer's Cognitive Theory of Multimedia Learning and Davis's (1989) TAM. In combining the three theatrical models, the current study employs the integration of these models to identify the most theoretical variables generating from such theories which can be utilized for achieving the three objectives, and consequently attempting to find out practical answers to the three questions in the research (See Figure 1).

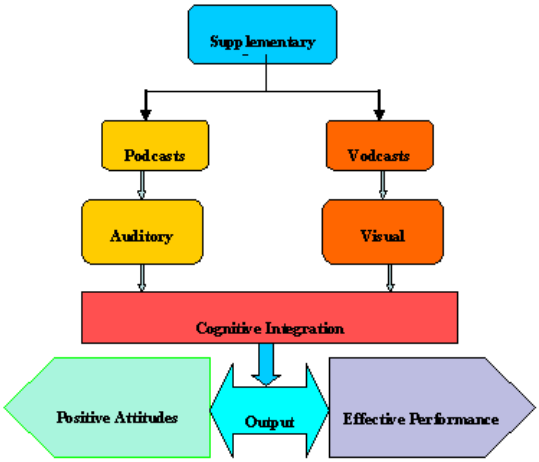

Figure 1: Conceptual Framework

The rationale for the combination of these three theoretical models is that they capture three different but interrelated aspects in listening learning namely: the comprehensible input, the dual cognitive process and the learners' attitudes and acceptance of integrating new technological devices in learning. In other words, the comprehensible input as stressed by Krashen's model is represented by the integration of podcasts and vodcasts as supplementary materials to the normal listening skills taught to the Yemeni EFL learners at Hodiedah university. Since the input provided via podcasts (audio only) and vodcasts (video along with pictures and transcripts), the theoretical perspectives that provide evidence of the effectiveness of the cognitive dual processing of the input are needed. Therefore, the effectiveness of the cognitive informational and learning process using dual senses (auditory and visual) to put in the input provided to learners is comprehensively explained by Mayer's Cognitive Theory of Multimedia Learning. Finally, the output as the final aspect of this conceptual framework presented through the learners' effective performance in the listening tests and their positive attitudes towards listening as a result of integrating podcasts and vodcasts in learning listening stresses the need for theoretical perspectives to better explain learners' attitudes and acceptance.

Therefore, learners' attitude or acceptance of integrating new technologies in learning in general is better explained by the TAM proposed by Davis (1989).

Previous Studies on the effectiveness of podcasts and vodcasts in English Foreign Language **Learning**

In revising the literature concerning the usefulness of podcasting in language learning and particularly, improving listening comprehension, and learning cultural aspects of the native speakers of English, Claudia (2008) points out to several advantages of using podcasting in listening skills. First, podcasts as a relatively new multimedia tool provide listeners the opportunity of enjoying their favourite shows without a time or schedule limitation. Secondly, they include authentic content in listening skills and it can be presented through audio and visual modes. Thirdly, as most of podcasts are located in online Websites, students can access such tools at anytime and anywhere and they can be connected to other more sources of podcasts as most of the podcast pages provide them with links to other websites.

In presenting the ESL learners' reflections on their experience of online listening through authentic podcasts spoken by native speakers, Kavaliauskiene (2008) conducted an experimental study by implementing podcasts as a supplementary authentic approach to listening course in ESP. The findings of the study showed that activities of listening to authentic records as the most common ways of practicing listening comprehension were supported through the implementation of podcasts in improving their listening skills. In addition, the participants were found to be using various techniques and strategies as to overcome some challenges understanding the assigned podcasts. Strategies in listening comprehension such as looking up the meaning of unknown words in a dictionary, recognizing the words by sight from having read the available transcript of the podcasts, using a dictionary while reading a recorded text and guessing the meaning from the context were all beneficial strategies used by the participants for better comprehending the recorded texts in listening skills in English.

To examine the effectiveness of using online podcasts as supplementary authentic materials in providing exposure for Taiwanese learners of English to authentic English, thus, improving listening skills in an EFL context, Lu (2007) conducted a case experimental study of one individual learner with the purpose to raise the learners' and teachers' awareness of the importance of such pedagogical online tools in enhancing EFL learners' listening skills. The study was conducted on the Internet via Microsoft Network Messenger (MSN over a period of four weeks. Based on the data collected through the participant's transcription of the podcasts, comments and suggestions he was assigned to post during the case study period, it was reported that the learner or participant found such podcasts of great benefits in providing him with repeated exposure to authentic English, thus, enhancing his language learning and specially linguistic aspects such as vocabulary and grammar items, pronunciation, word stress and intonation.

Miguel (2009) reviews some previous studies which have been conducted to examine the effectiveness of integrating two interactive e-tools (podcasts and vodcasts) to in higher education and particularly in learning and teaching English to enhance ESL learners' listening skills. The review stresses the various advantages of using such tools to provide learners of English with opportunities to have adequate input in listening. First, they provide learners with exposure to listen to English spoken in authentic situations by native or ELS speakers because they are produced by recording authentic radio and T.V. programs, lectures, interviews, talk shows, concerts and serials into audio and video files which can be delivered in Webs, blogs or even emails. Secondly, as a result of this, such tools can be easy, convenient and accessible because by directing learners to these online sites or emails, teachers can support learners a vast window to work on their own pace, at their comfort and control the way they learn to improve their listening skills as they can just download these files into their computers, laptops or other devices. In addition, since these tools comprise audio, video and written

texts, learners can involve their various perceptible aspects to develop their cognitive skills and other language skills and strategies such as writing down the meaning of chunks or words and taking notes on what they listen to or watch.

Gruba et al. (2009) conducted a longitudinal and reflective action research project that sought to blend podcasts in two different ESL contexts for one year with the purpose of assisting college students work on their 'extended' and 'authentic' listening skills as part of a complimentary set of materials as to meet the requirements of the Test of English as a Foreign Language (TOEFL) or meet other standards. In carrying out their action research, the researchers produced various podcasts by creating almost two dozen recordings on various topics, lectures, regular talks and other modern areas which were spoken by highly proficient speakers of ESL. They distributed these podcasts through learning management site. After a year, it was found that the integration of podcasts had effectively improved the learning and teaching English programs in terms of the learning impact, competence of the teachers, the enhanced learning styles, the integrated spaces, the practices of evaluation, the responsibility sharing and the achievement of the overall goals of the program . As far as learning development is concerned, it was found that blending podcasts in learning English listening skills enhanced learning as the students learned how to use such technological devices to improve their listening. In addition, podcasts made the participants' learning styles more active, participatory and demanding.

Methodology

The current study employed only one type of these approaches known as a post-test-only design approach which is a sub category of true experimental designs according to the classification proposed by (Creswell, 2008).

Subjects

The targeted population in the current study included all the students joining the Diploma Program in the 2nd level in English at the SDCEC at Hodiedah University in Yemen. It consisted of 250 students: one hundred and twenty one males and one hundred and twenty nine female students in group A and group B. However, to select the sufficient number which represents the sample of the study, only 60 EFL learners joining the same level were selected as the subjects to participate in this study including twenty five males and thirty five females. The first group received a new treatment in the form of podcasts and vodcasts as supplementary materials to their listening course whereas the second group relied only on the normal listening course.

Development of Podcasts and Vodcasts

The materials in the form of podcasts and vodcasts developed to be integrated into the listening classes as complimentary and supplementary materials to the normal listening course were all taken from the following diverse four online learning Websites for podcasts and vodcasts. All the 12 podcasts and vodcasts were selected since they were related to the content of the listening course being taught, and most importantly, they focused on different topics, grammatical aspects and lexical items in English taught by the listening teacher during this academic semester.

Administering Listening Test

For the purpose of the current study, the test developed by the instructor aimed to test the participants' listening skill in English. The length of the listening test conversations in this study was around two minutes and forty seconds.

Administering the Technology Acceptance Survey

After the post-performance test was carried out, the survey consisting of two sections was conducted to the participants in the experimental group and those in the control group. The 30

participating students in experimental group were offered the survey regarding their acceptance of listening learning with podcasting and vodcasting section which was previously described. The data collected from the participating students covered the information needed to identify their level of acceptance of podcasting and vodcasting in improving listening skills in English. In parallel to this, the 30 students in the control group were also given the normal listening course acceptance section as previously highlighted.

Data Analysis

Statistical Package for Social Sciences (SPSS) 17.0 / 11.0 for Microsoft Windows was utilized to provide both descriptive and statistical analyses. In determining if these differences between the two groups in the test scores and their responses to the Likert attitude survey were significant, an independent sample t-test was performed. Based on the previous studies by Leong (2003), Ramayah et al.(2006) and Masrom (2007) examining the same aspects, this study tested the null-hypotheses at the significance value of 0.5. For the current study, the seven null hypotheses as presented in the first chapter were proved or disproved (accepted or rejected) based on the significance level of the examined aspects (at 0.5.) for which these hypotheses were proposed to examine.

Results and Discussion

Based on the two research questions and the two null hypotheses, this section summarizes the results of this study obtained from the information gathered and organized in the following two sub-sections.

Results of the Two Groups' Listening Test Scores

Comparing the mean value of the two groups, it was observed that the M value achieved by the experimental group (M= 88.0357) was higher than the M value of the control group (M= 81.7857). It is evident that there is a difference in the listening test performance observed through the achievement between the two groups. The experimental group receiving the new treatment (podcasts and vodcasts) performed better and higher than the control group participants who only depended on the normal listening course in the listening test. The M scores of the listening test achieved by the two groups are also displayed in Chart 2.

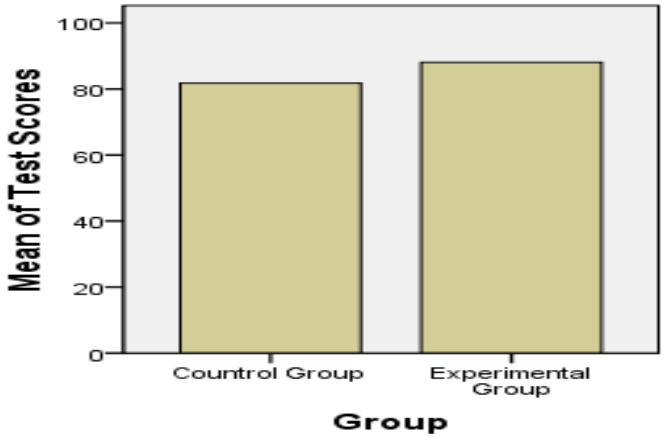

Fig. 2. Distribution of the means of the experimental and control groups in post-listening comprehension test

For this study, to determine if the level of difference in the students' performance on the listening comprehension test was statistically significant and not probably due to random chance, and instead due to use of the podcasts and vodcasts as supplementary materials to the traditional listening

course, an independent sample t-test was performed for this purpose and the p value of at 0.05 levels was .016 ($p < 0.05$).

This is an indication that the integration of podcasts and vodcasts in EFL learning in general and in learning listening skills in particular supports the theoretical perspectives of EFL learning, especially the notions of comprehensible input and exposure as emphasized by Krashen's model. Moreover, the findings of the current study seem to support the theoretical aspects underlying Mayer's (1997, 2001) Generative and Cognitive Theoretical Model of Multimedia Learning in listening skill. The presentation and organization of the input provided to the learner as emphasised by this model can be achieved through providing learners with podcasts and vodcasts. Since the listening lessons offered to the experimental group through the podcasts and vodcasts were presented in various modes of audio, video, animation, texts and other materials, the students were assumed to obtain more access to the input by involving their dual channels of information reception namely; auditory and imagery channels.

Results of the Two Groups' Overall Acceptance Level of Listening for Based on the TAM Variables / Constructs

The results obtained from the inferential analysis of the students' responses to the survey regarding their attitudes and acceptance of listening learning is displayed in Figure 3.

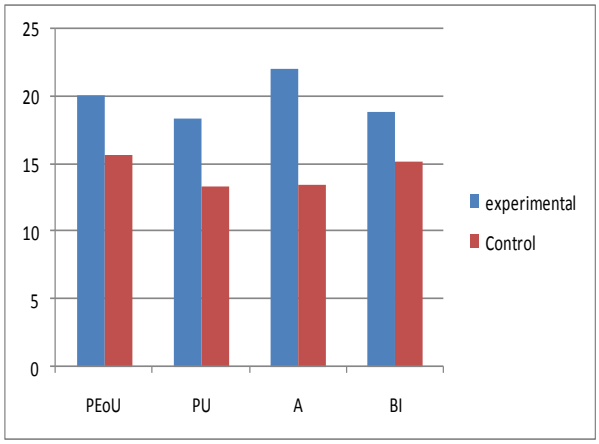

Fig. 3. The M scores for the overall acceptance level of listening by both groups based on the tam variables or constructs

Thus, the first independent t-test comparing the means of PEoU of the two groups indicated that the p value was .000 ($p< 0.05$). This means that the difference in the M values of the two groups was statistically significant. Moreover, a significant difference in the M scores of PU between the two groups was found since the p value was .000 ($p< 0.05$). Regarding the difference in the M values of A found in the two groups, the third t-test revealed the value of p was $< 0.05 = .000$) which indicated that there was a significant difference between the M Scores of the two groups. As proved by the result of the final t-test conducted to compare the means of BI obtained by the two groups, the two M scores were significantly different because the p value observed was as.$000 < 0.05$. Based on the inferential statistics verifying the level of significance in the difference between the two groups' M scores in the four TAM constructs, the second null hypothesis can be rejected. It is adequately evident that the integration of podcasts and vodcasts as complimentary materials to the traditional listening course supports students with more opportunities of exposure to listening resulted in positive attitudes and acceptance on the students towards listening learning at college.

Similar results were obtained in previous studies conducted by Gay et al.(2007), Chan & Lee (2005) and Taylor & Clark (2010) who found out that podcasts can enhance the students'

perception of learning when being used as learning materials in higher education. Moreover, in emphasizing the same idea, Claudia (2008) and Gromik (2008) found that such tools assisted EFL learners to perceive learning useful due to the authentic learning environment provided to the learners through the integration of such learning tools.

Since learners' motivation is an important factor in making learning successful, the results of the study by Janssen (2009) indicated that the use of podcasts could help the participants as EFL learners to enhance their motivation. Similarly, in investigating the integration of podcasts and vodcasts in Management Information Systems courses by Gribbins (2007), listening learning by Kavaliauskiene (2008) and pronunciation by Lord (2008) and Ducate & Lomicka (2009) respectively, it was commonly found that the use of podcasts in learning positively enhanced learners' attitudes towards learning in these areas of major in higher education.

Conclusion

It is obvious that the integration of podcasts and vodcasts has been increasingly viewed and realized as significant and useful learning tools in higher education in general and more specifically, in some ESL/EFL contexts. In Yemen, as an EFL context, it seems that the integration of such technological learning tools can enhance the students' exposure to listen to English more often than they are exposed to it in real life situations. Therefore, to better understand the effectiveness of podcasts and vodcasts in developing learners' listening skills among the Yemeni students at Hodiedah University, the current study examined the effectiveness of such tools by carrying out an experimental study including 60 Yemeni students at this university distributed into an experimental group (30) and a control group (30).The results of the study as previously presented and discussed provided a contemporary picture of how podcasts and vodcasts are proved to be effective in enhancing the Yemeni college students' performance in listening skills in English and lead to positive attitudes towards listening learning. Upon such findings, several useful conclusions and recommendations in an attempt to improve the integration of such technological tools in the university EFL situation in Yemen and to further conduct studies in the same area in the future are drawn up. To conclude, by making such recommendations applicable, it is possible that this area of learning listening skills in English with podcasts and vodcasts in such an EFL context could be significantly improved for both research and pedagogical practices.

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