INTERNATIONAL JOURNAL FOR INNOVATION EDUCATION AND RESEARCH

ONLINE ISSN: 2411-2933 PRINT - ISSN: 2411-3123

INTERNATIONAL EDUCATIVE RESEARCH FOUNDATION AND PUBLISHER (IERFP)

Volume- 6 Number- 1

January Edition

About the Journal

Name: International Journal for Innovation Education and Research

Publisher: Shubash Biswas

International Journal for Innovation Education and Research
44/1 Kallyanpur Main road
Mirpur, Dhaka 1207
Bangladesh.
Tel: +8801827488077

Edition: January 2018

Publication fee: $100 and overseas.

Editorial

Dear authors, reviewers, and readers

It has been a month since I was given the privilege to serve as the Chief Editor of the International Journal for Innovation Education and Research (IJIER). It is a great pleasure for me to shoulder this duty and to welcome you to ***THE VOL-6, ISSUE-1 of IJIER*** which is scheduled to be published on **31st January 2018.**

International Journal for Innovation Education and Research (IJIER) is an open access, peer-reviewed and refereed multidisciplinary journal which is published by the International Educative Research Foundation and Publisher (IERFP). IJIER aims to promote academic interchange and attempts to sustain a closer cooperation among academics, researchers, policy makers and practitioners from a wide range of disciplines, which contribute to state of the art in science, education, and humanities. It provides a forum for the exchange of information in the fields mentioned above by welcoming original research papers, survey papers, and work-in-progress reports on promising developments, case studies, and best practice papers. The journal will continue to publish high-quality papers and will also ensure that the published papers achieve broad international credibility.

The Chief Editor, appointed by the Associate Editors and the Editorial Board, is in charge for every task for publication and other editorial issues related to the Journal. All submitted manuscripts are first screensed by the editorial board. Those papers judged by the editors to be of insufficient general interest or otherwise inappropriate are rejected promptly without external review. Those papers that seem most likely to meet our editorial criteria are sent to experts for formal review, typically to one reviewer, but sometimes more if special advice is needed. The chief editor and the editors then make a decision based on the reviewers' advice.

We wish to encourage more contributions from the scientific community to ensure a continued success of the journal. We also welcome comments and suggestions that could improve the quality of the journal.

I would like to express my gratitude to all members of the editorial board for their courageous attempt, to authors and readers who have supported the journal and to those who are going to be with us on our journey to the journal to the higher level.

Thanks,

Dr Eleni Griva
Ass. Professor of Applied Linguistics
Department of Primary Education
University of Western Macedonia- Greece
Email: chiefeditor@ijier.net

Table of content

Estimating, Budgeting for Quality Control in Higher Education

Safar Bakheet Almudara[1]
[1]College of Arts and Science
Prince Sattam Bin Abdulaziz University
11991, Wadi Ad Dawaser
Saudi Arabia

ABSTRACT

The current study aims to determine the attitudes of estimate and budget of quality control for higher education for the universities and affiliated its institutions. Who is presently undergoing quality assessment according to the National Commission for Academic Accreditation and Assessment (NCAAA), it is the organization responsible for verifying quality documents which are prepared by the respective universities and its affiliated colleges and institutions to meet its goals. So in this article suggest the most suitable techniques to estimate and budget for the quality control. To determine most suitable estimate method, this paper analyzes various methods and selects a suitable method of the cost estimate. According to results, the attitudes of the cost estimate depends on the quality work break structure and its various levels of work done to achieve intended goals. The case research examined in this paper was carried out by the authors of the research project 'Factors Affecting the Quality control in higher education: an Empirical Investigation around Saudi Arabian Universities.

Keywords: Teaching Profession, Pedagogical Formation, Attitude.

INTRODUCTION

The quality Education for any university that adopts it and for its affiliated institutions, to have academic quality and standards (Carpenter, 2017), and to preserve its endurance (Davis, 2014). In most of the universities, Quality assessment unit is installed by the deanship of Quality Education to meet the demands of a growing job market. The emergence of The National Commission for Academic Accreditation and Assessment (NCAAA) units across the kingdom of Saudi Arabia (KSA) has been an instrumental in the changing kingdom's context of higher education over recent years. Furthermore, each higher education institutions of KSA provide their related features for the Quality assessment process. For such big number of institutions or organizations under NCAAA, obviously, major factors such as size, structure, resources, mission, goals, and leadership are the major differences between them. Therefore, cost Estimate and budgeting of quality control will always remain a challenge to the governing bodies.

So in this paper, the first section introduces the basic element in estimation and budgeting, then points out the significance of estimation and budgeting for Quality control for higher education. Finally, the paper outlines cost estimating activity method for estimating cost for the Quality control in higher education which may influence the implementation of the quality evaluation process and so as the cost.

Basic elements of quality assessment in higher education institutions

Poor estimation leads to a bigger problem for the system for which estimation is prepared. The estimate of Quality assurance costs is consequently acquired from a quantified assessments of Quality of the education of the universities essential to complete part, or all, of the Quality process of accreditation by the respective colleges, institutions or universities (Delamonica, 2001). This estimation process will be responsible for the calculation of the cost of the Quality process based on previous process carried out and recorded (Deininger, 2003). The previous process should be a set of reasons or a logical basis for a course of action or belief taken to declare any project process uncertainty. Furthermore, estimation of additional cost where the process might deviate from college to college or institution or university (for example of the award of research excellence for promoting ranking). Obviously, the main item for the cost estimation is the Quality document's scope of achievement, and as such, every element of the Quality Work Breakdown Structure (WBS) should be recorded in the estimation (Garrison, 2010). If WBS is not created (Haugan. 2002), the process of cost estimation will not produce accurate price estimate. The quality scope should include information such as:

- a detailed description of the Quality assessment work;
- any quality control item is excluded in the scope but key to completion
- the WBS items;
- a description of any procedures for accreditation and quality assurance and postsecondary accrediting institutions;
- details of quality assessment deliverables,
- Special conditions on the assessment process. A suitable example would be the time constraints for quality assessment team visit for its targeted institutions;
- Quality assessment considerations such as site access, it will have cost and time implications.

Situation of the Problem

A rough estimation of quality assessment of higher education of the costs is essential and beneficial, however, to get an estimation of the quality process consumes time, useful resources and costs money for the execution of the project. It should be noted there are some problems encountered during estimation and are listed in Table 1.

Table .1 Factors contribute which yield good cost estimate.

Factors which contribute a good cost estimation	Problems encountered in cost estimate
Accurate estimation of the process	Unable to determine the schedule of the resources
Resources needed to complete the process	Too confident and forget that everything works for the first time
Estimation of WBS items of the process	
Complete estimation showing all quantities unit costs and pricing for the IT	The estimate does not reflect the software development and security according to the geographical locations

Duration of the project and isolation of costs.	Continuous evaluation process of quality of education

To meet the requirements for the teaching profession, one has to have positive attitudes towards the profession. Carrying out the teaching profession with sympathy is an important factor for being successful in the profession (Henkel, 2000). Therefore, in order to provide opportunities to develop positive attitudes towards teaching profession, and in order to contribute to the efforts for developing and enhancing the pedagogic training, it is important to learn about the attitudes towards teaching profession among the students/graduates who did not prefer teacher education programs, but later took pedagogic training in order to be assigned as teachers.

Costs incurred for the software development can be measured and specifically tied to institutions requirement of the software for their quality assessments. Most of the software costs are variable because the amount of which they are charged will vary on the requirement and proficiency of the software usage by the resource involved in the process. Typically these include the salary of the server administrator, cost of hardware or equipment rentals and developer's salary.

There are some indirect costs which are common to all institutions and are continuously incurred during the visit of the quality officials to the respective institutions. Following are the indirect costs.

- The salaries of the Quality officials (playing multiple roles) ;
- the costs of rent for car, accommodations, and food ;
- cleaning and maintenance quality documents;
- stationery, printing, communications;
- Employee salaries of non-direct department's staff such as human resources, teaching staff, and security.

Hence, the estimate should, therefore, include direct and indirect costs associated with a Quality assessment.

Aim of the Study

The aim of the present study is to determine attitudes towards estimate and budgeting of Quality Control in higher education particularly, institutions, where quality assessment work is undertaken to meet mission and objectives of the program and that of the university. This study gives an analysis of the various methods of Cost estimation and finally suggest a suitable method to evaluate quality control process concerning cost estimate.

METHOD OF ESTIMATING

Methods of cost estimate give us how much you spend on the project and enable us costs accurately can help us plan for the future (Margavio, 1994; Owlia, 1996). There are many methods to estimate costs, and each method is a different blend of difficulty and accuracy, however, knowing. Some of these methods will help us to choose the right one for our universities (Winn, 1998). These methods should be well versed

with the quality team managers because these methods give an accuracy of the estimate and will reflect their efforts on project planning. There are some methods of cost estimating are listed below:

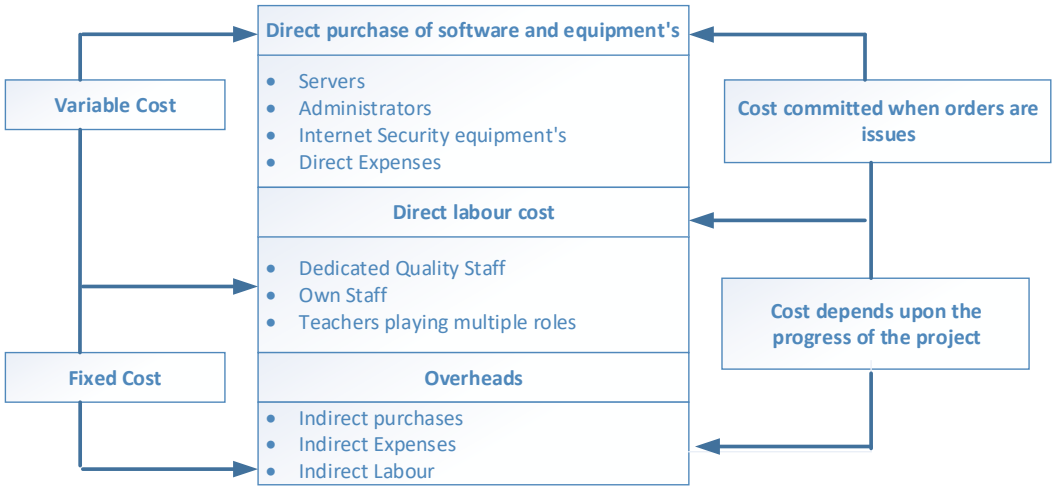


Figure 1. Variable and fixed costs. The model took from 'Project Management' 9th edition by Dennis Lock. © Gower Publications, 2007 and altered according to the Quality assessment of institution.

- Analogy and parametric;
- expert opinion;
- wideband Delphi;
- range estimating;
- Activity-based (bottom-up).

Analogy and parametric

This method of estimate uses statistical analysis methods to find correction between costs and performance of the previous project on quality assessment. It also needs a thorough understanding of difference and similarity of the previous project carried by institute or university. This can be modified for the current project based on the followings:

- the previous project compared in the complexity of conducting assessments and design;
- Listed differences in documents (as some of the institutes achieved the intended goals);
- Location and availability of data in the form software or physical.

Expert opinion

Sometimes expert opinion does play an important role in cost estimate however the experts must be aware of the current trend in the evaluation of quality assessment projects. This should be from some consultants referred and estimated however relying on them for the sake of such project will also question to be answered Quality managers.

Wideband Delphi

Wideband Delphi uses the estimation of projects of a group of experts to define cost estimate of the particular project. This method brings the expert opinions secretly to avoid bandwagon effect. Furthermore, this method also reduces the likelihood of people influencing others with their idea. It is not mandatory to submit their cost estimate by themselves however it can be carried by using Internet technology such email or any profession Wideband Delphi software. Some expert will play the role of coordinator who breaks down the project into WBS sections. Hence, the group members produce the cost estimate with the help of several meetings held between them. Moreover, the team is also responsible for formulating problems specification, identification of cost involved in direct and indirect with their assumptions.

Range Estimating

Range Estimating is very useful when there is very little information on technical data; the technical scope is very poorly defined or nonexistence of historical data. So hence with this very fewer information, experts write about uncertainty data of each critical items are calculated. Furthermore, three variables are produced name as most optimistic, most pessimistic and most likely estimates for items.

Activity Based

This method is also named as Activity-based Costing (ABC), and it follows a bottom-up approach and widely used in large-scale projects. It requires to list the activities to undertake a project of Quality assessment and each activity, and its material cost will be summed up through the various levels of WBS. For university-based costing of Quality control activates are very well suited for estimation.

CASE STUDY OF THE COLLEGE OF ARTS AND SCIENCES, WADI AD DAWASER, KSA

The case research examined in this paper was carried out by the authors of the research project 'Factors Affecting the Quality control in higher education: an Empirical Investigation around Saudi Arabian Universities.

The case for the current study was from Quality unit of College of Arts and Science, Wadi Ad Dawaser, KSA. Case study gathered information from various procedures over a continuous period. In this research, Author gathered research data through face to face interviews, and additionally quality documents provided by the college administrators where the study was carried out. Especially, interviews were held and audio-taped, then tapes were manually converted into word documents, every quality documents were studied. The additional module of this case studies is the module of analysis, defined as the contribution of this study. For this study, this unit of analysis was the college quality team participating in the study.

Process of Quality assessment within the college

College assessment process starts on the first day of the college ends on the day on last day of the college for that particular year. There is a hierarchy of this process as shown in figure 2. Between Quality

Deanship, head of the department and faculty members the process of quality assessment is carried for the program, each faculty members will submit their course based quality assessment to head of the department and he will convey this to his immediate quality manager. During this process there are many documents related to the course will be prepared and submitted to the deanship via the head of the department.

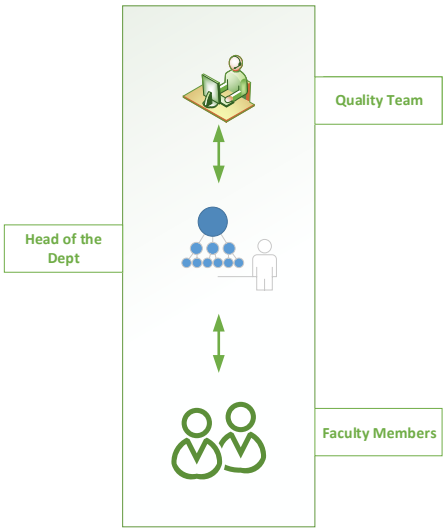


Figure 2. Movement of Quality Documents between Deanship, Head of the department and Faculty members.

Creation of WBS items

For this process, only the time and valuable resource are consumed, so hence WBS is preparing to estimate. Figure 3 shows the WBS structure of the quality assessment process. WBS for the quality assessment is a hierarchical and incremental breakdown of the quality assessment into phases, deliverables, and work packages. This is very much similar to a tree structure, which has different modules of work required to quality assessment for the particular department; for example. In our project, the WBS is produced by starting with the end mission and goal of the program and consecutively partitioning intended mission and goals into manageable modules in terms of documents, duration, and responsibility (e.g., course file, course report, tests and quizzes,) which include all steps essential to attain the objective. The WBS is also named as 100% rule. According to the 100% rule, WBS defines 100% of the quality assessment work according to the mission and goals of the program set by the university by this scope it gathers all deliverables – internal, external, to achieve mission and goal of the program, including work done.

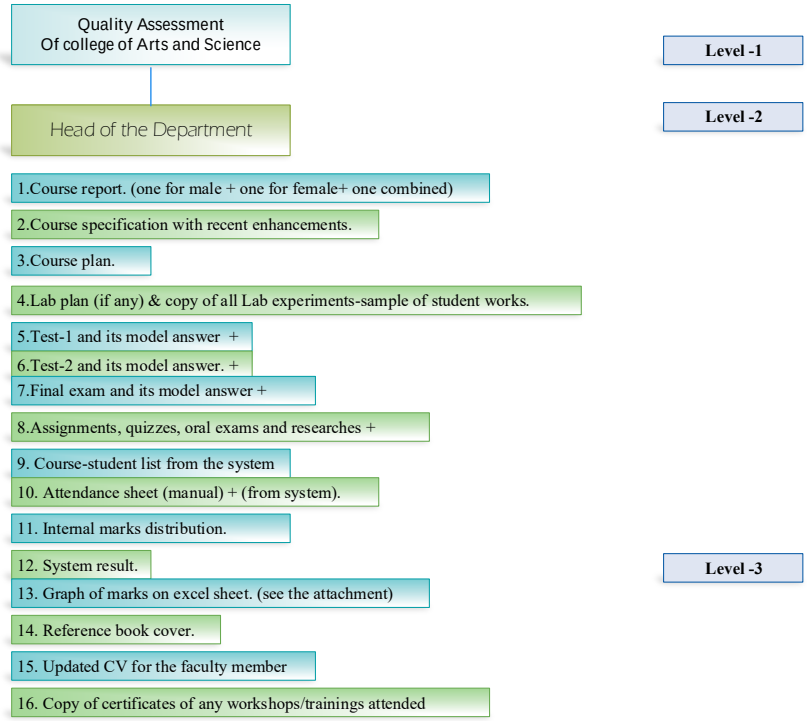


Figure 3. Faculty WBS of the quality assessment process.

Furthermore, on 100% rule, it is essential to note that there should not be any overlapping of modules between different sections of WBS. This could result in repeated work and also confuse project cost accounting. One important thing is observed that WBS structure should capture modules and list their proper actions and scope and should not cross and fall short of 100% of mission and goal of the program. Figure 3, shows faculty based WBS, faculties always liaise with their head of the department for their course based quality documents and Head of the department (HoD) is liaised with the assistant dean for the program based quality assessment process. This communication between HoD and assistant quality dean is also through WBS; it is consist of program report and program specification.

Participants

Purposeful sampling methods were used for collecting data. Selecting quality administrative team and stakeholders to be interviewed for this research was purposeful, because they are stakeholders of their respective departments, and they understand the process of execution of the quality assessment work about a college and its mission and object.

Cost Estimate

As we have utilized the Activity Cost Estimates technique for the quality control project for identifying the estimate for our college. Table 2, shows the template used for the ABC techniques, in which each ID is assigned to the WBS task, resource for that particular WBS is listed such as human resource and technical equipment to be purchased. Indirect costs can be attributed to the services hired resources such as quality personal or machinery for the verification of the Quality assessment service and whereas the direct costs are associated with the completion to the specific task of the WBS items. Reserve items or cost can be unplanned changes to the process of quality assessments.

Quality assessment teams should possess the ability to produce an idea of a Rough Order of Magnitude (ROM) at the initial stage of quality assessment project. The ROM permits the finance team to sense project's cost. The margin of error for a ROM estimate will have error point, and it can adjust according to the finance team. Level of confidence is cost estimate of an item is identified and its dependency on another variable of the project cost estimate, while all other items are kept constant in order, classify which items are most disturb cost estimate.

Table 2. Activity cost estimates.

Project Name			Date:					
Project Number			Document Number					
Project Manager			Project Owner/Client					
WBS ID #	Resource	Assumptions and Constraints	Direct Costs	Indirect Costs	Reserve	Range of Estimate	Level of Confidence	Misc.

BUDGETING

By planning quality process finances, universities can regularly seek to add human resource or machines before the financial crunch. A budget plan will help universities to live within affordable resources. Below mentioned tips that feasibly ease the quality process:

- have a plan or goals
- know quality process practices
- know what available institution resources are
- keep a record of all Quality process expenditures
- Hire quality process expertise
- Share cost

In the education sector, the budgeting process in educational institutional is lengthy and difficult, since the objectives of the institutions and colleges are more difficult to describe measurably that the objectives of companies. For example, a university's objectives may be to produce graduate students who are competent enough to secure job in the competitive market. Hence, to meet this kind of objective, the university will set aside a budget for a high-quality education and spend money on research and development by aiming for an increase in admission and possibly the cutting the cost on various other sectors of education. However, on the other hand, if you are budgeting for a company such as a cloth manufacturing plant, then the aims for budgeting may be mainly fashion oriented, such as confirming that all garments are meeting the standards of the population for whom the product it produces. Hence, this process of budgeting for clothes is difficult to compute, and how it is accomplished is even difficult to

describe. However, there are two types of budgeting are used in the educational sectors, which are named are incremental budgeting and zero budgeting.

Incremental budgeting is a very old budgeting technique whereby the financial plan is based on the current time's budget as a foundation, with incremental amounts then being further added to the new budget. These incremental amounts (salary hikes and other expenditures) and so as the prices to provide services such perks on research publications and to fund a project, or planned funding on research magazines.

Benefits of incremental budgeting

- It is very easy to prepare.
- Very less time-consuming.
- Avoids conflicts as similar style is applied throughout the organization.

Zero Budgeting

In zero-based budgeting, it starts from zero, with no reference being used to the current plan and spending. All of the budgets, hence, start with a zero. Every course is then reviewed carefully, with all spending requiring endorsement, moderately similar with the incremental expenditure needing endorsement. Following are the questioning sessions are carried before approval of any budget :

- *Is the activity really necessary at all?(http://www.accaglobal.com)*
- *What happens if the activity ceases?(http://www.accaglobal.com)*
- *Is the current level of provision adequate?(http://www.accaglobal.com)*
- *What other ways are there of carrying out the activity?(http://www.accaglobal.com)*
- *How much should the activity cost?(http://www.accaglobal.com)*
- *Do the benefits to be gained from the activity at least match the costs?(http://www.accaglobal.com)*

RESULT, DISCUSSION, AND SUGGESTIONS

We have chosen ABC method for the cost estimate for the quality control for college under the affiliation of the Prince Sattam Bin Abdulaziz University; we found this method of the estimate is useful and very easy to maintain to calculate the cost for the future projects of estimating and budgeting of quality control in higher education. ABC is a very simple and best way to calculate and predicate cost which influences our decisions made on the particular WBS items. There are some items such as the hiring of external human resources and computer server for remote sharing of quality documents information can come under indirect cost. However, these items can also be listed in the direct cost because hiring eternal quality evaluator is not a swift decision. As our college is not automated the quality assessment process. It is automated then the quality assessment process will cost much less as compared with the present manual system. Because each step as described in Fig 3 is consists of printing and submitting of hard copies to the HoD, which costs very huge for the college and subsequently increases the budget. Hence, making all these processes automated then the cost of everything will be different, and it will be less as compared with a manual. However the cost of server maintains and providing software, and hardware security will be extra.

Most of the server administrators' work on hourly basis and software security service is charged by license. Hence cost estimate for the quality project will different for the automated quality control assessment.

REFERENCES

Carpenter, B., Ashdown, R., & Bovair, K. (Eds.). (2017). Enabling access: Effective teaching and learning for pupils with learning difficulties. Routledge.

Davis, H. C., Dickens, K., Leon Urrutia, M., Vera, S., del Mar, M., & White, S. (2014). MOOCs for Universities and Learners an analysis of motivating factors.

Delamonica, E., Mehrotra, S., & Vandemoortele, J. (2001). Education for all is affordable: a minimum global cost estimate. New York: UNICEF.

Deininger, K. (2003). Does cost of schooling affect enrollment by the poor? Universal primary education in Uganda. Economics of Education review, 22(3), 291-305.

Garrison, R. H., Noreen, E. W., Brewer, P. C., & McGowan, A. (2010). Managerial accounting. Issues in Accounting Education, 25(4), 792-793.

Haugan, G. T. (2002). Effective work breakdown structures. Management Concepts Inc.

Henkel, M. (2000). Academic identities and policy change in higher education (Vol. 46). Jessica Kingsley Publishers.

Margavio, G. W., Fink, R. L., & Margavio, T. M. (1994). Quality improvement using capital budgeting and Taguchi's function. International Journal of Quality & Reliability Management, 11(6), 10-20.

Owlia, M. S., & Aspinwall, E. M. (1996). A framework for the dimensions of quality in higher education. Quality Assurance in Education, 4(2), 12-20.

Winn, B. A., & Cameron, K. S. (1998). Organizational quality: An examination of the Malcolm Baldrige national quality framework. Research in Higher Education, 39(5), 491-512.

Executive Coaching and Organisational Performance: Review and A Critique of Literature and A Research Agenda.

James Kahugu Kibe
(Department of Human Resource Management, School of Business, Kenyatta University, Kenya)

Dr. Stephen Muathe
(Department of Business Administration, School of Business, Kenyatta University, Kenya)

Abstract

Executive coaching is now becoming paramount in any organization that values performance. However, there is scanty research on the relationship between executive coaching and organizational performance. The purpose of this study is to identify the contextual, theoretical, conceptual and methodological gaps that exist between executive coaching and organizational performance. The study has found out that relatively few theories link the two major variables in the study. Experiential learning theory talks about learning experiences and outcomes of executives but fails to give a clear link of how the various outcomes lead to organizational performance. More so, cognitive behavior theory is more inclined to behavioral changes and self-driven scrutiny on finding fault in oneself with aid of Socratic questioning, but does not clearly explain how the changes lead to organizational performance. The systems approach sheds light on how the various systems in the organization can be amalgamated to give an effective leader but fails to indicate how effective leadership translates to organizational performance. The goal theory on the other hand explains how the various environment and personal aspects lead to goal attainment in the organization. However, learning and behavior change have not been used categorically to explain the goal attainment process. The empirical studies conducted tend to relate executive coaching to other variables such as job satisfaction, individual commitment, self-efficacy and self awareness in the western context but fails to associate the coaching exercise to organizational performance. Finally, few studies have employed inferential statistics to show the association between executive coaching and organizational performance. The fundamental conclusion, therefore, is that the gaps mentioned and explained in this study need to be addressed in order to show if indeed there is an association. The study would help organizations in realizing that, the association between executive coaching and organizational performance has an impact on the firm.

Keywords: *Effective leadership, Organizational performance, Socratic questioning.*

1.0 Introduction

Organizational coaching always marks the onset of organizations trying to work on their potential and capabilities on attaining the set targets. However, in most studies, the scientific relationship between executive coaching and organizational performance is inadequate.(Yang, & Fernandez, 2008; Luebbe, 2005).

There are a few empirical studies on the impact of executive coaching as a tool for development in organizations (Wasylyshyn, 2003 & Blackman, 2006). This failure to show the relationship that exists between executive coaching and organizational performance is a gap in existing research since executives have an influence on the success of the organization in which they operate (Malcolm, 2010;). This study has used learning, behavioral changes, 360-feedback process as executive coaching outcome measures, (Feldman & Lankau, 2005)

With the changing trends and nature of work, executive coaching seems to play a pivotal role (Arthur & Rousseau, 1996). Therefore, organizations must invest in human capital development in order to address the social, political, and economic changes in the environment that requires continuous innovation and managerial flexibility. (Antonacopoulou, 2000).

Further, since executive coaching programs incur a significant expense, it is paramount for organizations that manage these programs to think of new ways of increasing executive coaching effectiveness. More so, given the inadequacy of agreed-upon definitions and standards, more theoretical and empirical research on executive coaching effectiveness is required (Collings 2009). An organization's paramount goal is to achieve its strategic objectives.

To enhance high performance in an organization, employers should come up with measures that can help their employees work and think individually while meeting their responsibilities in an innovative way, while at the same time understanding and foreseeing their industry's market and business situation (Gadot, 2012). Consequently the question of how an employee can work in both an efficient and effective manner to maximize an organization's growth and productivity arises. An effective coaching program can be of great help in increasing productivity and engagement of staff in an organization.

It is imperative for employers to develop their employees through continuous developmental programs. This is because of the direct and indirect relationship that exists between performance and leadership (Gadot 2012). Jarvis (2014) explains that different factors are responsible for increased use of coaching by different organizations today. Many organizations work under pressure to manage change, which poses to be a continuous challenge. An employee ability to learn and also adapt has become an important skill in today's organization. Therefore coaching is used in today's workplace to help organizations regulate workplace changes.

Jarvis (2014) argues that there is a growing trend in today's firms where they are trying to incorporate personal learning and development so as to understand the developmental need of the employees, help in personal problem solving and planning of activities to be undertaken by the employee. Further, employees are best motivated when organizational coaching and training are connected and relevant to their job.

Development of skills in an organization can help staff give their maximum to the firm which can also enhance a worker's satisfaction on the job. Gladis (2012) argues that with relevant coaching, employees will perform better which in turn will lead to better organizational performance. The executive leader will get a better insight and knowledge which will strengthen one's position thus increases the benefits for the organization and its competitive advantage.

Rowold (2012) adds that current studies posit that organizations heavily invest in Human Resource Development interventions such as coaching in order to enhance the skills of the employees. This will in turn help in attaining job performance, job satisfaction, and job involvement. Thus coaching is an important undertaking as it can lead to improved job performance and better focus on work-related issues. Coaching supports an employee work development plans (Richard, 2013).

2.0 LITERATURE REVIEW

2.1 Theoretical review

This review will tend to demystify and give more information on existing literature about Executive Coaching. Coaching as a term was originally used in the fields of consulting and counseling. This was supposed to make them seem less intense (Tobias 1996).

Apparently, the re-labeling of this coaching to promote professional development worked in late 1990's whereby many companies sought the service since it enhanced employee's growth which in turn brought forth organizational performance (Stern, 2001).

Kilburg (1996) supported the approach on how coaching got its roots from consulting and counseling. Speculative reasons have been given by some authors who suggest that giving therapy into the workplace in disguise of coaching was a way of psychologists trying to resuscitate their practices (Filipczak, 1998 & Tobias, 1996). However, White and Witherspoon (1996) gave a simpler, more direct explanation for coaching popularity.

Experiential theory, as first articulated by John Dewey (1910) influences the coaching practice. It is a sub-set of Adult learning theory forms the cornerstone of coaching practice because it sheds more light on self-actualization, self-transformation, and self-determination, of the learner (Jarvis et al., 1998).

In this theory, the experiences form the basis of analysis. The analysis is then likened to the organization whereby future implications can be considered. Kolb (1984) posited that learning is a holistic process involving four aspects of learning (feeling, reflection, thinking and acting), which represents a learning cycle

Hurd's (2002) sheds some positive light on experiential learning by highlighting the significance of experiential learning whereby participants or clients engage in learning experiences within a real context. In addition, the capacity to solve problems in an organizational setting is evidenced in studies like that of Bostrom and Ellinger (1999) More so, Shields' (1997) study shows that within experiential learning, reasoning skills and problem-solving are utilized in a team-oriented setting resulting in substantial

learning. Thus coaching is pivotal since learning takes place through experience (Hurd, 2002; Hudson, 1999)

In their mentoring study, Wanberg et al. (2003), proposed three areas of change, namely: cognitive, skill-based, and effective learning. However, executive coaching is much focused on effective and cognitive learning which focuses on procedural and declarative knowledge. Affective learning would encompass changes in values, improved tolerance for diversity, changes in the coachee's motivational disposition, and goal setting.

Systems-oriented theory, advocated by Ludwig Bertalanffy(1968) has evolved to a method that is applicable in many different situations. It is set to help people secure better inter-relational experiences. Divergent views and aspects can be effectively solved with systems therapy. With this theory, the executive's behavior is not only as a result of intra-psychic forces but also the response of various work demands put on them by various stakeholder groups. Therefore, the executive's behavior can solely be understood in the context of organizational changes (Peltier,2001).

Orenstein (2002) espoused a theory that looks at group-level within-person, and organizational-level effect on executives' performance. The coach tries to be more enlightened about the organization at large so that he or she can be of great help the management in coming up with better ways of solving the challenges at hand.

This approach offers a more comprehensive angle to coaching because it not only includes the individuals but also other members of the organization including the top management. This theory is relatively comprehensive because it focuses the behavioral change on both the work-teams and top management of the organization.

However as much as the theory suggests that it focuses on the systems functioning within the organization to know how they function so that the coach can give an informed decision, it fails to point out how the systems influence one another to lead to an effective organizational performance. More so, it might take time for the coach to know how some systems work.

Cognitive Behavioral Theory (CBT) assimilates thinking and action. Behaviorism, as propounded by James Watson (1913) argues that learning takes place when a response is triggered by a stimulus. On the other hand, the cognitive theory describes the importance of choice and thinking in establishing behaviors.

Aaron T. Beck (1960) and Albert Ellis, pioneered cognitive theory and coincidentally came up with Rational Emotive Behavior Theory (REBT) (Anderson, cited in Ducharme, 2004, p. 214). REBT justifies how irrational thoughts, can be understood to cause various physical illness. CBT encourages the participants to think of the self-defeating and irrational thoughts and then think of better ways to turn this negative thought into positive ones, hence behave appropriately. (McMahon, 2007).

Cognitive Behavioral Coaching is grounded on self-driven scrutiny on finding fault in oneself with the aid of Socratic questioning. This is normally conducted by the coach. Specific event and developmental needs of the client are greatly focused by the coach, who tends to be more issue-focused (Ducharme, 2004). Once the mal-adaptive thoughts have been identified, cognitive restructuring is used to replace them with positive ones. The approach takes cognizance of the fact that one can learn from the behaviors observed in the

organizations and do rational thinking about them. However, it requires an executive to be knowledgeable in a relevant area so as to make a rational decision that will influence the organization positively. Therefore, learning can fail to take place. More so the theory fails to point out how thinking and behavior outcomes lead to organizational performance.

The Behavioral Systems Theory integrates the systems and behavioral theories in executive coaching. This theory is accredited to a Russian physiologist, Ivan Pavlov and an American psychologist B.F. Skinner (Berg and Carlson, 2007; De Han and Burger, 2005). A general explanation and description of behavior were propounded by Pavlov (Catania and Laities, 1999; Visor, 1996). Skinner strongly opposed the mentalist elucidation of behavior. This is because mental states can only be inferred from the verbal and physical behaviors a person displays. Bateson and Skinner's works have glaring resemblance as well as variation. In matters pertaining resemblance, they were both theorists with interest in adaptive behavior under the eventualities of the environment. They both thought of human behavior as a consequence of interdependence between people, environment and culture (Ales', 1992; Collar and Redmond, 1982).

It is crystal clear to espouse for an integrated behavioral systems approach. Tangible proof comes from both scientists and practitioners who are working in both theoretical fields that have an unmediated link to executive coaching (Haley, 1963 & Stuart,1969).

Behavioral systems are generally viewed in consultancy profession whereby the quality of verbal and non-verbal interactions among facilitators, consultants and clients is as important as the subject matter dispensed (Visser, 2003). In contrast to the cognitive-behavioral approach, behavioral approach takes cognizance of the observable behavior and how it can be conditioned to influence the organizational performance. It ignores the fact that as much as observation is taking place to learn of the various processes, the mind has to be involved in a greater way since one is acquiring a set of instructions and skills that will make him solve more complicated tasks through a given acquired technique. More so, the behavioral systems theory argues that choices that individuals make are influenced by environmental factors and the surroundings (Haley, 1963 & Gray, 1979).

Goal theory, as the name suggests, expounds on goals which are plans and commitment to reach out to the desired achievement (Klinger, 1975; Spence, 2007). Goals are defined in terms of cognition, behavior, and effect. (Locke, 2000 & Pervin, 1982). Cochran and Tesser (1996) argue that a goal is an image of the intended, stored in the memory for collation with the real estate. More so, it tends to influence the present due to some targets set for the future (Street, 2002, p.100).

Goal understanding is very pertinent since it stresses the cognitive role, effects, and behavior. More so, it acts as a source of motivation (Street 2002). Goals related to performance always focus on personal ability and competence (Gresham, Evans & Elliott, 1988). These goals tend to be powerful motivators in the attainment of set targets. The goal theory is relatively new, and thus there are a few excerpts linking it to executive coaching domain. However, it is very relevant in discussing coaching as stipulated above. (Grant 2012).

The integrated model, for instance, gives a preview of how coaching gets assimilated into the organization to give the desired goals and outcomes. It is equally important in analyzing the psychology of coaching. The model illustrates the various organizational and individual factors such as system complexity, rewards and punishments, personal needs and personality characteristics which inform the coach's understanding and engagement. (Grant 2012). This leads to the drafting of goal choice and action plans which are normally influenced by goal difficulty, learning, goal specificity and congruency. The goal attainment process which entails daily strivings is directly influenced by effort, persistence and task strategies. Feedback, commitment, and task complexity are pivotal in the goal attainment which in turn leads to goal satisfaction and preparedness for future action. (Grant 2012). Goals tend to give a sense of direction and enable people to refine their performance. Precise goals enhance motivation by making people focus on specific objectives and avoid falling back in the face of setbacks. (Locke & Bryant,1969). Achievement of goals always leaves employees prepared to deal with complex challenges that inform on future goal attainment. (Wood & Locke,1990).

However, goal achievement is solely dependent on certain aspects such as task complexity, persistence, group characteristics among others. But with a receptive group, the aforementioned challenges would not pose a threat to the goal attainment process (Latham & Locke, 1975).The above theory does not recognize the fact that learning and behavior change are important aspects of observing when it comes to goal setting and attainment. It is imperative that learning should take place before attainment of the goals. More so, behavior change has to take place to indicate a commitment to the attainment of goals in an organization clearly.

In relations to the above discussion, this article is recommending experiential learning theory because it emphasizes on the aspect of learning and acquiring skills in the organization thus enable the executives to work effectively and efficiently in line with the changing goals of the organizations brought forth by the ever-dynamic environment. More so, the theory captures the concept that, for any change in any given organization, learning must take place.

2.2 Empirical Review

Three major trends in coaching have been observed since early 20th century (Grant, 2004). The first trend concerns internal coaching while the second and third involve external coaching. Internal coaching is provided by a skilled or trained employee within the organization while external coaching is done by hired consultants (Hall 1999).

Gegner (1997) carried out research on outcomes of executive coaching.25 executives were interviewed to obtain information on their learning experience. 84% respondents reported positive attitude and feelings on their involvement in coaching. Eight respondents noted improvement in their performance. The most valuable outcome noted was learning more about themselves or acquiring new skills. Also, 20 percent had accepted change and exhumed self-confidence. The study fails to recognize or show the relationship between the newly acquired learning skills at the workplace and organizational performance. More so, the data collected was from a relatively small sample size and no tangible conclusions on cause and effect can be postulated with conviction.

Kopelman and Bane (1997) researched on executive coaching as a transfer-of-learning tool. Action research project was conducted. 31 managers in the civil service received coaching for two months on enhancing new managerial skills, implementing new systems of control and implement an essential work project that would, in turn, improve performance. The groups reported positive reactions to the coaching process. However, as much as executive coaching was being tested as a learning tool, its findings were restricted to a workgroup performance and employees in a work unit.

Paige (2002) carried out studies on the effectiveness of executive coaching on executives. 5 executives who worked in both private and public sectors and had undertaken to coach for an average of 8 months were considered for the study. Data was collected using taped interviews whereby 2 interviews were undertaken with each participant. Respondents indicated that executive coaching was meaningful and it had made them aware of the delicate balance between their work and family life. It was also observed that organizational learning occurred during the coaching process. However, the study used a limited sample size to make valid conclusions.

In Wasylyshyn's (2003) study on executive coaching outcomes, respondents were asked to present their views on whether the coaching experience is of any worth. 60% said that they attained behavioral changes, that is, they developed better inter-relationships.48% reported increased understanding, and 45% argued that they had become relatively effective as leaders that are they were more confident and had increased optimism. More so, according to Wasylyshyn studies, a number of coaching engagements were engrossed on behavior changes that executives yearned to make for better achievement in the organization. In a relatively similar study involving 26 executives of non-profit organizations, respondents gave a positive response in that coaching enhanced effective behavior at the work-place and improved learning (Compass Point, 2003). As much as the findings observed were positive, they tend to overlook at how behavior change and learning link to the organizational effectiveness.

Vargas and Kucine (2003), in their study of the impact of executive coaching improvement in multisource ratings over a one year period, showed that executive leaders are eager to learn and work with the respective executive coaches. More so the executives had a likelihood of coming up with clear and measurable objectives, with close consultation with their colleagues and supervisors. A quasi-experimental pre/post control group design was used for the study. There were 1361 respondents in the study were managers at the top level of various large organizations. All respondents had received multisource feedback, that is, ratings from supervisors and peers about their performance as managers. As much as the study indicates the positive response of 360- feedback to executive effectiveness, it casts a blind eye on other outcomes of executive coaching, and how they influence the performance of the organization at large. The sample size which was sampled through survey was relatively small though effective. Multisource feedback ratings are normally seen as very extensive to detect the effect of a tool used for measurement.

Karen Walker and David Weller (2004) conducted some studies on substantiating the link between coaching and performance. The study comprised of thirty-two executives. The executives were at the level of directors and vice presidents. A comprehensive 360-degree-feedback instrument that measures the strength of leadership and needs for development was used. The executives were rated by their peers and supervisors. The results obtained were used to take note of their strengths and weaknesses respectively and

to form plans for development. The outcome postulated that those leaders who were rated highly attained a lower turnover among employees, higher net profits and better employee morale than their lower-rated peers. Therefore, it is prudent to conclude that caching improves performance. As much as the results were positive, they only capture on multinational organizations. In addition to the use of one instrument, 360 degree-feedback instrument, to measure performance might tend to make the findings subjective.

Gil Bozer (2007) conducted a study on the effectiveness of executive coaching on coaches' performance.197 respondents participated in the study. It gives a supposition that executive coaching helps improve individual satisfaction and commitment. Unfortunately, the study limits itself to the employees working within a department in an organization and not on the organization as a whole. The study has only used a quasi-experimental design that concentrated on experimental and control groups in the collection of data.

Moen and Skaalvik (2009) conducted studies on executive coaching through the lens of psychology. Variables such as goal-setting, self-determination, and self-efficacy were considered in the study.144 respondents who happened to be executives participated in the study. The finding supported the notion that executive coaching has a positive influence on self-efficacy. Self–efficacy is at the core of human performance.

Beersma and Vianen (2013) conducted a meta-analysis study on the effects of coaching on individual level outcomes in an organizational context. The study focused on some dominant outcomes namely: well-being, career-related attributes, and goal-directed self-regulation. Secondary data was used where 107 articles that included quantitative data on effects of coaching were used. The study also factored articles in which coaches belonged to a non-clinical population. The results indicated that there is a positive effect of coaching on performance. However meta-analysis studies are more unlikely to yield a representative sample because studies that show some positive outcomes are more likely to be published, hence subjection to publication bias.

3.0 Conclusion and Recommendations

The purpose of this study is to explore the association that exists between executive coaching and organizational performance and to analyze the contextual, theoretical and methodological gaps and provides a conceptual framework for the relationship. The significance of this study lies in its integration of the literature that exists on executive coaching and performance, and related propositions derived from the literature.

Despite empirical coaching becoming sensationally popular, there is little empirical evidence about its impact. Spirited arguments have been set forth on which executive coaching approach to using and the professional qualification of coaches. The lack of proper research and adequate theories to advance the field seem to be one of the greatest hurdles in the field.

More so, the methodological gaps need to be bridged to make the studies relevant. It is hoped that the conceptual framework, methodological gaps, and propositions will stimulate further research on executive coaching and its relationship to organizational performance with rigor and relevance.

It is imperative to note that coaching plays a major role in organizations in trying to enhance performance. However little has been done to show if there is indeed a relationship between executive coaching and organizational performance.

Coaching is a program geared towards helping organizations and executives improve their performance. (Kampa-Kokesch & Anderson, 2001). Organizations and executives need to know that executive coaching is a young professional practice and it is still forming its identity. (Pinchot & Pinchot 2000). Therefore, it is imperative to acknowledge that as a growing area, executive coaching is still developing the appropriate behavioral techniques and methods to improve personal satisfaction and organizational effectiveness.(Kilburg 1996).

Many executives in organizations are slowly beginning to realize that coaching is beneficial in a wide range of areas (Dawdy, 2004) from managing stress, performance, satisfaction, self-regard and leader development(Passmore & Gibbes, 2007).Findings regarding the coachee's improvement in career satisfaction are in tandem with Luthans and Peterson (2003) who found out an improvement of job satisfaction and attitude, due to the 360-degree feedback combined with coaching .However, the above findings were based on the western context, and more so, on individual success. The studies fail to explain how the individual success outcomes translate to organizational performance.

Many executives realize the fact that they are facing a series of career challenges; therefore more focus is put on professional development.(Marshall, 2000). Brown and Hockman (2004, p. 42) posited that executives who employ coaches learn how to set objectives, goals and better strategies that improve their work-life balance. More so, Blackman's (2006) study shows that executive coaching had given the leaders an ideal way to attain their goals. Unexpectedly, the studies fall short of indicating whether executive coaching has a positive relationship with organizational performance or whether the goals geared towards organizational performance.

Shields' (1997) study shows that within experiential learning, reasoning skills and problem-solving are utilized in a team-oriented setting resulting in substantial learning. Therefore, executive coaching gives one the chance to acquire knowledge or skills through experience.(Hurd, 2002; Hudson, 1999). The aforementioned study fails to specify how experiential learning results in organizational performance.

More so, Grant (2012) conducted studies on the integrated model of goal-focused coaching. Goals are defined in terms of cognition, behavior, and affect goals and how they help organizations attain expected

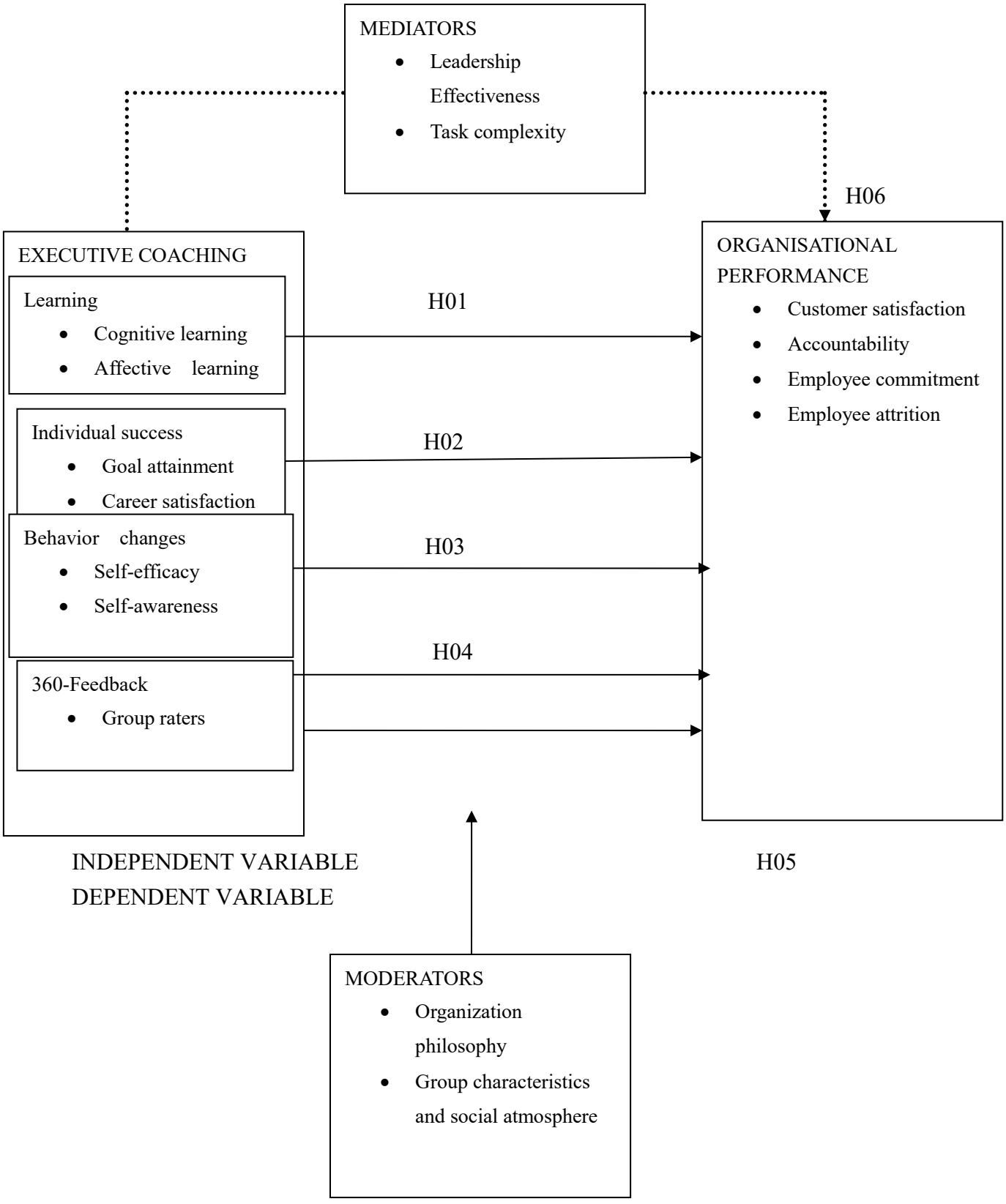
performance. Klinger, (1975) and Spence, (2007) define goals as the transition from an existing state to the desired outcome. The research fails to explain how challenging goals lead to the needed personal and organizational outcomes.

In a quasi-experimental study conducted by Evers et al.'s (2006), participants indicated that executive coaching improved their effectiveness and informed on how to set their goals appropriately. Therefore, the study proposes that executive coaching is a mechanism that can help attain high levels of career satisfaction. The study (among other studies) captured the western context, and therefore the researcher deems it wise to conduct the research and find out if at all there is any relationship between executive coaching and organizational performance.

Guangrang & Meuse (2009) carried out a study on the effectiveness of executive coaching. The study intended to seek data to support the notion that coaching produces positive outcomes. A meta-analysis study was conducted. It was found out that coaching contributes to sustained behavioral change (Genger 1997), achievement of goals (McGovern 2001) and increased leadership effectiveness (Thach 2002). However, as can be seen, the study was fully reliant on meta-analysis data which make it prone to bias. More so, some variables such as leadership effectiveness have been factored as dependent variable, but this study would like to factor them as moderators.

With the aforementioned studies, it is evidently clear that various variables such as self-efficacy, leadership effectiveness, among others, were treated as dependent variables but this theory tends to use them as moderators so as to be able to explain the relationship that exists between executive coaching and organizational performance. This will bring a clear view and perception of the two variables.

Various variables in the conceptual framework that form the basis of executive coaching and organizational performance have been used to explain the relationship. Learning, individual success, behavioral changes, and 360-degree feedback, give clear indication that independent variable can relate to organizational performance. The various moderators such as organizational philosophy, group characteristics and social atmosphere tend to explain the relationship between executive coaching and organizational performance.


MEDIATORS
Leadership Effectiveness
Task complexity
H06
EXECUTIVE COACHING
Learning
Cognitive learning
Affective learning
H01
ORGANISATIONAL PERFORMANCE
Customer satisfaction
Accountability
Employee commitment
Employee attrition
Individual success
Goal attainment
Career satisfaction
H02
Behavior changes
Self-efficacy
Self-awareness
H03
H04
360-Feedback
Group raters
INDEPENDENT VARIABLE
DEPENDENT VARIABLE
H05
MODERATORS
Organization philosophy
Group characteristics and social atmosphere

HYPOTHESIS

This study proposes descriptive survey design. This is in relation to other studies conducted, for instance,

H01 : There is no relationship between learning and organizational performance.

H02 : There is no relationship between individual success and organizational performance.

H03 : There is no relationship between behavior changes and organizational performance.

H04 : There is no relationship between 360-feedback and organizational performance.

Wasylyshyn (2003) and Lily Benadives (2008) used to survey and cross-sectional survey design which fall under descriptive studies. According to Mugenda & Mugenda (2003), descriptive studies determine and report things the way they are. The design allows for cross-referencing of data gathered from different participants using questionnaires. (Karanja,Ibrahim,Keriko& Tirimba 2005)This method is normally used to describe the area of interest by bringing out the facts on the ground as they are. The main advantage of this study design is that it allows the researcher to be flexible in the data collection exercise, by using both open/closed-ended questions hence providing the target group with an opportunity to give additional information.

Carol Gegner (1997) and Lily Benavides (2008) used cross-sectional survey design using a non-random sample of executives who had been coached. Both qualitative and quantitative data were collected. Effectiveness and ineffectiveness of the coaching process were measured using a 5-point Likert scale. A cross-sectional survey makes assumptions about a population of interest once the data is collected. The data collected will always give snap-shot information about the population from which data is collected. (Creswell, 2005).

A questionnaire with closed and open-ended questions can be of essence to this study. The data collected through questionnaires allows the researcher to calculate any perceived differences in executive coaching and organizational performance.

The administration of questionnaires is one of the primary methods used for collecting data from the respondents**.** They normally give room for anonymous feedback and exploration of trends which help describe the relationship between two or more variables. It also provides a measure of respondent's feelings and insights about issues that are of particular concern. They are relatively cheap and convenient for data collection within a limited period of time. (Mugenda &Mugenda, 2003)

This study intends to apply inferential statistics such as multiple regression analysis in trying to find out the relationship between the variables (Francis, 1998). Karanja and Ibrahim (2015) used regression analysis to find out the effects of coaching programmes on employee performance. The analysis was pivotal in inferencing social behavior.

The regression model can be in the following form

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + E_t$$

where:
Y: Organizational Performance (Dependent variable)
X1: Learning technique (Independent variable)
X2: Behavioral Change (Independent variable)
X3: Individual Success (Independent variable)

Descriptive statistics can be used in the analysis of quantitative data. Analysis of data refers to systematically applying statistical techniques to describe, manipulate, summarize and evaluate data in order to obtain answers to the research questions. (Resnik & Shamoo, 2003). The data can simply be analyzed using a computer software package SPSS.

REFERENCES

Abbott, G., & Rosinski,P (2007). Global coaching and evidence based coaching: Multiple perspectives operating in a process of pragmatic humanism. *International Journal of Evidence Based Coaching and Mentoring*, 5(1), 58-77.

Ashford, S. J. (1986). Feedback seeking in individual adaptation; A resource perspective. *Academy of Management Journal*, 29 (1), 465-487.

Axmith, M (2004). Executive coaching: A catalyst for personal growth and corporate change. *Ivey Business Journal*, 1–5.

Bandura, A. (1977). Social Learning Theory. Englewood Cliffs, NJ: Prentice Hall.

Berger, J. G. (2006). Adult Development Theory and Executive Coaching practice. In Evidence based coaching handbook: Putting best practices to work for your clients, pages 77-102.

Berglas, S.(2002).The very real dangers of executive coaching. Harvard Business Review, 80: 86-93.
Bolch, M. (2001). Proactive Coaching. *Training,* 38: 58-63.

Brockbank, A. and McGill, I (2006). Facilitating Reflective Learning Through Mentoring and Coaching. London.

Brooks, I., & Wright, S. (2007). A survey of executive coaching practices in New Zealand. *International Journal of Evidence based Coaching and Mentoring,* 5(1), 30-41

Brotman, L.E., Liberi, W.P., & Wasylyshyn, K.M. (2007). Executive coaching: The need for standards of competence. In R.R Kilburg & R.C. Diedrich (Eds.), The wisdom of coaching: Essential papers in consulting psychology for a world of change. Washington: American Psychological Association.

Conner, M. and Pokora, J. (2007). Coaching and mentoring at work: developing effective practice.

Dagley, G. (2006). Human resource professionals' perceptions of executive coaching: Efficacy, benefits and return on investment. *International Coaching Psychology Review*, 1(2), 34-45.

Ducharme, M. J. (2004). The Cognitive-behavioral Approach to executive coaching. *Consulting Psychology Journal: Practice and Research* , 56 (4), 214-224

Evers, W.J.G., Brouwers, A., & Tomic, W. (2006). A quasi-experimental study on management coaching effectiveness. *Consulting Psychology Journal: Practice and Research,* 58(3), 174-182.

Good, D., Yeganeh, B. & Yeganeh, R. (2010). Cognitive behavioral executive coaching. Od practitioner, 42 (3).

Grant, A. M., Franklin, J., & Langford, P. (2002). The self-reflection and insight scale: A new measure of private self-consciousness. Social Behavior & Personality: *An International Journal,* 30(8), 821.

Grant, A. M., & Zackon, R. (2004). Executive, workplace and life coaching: Findings from a large-scale survey of International Coach Federation members. *International Journal of Evidence based Coaching and Mentoring,* 2(2), 1-15.

Hall, D. T., Otazo, K. L., & Hollenbeck, G. P. 1999. Behind closed doors: What really happens in executive coaching. Organizational Dynamics, 27: 39-53.

Hogan, R., Curphy, G. J., & Hogan, J. 1994. What we know about leadership effectiveness and personality. American Psychologist, 49: 493-504.

Holman, D., Pavlica, K., & Thorpe, R. (1997). Rethinking Kolb's theory of experiential learning in management education: The contribution of social constructionism and activity theory. *Management Learning*, 28(2), 135-148.

Hopkins, R. (1993). David Kolb's experiential learning-machine. *Journal of Phenomenological Psychology,* 24:(1), 46-62.

Kampa-Kokesch, S, & White, R.P. (2002). The effectiveness of executive coaching: What we know and what we still need to know. In R.L. Lowman (Ed.), The handbook of organizational consulting psychology. San Francisco: Jossey-Bass.

Killburg, R.R. (2007a). Toward a conceptual understanding and definition of executive coaching. In R.R Kilburg & R.C. Diedrich (Eds.), The wisdom of coaching: Essential papers in consulting psychology for a world of change (pp. 21-30). Washington: American Psychological Association.

Luthans, F., & Peterson, S. (2003). 360-degree feedback with systematic coaching: Empirical analysis suggests a winning combination. Human Resource Management, 42 (3), 243-256.

Lynham, S. A. (2000). Theory building in the human resource development profession. Human Resource Development Quarterly, 11 (2), 159-178.

Mesterova, J., Prochazka, J., & Vaculik, M. (2014) Relationship between self-efficacy, transformational leadership and leader effectiveness. *Journal of Advanced Management Science,* 3(2), 109-122.

Mezirow, J. (1997). Transformative learning: Theory to practice. New Directions for Adult and Continuing Education, 74, 5-15

Moen, F., & Allgood, E. (2009). Coaching and the effect on self-efficacy. *Organization Development Journal,* 27(4), 69-82.

Moen, F., & Federici, R. A. (2012). Perceived leadership self-efficacy and coach competence: Assessing a coaching-based leadership self-efficacy scale. *International Journal of Evidence Based Coaching & Mentoring*, 10(2), 1-16.

Mugenda, O. M. and Mugenda, A. G. (1999). Research Methods: Quantitative and Qualitative Approaches. Nairobi: Acts Press.

Neenan, M. (2008). From cognitive behaviour therapy (CBT) to cognitive behavior coaching (CBC). *Journal of Rational-Emotive Cognitive-Behavior Therapy*, 26:(1), 3-15

Neenan, M. (2009). Using Socratic questioning in coaching. *Journal of Rational-Emotive Cognitive-Behavior Therapy*, 27: (4), 249-264

Peterson, D. B. (2007) Executive coaching in a cross-cultural context. *Consulting Psychology Journal: Practice and Research*, 59**,** 261-271.

Pryor, K.W., Haag, R. and O'Reilly, J. (1969), "The creative porpoise: training for novel behaviour", *Journal of the Experimental Analysis of Behavior,* Vol. 12 No. 4, pp. 653-61.

Ray, W.A. (2007), "Bateson's cybernetics: the basis of MRI brief therapy: prologue", Kybernetes, Vol. 36 Nos 7/8, pp. 859-70.

Shumway, S.T., Kimball, T.G., Korinek, A.W. and Arredondo, R. (2007), "A family systems-based model of organizational intervention", *Journal of Marital and Family Therapy*, Vol. 33 No. 2, pp. 134-48.

Smither, J. W., London, M., Flautt, R., Vargas, Y., & Kucine, I. (2003). Can working with an executive coach improve multisource feedback ratings over time? A quasi-experimental field study. Personnel Psychology, 56 (1), 23-44.

Wasylyshyn, K. M. (2003). Executive coaching: An outcome study. *Consulting Psychology Journal: Practice & Research,* 55(2), 94-106.

Wood, R. E. (1986). Task complexity: Definition of the construct. Organizational Behavior and Human Decision Processes, 37, 60–82.

Wood, R. E., & Locke, E. A. (1990). Goal setting and strategy effects on complex tasks. In B. Staw & L. L. Cummings (Eds.), Research in organizational behavior (Vol. 12, pp. 73–109). Greenwich, CT: JAI Press.

Wood, R. E., Mento, A. J., & Locke, E. A. (1990). Task complexity as a moderator of goal effects: A meta-analysis. *Journal of Applied Psychology*, 72, 416-425.

Vince, R. (1998). Behind and beyond Kolb's learning Cycle. *Journal of Management Education*, 22(3), 304-319.

Validation of the Polar Fitness Test

Gina Leigh Kraft
Dept. of Health and Physical Education, Arkansas Tech University,
Russellville, Arkansas, United States of America.

Maddie Dow
Dept. of Health and Physical Education, Arkansas Tech University,
Russellville, Arkansas, United States of America.

Abstract

Aerobic capacity testing can be beneficial to coaches, physical educators, and trainers in the process of designing aerobic training programs. However, testing in a laboratory can be costly. Polar heart rate monitors provide a fitness test that estimates aerobic capacity without having to use expensive equipment. The purpose of this study was to determine the efficacy of the Polar fitness test in comparison to the laboratory test. Eighteen college-age students completed the Polar fitness test along with a laboratory test for aerobic capacity. The laboratory test consisted of a maximal Bruce protocol treadmill test while the subject was connected to a metabolic cart. The study found that the Polar fitness test provides results that are not statistically different from the metabolic cart results (t = 1.681, p = 0.111). Additionally, the 2 tests were strongly correlated (r = 0.545, p = 0.019). This indicates that the Polar fitness test may be an appropriate means of aerobic capacity testing for those not needing the accuracy of expensive laboratory equipment.

Keywords: aerobic capacity, VO_{2max}, aerobic fitness assessment, Polar

1. Introduction

Maximal oxygen consumption, also referred to as aerobic capacity or VO_{2max}, is the maximum amount of oxygen that is consumed and used by an individual while they are in a maximal working state (Boone, p. 70). This measurement is typically obtained by conducting a maximal graded exercise test while a subject is connected to a metabolic cart (Beam, p. 164-166). Of the protocols available, the Bruce test is considered to be "by far the most popular" treadmill protocol (Neiman, p. 62). A treadmill and metabolic cart are needed to measure maximal oxygen consumption properly. The metabolic cart measures the oxygen consumption of the subject while the Bruce treadmill protocol pushes the individual to their maximal capacity (Beam, p. 164, 168). Measurement of oxygen consumption during maximal exercise stress provides a person's VO_{2max}.

The data that is collected from the metabolic cart is commonly used to define training zones for aerobic conditioning programs (Neiman, p. 180, Swain, p. 470-471). This information can also be used to determine which energy system an athlete's body is utilizing at a given work rate (Boone, p 269, Powers & Howley, p. 81). Knowing an athlete's VO_{2max} and energy system utilization allows coaches to specifically cater

workout regimens to the sport for which the athlete is training and, therefore, create a more efficient workout.

Testing VO_{2max} via metabolic cart requires expensive equipment as well as a professional to operate the metabolic cart and supervise the test. This ensures the correct protocols are followed, and accurate data is being collected. However, the cost of a metabolic cart is often prohibitive as a device costs upwards of $20,000 (P. Yeh, personal communication, August 8, 2017). Many coaches, training facilities, and schools do not have large enough budgets to warrant this expense.

Several devices have been developed to assess fitness levels without using a metabolic cart. These include various Polar devices, Garmin fitness watches, Fitbit, Nike Fuelband, and others (Porcari, p. 105). Many such devices track fitness rather than truly assessing it. Polar is unique in that several of the Polar devices are programmed with a fitness test (www.polar.com). The Polar RS300X is one such device. It can be purchased on Amazon for ~$200, which is significantly cheaper than a metabolic cart. Additionally, the Polar fitness test does not require a technician for administration and supervision. Such fitness tests may be significantly more practical for many coaches, physical educators, and trainers. The purpose of this study was to evaluate the efficacy of the Polar fitness test as an alternative to aerobic capacity testing using a metabolic cart.

2. Methods

This study was approved by the Arkansas Tech University Institutional Review Board.

2.1 Subjects

Subjects were all students majoring in Health and Physical Education or Wellness Science at Arkansas Tech University. The subjects were recruited primarily from the PE 3661 Laboratory Experiences in Anatomy/Physiology and Kinesiology and the WS 1002 Wellness Fitness classes. Twelve male and 6 female subjects volunteered (n=18). The subjects were 21.3 (± 2.25) years of age. To ensure that all subjects were healthy enough to participate in the study, they were screened using the Physical Activity Readiness Questionnaire (PAR-Q). All subjects answered no to all items on the PAR-Q, meaning they were considered to be healthy enough for physical activity. Had any subjects answered yes to any items, they would have been excluded from the study until being cleared by a medical professional for physical activity.

2.2 Procedures

The study was conducted in the Human Performance Laboratory. Each subject reported individually for a single session. During this session, the subject completed all 3 phases of the study. Phase 1 consisted of paperwork and resting measurements. The Polar fitness test comprised Phase 2, while phase 3 consisted of a Bruce treadmill test with the subject connected to the metabolic cart.

For phase 1, each subject completed the informed consent process and the PAR-Q. Height, weight, and blood pressure were measured for each subject. The subject then began phase 2 and was fitted with the Polar heart rate strap according to the instructions provided by Polar (Polar RS300X User Manual, 2011, p. 13). The heart rate strap was paired with the Polar RS300X fitness watch, and the User Profile was set

to match the subject.

The User Profile consisted of the subject's birthday, height, weight, sex, activity level, maximum heart rate and sitting heart rate (Polar RS300X User Manual, 2011, p 6). Polar uses an average of a person's physical activity over the past 3 months to determine activity level. Figure 1 shows the guidelines provided by Polar to determine an individual's physical activity level (How to Choose).

Figure 1 How to Choose the Right Activity Level in Polar Fitness Test

Activity level is an assessment of your level of long-term physical activity. Select the alternative that best describes the overall amount and intensity of your physical activity during the past three months.

- Top: You participate in heavy physical exercise at least 5 times a week, or you exercise to improve performance for competitive purposes.
- High: You participate at least 3 times a week in heavy physical exercise, e.g. you run 10-40 km/6-25 miles or you cycle 2-4 hours (40-120 km.25-75 miles) per week or spend that time in comparable physical activity.
- Moderate: You participate regularly in recreational sports, e.g. you run 5-10 km or 3-6 miles or you cycle ½-2 hours (15-40 km/3-25 miles) per week or spend that time in comparable physical activity, or your work requires modest physical activity.
- Low: You do not participate regularly in recreational sport or heavy physical activity, e.g. you walk only for pleasure or exercise hard enough to cause heavy breathing or perspiration only occasionally.

Maximum heart rate was determined by the standard calculation of 220-age (Boone, p. 128). Sitting heart rate was acquired based on the pre-test heart rate measured by the Polar device. The User Profile also requests the subject's VO_{2max}. However, this information was not yet known, so the predicted value was simply selected.

At this point, the subject was ready to begin the fitness test. The subject was instructed to lie down on the table in the lab. The fitness test was selected on the watch menu once the subject was in a comfortable position. The test began when the technician pressed start. The test simply required the subject to lie still for a 5 minute period. At the end of the test, the watch display showed the results as the OwnIndex (VO_{2max}). This number was recorded, and the Polar fitness test was complete.

Phase 3 began shortly after completion of the Polar fitness test once the subject's height, weight, age, gender, and race had been entered into the software for the Parvomedics TrueOne 2400 metabolic cart. Subjects were instructed that they were in charge of the test. If they signaled to end the test at any point in time, the test would end immediately. All subjects were encouraged to push themselves to their maximum capability in order to obtain accurate data.

At this time the subject was fitted with a facemask which was connected to the metabolic cart via an airtight hose. The subject straddled the belt of the treadmill until the belt was moving at the speed and grade for stage 1 of the Bruce protocol (see Table 1). The test began after the subject stepped onto the belt of the treadmill and was walking comfortably. The treadmill protocol used was the Bruce protocol (see Table 1).

This protocol consists of 3-minute stages where the speed and grade increase every 3 minutes. Heart rate was monitored continuously throughout the test as the subject was still wearing the Polar heart rate monitor. Blood pressure and rate of perceived exertion were measured in the final 30 seconds of each stage.

Table 1 Bruce Treadmill Protocol

Stage	Speed (mph)	Grade (%)	Duration (min)
1	1.7	10	3
2	2.5	12	3
3	3.4	14	3
4	4.2	16	3
5	5	18	3
6	5.5	20	3
7	6	22	3

In order to ensure the safety of all subjects, the American College of Sports Medicine (ACSM) guidelines for exercise test termination were followed. The absolute indications for test termination are:

- Drop in systolic BP of ≥10 mm Hg with an increase in work rate, or if systolic BP decreases below the value obtained in the same position prior to testing when accompanied by other evidence of ischemia
- Moderately severe angina (defined as 3 on standard scale)
- Increasing nervous system symptoms (*e.g.,* ataxia, dizziness, or near syncope)
- Signs of poor perfusion (cyanosis or pallor)
- Technical difficulties monitoring the ECG or SBP
- Subject's desire to stop (other than V_1 or aVR) (taken directly from ACMS's Guidelines for Exercise Testing, 2014, p. 131).

The relative indications for test termination are:

- Drop in systolic BP of ≥10 mm Hg with an increase in work rate, or if systolic BP below the same value obtained in the same position prior to testing
- Fatigue, shortness of breath, wheezing, leg cramps, or claudication
- Increasing chest pain
- Hypertensive response (SBP of >250 mm Hg and/or a DBP of >115 mm Hg (taken directly from ACMS's Guidelines for Exercise Testing, 2014, p. 131).

The electrocardiogram (ECG) guidelines were omitted from this list as ECG was not used during this test. The subjects were encouraged to continue the test until they obtained VO_{2max} which has been defined as the point where the subject's oxygen consumption leveled off regardless of an increase in workload (ACSM's Guidelines for Exercise Testing, 2014, p. 73). However, this leveling off does not occur for all individuals. Alternative criteria include: obtaining age-predicted maximum heart rate (HR_{max} = 220 – age) or obtaining a respiratory exchange ratio of 1.15 or greater (McArdle, Katch, Katch, 2015, p. 37). The trial was also terminated if the subject requested to stop. The test was brought to an end and the data saved when any of these criteria were obtained.

Upon completion of the treadmill test, the facemask was removed, and the subject began to cool down. The subject walked on the treadmill at a leisurely pace for 3 minutes followed by 3 minutes of sitting comfortably. Heart rate and blood pressure were monitored throughout this time. Subjects remained in the lab and were continuously monitored until their heart rate returned to below 120 bpm and their blood pressure reading returned to near normal.

2.2 Statistical Analysis

All statistical analyses were conducted using IBM SPSS Statistics 23. Descriptive statistics were used to ensure that the data met the assumptions for the selected tests. The similarity of the data obtained from the 2 fitness tests was evaluated by a paired samples T-test. A 2-tailed test was used with a p-value set at 0.05 for statistical significance. A Pearson correlation coefficient was also used to determine the strength of the relationship between the two tests.

3. Results

VO_{2max} from the Polar fitness test was found to be 47.67 (± 9.56) ml/kg/min while the metabolic cart revealed a VO_{2max} of 44.09 (± 9.37) ml/kg/min. The data are presented in Table 2.

Table 2 Aerobic Capacity Data

Subject	Polar (ml/kg/min)	Metabolic Cart (ml/kg/min)
1	35	37.3
2	57	43.5
3	42	37
4	49	53.3
5	57	39.4
6	52	38
7	42	47.3
8	60	56.1
9	56	59.3
10	51	39.4
11	48	58.3
12	37	36.4
13	29	33
14	48	42.6
15	60	53.5
16	58	51.8
17	41	34.9
18	36	42.5
Mean	47.67	44.09

The paired samples T-test revealed no significant differences in the data obtained from the Polar fitness test

compared to the data from the metabolic cart ($t = 1.681$, $p = 0.111$). The Pearson correlation evaluation revealed a correlation coefficient of $r = 0.545$ ($p = 0.019$) for the means of the two tests. This shows that the two methods for obtaining VO_{2max} are not statistically different from each other and, in fact, they are significantly correlated.

4. Discussion

The Polar fitness test was not found to be significantly different from the metabolic cart in terms of evaluating aerobic capacity. This indicates that the Polar fitness test may be an adequate means of assessing aerobic capacity. The Pearson correlation coefficient reveals more about the appropriateness of the Polar fitness test in that it was found to be 0.545. Miller labels a correlation of 0.3 - 0.7 as a strong correlation for the field of fitness and exercises science (Miller, 2012, p. 8). A correlation of 0.545 is right in the middle of the range defined by Miller as being a strong correlation. Thus, the Polar fitness test can be considered an appropriate tool for assessing VO_{2max}.

The Polar fitness test did tend to overestimate an individual's aerobic fitness level. The mean from the Polar test was 47.67 ml/kg/min, which was 3.58 ml/kg/min greater than the results obtained from the metabolic cart. Although this difference was not statistically significant, it would make a practical difference in any training plans built using this information. Individuals following a training plan built from the Polar results would potentially be working harder than they needed to be or that the plan intended. Practitioners should be mindful of the overestimation of fitness levels by the Polar fitness test.

There are a few strengths and weaknesses in this study. A strength of the study is that the subjects performed both tests on the same day. This means that there is less potential within-individual variability in the results. Most confounding variables would have impacted both tests equally. Another strength is that the statistical power was found to be quite high even though the number of subjects was relatively small ($n = 18$). When evaluated for statistical power, the study was found to have a power of 0.96, indicating that there is a 96% chance that the results are actually correct. A weakness might be that the subjects were permitted to self-select their activity level, potentially introducing bias and error into the results. Another weakness could be the imbalance of males and females in the sample size. Sex and age were not found to account for a significant amount of the variance in the data; however, this could be due to the relatively small sample size. In general, the strengths of this study seem to outweigh the weaknesses.

5. Conclusion

The Polar fitness test may be an appropriate tool to assess aerobic fitness levels in some settings. Practitioners choosing to use this assessment over other tools should keep in mind that the Polar test tends to overestimate a person's aerobic capacity. However, this should not prevent individuals from using the Polar fitness test if they find it to be appropriate for their setting otherwise.

The Polar fitness test is much cheaper to administer than the assessment using the metabolic cart. The Polar RSX300 watch used in this study can be purchased for under $200 on Amazon (https://www.amazon.com/Polar-RS300X-Heart-Rate-Monitor/dp/B00SB078ME). Other models of Polar

watches programmed with the fitness test can be purchased for under $100 from Amazon (https://www.amazon.com/Polar-FT60-Heart-Monitor-White/dp/B00G40M6X4). In contrast to this expense, a metabolic cart is going to cost over $20,000 (P. Yeh, personal communication, August 8, 2017) and requires additional manpower to administer. The cost of a metabolic cart makes it far more inaccessible to most individuals than the cost of a Polar heart rate monitor/fitness watch.

The Polar fitness test is not an appropriate substitute for a metabolic cart when conducting research. However, the results from the Polar fitness test may be useful to sports coaches, strength and conditioning specialists, physical educators, personal trainers, amateur athletes and fitness enthusiasts. These individuals may not need the precision and accuracy of the results from a metabolic cart but could find the knowledge of aerobic capacity to be beneficial. This information could aid in designing training programs, monitoring the effectiveness of those programs, evaluating progress and even enhancing motivation. The Polar fitness test seems to be an appropriate, lower cost alternative to aerobic capacity testing using a metabolic cart.

Acknowledgement

The research was not financed or supported in any way by the Polar Electro.

References

Beam, W.C and G.M Adams. Exercise Physiology: Laboratory Manual, 7th ed., McGraw Hill, New York, NY, 2014 pp. 163-179.

Boone, T. Introduction to Exercise Physiology, Jones & Bartlett Learning, Burlington, MA, 2014 pp. 69-83, 125-130.

McAardle, W.D., F.I. Katch, and V.L. Katch, Exercise Physiolgoy: Nutrition, Energy, and Human Performance, 8th ed., Wolters Kluwer Health, Philadelphia, 2015 pp. 37.

Miller, T. (Ed.). NSCA's Guide to Tests and Assessment. Human Kinetics, Champaign, IL, 2012, p. 8.

Pescatello, L.S (Eds.). ACSM's Guidelines for Exercise Testing and Prescription. Lippincott, Baltimore, MD, 2014, p. 131.

Porcari, J., Bryant, C., and F. Comana. Exercise Physiology, F.A. Davis, Philadelphia, PA, 2015, pp. 96-123.

Swain, D.P., (Ed.). ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription, Wolters Kluwer Health, Baltimore, MD, 2014 pp. 466-481.

Web References

Polar RS300X User Manual, Polar Electro Oy, Finland, 2011, pp. 6, 8-9 https://support.polar.com/e_manuals/RS300X/Polar_RS300X_user_manual_English.pdf

How to Choose the Right Activity Level in Polar Fitness Test https://support.polar.com/us-en/support/How_to_Choose_the_Right_Activity_Level_in_Polar_Fitness_Test

Polar RS300X Heart Rate Monitor, https://www.amazon.com/Polar-RS300X-Heart-Rate-Monitor/dp/B00SB078ME

Polar FT60 Heart Rate Monitor, https://www.amazon.com/Polar-FT60-Heart-Monitor-White/dp/B00G40M6X4

The crisis in private higher education in Brazil: main causes and possible solutions

Prof. Dr. Diego Santos Vieira de Jesus (Corresponding author)
Executive Master of Science in Creative Economy, Superior School of Advertising and Marketing, Rio de Janeiro, Brazil.
dvieira@espm.br

Prof. Dr. Veranise Jacubowski Correia Dubeux
Executive Master of Science in Creative Economy, Superior School of Advertising and Marketing, Rio de Janeiro, Brazil.
vdubeux@espm.br

Abstract

The aim of the article is to examine the main causes of the crisis in private higher education in Brazil since 2015, characterized by the mass dismissals of teachers, the reduction of salaries of those who remain in private higher education institutions, the overcrowding of classrooms and the greater adhesion of students to distance education in the light of the high costs of classroom-based courses. In addition, one of the objectives is also to offer recommendations for overcoming this situation. The research follows the methodological steps of Sécca & Souza (2009) for the analysis of private higher education in Brazil. The bibliographic research consisted of reading, selecting and organizing topics on the general causes of the crisis of the private higher education sector in Brazil since 2016. The next step was the research of information on specific private higher education institutions in Brazil, divided per region: Southeast, South, Midwest and North / Northeast. The central argument points out that the crisis is closely related to the financial crisis in the country, motivated by the adverse international economic situation and the political chaos caused by allegations of corruption and misappropriation of funds by politicians and businessmen. This forced the Brazilian government to reduce and limit access to student financing contracts drastically from 2015 on, and most students from low-income classes were excluded from entering higher education or had to stop studying. Besides, in the light of a higher number of unemployed people and lower salaries, students were less able to afford the tuition fees of a higher education course at a private institution. To overcome difficulties and attract new students, private higher education institutions can rely on multiple strategies, such as scholarships, alternative financing, discounts for those who pay the current monthly fees and the creation of academic endowments.

Keywords: higher education; Brazil; crisis; private education; student financing contracts; financial crisis

1. Introduction

Brazil has one of the largest private higher education sectors in the world. Brazilian private universities had relevant support from the government for their growth and expansion in the 2000s and the beginning of this decade. Many groups in Brazilian society think of private education in terms of business rather than of a national plan, with focus on quality. However, the national test of graduates (ENADE, its acronym in Portuguese) shows a wide range of quality in the private sector. Besides, private higher education institutions, as parts of the Brazilian National Education Program (PNE, its acronym in Portuguese), often undergo rigid quality checks by Brazil's Ministry of Education (MEC, its acronym in Portuguese) (Bezerra, Niskier & Batourina, 2017, p.24).

For the first time in 11 years, the number of students in the private higher education sector has fallen in Brazil in 2016. Private higher education institutions had 6.05 million students enrolled – 16,500 fewer students than in 2015. For representatives of the sector, the decrease in the number of students in private higher education is due to the reduction of student financing contracts (FIES, the acronym in Portuguese), in the context of the economic crisis in the country. The 2016 Census of Higher Education shows that 8 million students were enrolled in higher education that year, and the private network accounted for 75.3% of enrolments. While public universities have kept the total number of students practically stable (1.99 million), the fall of the number of students in private higher education puts the country even further from reaching the PNE's goals, which aim to raise the net enrolment rate in this stage to 33% of the population aged 18-24. The decrease in enrolments occurred at the same time as the federal government restricted access to FIES. The government established stricter rules for the student to benefit from the financing contracts, such as the requirement for a minimum grade of 450 points in the National High School Exam (ENEM, its acronym in Portuguese) and income ceiling for the candidates (Palhares, 2017).

Private institutions concentrate the largest number of vacant posts – 2.89 million (85.3% of the total) –, while in public universities they correspond to half million (14.7% of vacant posts). The 2016 Census points out different reasons for the vacancy, but most vacant posts are related to students who abandoned their course or did not comply with conditions imposed by the institution. Most students in this situation were in the private network: 86% of almost 2 million students (Oliveira, 2017). In the light of restrictions on student financing and increased failure of the students to pay, many universities in Brazil had to curb investments, seek reductions in the payroll and make some adjustments. The adverse economic scenario led many students to seek lower tuition fees – whether attending fewer disciplines or going after alternative funding – or even stop studying. The dismissal of teachers was the option for some universities in the attempt to stem the effects of non-payment by many students and the lower number of enrolled ones. Many institutions dismissed professors who had the highest salaries (Justino, 2017).

The aim of the article is to examine the main causes of the crisis in private higher education in Brazil since 2016, characterized by the mass dismissals of teachers, the reduction of salaries of those who remain in private higher education institutions, the overcrowding of classrooms and the greater adhesion of students to distance education in the light of the high costs of classroom-based courses. In addition, one of the objectives is also to offer recommendations for overcoming this situation. The central argument points out that the crisis is closely related to the financial crisis in the country, motivated by the adverse

international economic situation and the political chaos caused by allegations of corruption and misappropriation of funds by politicians and businessmen. This forced the Brazilian government to reduce and limit access to student financing contracts drastically from 2015 on, and most students from low-income classes were excluded from entering higher education or had to stop studying. Besides, in the light of a higher number of unemployed people and lower salaries, students were less able to afford the tuition fees of a higher education course at a private institution. To overcome difficulties and attract new students, private higher education institutions can rely on multiple strategies, such as scholarships, alternative financing, discounts for those who pay the current monthly fees and the creation of academic endowments.

2. Theoretical framework

In the 1980s and 1990s, private higher education was a major force in the education realm in many countries regarding the promotion of innovation and economic growth. While in East Asian nations the private sector became dominant, private higher education in Latin American has started to grow since the early 1960s. The private sector has become the fastest-growing segment of higher education in Brazil (Altbach & Levy, 2005). In this country, private higher education has consolidated since 1996, including approximately 2,000 universities, university centers and colleges distributed throughout its territory, but mostly in the Southeastern, Southern and Midwestern regions. 1996 represents a turning point for private higher education in Brazil, because it was the moment of the introduction of a fund which allowed young people to take out loans to study in private higher education institutions (Sampaio, 2000).

The growth of private higher education gave many Brazilian citizens the opportunity to have a degree (undergraduate, master and doctorate) and change their lives. More than 75% of all university students are enrolled in private higher education institutions. A social twist in the Brazilian educational system is evident: after ENEM, young people who study in expensive private high schools can study for free in federal or state universities. However, students from public schools with lower ENEM scores apply for grants to pay for their education in the private higher education sector. Basically, the private sector has the responsibility of bringing these students to the necessary level of knowledge and education (Bezerra, Niskier & Batourina, 2017, p.24-25).

Higher education institutions – public or private – face multiple challenges in Brazil, such as sustaining quality standards, attracting the best staff, remaining flexible, passing rigid audits for accreditation and adapting to numerous changes in regulations. Private higher education institutions in Brazil are better known for courses in the social and humanities fields, while courses more related to technology and biomedical sciences are more expressive in public universities. Taking the courses offered by private institutions into consideration, law is traditionally the most popular, because it brings the opportunity for many students to take exams to work in public institutions and have more stable jobs after they finish the university course (Soares, 2002). It represented 14% of the total number of students in private higher education in Brazil in 2016, followed by management (9%), civil engineering (6%), and finally medical school, pedagogy, and HR management. According to Bezerra, Niskier & Batourina (2017, p.25):

> Thus, the growth of the private education sector in Brazil should not be mistaken for a result of the

> development of the private business in general, as it is the natural outcome of the National Education Plan (PNE). In fact, this is the core characteristic that differentiates private education in Brazil from, for instance, private education in European countries. Brazilian private universities are an inseparable part, tool, and provider of the PNE. They serve as a joint innovative solution by the country's leaders and highly educated businesspersons, to tackle the problem of the insufficient quantity of higher education institutions and of social inclusion in the country (Bezerra, Niskier & Batourina, 2017, p.25).

In this sense, Brazilian private higher education sector reflects the growing articulation between the state and the market, which brought a greater institutionalization of the sector from the mid-1990s on (Sampaio, 2000). Private higher education has become increasingly subject to compliance with the general norms of national education and the authorization and evaluation of quality by the public administration. Most private higher education institutions must obey the principle of inseparability of teaching, research and extension, although some of them are allowed, according to the legislation, to teach without developing research and extension, which implies lower costs (Barreyro, 2008, p.28).

An extraordinary growth of private higher education in Brazil took place in 2002, with the introduction of the first technological undergraduate courses in private institutions. These courses were of shorter duration and facilitated the admission of students from the low-income social classes, which represented more than a half of the Brazilian student population. Three years later, the ProUni fund – which offered scholarships at private institutions for students from less privileged families – was created. In 2010, the reformulation of the funding structure with FIES brought a reduction of interest rates and an increase of the amortization period, which caused an exponential increase in new enrollments all over the country (Bezerra, Niskier & Batourina, 2017, p.25). Most courses in the private higher education sector are concentrated in the Southeastern, Southern and Midwestern regions of Brazil, while the Northern and Northeastern regions have a preponderance of the public sector. However, the benefits from FIES were also felt by students in private institutions in these two regions. The majority of the courses of the private sector in the Southern region is managed by community and philanthropic institutions, whose importance is much smaller in other regions, such as the Northern and Northeastern regions of the country (Barreyro, 2008, p.34).

The financial crisis – motivated by the adverse international economic situation and the political chaos caused by allegations of corruption and misappropriation of funds by politicians and businessmen – forced the Brazilian government to reduce FIES contracts drastically from 2015 on, and most students from low-income classes were excluded from entering higher education and were not able to keep studying. Many students had other priorities in their expenses and preferred to leave university to cut costs. Besides, although FIES reached almost 40% of the goal established at the PNE for the net enrollment rate from 1996 to 2014, it accounted for less than 15% of the students in 2016 after the sharp reduction of 2015. However, the cost of students at private institutions is lower to the country than that of students at public ones, while the impact of the students in the private sector on Brazilian economy is impressive. Therefore, the association of private universities (ABMES, its acronym in Portuguese) is strategically focusing on pushing

the public authorities to keep investing in scholarships and working with the government to find alternative funding instruments, e.g., the joining of private banks at the financing market for prospective students. Despite the negative effect of the crisis, the private higher education sector preserves its position as one of the most active partners of the government in looking for ways to provide society with opportunities to access higher education and preserve economic growth (Bezerra, Niskier & Batourina, 2017, p.25-26).

3. Methodology

Following the methodological steps of Sécca & Souza (2009, p.106) for the analysis of private higher education in Brazil, the bibliographic research consisted of reading, selecting and organizing topics on the general causes of the crisis of the private higher education sector in Brazil since 2016. The next step was the research of information on specific private higher education institutions in Brazil. Differently from Sécca & Souza (2009), the results of the research were divided per region in Brazil's territory – Southeast, South, Midwest and North / Northeast – to map the causes of the crisis more precisely, taking into consideration the diversity of each region and the particularity of private higher education institutions in these regions. At this step, we used the following sources: information released by governmental institutions, such as the National Institute of Educational Studies and Research (INEP, its acronym in Portuguese), the Brazilian Institute of Geography and Statistics (IBGE, its acronym in Portuguese) and MEC, and statements and data from government officials and private higher education institutions' managers, drawn from the media and think tanks. The analysis of the results focused on the deep causes of the crisis of the private higher education sector and indicated some possible solutions that have already been adopted and recommendations.

4. Results

According to the 2016 Higher Education Census, the number of new students in classroom-based courses dropped by 3.7% from 2015 to 2016. These courses are still more sought by young people than distance learning courses, which are preferred by older people who have already entered the job market. Brazil has 2,407 higher education institutions, of which 87.7% are private and 12.3% are public (federal, state and municipal). Private education concentrates the majority of students: 75.3%. The national average is 2.5 students at the private higher education sector for each one at the public one (São Martinho, 2017).

In 2017, the Education Minister José Mendonça Filho said that the economic crisis led to a slowdown in higher education in the light of the reduction in income and the recession experienced in Brazil since 2015. Another sign that the crisis has affected the demand for higher education is the number of candidates who paid the registration fee and did not take the ENEM exam, which serves as a university entrance test for several public and private universities. In 2017, 7.6 million people registered for the test, but only 6.1 million took the exam. According to INEP, the number of posts to enter higher education institutions is greater than the number of students who come from high school. However, financial problems and lack of prospects of getting the whole course make many students give up studying at a private university, especially in the poorest sections of society. Many students depend on scholarships and

assistance programs from institutions, but not all of them are contemplated by these programs (São Martinho, 2017). Some students, especially the ones who study at evening courses, are losing their jobs and dropping out of private universities to cut expenses. In addition to unemployment, which already affected 1.7 million people in Brazil in 2016 (a growth of 42% in relation to the previous year), another aggravating factor for university students was the budget cut for education and financing, particularly FIES (Evans, 2016).

4.1. Southeast

In the light of the recession and the economic crisis, some private higher education institutions in Southeastern Brazil lost more than 15% of the total number of their students, such as Faculdade Novos Horizontes, in the state of Minas Gerais. Because of that, many institutions dismissed professors. According to the managers of some of these institutions, people feel insecure both from the economic crisis and the cutting in FIES. Because of that, many students give up studying or opt for a distance learning course, which is generally cheaper than a classroom-based one. To avoid the evasion of students, many private institutions are making possible for the indebted ones to divide their debts and pay according to their economic and financial conditions (Evans, 2016).

In São Paulo, the richest state in Brazil, private universities face their worst crisis in 40 years. With the intensification of unemployment, many students gave up studying at a private university to cut expenses or work to help their family to pay for other expenses they have (Instituto Millenium, 2017). Because many universities cannot afford teachers with high levels of student defaults and dropouts, they dismiss employees, often in large numbers. The Methodist University – which has undergraduate and graduate courses renowned in Brazil, in areas such as Social Communication – dismissed more than 60 teachers in the second half of 2017. In August 2017, the Faculdades Metropolitanas Unidas (FMU) dismissed 200 teachers, and Anhembi Morumbi University dismissed at least 150 professionals. Some institutions said they were “restructuring” or “bringing new flexible and modern academic models” to justify the changes that impact not only the lives of dismissed teachers, but also those of the contracted ones, who have to face reduction of their salaries. The payment for many teachers has also been irregular for months. The crisis is characterized not only by mass dismissals, but also the reduction of the salaries of teachers who remain in institutions, the overcrowding of some classrooms and the greater adherence to distance education by students who cannot afford more expensive classroom-based courses (Basilio, 2017).

For many experts, the scenario of mass dismissal was strengthened by Brazilian Labor Reform, in force since November 2017. In the state of Rio de Janeiro, the private university Estácio de Sá – which also operates in other parts of Brazilian territory – announced the dismissal of 1,200 teachers. The reorganization of the teachers’ team led to the dismissal of more than a thousand professionals and the announcement of a “reserve team”, which would be classified as intermittent work, also based in the new labor legislation. The decision led to a reaction from the Labor Court of Rio de Janeiro, which initially suspended 400 dismissals in the state. Later, the Public Prosecutor’s Office in Rio de Janeiro, via an injunction, was able to suspend the dismissal of teachers in Estácio de Sá’s units throughout the country.

However, the injunction was suspended in December 2017. In the light of the Labor Reform, the individual and collective dismissals no longer need prior authorization from the union entities or the conclusion of collective agreements for their validation (Basilio, 2017; Instituto Millenium, 2017). Because of the Labor Reform, Brazil lost 12,292 formal jobs in November 2017, when the effects of the reform were already in force. This frustrated the expectation of the creation of 22,000 jobs. At the same time, 3,120 intermittent jobs were created. When Brazilian President Michel Temer proposed the Labor Reform, he defended that the legislative easing would help the creation of new jobs (Ayres, 2017).

4.2. South

The impact of the crisis of the private higher education system in the state of Rio Grande do Sul led to a 35% increase in the dismissal of professors at private universities between 2014 and 2016. In 2015 and 2016, the accumulated drop in enrollment of students reached 20%. This number reflects the unemployment of 13.5 million people and the fall of 3.6% in the GDP in 2016, according to IBGE. The situation led not only to a decrease in the number of entrants, but also to a sharp evasion of students. For every 100 students who entered an educational establishment, only 42 still remain in the university in Rio Grande do Sul. The number may even be lower in the light of the difficulties faced by government programs, such as FIES. The Pontifical Catholic University of Rio Grande do Sul's dean, Evilázio Teixeira, said that, while the number of private universities and colleges has increased significantly in recent years, the purchasing power of the population has declined (Hickmann, 2017).

One of the first measures of budgetary adjustment that private higher education institutions took in the states of Rio Grande do Sul, Santa Catarina and Paraná was the dismissal of part of the team of professors, generally the most qualified ones who earn more. However, the strategy brings the possibility of lowering the levels of the academic production of the institutions, evaluated by MEC. Even so, the number of dismissals remain high. As of April 2017, 486 professionals have been dismissed from colleges and universities in Rio Grande do Sul. In December 2017, Uniritter dismissed 100 teachers, claiming that it was going through a time of restructuring its courses and reducing workloads (Basilio, 2017).

It is unanimous among managers of private universities in Southern Brazil that the reduction of the FIES disrupted the cash flow of these institutions. FIES underwent a restructuring in 2010 and started to operate with an annual interest of 3.4%. After 2015, the rate increased to 6.5%. In addition, there was a change in the offer. By 2014, there was no limit for demand at the program. From 2015 on, MEC determined this limit. The director of Institutional Development at Feevale University, Alexandre Zeni, believes that FIES has no way of sustaining itself financially, referring to the university's default rate of almost 50% in 2016. At Unisinos, a university with a pole in the Sinos River Valley region and a branch in the city of Porto Alegre, there was a 27% fall in the number of enrolments via FIES from 2015 to 2017. In 2015, approximately 13% of the students had FIES contracts. In 2017, the percentage was 9.5%. Unisinos dean, Marcelo de Aquino, said the university had a period of strong expansion, largely stimulated by government incentives. However, the new rules of the program, associated with unemployment, have determined the end of the cycle (Hickmann, 2017).

4.3. Midwest

The entry and the permanence of students in private higher education institutions in the Federal District, in Midwestern Brazil, have been threatened by the economic crisis, unemployment and readjustment in tuition fees. MEC indicates that 186,175 inhabitants of Brasília – the country's capital – are attending higher education institutions – 80.5% in private educational institutions. However, maintaining that number has been an arduous task for the institutions' managers. The scenario of economic instability has been reflected in undergraduate courses. The number of contracts of FIES – one of the main factors responsible for the increase in recent years of the total number of students in private higher education in the states of Goiás, Mato Grosso and Mato Grosso do Sul – has been reduced. Between 2014 and 2016, the number of beneficiaries have been reduced from 730,000 to 200,000 in the Federal District (Amador, 2017).

Simultaneously with the fall of the federal government's investments in FIES, the private higher education sector's defaults grew, and the value of the monthly payments continued to increase. Some courses, such as medical science, cost up to 6,000 reais (almost 1,800 dollars) in Brasília. The adjustments in tuitions, in turn, are above inflation. There are cases of increases of more than 15% in 2016, but national inflation was 6.29% in the same year. Students contest these adjustments and ask for the expansion of student scholarship programs. UniCeub's students did that. Institutions such as the Catholic University of Brasília argue that monthly tuition fees increases are due to high investment costs and the growth of defaults in recent years. Managers of some universities such as UniCeub have said they planned specific actions for accepting payments by check and credit card as well as parcelling the tuition fees. In the Federal District, there are about 336,000 unemployed people in 2017. They represent 20.5% of the universe of 1.3 million professionals, according to INEP. This represents a smaller number of adults able to finance the studies at a private university (Amador, 2017; Instituto Millenium, 2017).

4.4. North / Northeast

In Northern and Northeastern Brazil, the presence of two large private educational groups – Devry and Ser Educacional – brought to these two regions – which had fewer private higher education institutions compared to the rest of the country – an increase in the number of students to 15,000 by the end of 2015. With the action of these groups, many students saw the possibility of entering a more restricted labor market in these regions, but, with the FIES cuts, most of them left the university or abandoned the idea of entering an institution of private higher education. In addition to the reduction of financing, the government has established new rules for granting FIES, which were considered very stringent by many students in the North and in the Northeast, especially in the poorest areas. The fulfilment of PNE goals is compromised by that. One of the PNE's objectives, of which federal funding is an important lever, is to raise the gross enrolment rate in higher education by 2024 to 50% of the population aged 18-24 (Evans, 2016; Schincariol, 2016).

When students receive negative responses regarding the possibility of funding, many end up leaving private institutions of higher education in Northern and Northeastern states, such as the Mauricio de Nassau Faculty, which has branches in many states of these two regions. Despite the problems, the North and

Northeast are seen as strategic areas by many companies in the higher education sector, which still maintain expansion plans for such areas, despite the cut in public funding. Some groups even plan to grow outside the state capitals, but the economic context does not favor such expansion. Private education institutions of a smaller size are the most affected, having suffered a 30% decline in the number of new students in 2016, while the national drop was 20-25% (Schincariol, 2016).

5. Analysis and Discussion

The 2016 Higher Education Census shows how the economic crisis affected the students of private institutions of higher education. The number of students enrolled was virtually the same as in 2015, and the number of new students enrolled in classroom-based courses declined. The fall in the number of private network registrations in 2016 may be partly explained by the economic crisis that has hit the country. In Southeastern and Southern Brazil, regions which have the largest number of private higher education institutions, the effects were more visible, particularly in 2017. The provision of credit through FIES guaranteed funding for 45% of students in private higher education institutions in the country, but, with the cuts and changes in the rules of the program, the number of students who can enrol in a private higher education institution has fallen dramatically (Peduzzi, 2017).

The rate of defaults in private higher education reached 8.8% of enrolments in 2016, the worst rate since 2010. This happened because many students entered private institutions expecting to receive the FIES financing, but, with the restriction of the program, they were unable to pay the monthly fees, which increased the default. Defaults are even greater in small institutions, as observed mainly in the North and Northeast. A higher level of defaults led to an increase in tuition fees, as observed in the Midwest, in order to minimize the burden of non-payment, and the overcrowding of classrooms to lower staff costs, which could lead to the loss of quality of teaching and the dismissal of teachers in private institutions in the country (Folha de S. Paulo, 2016).

The crisis affected not only the government budget, but also the level of employment in the society. With a higher number of unemployed people and lower salaries, students are less able to afford the tuition fees of a higher education course at a private institution. Such students have a hierarchy of priorities in their expenses. Some basic ones such as rent and food are in a higher position than education. In this sense, to cut costs, students end up not entering universities or choose to abandon them in the light of their reduced income (Jornal do Comércio, 2017). With the reduction of student funding – which guaranteed the access of the poorest families to higher education –, the people who wish to study and do not have resources look for alternative ways, such as distance learning. In the light of the deepening of the crisis in 2017, it is possible that a future Census shows an even more negative scenario (Alves Filho, 2017).

To overcome difficulties and attract new students, private higher education institutions can rely on multiple strategies, such as scholarships, alternative financing and even discounts for those who pay the current monthly fees. Many institutions can offer scholarships, including full ones. One of the most commonly used criteria to offer scholarships is the ENEM score. In addition to FIES, ProUni continues to offer full scholarships or 50% of the monthly fees. In order to register at this program, the student must finish high school at a public institution and reach 450 points in the ENEM exam. Due to the delay in the

FIES transfers to private higher education institutions in 2016, some of them have offered private financing in partnership with banks. To ensure student loyalty, many institutions may offer discounts to those who pay their tuition monthly. It can generate considerable savings for students on more expensive courses (Amador, 2017).

Another alternative to face the crisis may be the creation of academic endowments to finance the activities of higher education institutions, which could strengthen teaching and develop excellence research. This practice is in line with international best practices, which encourage donations to educational institutions, through income tax deductions, for alumni and partner companies. Such endowments could be an alternative for attracting additional resources in a sustainable and long-term way. In the United States, where the practice of philanthropy and donation to nongovernmental organizations is consolidated, its most important universities have billionaire endowments. The Harvard University endowment has funds under management of about $ 37 billion. Others, such as Stanford, Princeton and Yale Universities, have endowments with estimated funds between $ 20 and $ 25 billion. These universities are routinely ranked among the best in the world, because there are resources for investments thanks to the large donations or the financial return of the applications, provided by independent administrations (Senado Notícias, 2017).

6. Conclusion

The crisis in private higher education since 2016 is very intense in all regions of Brazilian territory, particularly when the reality of mass dismissals of teachers, reduction of salaries of those who remain in the institutions, overcrowding of classrooms and greater adhesion of students to distance education consolidates in the country. This crisis is related to the financial crisis, whose origins can be found in the adverse international economic situation for Brazil and also the political chaos caused by corruption and misappropriation of funds by politicians and businessmen. Brazilian government reduced FIES contracts and redefined the rules for these contracts drastically, and the students from the poorest classes could not enter higher education nor keep studying at a private university. With the high rate of unemployment in the country and the lowering of salaries in multiple sectors of Brazilian economy, students cannot afford higher education courses at private institutions.

Higher education was seen by a great part of Brazilian population – especially the lower-income classes – as a way of expanding the prospects for personal and social development. However, the crisis in private higher education has stimulated the disbelief on the transformative role of education, which has become secondary in the hierarchy of priorities for many young people. To face the problems brought by the crisis, private higher education institutions can develop strategies such as scholarships, alternative financing from private banks, discounts for those who pay the current monthly fees and the creation of educational endowments.

7. References

Alves Filho, F. (2017, September). Profissão Certa: cadeiras vazias. *O Dia*. Retrieved December 24, 2017 from http://odia.ig.com.br/economia/empregos-negocios/2017-09-03/profissao-certa-cadeiras-

vazias.html

Altbach, P.G. & Levy, D.C. (2005). *Private Higher Education: A Global Revolution*. Rotterdam: Sense Publishers.

Amador, J.G. (2017, June). Crise, desemprego e aumento na mensalidade dificultam ensino superior. *Metrópoles*. Retrieved December 24, 2017 from https://www.metropoles.com/distrito-federal/educacao-df/crise-desemprego-e-aumento-na-mensalidade-dificultam-ensino-superior

Ayres, M. (2017, December). Brasil fecha 12.292 vagas formais após a reforma trabalhista. *Terra*. Retrieved December 27, 2017 from https://www.terra.com.br/economia/brasil-surpreende-e-fecha-12292-vagas-formais-em-novembro-mesmo-apos-reforma-trabalhista,063debaae82e92034ea848bfea701cdav8g1o1ub.html

Barreyro, G.B. (2008). *Mapa do Ensino Superior Privado*. Brasília: Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira.

Basilio, A.L. (2017, December). Por que as universidades particulares estão demitindo professores? Retrieved December 24, 2017 from https://www.cartacapital.com.br/educacao/por-que-as-universidades-particulares-estao-demitindo-professores

Bezerra, J.J.; Niskier, C. & Batourina, L. (2017). Private Higher Education in Brazil: Fueling Economic Growth. *International Higher Education*, 90, 24-26.

Evans, L. (2016, February). Universidades demitem para enfrentar recessão. *EM website*. Retrieved December 24, 2017 from https://www.em.com.br/app/noticia/economia/2016/02/03/internas_economia,730971/universidades-demitem-para-enfrentar-recessao.shtml

Folha de S. Paulo. (2016, July). Crise e Fies agravam calote de estudantes em faculdades. *Folha website*. Retrieved December 24, 2017 from http://www1.folha.uol.com.br/educacao/2016/07/1790529-inadimplencia-no-ensino-superior-cresce-em-2015-e-e-a-maior-em-5-anos.shtml

Hickmann, C. (2017, May). Ensino Superior busca saída para driblar reflexos da crise. *Jornal do Comércio*. Retrieved December 24, 2017 from http://jcrs.uol.com.br/_conteudo/2017/05/cadernos/empresas_e_negocios/561655-ensino-superior-busca-saida-para-driblar-reflexos-da-crise.html

Instituto Millenium (2017, July). Universidades particulares passam pela pior crise em 40 anos. Instituto Millenium website. Retrieved December 24, 2017 from https://www.institutomillenium.org.br/blog/universidades-particulares-passam-pela-pior-crise-em-40-anos/

Jornal do Comércio (2017, June). Inadimplência em faculdades privadas foi de 9% em 2016. *JC Online*. Retrieved December 24, 2017 from http://jconline.ne10.uol.com.br/canal/economia/nacional/noticia/2017/06/22/inadimplencia-em-faculdades-privadas-foi-de-9_porcento-em-2016-291227.php

Justino, G. (2017, July). Universidades particulares voltam às aulas com demissões de professores. *GaúchaZH*. Retrieved December 24, 2017 from https://gauchazh.clicrbs.com.br/educacao-e-emprego/noticia/2017/07/universidades-particulares-voltam-as-aulas-com-demissoes-de-

professores-9857457.html

Oliveira, J. (2017, November). Número de estudantes que deixaram universidades em 2016 chega a 30% das matrículas. Retrieved December 24, 2017 from https://www.em.com.br/app/noticia/especiais/educacao/2017/11/13/internas_educacao,916263/estudantes-que-deixaram-faculdades-em-2016-chegam-a-30-de-matriculas.shtml

Palhares, I. (2017, August). Com crise, cai número de alunos na rede particular de ensino superior. *Estadão*. Retrieved December 24, 2017 from https://educacao.uol.com.br/noticias/agencia-estado/2017/08/31/com-crise-cai-numero-de-alunos-na-rede-particular-de-ensino-superior.htm

Peduzzi, P. (2017, August). Ritmo de crescimento no número de matrículas no ensino superior diminui em 2016. Agência Brasil. Retrieved December 24, 2017 from http://agenciabrasil.ebc.com.br/educacao/noticia/2017-08/ritmo-de-crescimento-no-numero-de-matriculas-no-ensino-superior-diminui-em

Sampaio, H. (2000). *Ensino superior no Brasil: o setor privado*. São Paulo: Hucitec, Fapesp.

São Martinho (2017, September). Matrículas no ensino superior caíram por causa da crise brasileira. *Sao Martinho website*. Retrieved December 24, 2017 from http://www.saomartinho.org.br/2017/09/05/matriculas-no-ensino-superior-cairam-por-causa-da-crise-brasileira/

Sécca, R.X. & Souza, R.M.L. (2009). Análise do setor de ensino superior privado no Brasil. *BNDES Setorial*, 30, 103-156.

Schincariol, J. (2016, April). Apesar da crise, universidades privadas apostam no Nordeste. Brasil247. Retrieved December 24, 2017 from https://www.brasil247.com/pt/247/pernambuco247/229150/Apesar-da-crise-universidades-privadas-apostam-no-Nordeste.htm

Senado Notícias (2017, August). Afetadas pela crise, universidades poderão vir a contar com fundos patrimoniais. *Senado Notícias website*. Retrieved December 24, 2017 from https://www12.senado.leg.br/noticias/materias/2017/08/03/afetadas-pela-crise-universidades-poderao-vir-a-contar-com-fundos-patrimoniais

Soares, M.S.A. (2002). *A educação superior no Brasil*. Porto Alegre: UNESCO.

An application of Butler's (1980) Tourist Area Life Cycle to Saly (Senegal)

Mouhamadou Bamba LY
Université de Thiès
Sénégal

Abstract

Richard W. Butler publishes in 1980 a model of evolution of tourist destinations known as TALC -Tourism Area Life Cycle- which stipulates that a site exploited for tourism and leisure knows 6 phases in its evolution: exploration, involvement, development, consolidation, stagnation, decline or rejuvenation. Several experiments of the model will be carried out around the world, however the tourist destinations located in the developing countries constitute a residual category of these applications. This article proposes an exploration of the TALC at the first station developed by the public authorities in West Africa, Saly located on the small coast in Senegal. For this purpose, we used a qualitative research method based on semi-directive interviews with actors at the level of the student site completed by official statistics. Our results show that Saly is in a so-called stagnation phase and that it is important to re-qualify the typology of tourist space in this city, which is experiencing a significant change in relation to its location.

Keywords: Tourist destination, TALC, Saly (Senegal)

Introduction

The life cycle theory used to analyze the progressive, physiological (biology), ecological (ecoevaluation) or socio-economic phenomena has been mobilized by Butler (1980) to study the dynamics of development of touristic destinations. The *Tourism Area Life Cycle* (from now on *TALC*) postulates that the latter are facing different steps of evolution which present each some characteristics. This hypothetical model can then help to identify the mechanisms and factors of change in the piloting of touristic vocation spaces.

From our review of literature, it has appeared to us that several *TALC* applications and tests have been conducted by researchers but few of them are interested in Developing Countries (from now on DC).

The continuous growth of international tourism for around fifty years and the important economic changes which are correlated to them have led many of these DC to retain tourism like a strategic orientation in their development plan.

Taking profit by the important natural potential and a favorable geographical position, the Senegalese government has, therefore, wanted to make of the little coastal area a touristic attraction pole. By doing so, the Saly sea resort that was created at the beginning of the 1980s, constitutes the emblem of this economic orientation. It welcomes important public as well as private investments and ends up becoming all along the years a major touristic destination in West Africa.

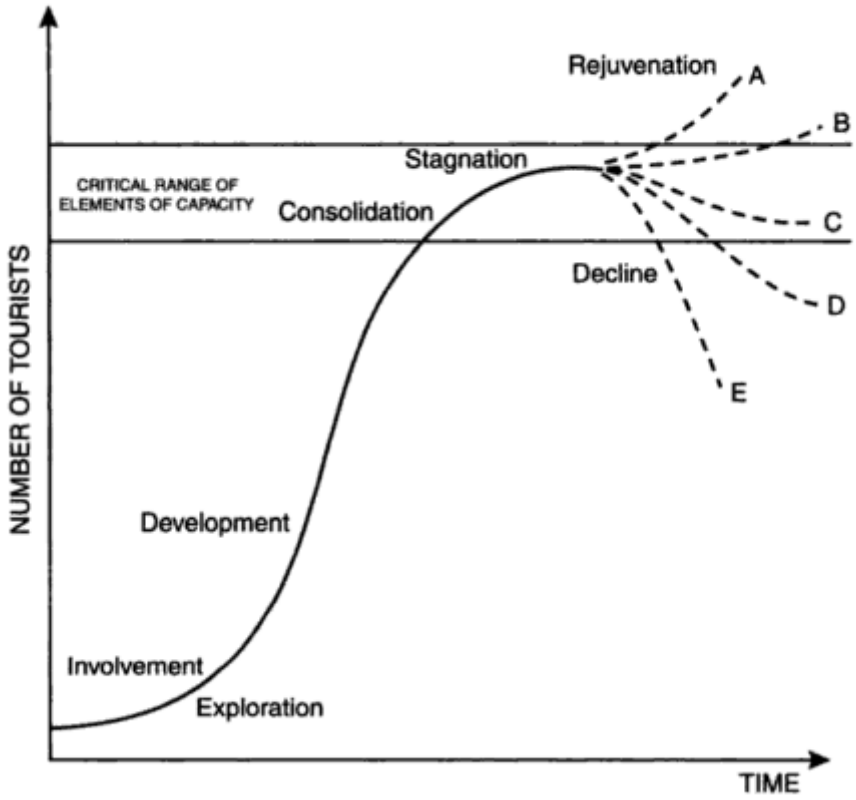
Our paper proposes to retrace the development direction of this destination and to draw up the profile of its current evolution phase. The principal objective being to discuss the *TALC* applicability to this space

located in a DC and which is then, an original context of study, in the theoretical domain of the touristic destination life cycle.

1. The theoretical framework

From the work on the development of touristic poles (Plog, 1973 ; Cohen, 1972) and the life cycle of the product in marketing widely distributed since Levitt (1965), Butler (1980) exposes a theoritical evolution model of the destination. Known under the acronym *TALC* for *Tourism Area Life Cycle*, the model postulates that the touristic sites go through six steps in their evolutions: exploration, involvement, development, consolidation, stagnation, decline or rejuvenation (diagram 1). Each of the different phases is identifiable thanks to the characteristics and a spectrum of social, geographic and economic indicators.

Diagram 1 : The theoretical life cycle of a destination



Richard W. BUTLER, (1980). "The concept of a Tourism Area Life Cycle of Evolution" Canadian Geographer. No 24, p.5-12.

Exploration: Few people visit the areas, adventurous tourist; interest in nature/culture; close interaction with local people, word-of-mouth promotion; minimal effect on social, cultural and physical environments; local facilities are used.

Involvement: Increased tourist numbers; still under local control; some advertising; start of tourist market and season; interaction stay high; some changes in social life and pressure on infrastructure; local entrepreneurs start to offer basic specialized service and facilities for tourists.

Development: Tourists' number rapidly increase to equal or exceed local population more foreign-owned facilities, loss of local control; promotion of artificial attraction; intensive and extensive advertising; enhanced accessibility; use of migrant labour; a rapid landscape change.

Consolidation: Growth rate declines; tourism now a major economic sector; heavy advertising; some opposition to tourism due to over-crowded and high-density of tourism destination; product deterioration and abandonment of facilities.

Stagnation: Tourist capacity reached/exceeded; reliance on repeats and conventions; surplus hotel capacity and changes in ownership; focus on package tourist; social, environmental and economic problems.

Decline: Tourist market is lost; vacationers decline; reliance on weekenders and day visitors; conversions of many facilities; local resentment towards visitors

... or **Rejuvenation**: changed attractions; a new tourist market is found.

Since its publication, the Butler model (1980) is one of the most quoted theories in the touristic literature (Cooper, 1994). In fact, more than around fifty applications under the test or even confrontation layout to "real world" have been conducted on several sites throughout the world (Weaver and Lawton, 2006). It is obvious that the *TALC* has been considered badly for its relative simplicity. The recurrent criticisms that are addressed to it underline that on the empirical plan, the process noticed in the life in touristic poles are far from the theoretical model (Haywood, 2006). As a matter of fact, the experimentations often result in modifications and adaptations to a specific case of the surveyed regions.

However, the strength of the model lies in some significant implications concerning destination management.

(i) Destination as a place of production and dissemination of tourism practices is far from static. On the contrary, its identity and position change over time due to several factors:

- Characteristics and consumption patterns of visitors;
- Accessibility and availability of means of transport and tourist facilities;
- Physical and environmental characteristics of the site;
- Dynamics and territorial recompositions of the region;
- Investments and choice of government policies;
- Appearance of new sites (competition)

(ii) The identification of reaching the limits beyond which, the destination can not "technically" continue to be properly exploited, occupies a key place in the TALC. This is the critical phase that announces the decline. The challenge therefore remains the prevention of this step by highlighting precursory signs. The difficulty remains in determining and measuring this "carrying capacity". Given the variable geographical characteristics according to the sites and the plethora of indicators likely to be taken into account, it is particularly difficult to define a universal method or "index". The TALC has been criticized from this point of view for the simplicity and "poverty" of the only indicator of "visitor numbers" (Getz 1992, Cooper 1994).

(iii) In the absence of intervention in the evolution of the destination, there appear a number of problems making the decline inevitable. It is necessary to take corrective actions in order to have a significant impact on the destination lifetime and thus increase the positive effects while controlling the tensions linked to the

tourist exploitation of the site. Thus, the management appears as necessary and constitutes the weft of the TALC. In this respect, the model can be understood and used as a tool for planning and operating tourist destinations. Haywood (1986) in an article entitled "Can the tourist-area cycle be made operational?" Provides a significant number of recommendations for the use of the TALC for analysis, prospective and site management purposes. The last phase of the model involves "the theory of innovation". Butler postulates that the destination is not necessarily doomed to decline, but on the contrary innovation allows to extend it under another identity or a new tourist function.

2. The illustrative case (Saly)

Saly (or Sali) is located at 80 km to the South from Dakar and at 5 km from Mbour, main big city of the Senegalese little coast which extends to around 110 km long (from the Cap Vert peak to the Sangomar one).

Discovered by the Portuguese in 1444, the village has become a flourishing trading post on the Indian sea roads and was named "Saly Portugal" which has become with time the deformed expression "Saly Portudal". Until the 1970s, the village traditional economy was mainly based on agriculture, cattle breeding and fishing. The population[1] is estimated in the last national census at around 4,000 inhabitants but some sources put forward the figure 20,000 inhabitants.

Saly has a touristic function with the adoption of the Senegal 4th economic and social development plan (1969-1973) which is going to consider tourism as a major sector. In fact, from its physical, landscaped and climatic characteristics favorable to tourism, the little coast will be concerned about an adjustment plan in 1972 completed by a feasability survey in 1976 and the implementation of an adjustment and promotion of tourism company in 1975. If the project planned putting in tourism 6 zones, only the sea resort of Saly would effectively come to light at the beginning of the 1980s. The objective set by the then authorities was to position the little coast and Saly as a foundation of European winter tourism[2]. Two Touristic Adjustment Units (TAU) will be identified on a total perimeter of 600 hectares. The Saly resort has become, throughout the years, one of the main destinations of sea resort tourism in West Africa. During the decade 1990-2000, there has been a rise of 132% in activity there with more than 100,000 international tourists, around 22% of all the tourists registered in a national level (Dehoorne and Diagne, 2008).

In 2015, we count on the domain of the sea resort 17 hotels from 2 to 5 stars and 33 residences for a total of 10,000 beds (according to the company in charge of the development of the little coast, SAPCO). Next to this accommodation and hostelry offer, there is an important number of activities linked to a touristic stay namely some chains of agencies, business, restaurants and various leisure equipments. The demand addressed to the destination is essentially composed of two segments: the seaside resort of leasures and for around fifteen years the tourism of congresses and seminars.

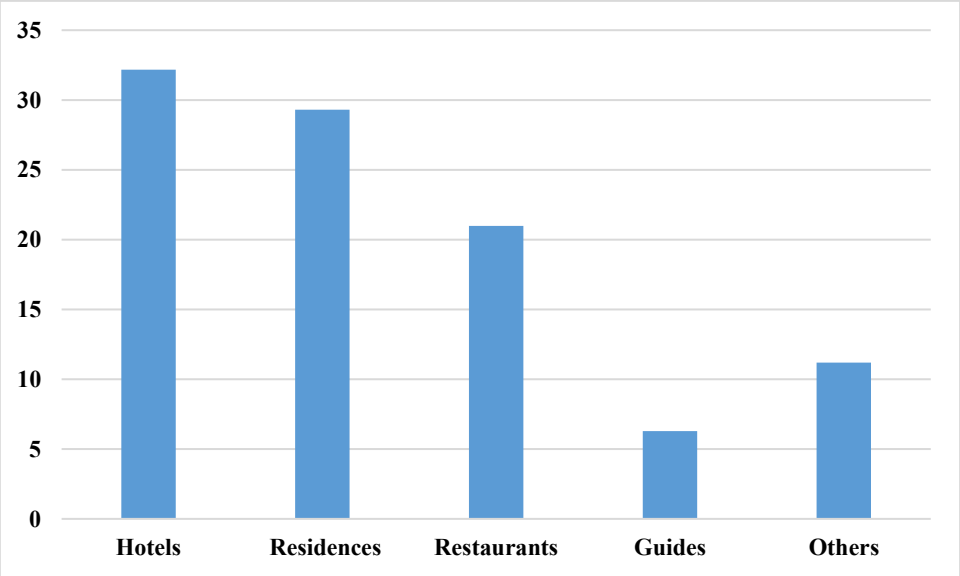
[1] It is particularly difficult to give an exact figure of the population due to a very unstable demography which can be explained by the flows of tourists, seasonal workers, Europeans who have got secondary residences in the area.

[2] In the tropical countries and particularly in Sub Saharan African lands, « European winter tourism » is the tourism done by European nationals during the winter in Europe. This period coincides in these countries with season said dry to that is opposed to the rainy season. The sunniness and the temperatures that are particularly mild offer an ideal holiday framework. It also corresponds to the high touristic season from November (n-1) to April (n).

We remark therefore an important change in the frequentation of the site that is related these last years to a high proportion of residential tourism.

Tourism is, has become throughout the years, the main economic activity of Saly so much so that all or almost in this city are in a way or another related to the frequentation and the consumption of visitors. The contribution of the sector to the budget of the township is estimated to 70% and a great number of residents has a job in an activity directly in relation with tourism (Diagram 2).

Diagram 2: **Distribution of employment in Saly**



Source: Senegalese Ministry of Environment (2011)

As a whole, 82.5% of the assets develop in the lodging, hostelry and restaurant sectors. As for the activities indirectly related to tourism, trade has one third of the workers.

3. Methodology

The results obtained are outputs of a land exploring first phase within the context of a doctorate paper. The approach is essentially based on the collect of qualitative data in order to appreciate the actors' perception on the evolution of the resort, their attitude in relation with a transfer of the concepts of sustainable development to their activities and aptitude to adhere to a collective strategy. The material used is a semi-directive maintenance guide articulated around five themes: (i) image and competitivity of the destination, (ii) level of threat on the ecosystems and the main natural attractions of the site, (iii) commitment of the actors on sustainable tourism, (iv) aptitude of the actors in participating in a collective strategy and (v) perception of the local populations on the touristic project. Secondarily, some quantitative data (statistics of frequentation, weight of the touristic economy in the township) have been collected within the circle of

the contractors and official structures. The recruitment of interlocutors has been undertaken from these three criteria :

- *Diversity* so as to touch all types of actors involved in the touristic project ;
- *Knowledge by the speaker of the sustainable development concept* as well as its transfer to the touristic activities in the developing countries ;
- *Length of service* of their activity on the site.

As a whole, 11 (line of semantic saturation) leaders with important positions in public institutions, local authorities (Saly town hall) and managers of hotels have been interviewed face to face with note taking and /or audio recording. The answers have been retranscribed on computer under Word format. Due to the reduced size of the sample, it has not seemed necessary for us to resort to a software of textual analysis or of discursive analysis. A manual thematic analysis of the verbatim has then been conducted. Secondly, we have proceeded to the exploitation of a corpus of historic archives namely press articles and the speech of actors.

4. Results and discussions

4.1 The « Saly destination » life cycle

The answers given by the interviewed actors which are completed by the observation and the exploitation of a rather varied corpus of additional resources (archives, newspaper articles, internet sites) have led us to identify three great phases in the Saly life cycle.

4.1.1 First phase (1980-2000)

A relatively long stage during which the destination has positioned itself like a credible alternative to the destinations « sun » of the West Indies, of the Carribean and Maghreb due to a relative physical proximity (5,000 kms) and cultural proximity (French language, former French colony) of Senegal with the French market, principal provider of tourists in West Africa. That being done, a strategy of promotion of the destination with the TO relayed by a "*charterization"* policy thanks to a funding of the European Economic Community (EEC which is currently EU) has allowed to establish a strong international image. This phase could briefly be cut up into two sequences of evolution of the *TALC* theoretical model:

- « *involvement* » from 1980 to 1986 corresponding to the first investments as well private as public since the state through the support instruments is going to conduct the implantation of the operators on the site. The assumed option to make of tourism the lever of diversification of the Senegalese economy has been shown by important efforts in adjustment, a training of human resources, a policy of fiscal incentive and the participation of the State in the touristic companies.
- « *development* » from 1986 to 2000, a long phase certainly ponctuated by « points of discontinuity » corresponding to conjunctural events the main ones of which are :
  - in 1989-1990, the Senegalo-Mauritanian conflict which negatively impacted on the touristic frequentation of the country causing by the way an important drop in the arrivals in Saly which obtained the quarter of them to the national level ;
  - in 1994-1995, in the heart of the Casamance conflict, the missing of 4 French tourists in the region provoked a certain disaffection of the destination ;

- after the devaluation of the CFA in 1994, it is noted a recovery of arrivals and investments namely in the residential properties.

But globally, the touristic activity growth tendency on the site and the confirmation of Saly as a major sea-side resort destination in Africa capable of competing with the Maghreb remains :

- important investments in hotel ;
- the marketing of the destination by the TO with the rates of hotel bookings close to 100% in the height of the season ;
- rather varied customers'profiles : young people, unmarried ones, couples, families from different geographical areas even if the French market has remained in the majority ;
- an important training practice of the touristic activity with the flowering of connected activities (craft industry, trade, leisures…) a positive economic impact in all the city of Mbour.

On the ecological domain, it is when the first problems arise, those essentially related to a mismanagement of the natural capital and the landed property. An important program of deforestation initiated without a real environmental impact survey consisted in cutting several vegetable species (filaos, eucalyptus, bougainvilleas…) which were forming "the landscaped belt" to welcome private residences and secondarily those of holiday by besides breaking the law of the adjustment plan. The land speculation and the anarchical development of buildings that resulted from this combined to a whole lot of interventions on the sea-shore are progressively going to sustainably transform the resort.

4.1.2 Second phase (2000-2008)

It is one phase that can be qualified as that of maturity (« *consolidation* » in Butler's model). The destination is well established as a base of sea resort tourism and of leisures in Senegal and even in West Africa and obtains according to estimations a little more than the quarter of the national touristic frequentation (around 800,000 visitors in 2007). Though in the height of the season, the number of visitors exceeds the local population, signs of slackening or even breathtaking start to be apparent :

- accentuation of the deforestation and anarchical construction of new residences ;
- uncontroled urbanization which moreover results in Saly being turned into a township in 2008;
- net slackening of hotel investment ;
- disappearance of the beach up to the level of some sites that is indeed due to the building of infrastructures without dialogue and progressive, previous survey ;
- occupancy rates on a falling tendency ;
- progression of local customers and of the segment « congress and business » ;
- weak progression of the « *first time tourist* » proportion ;
- high rate of return of « habitual ones » (up to 60%) showing then the Saly *product destination* does no longer conquer new parts of the market ;
- strong proportion to residential tourism and rise of property business ;
- the offer is a little diversified and globally suffers from a quality deficit ;
- accentuation of social problems : insecurity, prostitution, cultural depravity.

4.1.3 Current phase (since 2010)

The current phase in which the destination is found is the one called "*stagnation*" in Butler's model (1980). It is described as being a critical evolution stage of the destination during which the contract capacity of the site is achieved turning to a deterioration of the original offer (primary resources originally from the attractivity of the territory), a loss of competitivity, of the erosion of the image and other criteria of several orders (economic, social and even cultural) that we test in table 2.

As a whole 12 of the 14 criteria defined by Butler to qualify the "*stagnation*" stage evolution are verified at Saly presently. Some points have been observed before or have started at anterior phases and are confirmed progressively, it is namely about the criteria 2, 3, 6, 10 and 13.

Table 1 : Test of the indicators of the stagnation phase

	Butler's criteria (1980) from (Berry, 2001)	YES	NO	Comments
1	Peak of frequentation achieved	X		
2	Environmental issues	X		Progressive disappearance of the landscaped strip, insalubrity, coastal erosion.
3	Social issues	X		Prostitution, begging and soliciting, acculturation
4	Economic problems	X		Promoters' confidence crisis, land speculation, important seasonality, bankruptcy of many companies, under-utilization of capacities,
5	The image of the destination is established but is no longer so attractive	X		Namely with the segment young / adult European tourist in couple or in a family
6	Strong proportion of « *repeat tourist* »	X		Up to 60% of frequentation of some establishments and strong tendency to residential tourism
7	Occupancy rate fall	X		Yearly average booking rates of hotels below 50%
8	Important efforts to attract visitors (i.e. publicity, diversification of offers, lengthening of the touristic season,..)	X		Publicity with Senegalese during the periods of school holiday, rise of the congress and seminar segment
9	Montée du profil visiteur en groupe (tourisme de masse par des TO notamment)Rise of the visitor profile in group(mass tourism by namely TO)		X	
10	The equipments built by man become more attractive than the natural and cultural attractions.	X		Development of several leisure equipments (sport, casinos, night clubs)
11	The sea resort image more and more departs from the destination	X		Due to the coastal erosion, a lot of hotels do no longer have beaches and the leisure activities have overtopped the sea resort ones (weekend leisures and namely night clubs)

12	The destination develops with new investments but more and more in periphery of the original site	X		Saly has become very urbanized, building of residences, shopping centers, restaurants and hotels between Saly and Mbour to the South and Saly and Somone to the North.
13	Frequent changes of the proprety (investors-promoters) of the equipments	X		
14	Local people consider that tourists are boring		X	

4.2 Discussions

As it is true that the conjunctural factors like the insecurity related to terrorism, the establishment of an entry visa in Senegal for the French nationals, the airline transport cost and more recently the Ebola virus episode, have affected the destination, it goes without saying that the "*Saly destination product*" has not been able either to renew itself or to preserve and value its main comparative advantages: a natural, landscaped and preserved environment and a good location. Today, it is even the question of the future of Saly tourism which worries the actors since many signs that are presently evoked tend to confirm that Saly is ready to start a *post touristic era* (Baum, 2006). So, it is the typology of Saly touristic space that it is suitable to reconsider. In fact, from a sea resort, Saly has become a " resort with an urban function" (Knafou and *al*, 2008) and presents the following characteristics:

- Strong urbanization ;
- Development of a « residential tourism »;
- Decline of sea resort tourism and development of business tourism;
- Frequented in major part by local people;
- Diversification of economic functions ;
- Equipments of cultural animation and of leisures;
- Management shared between local authority (Town Hall) and the authorities (SAPCO) with a recurrent conflict of competences.

Conclusion

Butler's *TALC* applications (1980) have almost concerned destinations localized in rich countries. By experimenting it in Saly, sea-shore resort emblematic of the touristic promotion politics in Senegal, we have been able to show that the theory could also be mobilized to read and qualify the touristic destination evolution dynamics in DC. From our investigations, it has been shown, at the level of our case study, that its evolution trajectory has a little bit been hastened by an absence of a sustainable management of resources. What urges us to postulate that life cycle and sustainability must be complementary concepts in the piloting of touristic destinations.

References

S. Agarwal, "Coastal resort restructuring and the TALC", in R.W. Butler (ed.), The Tourism Area Life Cycle Vol.2: Conceptual and theoretical issues, Chanel View Publications, 2006, pp.201-218.

T.G. Baum, “Revisiting the TALC: Is there an off-ramp” in R.W. Butler (ed.), The Tourism Area Life Cycle Vol.2: Conceptual and theoretical issues, Chanel View Publications, 2006, pp. 219-230.

E.N. Berry, An application of Butler’s (1980) model Tourist Area Life Cycle theory to the Cairns Region, Australia 1876-1998, Doctoral thesis, School of Tropical Environment Studies and Geography, James Cook University of North Queensland, Cairns Campus, 2001.

R.W. Butler, “The concept of tourism area cycle of evolution: implications for management of resources”, Canadian Geographer 24, 1980, pp.5-12.

E. Cohen, "Toward a Sociology of International Tourism", Social Research 39, 1972, pp.164- 182.

C.P. Cooper, "The Destination Life Cycle: an Update." In Seaton A. V., Jenkins, C. L.,Wood R. C. , Dieke, P.U.C., Bennett, M., MacLellan, L. R. et Smith R. (eds.) Tourism: the State of the Art, Brisbane: Wiley, 1994, pp. 340-346.

D. Getz, “Tourism planning and destination life cycle”, *Annals of Tourism Research*, 19(4), 1992, pp.752-770.

K.M. Haywood, “Can the tourist-area life cycle be made operational?”, *Tourism Management*, 7(3), 1986, pp.154-167.

R .Knafou, (ed.), Duhamel P., Gay J.C., Lazzarotti O., Sacareau I., Stock M., Violier P. *Tourisme 1, Lieux communs*, Belin, Mappemonde, 2008.

T. Levitt, “Exploit the product life cycle”, Harvard Business Review, Vol. 43, 1965, pp 81-94.

S. Plog, “Why destination areas rise and fall in popularity?, The Cornell Hotel and Restaurant Administration Quarterly, 14(3), 1973, pp.13-16.

Senegalese Ministry of Tourism, Strategic Plan for Sustainable Development of Tourism (2014-2018), 2013.

D.Weaver, and L. Lawton, Tourism Management, 3rd ed., Milton: John Wiley, 2006.

O. Dehoorne and A. K. Diagne, « Tourisme, développement et enjeux politiques : l’exemple de la Petite Côte (Sénégal) », Études caribéennes [Online], 9-10 | April-August 2008, posted on August 15, 2008, accessed on May 11, 2017. URL: http://caribbeanreviews.revues.org/1172; DOI: 10.4000 / Caribbean Studies.1172

The perceptions of teacher trainers and trainees on the relevance of instructional resources for Creative Arts teacher education curriculum to learners' needs in Kenya

Keoro Andrew Nyamota
PhD researcher
Moi University,
School of Education,
P.O. Box 3900-30100, Eldoret-Kenya.
Tel: +254(0)725838261

Dr Anne Syomwene Kisilu, Prof Peter L. Barasa
Moi University,
School of Education,
Eldoret-Kenya.

Abstract

This paper is a report of a study that was carried out in year 2017 on the perceptions of teacher trainers and trainees on the relevance of instructional resources for Creative Arts teacher education curriculum to learners' needs in Kenya. The larger study from which this paper was drawn was on the perceptions of teacher trainers and trainees on the relevance of Creative Arts teacher education curriculum to learners' and societal needs. This study was guided by Structural Functionalism Theory. The pragmatic paradigm was adopted in the study. The study used mixed methods research approach. These involved integrating the qualitative and quantitative approaches. Under this design both the qualitative and quantitative data were collected concurrently, analyzed separately and then merged for interpretation of overall results. This study targeted teacher trainees, trainers and HoDs of Creative Arts drawn from public primary teacher training colleges in the western region of Kenya. Stratified and simple random sampling methods were used to select the sample whereby three hundred and ten participants were selected for the study. These comprised of 270 teacher trainees, 30 teacher trainers (tutors) and 10 HODs for Creative Arts. The research instruments used were teacher trainees' questionnaire; the teacher trainers' questionnaire; and the HoDs interview schedule. Data analysis was done by the use of descriptive statistics whereby frequencies and percentages were calculated using the Statistical Package for the Social Sciences (SPSS) software. The results of the study revealed that teacher trainees and trainers perceived resources such as song repertoire and audio-visuals among others as relevant to learner and societal needs but inadequate. The instructional resources in the colleges were perceived to be inadequate and obsolete. Lack of rooms to accommodate practical teaching using the suggested resources was also of concern. It was recommended that colleges should endeavor to provide all the resources suggested in the syllabus and replace those that

are obsolete. In addition, emphasis should be put on teaching the subject in a more practical way through the provision of time and space. The results of this study will be useful to pre-service teachers, teacher trainers, policy makers and researchers, on curriculum development and implementation of Creative Arts curriculum for teacher education.

Key words: Creative Arts, perceptions, curriculum relevance, instructional resources.

Introduction and Background to the Study

Creative Arts is an integrated course of Art, Craft, Music and some elements of drama. Research has shown that creative arts education can develop creativity and critical thinking skills while giving a holistic education to a child (Deasy, 2002). Recently there has been a general recognition of creative arts education's function in developing an individual's personality and strengthening social cohesion (UNESCO, 2001). Despite this recognition, creative arts education programmes are absent throughout a majority of the world.

UNESCO (2006) points out that the teaching of creative arts is not given the due consideration it deserves. The findings further supports views which find parental/community support for creative arts lacking. The research findings of Okong'o *et al.,* (2015); Syomwene (2013) and Likoko *et al.,* (2013) established that inadequacy of resources is an impediment to implementation of educational programmes. The absence of minimally adequate workshops, equipment, consumables and trained teachers' vocational subjects such as arts, degenerate into being taught theoretically with inadequate attention to practical skills learning (Langlo, 2004).

The centrality of creative arts in the practicing of reflective thinking and aesthetic inquiry is such that scholars have suggested infusing of the arts in education (Grierson, 2006; Richmond, 2009; Robinson, 2006). It would then seem that this fact is clear among curriculum developers in Kenya who have tended to infuse arts in the curriculum. The contention however is why the curriculum is silent on enforcement of implementation. It is therefore no wonder that the Kenya institute of Education's (now Kenya Institute of Curriculum Development) evaluation report of 2008 found the system of education inadequate in development of practical skills (MOEST, 2005).

In addition, evidence points to the importance of arts in fulfilling the students psychological need for imagination, sense, feeling, language, judgment, spontaneity and self-awareness (Nilson, 2008) Mckenna, 2012; Richmond, 2009). The question then is what the feeling is among teacher trainees and trainers about the current creative arts teacher education curriculum, in relation to adequacy of specialized creative arts teachers and sufficiency and suitability of resources necessary for the stated psychological truths. More importantly, do creative arts teacher trainers have the relevant skills needed to teach the arts? Evidence from elsewhere has shown that the teaching of the arts has not been adequately done in teacher training courses (Ewing, 2010; Garvis & Pendergast, 2012; Mckenna, 2012; Torzillo. 2013). Moreover, there has been little or no mentor support and opportunities for professional development.

Oketch and Asiachi (1992) state that the quality of curriculum, more especially when it is practically oriented, is of paramount importance. During music and drama festival and during art and craft exhibition, the participants from various ethnic groups come together whereby they share ideas, make friends, and thus appreciate culture of various ethnic groups. However, these festivals need adequate resources in order to make them practically oriented.

Education, creative arts inclusive, should promote individual development and self-fulfillment (Shiundu & Omulando, 1992). Alongside other subjects, Creative Arts contributes to the development of the intellectual, emotional and physical abilities of a person. With adequate resources, creative artworks in art, craft, music and drama, one is able to exercise the freedom of expression which includes freedom of creativity. Besides this, learners develop the power of imagination. They develop critical, analytical, leadership and social skills through discussions during work displays (KLB, 2013).

Dissanayake (cited in Upitis, 2011) argues that art cannot be considered as unimportant or peripheral owing to the disproportionate large amounts of resources often spent on art particularly in pre-modern times. Consequently, arts require investment on resources. Apparently, the issue of resources for arts remains a thorny issue among public teacher training colleges in Kenya. Whereas the creative arts teacher education curriculum suggests an array of resources that include charts, wooden blocks, woodwork tools, metal work tools, building tools, drawing instruments, among others, most institutions operate without basic resources or dilapidated ones. It is important therefore to examine the perceptions of teacher trainees and trainers regarding such resources.

This study sought to establish the perceptions of teacher trainers and trainees on the relevance of the instructional resources for Creative Arts teacher education curriculum to learners' needs in Western Kenya. Trainers' perceptions (as implementers of the Creative Arts curriculum) were deemed useful as well as the perceptions of the trainees (the consumers of the curriculum).

Statement of the Problem

Creative Arts curriculum contributes immensely in all areas of the society such as social/cultural, economic, political, utilitarian, communication and personal expression. Cultures around the world are rich in practices that use creative arts (Music, dance, drama and the visual arts). Creative Arts prepare the youth to be self- reliant. A student (learner) who has a good grounding in Creative Arts, given the initial capital has the ability to start and manage business out of creative arts (Shiundu & Omulando, 1992).

Instructional resources play a key role in the implementation of school programmes (Bishop, 1985; Otunga, Odero & Barasa, 2011; Syomwene, Nyandusi & Yungungu, 2017). Bishop (1985) calls resources the 'tools' of implementation. This being the case, the objectives of Creative Arts curriculum cannot be achieved if there are flaws in the instructional resources used in the implementation process. This study therefore sought to find out the perceptions of teacher trainers and trainees on the relevance of the instructional resources for Creative Arts teacher education curriculum to learners' needs in Western Kenya.

Purpose of the Study

The purpose of the study was to explore the perceptions of teacher trainers and trainees on the relevance of instructional resources for Creative Arts teacher education curriculum to learners' needs in Kenya.

Research question

What are the perceptions of teacher trainers and trainees on the relevance of instructional resources for Creative Arts teacher education curriculum to learners' needs in Kenya?

Significance of the Study

Creative Arts curriculum contributes immensely in all areas of the society such as social/cultural, economic, political, utilitarian, communication and personal expression. Cultures around the world are rich in practices that use creative arts (Music, dance, drama and the visual arts). We live in a rapidly changing society, where the demands of a global economy mean that flexibility, critical thinking, problem-solving and the ability to respond to creativity are being recognized as important traits. Creative Arts prepare the youth to be self- reliant. A student (learner) who has a good grounding in Creative Arts, given the initial capital has the ability to start and manage business out of creative arts (Shiundu & Omulando, 1992). Economically, the country aspires at improving the prosperity of all Kenyans through an economic development program covering all the regions in Kenya. Creative Arts, part of school curriculum, can develop skills which form a strong foundation for economic, technological and industrial needs for national development and self-employment. Socially, the country aims at building a just and cohesive society with social equity in a clean and secure environment. Creative Arts can play a great role in enhancing or promoting these values in the society. Politically, the country aspires to realize a democratic political system founded on issue based politics that respects the rule of law and protects the rights and freedoms of every individual in Kenyan society. Creative Arts therefore can enable the Kenyan society to live by the laws in the constitution. Through Creative Arts; an environment for vision 2030 can therefore be created. In order to realize all these, relevant and adequate resources must be availed.

The findings of the study of the perceptions of trainers and pre-service teachers on the relevance of resources of Creative Arts for teacher education curriculum to pre-service teachers' personal and societal needs in public primary teacher training colleges in Kenya will inform the government and all other stakeholders in curriculum development and implementation process.

Theoretical Framework

This study was guided by Structural Functionalism theory. Structural Functionalism is a sociological theory that attempts to explain why society functions the way it does by focusing on the relationships between the various social institutions those make up society (Kibera and Kimokoti, 2007). Structural Functionalism is simply a framework for building theory that sees society as a complex system whose parts work together

to promote solidarity and stability. It asserts that our lives are guided by social structures, which are relatively stable patterns of social behaviour. Social structures give shape, for example, in families, the community, and through religious organizations. And certain rituals, such as handshake or complex religious ceremonies, give structure to our everyday lives. Each social structure has social functions, or consequences for the operation of society as a whole. Education, for example, has several important functions in a society, such as socialization, learning and social placement.

Herbert Spencer, who lived from 1820-1903, was an English philosopher. Spencer compared society to a human body. In the same way each part of the body works in harmony with all other parts. If we want to understand the importance of the heart for helping the body function properly, we need to understand how it relates to other parts of the body. Similarly, if we analyze the functions of some aspect of society, such as Creative Arts, we can learn how it impacts the other parts of the system.

Functionalists emphasize that order and balance are the normal state of society, and a disruption in one part of the system will certainly disrupt the other parts. Creative art is part of the educational system and if it is not relevant to work effectively it may not impact the other parts of the system positively. As a result of this, the learners' and societal needs are not met. The school and the society according to this theory co-exist. The school receives learners from the society and it has a duty of preparing them for life in the society. On the other hand, for the school to achieve this function, the curriculum offered has to be relevant to learners' and societal needs.

Literature Review

This part reviews literature on relevant resources for the curriculum of Creative Arts.

Relevant instructional resources for the curriculum of Creative Arts

Instructional resources reverberate in literature as being crucial in the successful implementation of an educational programme (Adeogun, 2001; Babayomi, 1999; Gogo, 2002; Muthamia, 2009, MOEST, 2005). In a study focusing on the correlation between availability and use of resources and performance, Adeogun (2002) was able to show that availability and use of instructional resources tended to influence academic performance in a positive way. This was consistent with the findings by Babayomi (1999) that the presence of instructional resources in private schools accounted for the better performance witnessed in private schools as compared to public ones.

Gogo (2002) concerned with the quality of education established that lack of or inadequacy of instructional resources was a precursor to poor performance. This implies that good performance requires resources to facilitate learning through learning and seeing. Echoing similar views, Muthamia (2009) avers that adequacy of relevant resources is the platform that teachers require to base their effectiveness and productivity. MOEST (2005) argues that effective implementation of educational programmes is dependent

on adequacy of relevant resources. Atieno (2014) further acknowledges that resources are crucial to instruction and need not be overstretched. Okobia (2011) advocates for the importance of instructional materials and observes that they promote educational efficiency through improved teaching and learning. Orodho, Waweru, Ndichu and Nthinguri (2013) established that the challenges of availability and adequacy of learning resources was found to negatively affect teacher effectiveness in the use of teaching methods. A study by Akinsanya (2010) to establish the differential distribution and utilization of human resources on students' performance in state owned and federal schools in Nigeria revealed that both material and human resources were practically inadequate and where there were adequate they were not well utilized. According to Adeoye and Papoola (2011) noted that for learning to take place, learners must have access to necessary materials and resources. They have to interact with tangible and intangible resources to ensure some level of performance.

These findings no doubt accentuate the importance of teaching resources in learner performance irrespective of the subject area. Such findings provide the platform upon which the need to explore the perceptions of teacher trainees and trainers of creative arts resources as existing in public primary teacher education was founded.

UNCST (2007) noted that practical experiments have been observed to be central to the teaching of science in that they help develop scientific investigation and motivates, creates curiosity, objectivity and willingness to evaluates evidence the reason why in availability and utilization of laboratories cannot be over emphasized. Talaka (2009) posits that educational has an intrinsic value and is an instrument for social development, so schools need resources to improve the mathematics performance. Bello (1980) established that there is the problem of inadequate preparation of teachers to carry out reading instruction due to inadequacy of relevant resources.

Mutai (2006) asserts that learning is strengthened when there are enough materials such as teaching aids and classrooms. Instructional materials are actual equipment used as "hands on" process by learners in order to develop the degree of skills sought by the course requirement (Chauha, 1973). According to World Bank (2007), instructional materials are ingredients in learning and the intended curriculum cannot be implemented without them. Adwale (2011) avers that instructional materials help teachers to hold students' attention in the class. Ani (2006) noted that instructional materials help students to improve in their learning procedure and develop language skills. Omwonyo (2003) notes that teaching/learning resources enable the teacher to clearly explain concepts to the learners. According to Usman (2007) educational resources play an important role in the achievement of educational goals and objectives. Akisanya (2010) avers that educational resources are important because the goal of any school depends on adequate supply and utilization of physical and material resources which enhance proper teaching and learning. This is supported by Chiriswa (2002) who noted that effective teaching and learning depends on the availability of suitable and adequate resources such as books, laboratories, library materials and host of other visual and audio teaching aids which enhance good performance in national examination.

Ayoo (2002) in her study established that availability of facilities in schools had a direct link with the performance of learners in examination. Mwonga and Wanyama (2012) were able to show that teaching and learning resources not only enhances a child's acquisition of music and movement (dance) skills but also ensured that transition from pre-primary to primary school is smooth. This was consistent with the findings by Hirst et al (2011) that despite the provision of best practices, it is critical to highlight one fact that teaching and learning resources play a key role in the transition process. Ngang'a (2008), Simiyu (2007) and Mesis (2006) contend that resources enhance efficient learning, sustain students' attention and remove monotony of speech in the teaching and learning process. Mesis (2006) notes that resources are needed to assist in teaching certain concepts which could have been difficult to teach theoretically. They thus make learning interesting, they help shorten the explanations and make abstract concepts to be understood easily by the learners. Sallis (2002) indicated that an educational programme cannot be effectively implemented using only policy guidelines even if the teachers are trained and committed without adequate and appropriate physical facilities. Bila (2008) noted that teachers are free to use a variety of relevant resources while teaching. Such materials range from pictures, charts, diagrams and models, televisions, videos, projectors and computers. Such materials provide students with opportunities to use their senses, so that at the end of instruction, students can perform teachers' stated objectives.

Saba (2007) avers that school facilities and equipment are important pillars in support for effective teaching and learning to take place in an ideal environment. Okpanku and Uchechi (2008) establish that facilities and equipment help to stimulate interest and also enhance retention of ideas. Hamza (2000) and Nwagwu (2007) contend that the short supply of instructional materials in Nigerian secondary schools hinder effective teaching and learning. Igu (2007) avers that school libraries, where available, are filled with old and obsolete books that are irrelevant.

Begi (2014) conducted a study in counties of Bondo, Kisii and Kericho and established there was poor academic performance due to lack of culturally-relevant resources in the market, teachers lacked information on published resources and also there was lack of funds for developing and acquiring culturally-relevant resources.

Resources are thus very significant in the teaching and learning process. Without relevant and adequate resources, the instruction for Creative Arts can be greatly affected.

Research design and methodology

The study was conducted in public primary teacher training colleges situated in the western region of Kenya. The choice of public primary teacher training colleges from this region was informed by the rich artistic cultures exemplified by colleges from the regions in national performing arts competitions. The pragmatic worldview was found to be ideal for the purposes of the present study in the sense that besides

being not committed to particular systems of reality and philosophy, it also offered the researcher freedom of choice.

On the basis of the pragmatic worldview, the study adapted the mixed methods research approach. This involved integrating the qualitative and quantitative approaches. The study targeted teacher trainees, trainers and HoDs of Creative Arts departments drawn from public primary teacher training colleges. For purposes of this study, the target population for teacher trainees was further narrowed down to a study population of those attending their second year of training. The argument was that second year teacher trainees having been in the colleges for long would have more telling perceptions. The total target population therefore comprised of 4828 teacher trainees, 80 teacher trainers and 10 HODs.

All the ten HoDs representing the ten-public primary teacher training colleges in the region were selected. This was consistent with Krejcie and Morgan's (1970) sample size table which recommends a sample of size 10 if the population size is 10. Second, 3 creative arts teacher trainers were purposively selected from each of the institutions yielding a total sample of 30 (Creswell-Plano Clark, 2011). Stratified and simple random sampling methods were used to select teacher trainees from the respective teacher training colleges. First the required sample was stratified by college and then by trainee gender. A sample of 132 male trainees and 138 female trainees were selected giving a total of 270 trainees. The sample size thus constituted 310 respondents (10 HoD's; 270 trainees and 30 trainers).

Three instruments were used to collect data for purposes of the present study. These were: the teacher trainees' questionnaire; the trainer's questionnaire and the HoD's interview schedule. Data was analyzed using descriptive statistics for all the quantitative data. It was coded and entered into the Statistical Package for Social Science (SPSS) Ver.20) which was then used to screen data for missing values and response rate. Frequency distribution tables were used to summarize the perceptions of teacher trainees and trainers with regards to the relevance of the constructs under study. The perceptions of trainees and trainers were therefore captured in terms of proportions of agreements or disagreements. Thematic analysis was used to explore the perceptions of HoDs derived from interviews with this set of respondents. Thematic analysis was preferred since as noted by Seidman (1998), it allows for an examination of responses for prominent, recurrent themes across and within respondents.

Findings

The question that the study sought to answer was perceptions of teacher trainees and trainers on the relevance of the instructional resources used in Creative Arts. The study revealed that both trainees and trainers perceived the resources as very relevant but hardly available. The interviews demonstrated lack of resources such as computers, projectors and pianos. Space to accommodate practical lessons in creative arts was perceived to be unavailable.

The findings are presented in Tables 1, 2, 3 and 4.

Table 1: The Perceptions of Teacher Trainees on Frequency and Proportion of Use of Resources of Creative Arts

Resource	Frequency and proportion of use	
	n	%
1.Song repertoire	56	29.2
2.Music instruments (Piano, drum, keyboards)	54	28.3
3.Paintings	73	38.0
4.Resource persons	95	50.8
5.Audio visual materials	60	31.3
6.Calligraphic pens	59	30.7
7.Charts	184	95.8
8.Flash cards	139	75.5
9.Recorded music	103	53.6
10.Ornaments	59	30.7
11.Printed materials	184	96.3
12.Photographs	183	95.3
13.Metronomes	54	28.1
14.Radio programmers	59	30.7
15.Recording studio	51	26.6
16.Art/craft items	151	88.8
17.Woodwork tools	95	50.8
18.ICT	52	27.1
19.Drawing instruments	109	56.8
20.Building tools	65	33.9
21.Costumes	96	50.0

The implication of these results is that teacher trainees are mainly taught Creative Arts theoretically using resources that hardly give them a practical orientation. This in essence means that they lack the competence to handle the practical aspect of the subject. It is also surprising to note that there is minimal use of ICT when indeed the current generation is generation 'Y' which is technology savvy.

Trainees were asked how relevant the instructional resources were in meeting their needs. The results shown reveal that teacher trainees find the listed resources very relevant to their needs.

Table 2: The Perceptions of Teacher Trainees on Relevance of Resources used in Creative Arts Instruction

	not sure		not relevant at all		somewhat relevant		very relevant		extremely relevant	
	n	%	n	%	N	%	n	%	n	%
1.Song repertoire	8	4.2	0	.0	81	42.2	100	52.1	3	1.6
2.Music instruments	8	4.2	0	.0	81	42.2	100	52.1	3	1.6
3.Paintings	0	.0	0	.0	0	.0	178	92.7	14	7.3
4.Resource persons	8	4.2	0	.0	81	42.2	100	52.1	3	1.6
5.Audio visual materials	0	.0	81	42.2	8	4.2	103	53.6	0	.0
6.Calligraphic pens	0	.0	0	.0	8	4.2	182	94.8	2	1.0
7.Charts	0	.0	0	.0	0	.0	189	98.4	3	1.6
8.Flash cards	8	4.2	0	.0	0	.0	181	94.3	3	1.6
9.Recorded music	0	.0	81	42.2	0	.0	109	56.8	2	1.0
10.Ornaments	0	.0	0	.0	81	42.2	100	52.1	11	5.7
11.Printed materials	8	4.2	0	.0	81	42.2	92	47.9	11	5.7
12.Photographs	8	4.2	0	.0	81	42.2	89	46.4	14	7.3
13.Metronomes	48	25.0	0	.0	41	21.4	101	52.6	2	1.0
14.Radio programmers	8	4.2	40	20.8	49	25.5	95	49.5	0	.0
15.Recording studio	8	4.2	40	20.8	49	25.5	95	49.5	0	.0
16.Art/craft items	8	4.2	41	21.4	0	.0	132	68.8	11	5.7
17.Woodwork tools	8	4.2	41	21.4	40	20.8	89	46.4	14	7.3
18.ICT	0	.0	0	.0	48	25.0	130	67.7	14	7.3
19.Drawing instruments	0	.0	41	21.4	0	.0	140	72.9	11	5.7
20.Building tools	0	.0	1	.5	46	24.1	131	68.6	13	6.8
21.Costumes	0	.0	0	.0	51	26.6	130	67.7	11	5.7

Table 3: The Perceptions of Teacher Trainers on Availability and Relevance of Resources for Creative Arts Instruction

	SA		A		U		D		SD	
	n	%	n	%	n	%	n	%	n	%
1.Creative arts resources are available and adequate	0	.0	3	12.0	0	.0	18	72.0	4	16.0
2.The available resources for creative arts teaching are in good condition	0	.0	2	8.0	1	4.0	16	64.0	6	24.0
3.There is an array of resources for handling diverse creative arts domains	0	.0	1	4.0	0	.0	17	68.0	7	28.0
4.The available resources adequately expose trainee teachers to practical aspects of their training	0	.0	3	12.0	2	8.0	15	60.0	5	20.0
5.Trainees are encouraged to improvise using locally available resources	15	60.0	10	40.0	0	.0	0	.0	0	.0
6.Resources for creative arts training are readily available when needed	1	4.0	1	4.0	1	4.0	17	68.0	5	20.0

The implication of these results is that Creative Arts teacher trainers are constrained in their pursuit for practical orientation in creative arts training by lack of recommended resources in their respective colleges. Besides, the few resources that are available are not in good conditions and hardly expose trainees to required practical skills. These findings therefore support the findings by teacher trainees and confirm existence of challenges due to resource constraints.

Table 4: Summary of HODs Perceptions on whether Resources were Relevant (n=6)

Category	Narratives
Not relevant (n=4, 66.7%)	--'we hardly have required resources such as computers, projectors, pianos, name them…'(Interview: participant 2) --'we lack space to accommodate practical art lessons…although we have a music room, it is ill equipped' (interview: participant 5) --'…how do we teach woodwork and metal work practically? We simply don't have materials for those crafts' (interview: participant 4) --'…ah no, we do not even have pianos for teaching music. Those that are there are in very bad state' (Interview: participant 3)

Relevant (n=2, 33.3%)	+ '…I must admit that materials for music and dance are occasionally purchased particularly when national festivals are on' (Interview: participant 6) + Text books and materials for teaching practice are usually availed' (Interview: participant 1)

-- means disagreement
+ means agreement

These perceptions by HODs were consistent with perceptions of teacher trainers and trainees in portraying lack of relevant resources for teaching creative arts in primary teacher training colleges in the Western region. The implication then is that whereas fine arts is taught in these colleges, teacher trainees and trainers perceive resources used as only able to support theory lessons and therefore teacher trainees are short of required practical skills necessary for meeting their personal and societal needs.

Okongo, Ngao, Rop and Wesonga (2015) in a study to establish the effect of availability of teaching and learning resources on the implementation of inclusive education in pre-schools in Nyamira North Sub-county established that the inadequacy of teaching and learning resources interfered with implementation of inclusive education in the sub-county. The findings further strengthen the position taken by UNESCO (2004) that few schools and colleges in Kenya have access to computers and the appropriate infrastructure essential to the learning process. Evidence shows why use of relevant resources is crucial to the development of skills among teacher trainees. Muthamia (2009), for instance observes that teachers can only be effective and productive in their work if they have adequate and relevant facilities. MOEST (2004, cited in Likoko *et al*, 2013) noted that adequate and appropriate facilities for teaching and learning ensure effective implementation of educational programmes.

Conclusions

The study concluded that the instructional resources outlined in the syllabus for Creative Arts teacher education curriculum are perceived to be very relevant to trainees' needs. The resources in the colleges are however perceived to be inadequate and obsolete. Lack of rooms to accommodate practical teaching using the suggested resources was also of concern.

Recommendations

The syllabus for Creative Arts teacher education curriculum has suggested very relevant resources for use in the instruction of the subject. However, many of the suggested resources are lacking or obsolete in the colleges. It's recommended that colleges should endeavor to provide all the resources suggested in the syllabus and replace those that are obsolete. In addition, emphasis should be put on teaching the subject in a more practical way through the provision of time and space.

References

Adewale, J. G. (2011). Competency Level of Nigerian Primary 4 Pupils in Life Skills Achievement Test. International Journal of Primary, Elementary and Early Tears Education. 39 (3):221-232.

Adeogun, A. A. (2001). *The principal and the financial management of public secondary schools in Osun State*. Journal of Educational System and Development, 5(1). Pp.1-10.

Adeoye, O. M. and Popoola, S.O. (2011). Teaching Effectiveness, Availability and Use of Library Information Resources among Teaching of Nursing in Osun and Oyo State, Nigeria.

Akinsanya, O. (2010). *Differential Distribution and Utilization of Human and Material Resources on Students Academic Performance in Secondary Schools in Ogun State.* African Journal for the Study of educational issues Vol (3, 4) 2010.

Ani, E. O. (2006). The Impact of Instructional Materials on Students Performance. Owerri: Alvan Publishers.

Atieno, A. J. (2014). *Influence of Teaching and Learning Resources on Students' Performance in Kenya Certificate of Secondary Education in Free Day Secondary Education in Embakasi District, Kenya.* Master's Thesis Submitted to the University of Nairobi.

Ayoo, S.J. (2002). "An Investigation of the Factors influencing K.C.S.E. Performance in Kisumu County. Unpublished M.Ed. Thesis. University of Nairobi.

Babayomi, O. A. (1999). Grade-related changes in the school Environment. Effects on Achievement Motivation. In advances in motivation and Achievement, vol.3: 155.

Bello, J.Y. (1980). Basic principles of teaching: Chichester, John Wiley and Sons limited.

Bila, G.J., (2008) Current assessment practices in schools/ institutions. *National Board or Technical Education(N.B.T.E.) Training Manual Pedagogical Skills for Technical Teachers in Nigerian Polytechnics and Monotechnics(MDGs/DRG)* 2-3, 16-20.

Bishop, G. (1985). *Curriculum Development: A text book for students.* London: Macmillan.

Chauha, S.S. (1973). Advance Educational psychology. New Delhi: UBS publisher distributors PVT Ltd.

Creswell, J. W. & Plano, C. V. L. (2011). *Designing and conducting mixed methods research.* (2nd ed.). Thousand Oaks, CA: Sage.

Deasy, R. J. (2002). *Critical links: Learning in the arts and student achievement and social development.* Washington, DC: Arts Education Partnership.

Ewing, R. (2010). *The arts and Australian education: Realizing potential.* Victoria: Australian Council for Educational Research.

Garvis, S. & Pendergast, D. (2012). Storying music and the arts education*:* The generalist teacher voice. *British Journal of Music Education*, 29(1), 107-123. Doi: 10.1017/S0265051711000386.

Gogo, K. S. (2002). Input of cost sharing on access, equity and quality of secondary education in Rachuonyo District. *Unpublished M. Ed. Thesis*, Kenyatta University.

Grierson, E. (2006). 'Creativity: Cultural identities in a state of becoming', *Australian Art Education*, Vol. 29, No. 2, pp. 5-20.

Hamza, A.A. (2000). *Funding of Universal Basic Education (UBE) for Nigeria*. Abuja: Federal Ministry of Education.

Hirst, Jewis, Sojo and Cavanagh (2011). *Transition to Primary: A Review of the Literature.* Retrieved From: www.kidsmatter.Edu.Au.

Idiagbe, J.E: (2004). *Relationship between Education Facilities, Teachers Qualification, School Location and Academic Performance of Students in Secondary Schools in Delta State.* Unpublished Ph.D Thesis. Delta State University, Abraka Ijebu Ode, Ogun State.

Igu, C.N.C. (2007). Procurement and maintenance of school plant in secondary schools in Afikpo Education Zone of Ebonyi State. Unpublished M.Ed. Dissertation, EBSU Abakaliki.

Kenya Literature Bureau (KLB) (2013). *Distinction Creative Arts Year 1*, second edition, For Primary Teacher Education.

Kibera, L. W. & Kimokoti, A. (2007). *Fundamentals of Sociology of Education with reference to Africa.* Nairobi: University of Nairobi Press.

Krejcie, R.V. & Morgan, D.W. (1970). Determining sample size for research activities.

Educational and Psychological Measurement, 30, 607-610.

Langlo, I. (2004). *"Social Competency" – a forsaken aspect of home education?* I: Beck, C. and Straume, M. (red): Home education – The Start of a New Revolution in Education? (Vallset, Oplandskebokforlag). Learning. UK: Futurelab.

Likoko, S., Mutsotso, S., & Nasongo, J. (2013). The adequacy of instructional materials and physical facilities and their effects on quality of teacher preparation in emerging private primary teacher training colleges in Bungoma County, Kenya. *International Journal of Science and Research (IJSR)*, 2(1) India Online ISSN: 2319 7064.

McKenna, T. (2013). Arts education: Do the arts really matter? In McKenna, T., Cacciattolo, M., Vicars, M., & Steinberg, S. (Eds.). *Engaging the disengaged: Inclusive Method in an EFL class for upper grade primary students.* Contributed to the JALT Pan SIG.

Mesis, O.K. (2006). *Constraints in Effective Resource Utilization by Teachers in Primary Schools in Bomet District Kenya.* Unpublished M.Ed Thesis. Nairobi: Kenyatta University.

Ministry of Education Science & Technology (MOEST) (2005). *Delivering Quality Education and Training to all Kenyans:* Kenya Education Sector Support Programme 2005-10. Nairobi: ROK

Mutai, B. K. (2006). *How to write quality research proposal: A complete and simplified Recipe.* New York: Talley Publications.

Muthamia, H. N. (2009). *Factors affecting Adult Educational Learners recruitment Programme in Kakamega South District, Kenya*. Unpublished M.Ed. Thesis, Masinde Muliro University.

Mwonga & Wanyama, M. (2012) Dealing with the prevailing attitudes and challenges for effective implementation of ECD Music and Movement Curriculum in Eldoret Municipality, Kenya. Research Journal in Organizational and Education Studies, 1(5), 292-302.

Ng"ang"a, K.H (2008). *An Investigation into the availability and Utilization of Teaching Learning Resources in Pre-School Education in Kieni West Division, Nyeri District.* Unpublished M.Ed. Thesis. Nairobi: Kenyatta University.

Nilson, C., Fetherston, C. M., McMurray, A., & Fetherston, T. (2013). Creative Arts: An Essential Element in the Teacher's Toolkkit When Developing Critical Thinking

In Children. *Australian Journal of Teacher Education, 38(7)*

Oketch, J. G. & Asiachi, A. J. (1992). *Curriculum development for schools.* Kenya Educational Research and Publications (ERAP) Ltd, Nairobi.

Okpanku, K.O. and Uchechi, O.U. (2008). Mandate of business education at the secondary level. *ABEN Book of Readings*, 1(8): 213-217.

Okobia, E. (2011). Availability and Teachers' use of instructional materials and resources in the implementation of Social studies in Junior Secondary in Edo State, Nigeria. *Review of European Studies*, vol.3, No.2.

Okong'o R., Ngao, G., Rop, N. & Wesonga, J. (2015). Effect of Availability of Teaching and Learning Resources on the Implementation of Inclusive Education in Pre-School Center in Nyamira North Sub-County, Nyamira County, Kenya. *Journal of Education and Practice*, ISSN 2222-1735 (paper) ISSN 2222-288X (online), vol.6, No.35.

Omwonyo, R. (2003): *Primary science and teaching handbook.* Jomo Kenyatta Foundation. Nairobi.

Orodho ,A.J. ,Waweru ,N.P., Ndichu,.M.,&Nthinguri,R.(2013).Basic education in Kenya: Focus On strategies applied to cope with school-based challenges inhibiting effective implementation of curriculum. *International Journal of Education and Research.Vol.1. No. 11 November 2013.www.ijern.com*

Otunga, R. N., Odero, I. I. & Barasa, P. L. (ed) (2011). *A hand book of curriculum & Instruction.* Eldoret: Moi University Press.

Owino, O. A., Yunguyungu, A. M., Osman, A. (2015). *The Relationship Between Availability of Teaching/ Learning Resources and Performancein KCSE Biology in Selected Secondary Schools in Nyakach Sub-County, Kisumu County , Kenya.* International Journal of Contemporary Applied Sciences Vol. 2, No.7.

Richmond, S. (2009). Art's educational value. *Journal of Aesthetic Education, 43*(1), 92 105.

Robinson, K. (2006). *Ken Robinson says schools kill creativity*. Technology, Entertainment and Design Talks. Retrieved from http://www.ted.com/talks/ken_robinson_says_schools_kill_creativity.html.

Saba, M.D. (2007). School facilities management in Nigeria. *Educational Digest Journal,* 10(1): 17-19.

Sallis, E.(2002).*Total Quality Management in Education*.(3rdEdition).Quick Silver sterling, Virginia. USA: Stylus.

Seidman, I. (2013).A Review of "Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences" (4thed.). *New York, NY: Teachers College Press.*

Shiundu, S. J. & Omulando, J. S. (1992). *Curriculum Theory and practice in Kenya*. Nairobi: Oxford University Press.

Simiyu, D.N. (2007). *Factors Influencing Availability and Utilization of Instructional Resources in Teaching Kiswahili in Public Secondary Schools in Githunguri Division.* Unpublished M.Ed. Thesis. Nairobi: Kenyatta University.

Syomwene, A. (2013). Factors Affecting Teachers' Implementation of curriculum Reforms and Educational Policies in Schools: The Kenyan Experience. *Journal of Education and Practice.* ISSN2222-1735 (paper), ISSN-2222-2/88* (Online) Vol 4, No 22,2013.

Syomwene, A. ,Nyandusi, C. M., & Yungungu, A. M. (2017). Curriculum development process. In A. Syomwene; C. M. Nyandusi & A. M. Yungungu (Eds.). *Core Principles in curriculum*. Eldoret: Utafiti Foundation.

Talaka, T. (2009).*Roles of Education in Social Development*. In Perspectives to Global Social Development (edited by Perkiö, Mikko).Tampere University Press: 119-126.

Torzillo, M. (2013). Dancing around the edges: dance in the primary school. *International Journal of Arts Education, 7*(1), 25-36.

UNCST (2007). *Report of the Survey of Attitudes of Secondary Students.* Attitudes to Science; Uganda.

UNESCO (2001). *Technical and Vocational Education.* Geneva: United Nations Educational Scientific and Cultural Organization. www.unesco.org/education.

UNESCO (2004). *EFA News:* A Newsletter of UNESCO, Nairobi office issue VI.

Upitis, R. (2011). Engaging students through the arts. The Literacy and Numeracy Secretariat, voice. *British Journal of Music Education, 29*(1), 107–123. doi: 10.1017/S0265051711000386.

World Bank, (2007). Pre-school, Secondary Education in Africa: Developing science Mathematics & ITC Education in Sub-Sahara Africa.World Bank.

Yara, P. & Omondi, K. O. (2010). *Teaching/Learning Resources and Academic Performance in Mathematics in Schools in Bondo District of Kenya.* Asian Social Science 6(12).

Do Veterinarians Recognize a Role for Physical Therapists in Small Animal Physical Therapy and Rehabilitation?

Sue Ann S. Kalish, PT, DPT OCS
Professor
Courtney Charlesworth, Brittny Garrison, Brooke Terilli, Ashton Zambrowicz
Graduate student,
Department of physical therapy
University of North Georgia.

ABSTRACT

The role of physical therapy and rehabilitation of an injured or aging small animal offers great potential. The increase in the use of domestic small animals, particularly canines, as companion animals, service animals and for athletic competition, advances in medical and surgical techniques in veterinary medicine and personal experiences participating in physical therapy appears to have created a desire from owners regarding the animal's quality of life and quantity of years. There is little literature addressing small animal physical therapy rehabilitation and how such services might be accessed. We present an interview-based study to assess opinions of veterinarians to gauge whether they perceive a need for small animal physical therapy and rehabilitation. We further examine which health care professionals these veterinarians perceive are most qualified to render these rehabilitative services. Eight veterinarians from a rural, northeastern region of Georgia were interviewed. The results demonstrate that many veterinarians may not have received curriculum instruction in small animal physical therapy through veterinary school. Still, results reveal that veterinarians in this study support physical therapists playing a role in the rehabilitative treatment of small animals. This study further supports the need for interprofessional education and collaboration in the treatment of small animals and their physical therapy needs.

Key Words: *physical therapy, small animal physical therapy, veterinary rehabilitation physician, small animal rehabilitation*

INTRODUCTION

As society, at large, becomes more demanding of small animal rehabilitation for the benefit of companion and service animals, physical therapy as an alternative, or adjunct, to more conventional remedies, such as surgery, offers a less invasive, less expensive alternative. Animal rehabilitation gained momentum in the United States in the late 1980s.[1]

The veterinarian, Dr. Janet Van Dyke, was a representative of the formative period of animal rehabilitation. The Canine Rehabilitation Institute, founded by Janet Van Dyke in 2003, is responsible for the majority of rehabilitation licensing for animal physical therapy in the United States. [2] The field has grown immensely

in the last 30 years, with 350 animal rehabilitation clinics currently available in the United States. The field growth has resulted in hundreds of certified animal rehabilitation specialists from both the veterinary specialty and the physical therapy specialty .[3, 4] As an alternative to traditional veterinary surgical techniques, or euthanasia, veterinarians began to apply principles and techniques of human rehabilitation to animals [5].

Some veterinarians believe that animal rehabilitation should only be performed by veterinary practitioners, because others are not knowledgeable in animal physiology and pathology and as such may overlook diseases and other medical conditions. While there is certainly a difference in animal and human anatomy and physiology, the basic principles of structure and function are the same from the standpoint of the work of the physical therapist. Many of the techniques used to treat humans are directly applicable to animals.[1, 6, 7] Susan Bertram, DVM, notes that many veterinarians are considering the usefulness and benefits of physical therapy for their patients. She states "veterinarians wishing to institute a physical therapy program must… [acquire] knowledge of equipment, clinical indications for each modality, proper application and contraindications," With the exception of animal anatomy and physiology, the majority of courses required for certification in small animal rehabilitation programs are offered in Doctorate of Physical Therapy programs. [14] Dr. Bertram continues with "consulting with, employing or referring cases to a licensed physical therapist is a good way to tap into their unique knowledge and experience." [8, 9] Dr. Bertram is paralleling the veterinary medicine with the traditional human medical model with medical physicians (Orthopaedic surgeons, internists, and osteopaths as examples) treating surgical or disease processes and referring the human patient to physical therapy for rehabilitation to improve function and quality of life.

Jackie Woelz, PT, DPT, MS, CCRP is the founding therapist for UC Davis Veterinary School Physical Rehabilitation, and bases her approach on the idea that the objective of physical therapy treatments results in regaining functional ability. Dr. Woelz noted that the "… animal benefits parallel those seen in human medicine, [with improvements in] flexibility and improved postural control and balance."[10] As an added benefit, there are positive psychological effects observable not only in the animal, but also in the animal's owner/caregiver following animal rehabilitation. [10]

The area of small animal rehabilitation is a new and relatively unexplored field. Because little research has been done to determine potential benefits of physical therapy on small animal rehabilitation, veterinary practice has no meaningful evidence to judge in making an opinion on the benefits of physical rehabilitation. The little literature available that consists mainly of expert opinion and little empirical evidence does not dispute a need for physical therapists in small animal rehabilitation. In fact, the ongoing debate is primarily over the extent to which the physical therapists should be involved in animal rehabilitation. The American Association of Rehabilitation Veterinarians' (AARV) position on this matter is that animal rehabilitation is part of veterinary medicine and a veterinarian should be directly involved in an animal's rehabilitation program. While AARV supports veterinary staff working with non-veterinary professionals in the rehabilitation process, it strictly opposes non-veterinary professionals having direct access to animal patients. Likewise, some veterinarians worry about expanding state practice acts to include

non-veterinary professionals.[11]

Extensive effort researching small animal rehabilitation has highlighted the severe lack of scientific evidence pertaining to this topic [12,13] The present investigation is focused on gaining a better understanding of how veterinarians in northeast Georgia view physical therapy as a potential for small animal rehabilitation. The investigation further questions which health care professionals, veterinarians or physical therapists, are qualified to render these rehabilitative services.

METHODS AND PROCEDURES

Data Sources

The literature search included the following databases: CINAHL Plus with Full Text, MEDLINE with Full Text, ProQuest Nursing and Allied Health Source, SPORT Discus with Full Text, PubMed, Google Scholar, The Veterinary Journal, Journal of Veterinary
Science and Technology, and the American Journal of Veterinary Research. Due to the scarcity of citations, our inclusion criteria broadened to include not only research articles, but expert editorial opinions. Only studies of canine or feline animal rehabilitation were included in the present study. The databases used, while extensive, do not access all veterinary journals.

The bulk of the literature retrieved was not randomized control trials, but rather an overview of different modalities and rehabilitative protocols used on small animals with various neurologic or musculoskeletal conditions. These authors applied rehabilitative understanding, based on studies of humans with musculoskeletal or neurologic conditions, to the animal population they were treating with similar conditions.

Subjects

Purposive sampling identified eight licensed veterinarians in the tri-county area of rural northeast Georgia agreed to answer interview questions related to animal rehabilitation, education, and the role of physical therapists in small animal rehabilitation. Veterinarians answering the interview questionnaire were in private practice settings or shelter settings. They reported mean of 16.5 years experience in veterinary medicine, ranging from 4 to 30 years. All of the veterinarians who participated in the study worked in settings with a population mainly consisting of canines and felines, with an occasional pocket pet, such as a rabbits or Guinea pigs.

Interviews

Initially, a focus group consisting of veterinarians and veterinarian technicians was conducted to formulate questions for the interview process. The eight veterinarians were then interviewed to obtain deeper understanding of the role of physical therapy in small animal rehabilitation. One on one interviews were conducted in the offices of the participating veterinarians. Each interview lasted 15-40 minutes. A semi-structured interview was used to solicit the veterinarians' expert opinions on the subject matter. Each

interview was recorded and then transcribed by the research group. The initial inquiry involved conversation about each veterinarian's typical client population, followed by questions probing (1) treatment courses of various diagnoses and their outcomes, (2) educational and experiential background, (3) use and availability of rehabilitative services, and (4) knowledge of components of small animal rehabilitation and physical therapy in an attempt to understand the veterinarian's personal points of view on this small animal rehabilitation therapeutic concepts.

Authorization and Analytic Procedure

Prior to data collection, the study was approved by the University of North Georgia Investigational Review Board (IRB) committee. All transcripts were uploaded to NVivo Software for Data Analysis and nodes were created in search of repeated thoughts and ideas from each of the interviewed veterinarians. Each researcher then assessed the nodes and themes were determined from the nodes (Table 1). Once themes were discovered, a common, implicit idea, qualitative research labels as "essence" ,was established to bring meaning to the research endeavor. The common, implicit idea, or essence, derived from this research paper concluded that physical therapists, with proper training, are a valuable part of the small animal rehabilitation team.

RESULTS

Thematic Correlations

Table one illustrates the different nodes and themes derived from the semi-structured interviews in this project. Each node represents the summaries of basic concepts derived from the discussion with the veterinarians. The nodes were then summarized into themes. Each theme is addressed separately in this paper. An major idea or essence was then formulated from the sum of the information provided by the veterinarians.

Table 1: Thematic Correlations

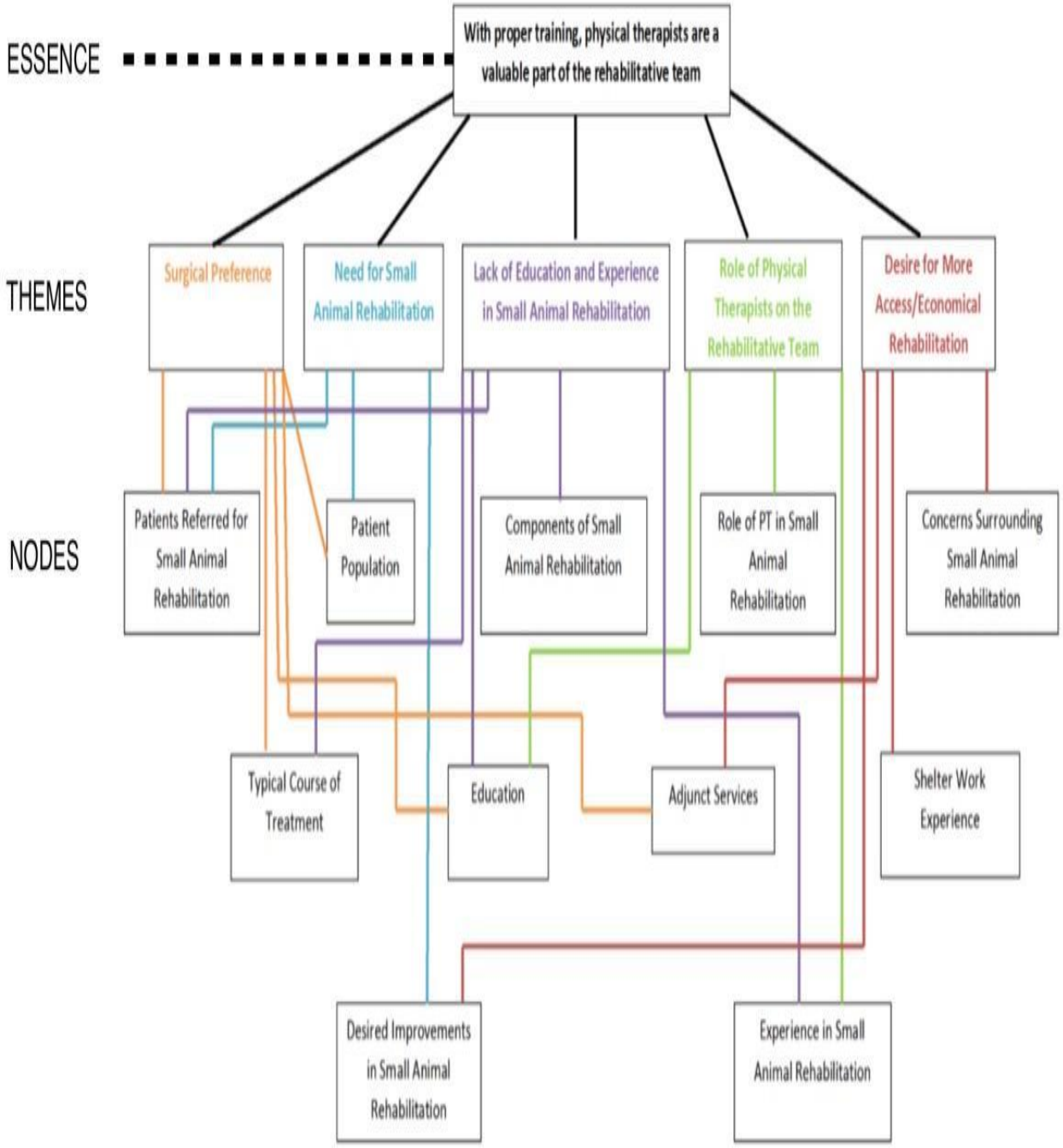
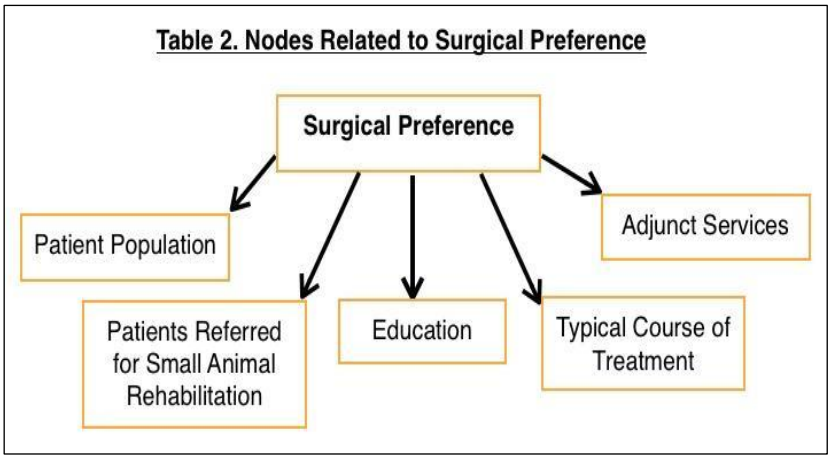


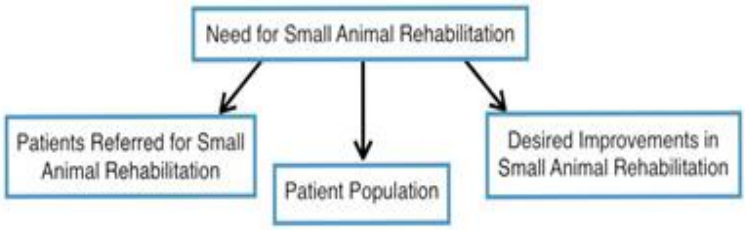
Table 2. Nodes Related to Surgical Preference



Surgical Preference

When asked about their tendency to refer their clients with orthopaedic or neurological impairments to rehabilitation, half (50%) of the veterinarians stated that they rarely, if ever, referred their patients out for rehabilitation, whether the case was a post op case or disease process such as arthritis and spine nerve root involvement. When asked to consider the clinical decision of performing surgery or conservative management of a disease process, most (63%) of veterinarians opted for surgical intervention that they could perform. The remaining veterinarians (37%) opted for cage rest and medication as their first choice for treatment for their clients with orthopaedic or neurological disease processes. Most veterinarians (67%) felt the need for a professional second opinion regarding a surgical situation. They often referred to a surgical referral service, which, if recommended and performed surgery, would then supply rehabilitation to the patient post-surgically . All (100%) of the veterinarians noted that, when indicated, preferred the surgical intervention to the rehabilitation intervention. The veterinarians were well schooled and skilled in surgical interventions and the subsequent outcomes. As previously identified earlier, physical therapy and rehabilitation management of small animals, to date, is poorly investigated with unpredictable outcomes measured.

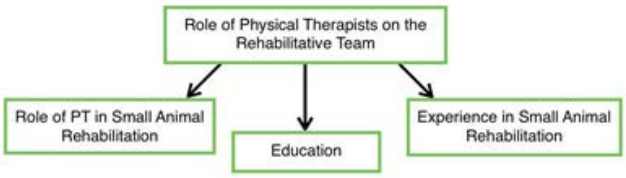
Table 3. Nodes Related to Need for Small Animal Rehabilitation



Need for Small Animal Rehabilitation

The two veterinarians working in shelter settings agreed that they would prefer rehabilitation as an option to avoid elective surgeries, and to offset the high cost of surgery. However, due to economic burdens, they both agreed, that shelter settings would not have the means to offer advanced rehabilitation techniques and modalities to
small animals.

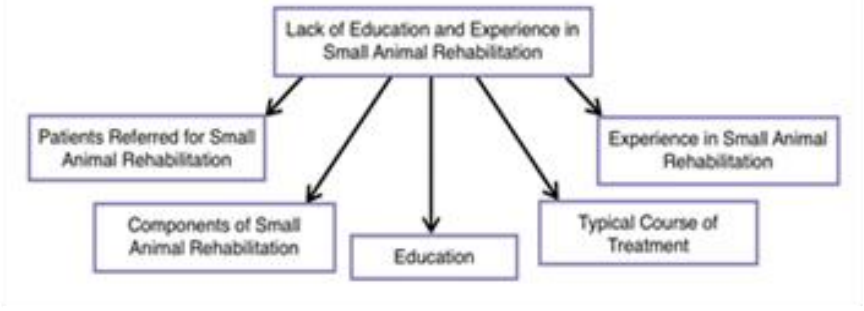
Table 4. Nodes Related to Role of the Physical Therapist in the Rehabilitative Team



Role of the Physical Therapist in the Rehabilitation Team

Most (67%) veterinarians agreed it would be easier for the PT to learn about animal anatomy & physiology, due to similarities to human anatomy & physiology, than it would be for veterinarians and vet techs to learn rehabilitation techniques. Most (67%) veterinarians would support a physical therapist taking a lead role on the rehabilitative team of small animals, as long as therapists worked in conjunction with the veterinary team.

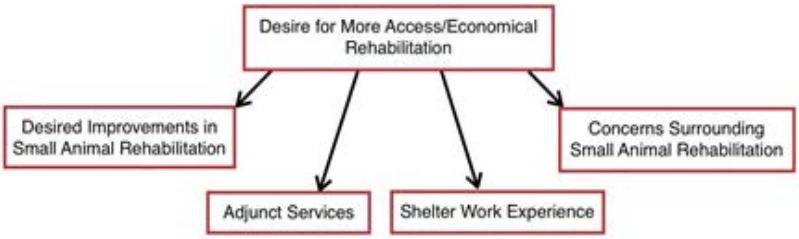
Table 5. Nodes Related to Lack of Education and Experience in Small Animal Rehabilitation



Lack of Education and Experience in Small Animal Rehabilitation

All (100%) of the veterinarians reported no exposure to rehabilitative techniques in professional school , though a few (37%) gained exposure through continuing education classes and current journal articles . All (100%) of the veterinarians stated that courses in small animal rehabilitation provided during veterinary school would increase their confidence in recommending these services to their clients by increasing their knowledge of rehabilitation efficacy and techniques.

Table 6. Nodes Related to Desire for More Accessible and Economical Rehabilitation



Desire for More Accessible and Economical Rehabilitation

All (100%) of the veterinarians agreed that they would be more likely to recommend rehabilitation services if these services were either more accessible and/or affordable. There is a lack of services in the small towns of North Georgia, so if veterinarians need to recommend services, patients will have to travel approximately fifty miles to the closest services. A few (37%) of the veterinarians also expressed the concern that offering rehabilitation services “in house” would entail a significant economic burden due to the high cost of equipment and perceived low demand for services.

DISCUSSION

When presented with a neuromuscular or orthopaedic abnormality involving a small animal, veterinarians, primarily opted for surgical intervention since surgery was emphasized in veterinary school and the veterinarians felt comfortable with their surgical abilities and outcomes. This curriculum deficit in the application of rehabilitation techniques, specifically physical therapy skills, is very much like the one observed in human medicine curriculum design. A study by Stanton, et al regarding the resident physician's' knowledge of physical therapy, a questionnaire design method, confirmed the knowledge deficit of these resident physicians, regardless of the years of residency, of components of physical therapy treatment. [15] Cherkin, et al, found similar results regarding physician's approach to the treatment of low back pain.[16] Of particular interest in this study was the physician commitment to a certain mode of therapy, regardless of the evidence, and of competing treatments.[16] The researcher concludes that veterinary medicine curriculum mirrors human medicine school curriculum in that both lack proper education for students regarding the benefits and components of physical therapy for their respective clients. Only the veterinarians that had experience with physical therapy, either human or animal, agreed that physical therapy might be a great addition to a protocol as a means of conservative treatment before opting for surgery, or as an option to be used post-surgically for improved functional outcomes and long term effects. Even after a personal experience in physical therapy, when asked to describe the components of small animal physical therapy rehabilitation, most of the veterinarians were unable to do so. Many of the veterinarians often stated they perceived the physical therapist's job was to improve quality of life and decrease pain. While this is true, none could articulate more specific applications and benefits of physical therapy. Only one veterinarian mentioned personally experiencing physical therapy treatments. This lack of knowledge of the benefits and components of physical therapy, even for humans, is a common problem in the general population as well. The American Physical Therapy Association (APTA) has dedicated healthcare provider and consumer educational materials to fill this gap of knowledge.

When describing common diagnoses, the veterinarians all had similar treatment plans, most of which involved cage rest and medications or steroid injections for pain relief. Short leash walking and passive range of motion were often incorporated for orthopedic diagnoses post-surgery. Return to function ranges varied depending on severity of the diagnosis and age of the patient. Therapeutic interventions, such as use of the underwater treadmill, acupuncture, and various other modalities were mentioned as something veterinarians had either seen used or had read about in current veterinary literature. Exactly how these components of animal rehabilitation should be delivered and outcomes assessed were not mentioned or discussed. This circles back to the basic premise that veterinarians are not fully aware of the complexity and comprehensiveness a physical therapy can offer their patients. These two components, strategic parts of the physical therapy educational curriculum, create the entire rehabilitation plan to restore the animal to full function.

While the private practice veterinarians acknowledged potential benefits of physical therapy, both conservatively and post-surgically, shelter veterinarians thought physical therapy would be an excellent addition to their practice, as it would increase their ability to care for more animals in a cost effective manner. If certified personnel were available to perform conservative care, such as physical therapy for

many of the shelter animals, surgery could be avoided in a large percentage of cases. In cases where surgery is cost prohibitive, rehabilitation services, delivered by a physical therapist, may improve the quality of life for an injured animal. However, due to the lack of trained volunteers and inconsistencies in treatment, small animal physical therapy and rehabilitation is not currently an option in the shelter setting.

A main concern voiced by all the veterinarians was the lack of accessibility and/or expense of referring clients to small animal rehabilitation. Currently, there are no practices offering small animal rehabilitation in northeast Georgia. The closest centers are located over an hour away from the populations in question. Because of the distance to these locations, referrals from the interviewed veterinarians were infrequent as many of their clients were unlikely to travel that far. When asked why their practices did not offer rehabilitation services, many said lack of demand from clientele. Veterinarians generally only referred clients to rehabilitative services at request of the owner and due to owner's having no financial restrictions.

METHODOLOGIC ISSUES

Semi-structured interviews are a common form of information gathering in qualitative research. In order account for biases, the research team participated in bracketing before data collection. These biases include the researchers' personal experiences as pet owners and animal enthusiasts and their status as doctorate of physical therapy students, because these may bias the perceived importance of physical therapists as the best practitioner concerning the research question. The small geographic area in a rural setting, as well as the small number of interviews conducted, may not be representative enough to promulgate generalizable information.

CONCLUSION

Overall, the idea of adding physical therapists to the small animal rehabilitative team was positively received, on two conditions: (1) that small animal rehabilitation physical therapists are trained in animal anatomy and physiology, and (2) that clients do not have direct access to small animal rehabilitation physical therapists, but require a veterinarian's referral. Because of the extensive educational background in rehabilitation theory and application, the addition of the physical therapist to the small animal rehabilitation team would provide a more comprehensive approach to small animal rehabilitation, offering the animal the best chance of restoration of function and quality of life.

Funding: No funding was used nor accepted for this study
Disclosures: The authors declare that no conflicts of interest exist.

REFERENCES

1. McGonagle L, Blythe I., Levine D. History of canine physical rehabilitation. In: Millis, DL, Levine D, eds. *Canine Rehabilitation and Physical Therapy*. 2nd edition. Philadelphia: Elsevier Saunders, 2014:1-7.

2. A Pioneer in Animal Rehab. http://www.veterinarypracticenews.com/April-2009/A-Pioneer-In-Animal-Rehab-Education/ Posted May 22, 2008. Accessed March 11, 2017.
3. Canine Rehabilitation Institute. *Certification Programs*. http://www.caninerehabinstitute.com/Overview.html. Accessed February 12, 2017.

4. Canine Rehabilitation Certificate Programs. The University of Tennessee. http://www.utvetce.com. Accessed March 20, 2017
5. Canapp, Sherman et al. *Rehabilitation Therapy for Elbow Disorders in Dogs*. Veterinary Surgery. 2009. 38 (2): 301-307
6.Saunders DG. Therapeutic Exercise. *Clinical Techniques in Small Animal Practice.* 1096-2867/07/$-see front matter c2007 Elsevier Inc. All rights reserved. Doi:10.1053/j.crsap.2007.09.003
7.Hesbachm AL. Techniques for Objective Outcome Assessment. *Clinical Techniques in Small Animal Practice.* 2007 Elsevier. 22(4): 146-154. https://doi.org/10.1053/j.ctsap.2007.09.002
8. Bertram S. *Physical Therapy, Rehabilitation Gain Momentum: Post-surgical, degenerative joint disease and obesity cases among primary candidates for physical therapy*. Veterinary Practice News. 2000. http://www.tops-vet-rehab.com/NewsArticles/VetPracticeNews012000.php. Accessed March 28, 2017
9. Sharp, B. Physiotherapy in small animal practice. *In Practice*. 2008. (30),190-199
10. Woelz,J. Physical Rehabilitation Optimizes Recovery in Animal Patients. Veterinary Medicine News, UC Davis, Spring 2006. http://www.vetmed.ucdavis.edu/vmnews/23-1/vmnews23-1p04.pdf
11. American Association of Rehabilitation Veterinarians. *Model Standards for Veterinary Rehabilitation Practices*. 2009. http://rehabvets.org/model-standards.lasso Accessed April 24, 2015.
12. Boyle KL, Marcellin-Little DJ, Levine D. An Interdisciplinary Animal Physical Rehabilitation Course for Physical Therapy and Veterinary Students. Innovations in Veterinary Education. *JVME* 29(3) 183-185
13. Millis DL, Ciuperca IA. Evidence for canine rehabilitation and physical therapy. *Vet Clin North Am Small Anim Pract*. 2015 Jan;45(1):1-27.**doi: 10.1016/j.cvsm.2014.09.001**
14. Commission on Accreditation in Physical Therapy Education (CAPTE). Accreditation Handbook. PT Standards and Required Elements. www.capteoline.org/accreditation handbook/. Accessed March 11, 2017.
15. Alvarez LX, Fox PR, Van Dyke JB, Grigsby P. Survey of referring veterinarians' perceptions of and reasons for referring patients to rehabilitation facilities.
J Am Vet Med Assoc. 2016; 249(7): 807-813. **doi: 10.2460/javma.249.7.807**
16. Cherkin,DC, Deyo RA, Wheeler, K, Ciol M. Physician Views about Treating Low Back Pain: The Results of a National Survey. **Spine**. 20(1):1-8, January 1995.

A Study of the Secondary Flow in Aircraft Engine Compressor Disks using Computational Fluid Dynamics

Syed Naveed Ahmed[1], Dr. P Ravinder Reddy[2], Dr Sri Ram Venkatesh[3]

1) *PhD Scholar, Mechanical Engineering Department, Osmania University, Hyderabad, Telangana, India.*
2) *Professor, Head, Mechanical Engineering Department, CBIT, Hyderabad, Telangana, India.*
3) *Professor, Mechanical Engineering Department, Osmania University, Telangana, India*

Abstract

The compressor disks of an aircraft engine which operate at very high rotational speeds are exposed to significant temperature gradients. These temperature gradients induce thermal stresses into the rotating disks which along with the existing dynamic stresses significantly reduce their useful field life. Hence it becomes essential to reduce the disk temperature gradients by utilizing a certain percentage of the compressor core flow known as the secondary flow for either heating or cooling these rotating parts. But this extraction of the compressor core flow results in a higher engine fuel burn for a given engine thrust. Hence the need arises for a better utilization of the secondary flow to effectively reduce the temperature gradients of the rotating compressor disks. As the secondary flow thermal phenomenon inside the rotating compressor disk cavities is very complex and due to it's direct impact on the life expectancy of the disks it becomes critical to understand it's thermo-fluid behaviour by the effective use of available Computational Fluid Dynamic tools. In the current study the secondary flow through the compressor disk cavities is simulated using Computational Fluid Dynamics (CFD) and the results are analysed and reported. The analysis of these results help in a better understanding of the distribution of the flow and the variations of the thermal fluid parameters across the secondary flow system. These results are also later used as thermal boundary conditions in the Finite Element model (FEM) to study the impact of various engine design parameters on the disk temperature gradients after being validated by the experimental results. The findings from this computer aided investigation offers support in make design improvements aimed at lowering the disk temperature gradients and enhancing their useful field life

Keywords: Compressor Secondary Flow, Computational Fluid Dynamics, Aircraft Engine, Compressor Disks, Thermo-fluid analysis.

Nomenclature

T: Temperature, C
ΔT: Temperature difference, K
V: Flow velocity, m s^{-1}
d: Annulus Gap, m
d_h : Hydraulic diameter = 2d, m
ν: Kinematic viscosity of the fluid, m^2 s^{-1}
r : Radius from rotor axis, m
ρ: Density of the fluid, kg m^{-3}
μ: Dynamic viscosity of the fluid, N s m^{-2}
K: Thermal conductivity of air, W m^{-1} K^{-1}
K_{disk}: Thermal conductivity of the disk material, W m^{-1} K^{-1}
h: Heat Transfer Coefficient, W m^{-2} K^{-1}
ω : Disk angular velocity, rad s^{-1}
R_b: Cavity outer radius, m
R_a: Cavity inner radius, m
β: Volume expansion coefficient of the fluid, K^{-1}
$R_{O,ax}$: Axial Rossby number
Nu: Nusselt Number
Re_{ax}: Axial Reynolds Number
Re_{ω}: Rotational Reynolds's number
Gr: Grashof number
Pr: Prandtl number
s: Axial width of cavity, m
G: Axial gap ratio
x: Axial distance, m
D_s : Shaft diameter, m
$\dot{m}$: Mass flow rate, kg s^{-1}
xk: Ratio of the air to rotor tangential velocities.
q: Heat flux, W m^{-2}

Subscripts:

sh: Shroud
in: Air inlet to cavity
ax: Axial
av: Average
r: At local radius r from axis
o: Outer
i: Inner
cav: Cavity

1. Introduction

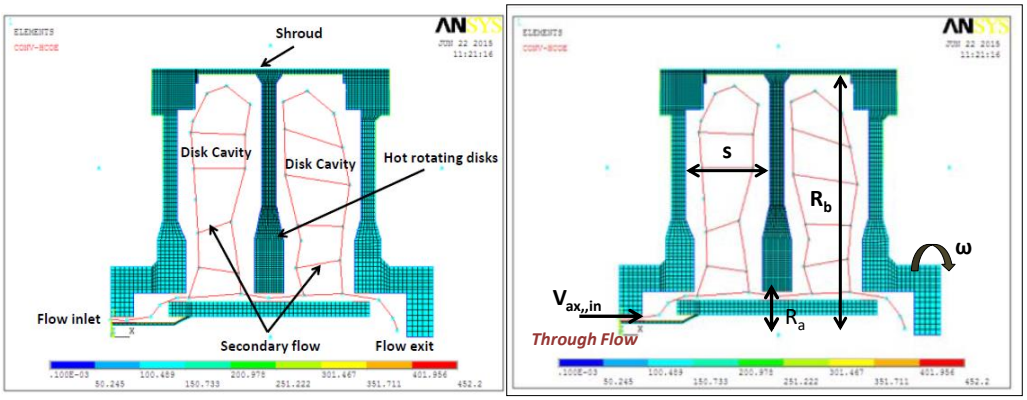


Fig.1 The rotating disks and secondary flow Fig.2 The disk nomenclature

Figure 1 is a schematic of the secondary air flow through the rotating disk cavities. As seen a certain percentage of the secondary through flow circulates into the rotating disk cavities. The amount of this flow re circulation inside the disk cavity depends on

1) The mass of secondary air flow (Represented in terms of the axial Reynolds number).
$Re_{ax} = V_{ax,in}\, d_h / \nu$, Where d_h , $V_{ax,in}$ are the flow diameter and the flow velocity at the inlet.

2) The rotational speed of the disks (Represented in terms of the rotational Reynolds number).
$Re_{\omega} = \omega\, R_b^2 / \nu$, Where ω and R_b are the rotational speed of the disks and the outer radius of the disk cavity.

3) The Axial Rossby number.
$R_{O,ax} = V_{ax,,in} / \omega\, R_a$, Where R_a is the inner radius of the disk cavity.

4) The axial gap ratio.
$G = s / R_b$, Where s , R_b are the axial width and the inner radius of the disk cavity.

The flow simulations are performed using Computational Fluid Dynamics (*CFD*) consistent with the experimental set up (Figure 4) conducted by A. Gunther, L. Heller [5]. The simulations are performed for the two operating conditions of the engine as shown in table 1. Lower operating condition where the secondary mass flow is 0.04 Kg/sec with an engine rotational speed of 6000 r.p.m. Higher operating condition where the secondary mass flow is 0.4 Kg/sec with an engine rotational speed of 12000 r.p.m.

Table 1 shows the details of the two operating conditions of the engine which are modelled and analysed.

Table .1 The two operating conditions of the engine

	ΔT	Re_{ax}	Re_{ω}	Gr	$R_{O,ax}$	$\dot{m}$	N
	K					kg/s	r.p.m
Measurement Test conditions	70	2×10^4	1.5×10^6	6×10^{11}	1	0.04	6000
Maximum test conditions	70	1.8×10^5	1.5×10^7	5×10^{13}	1	0.4	12000

The change in the engine operating condition impacts the thermo-fluid factors listed below 1,2,3 which ultimately influence the heat transfer phenomenon occurring inside the rotating disk cavities. The *CFD* simulation is performed to estimate these thermo-fluid parameters related to the secondary flow system which are later used as boundary conditions in the Finite Element Model (*FEM*) to predict the disk temperature gradients.

1) Pressure, Temperature and density variations of the flow inside the disk cavities.
2) Swirl velocities of re circulating flows inside the disk cavities.
3) The flow structure and the flow distribution within the disk cavities.

2. The CFD Simulation:

The following are some of the earlier studies carried out related to the flow in a rotating cavity similar to that of the rotating compressor disk using computational fluid dynamics (*CFD*). Tucker P.G, Long C.A [1] had conducted a *CFD* study to investigate the vortex flow in a rotating cavity with an axial through flow of air. K. Saunders, S. Alizadeh [2] used the *CFD* study to Generate Heat Transfer Boundary Conditions for a Rotor-Stator Cavity. J. Michael Owen, Hans Abrahamsson [3] had carried out a *CFD* study to study the Buoyancy-Induced Flow in Open Rotating Cavities. Daniele Massini, Bruno Facchini [4] carried out an investigation on Swirl and Heat Transfer Within a Rotor-Stator Cavity.

In the current study the secondary flow simulation is performed using Computational Fluid Dynamics (*CFD*) consistent with the experimental set up (Figure 4) conducted by A. Gunther, L. Heller [5] for the two operating conditions listed in table 1.The *CFD* model is constructed using commercially available Gambit and Fluent software. Figure 3 represents the CFD model and Figure 4 represents the experimental set up

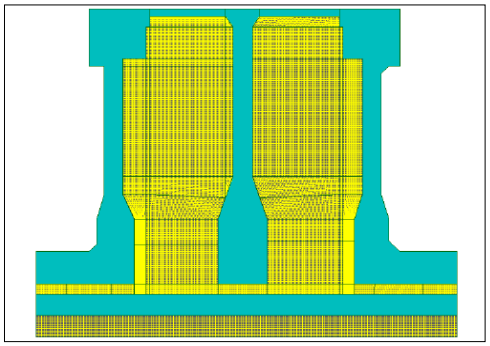


Fig. 3 The CFD model

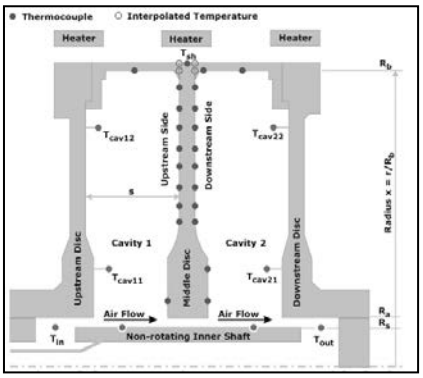


Fig. 4. The experimental set up

The model is a 2D axi-symmetric model with the flow domain meshed with the Quad elements using the Map scheme. The mesh consists of 32330 quadrilateral cells and 33156 nodes. The boundary zone types applied along the flow domain are fixed and rotating walls, mass flow inlet, pressure outlet and axis of rotation (figure 6). The boundary conditions as applied in the Fluent model are shown in figures 5 and 6.

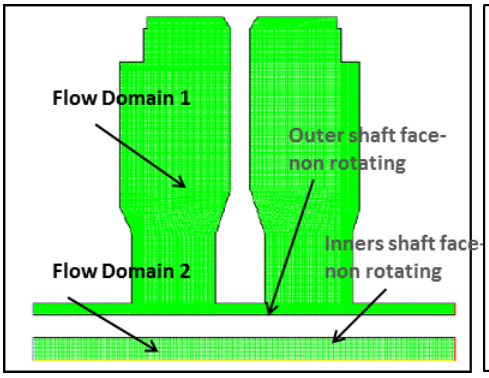


Fig. 5. Fluent Boundary Conditions

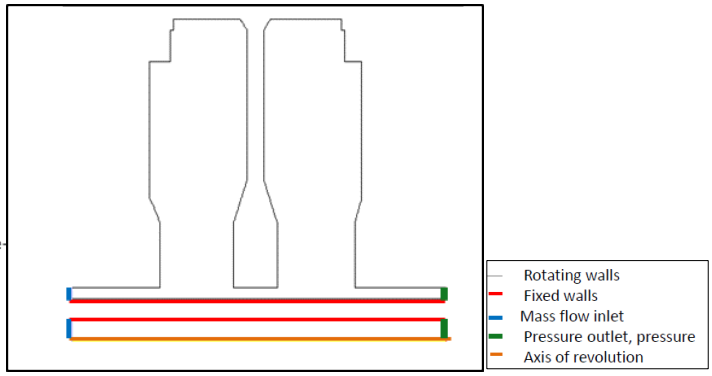


Fig. 6. Fluent Boundary Conditions

The flow model in Fluent model is also 2D axi-symmetric modelled using a Swirl Segregated solver. It has the following modelling features.

1. Compressible flow with application of the energy equation.
2. Uses Spalart-Allmaras 1 equation model for the viscous flow solution.
3. The effects of gravity and buoyancy are captured.
4. Flow domain is air with air with the standard properties.

The flow domain is solved using the flow, the swirl velocity, the modified turbulent viscosity and the energy differential equations with the first order discretization.

3. Results and Discussions:

3.1. The Secondary Flow Pattern and Distribution :

Based on the flow vector patterns obtained from Fluent analysis (Figure 5) , the flow distribution inside the cavities was

estimated and was later used to construct the flow network in the FEA model (figure 6). As observed from the flow vectors in

Fluent, the flow moves radially upwards (up wash) towards the left of the cavity and then radially downwards (down wash)

towards the right of the cavity with internal re circulations from the right to the left of cavity (cross flow). An estimated 20

percent of the incoming flow circulates into the inter disk cavity with 2 percent local re circulations (figure 7). For the measured

test conditions, 100 percent incoming flow (figure 7) corresponds to 0.04 Kgs / sec and for maximum test rig conditions

corresponds to 0.4 Kgs / sec.

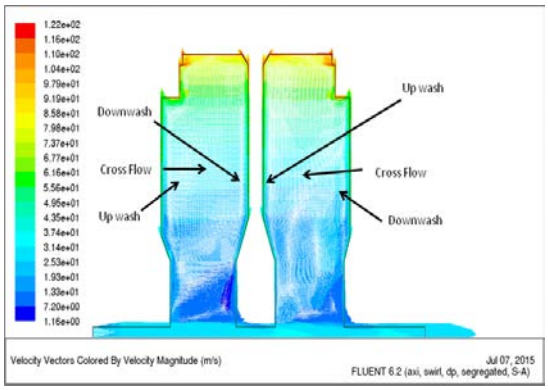


Fig. 5. Flow vector pattern in Fluent

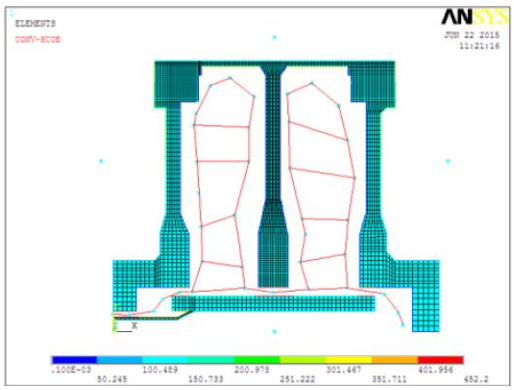


Fig. 6. The flow circulation pattern

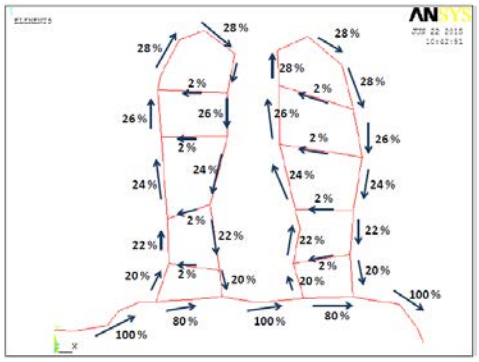


Fig. 7. Estimated percentage of flow re circulation

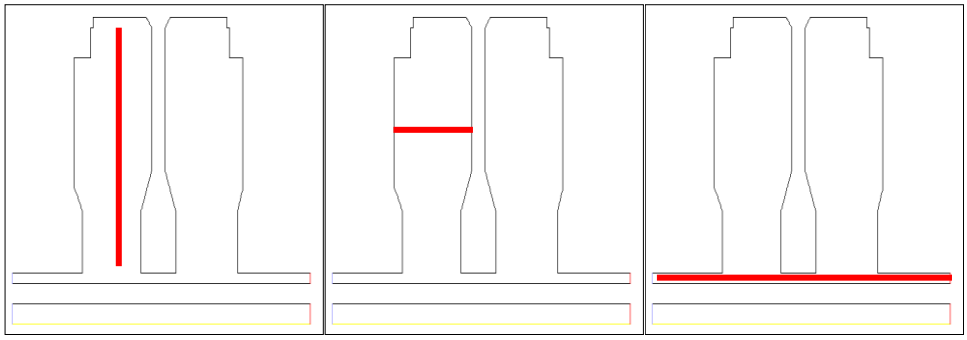


Fig. 8. Location of plotted results Fig. 9. Location of plotted results Fig. 10. Location of plotted results along the cavity radius across the cavity width along the through flow

3.2 The Flow Pressure Variations:

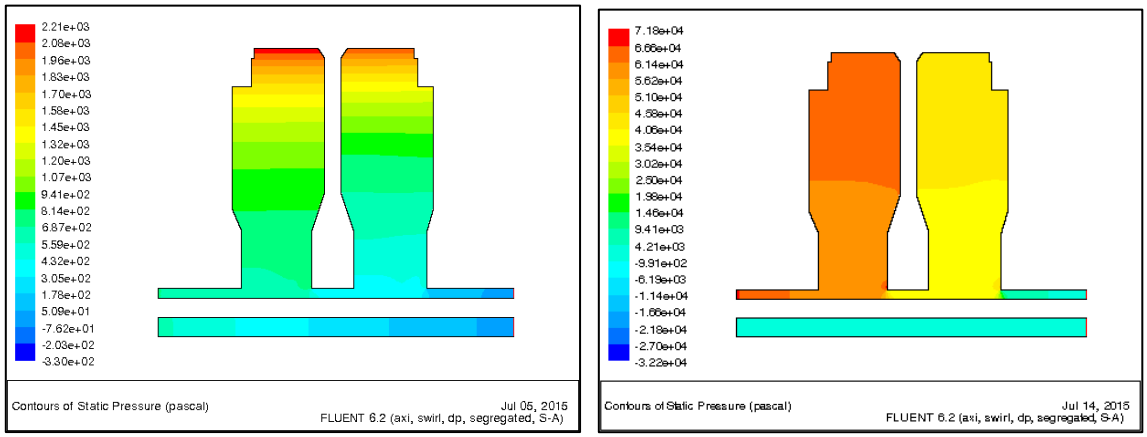


Fig. 11. Pressure variations contours for measured test conditions Fig. 12. Pressure variations contours for max test conditions

Figures 11 and 12 represent the pressure contours obtained for the two engine operating conditions listed in table 1. Figures 13 and 14 show the pressure variations along the radius of the cavity (figure 8) for these two operating conditions. The horizontal scale in these figures represents the radial location in the cavity from the axis of rotation. The results tabulated in table 2 indicate the percentage increase of flow pressures from the inner to the outer radius of the cavity for the two engine operating conditions.

For the test and measurement conditions, as seen from the results (figure 11,13) and the tabulated results (table 2) the pressure build up from the *inner to the middle* radii of the cavity is steady and gradual. The pressure rise at the inner radius is 14 percent compared to 71 percent at the middle radius of the cavity (table 2). But from the *middle to the outer* cavity radius there is a significant pressure build up from 71 to the percent 214 percent (table 2). This phenomenon of higher pressure gradients occurring towards the outer radii is due to the closer interaction of the flow with the rotating shroud and the higher tangential speeds of the rotor towards the outer radii.

For the maximum test conditions, as seen from the results (figure 12,14) and the tabulated results (table 2) the pressure build up throughout from the inner to the outer radii of the cavity is steady and gradual. The

uniformity of pressure gradients throughout the cavity is due to higher mass of the through flow getting ingested into the cavity for the maximum test condition. The higher mass of flow in the cavity reduces the impact of the rotating shroud and the disk over the pressure build up and make the pressure rise more gradual and uniform.

Also as observed from the results (figures 13, 14, table 2) the percentage rise in pressure along the cavity radius for the maximum condition is significantly low compared to the test condition. At the middle of the cavity for the maximum condition the pressure rise is only 3 percent compared to 71 percent for the test condition. This brings to light an important finding of this investigation that the impact of the rotating disks on the pressure gradients significantly reduces with the increase of the mass of air that gets ingested into the rotor cavity. Or in simpler terms the rotational speed of the rotor has a greater impact on the pressure changes with a lower mass of air ingestion into the rotor cavity.

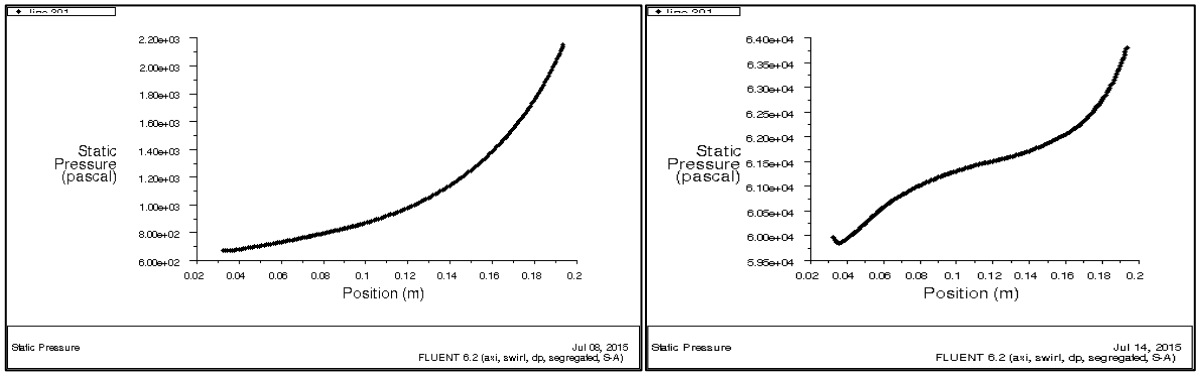


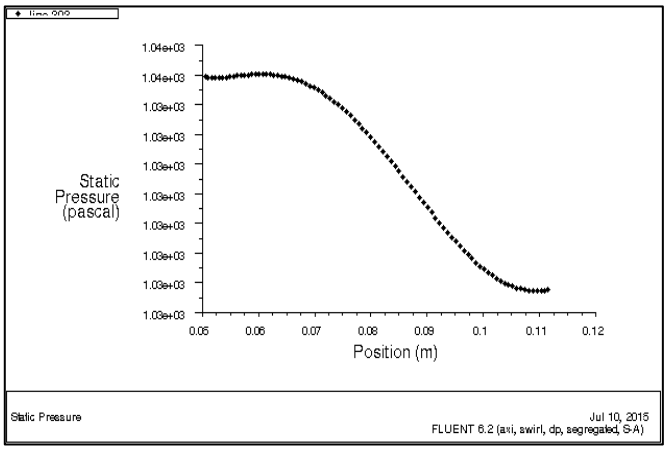
Fig.13. Pressure variation along the cavity radius for measured conditions Fig.14. Pressure variation along the cavity radius for max conditions

Table .2 Air pressure variations along the cavity radius for the two operating conditions

	Percent increase in pressure	
Air Cavity Location	Test Condition	Maximum Condition
Inner Cavity Radius	14	2
Middle Cavity Radius	71	3
Outer Cavity Radius	214	7

Figures 15 and 16 show the pressure variations across the width of the cavity (figure 9) for the two operating conditions (table 1). The horizontal scale in these figures represents the axial location across the cavity width. As observed from these figures the pressure increases continuously across the width from the right to the left rotating wall of the cavity. This rise in pressure towards the left wall of the cavity is due to the flow accumulation towards the left wall on account of the cross flow coming from the right wall (figures 5,7). Also as observed from the results of the test conditions (figure 15) the pressure rise across the cavity width is by 1 percent compared to the maximum condition (figure 16) where the pressure rise is by 6 percent. This higher percentage increase in the pressures across the cavity for the maximum condition is

on account of higher mass of the cross flow that mergers with the outward flow adjacent to the left rotating wall (figure 7).



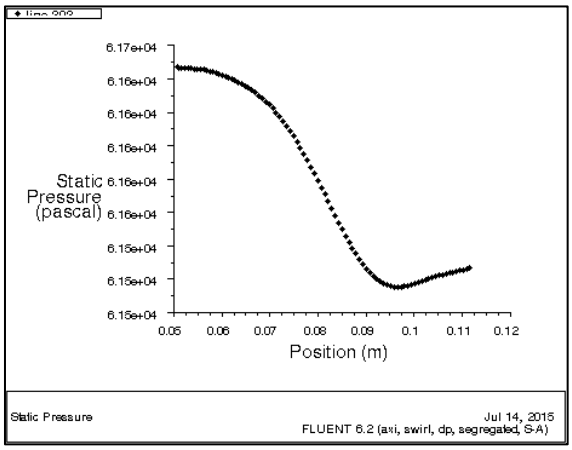
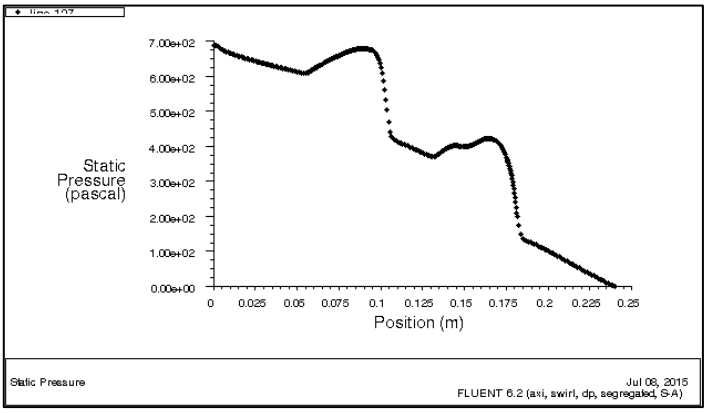


Fig.15. Pressure variation along the cavity width for measured conditions Fig.16. Pressure variation along the cavity width for max conditions

Figures 17 and 18 show the pressure variations along the through flow from the inlet to the exit (figure 10) for the two operating conditions (table 1). The horizontal scale in these figures represents the axial location of the through flow. As observed from these results (figures 17,18) there is a continuous decrease in pressure from the inlet to the exit of the through flow but with a sudden rise in pressure at two locations where the through flow crosses the bottom of the two rotor cavities. For the test condition the rise in this pressure across the cavity is 16 percent compared to 13 percent for the maximum condition. The higher percentage of the pressure rise for the minimum condition is due to the greater impact of the rotating disk over through flow crossing the cavity with lower mass and lower velocities compared to that of the maximum condition.



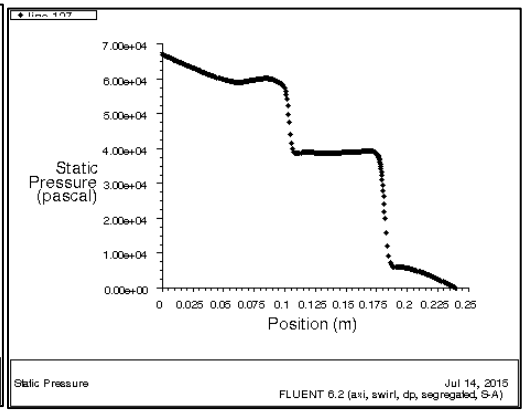


Fig.17. Pressure variation along through flow for measured conditions Fig.18. Pressure variation along through flow for max conditions

3.3. The Swirl Velocity Variations:

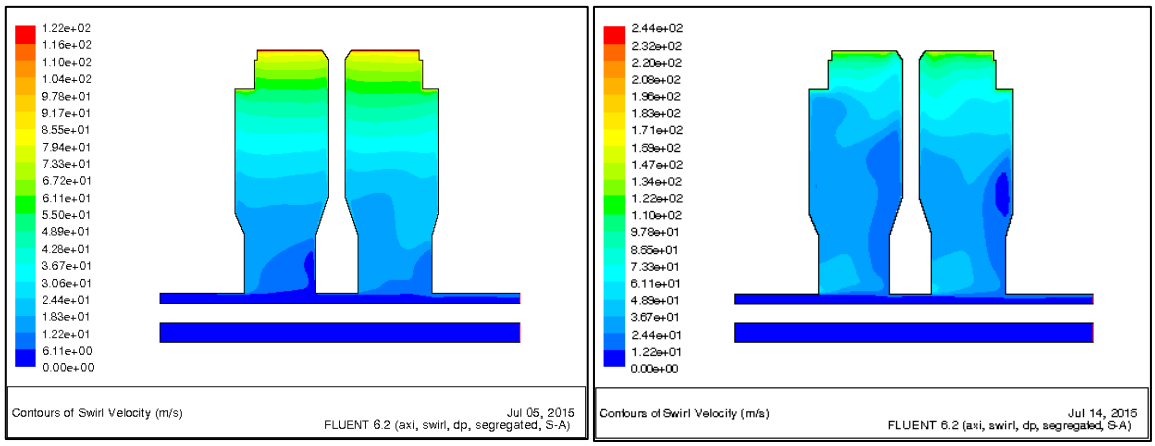
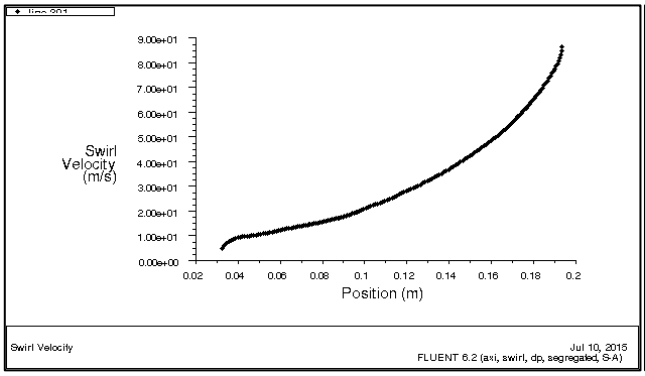


Fig. 19. Swirl velocity contours for measured test conditions Fig. 20. Swirl velocity contours for max test conditions

Figures 19 and 20 represent the swirl velocity contours obtained for the two operating conditions listed in table 1. For the measured test conditions as observed from the swirl velocity contours (figure 19), the increase in the swirl velocity from the inner to the outer radius of the cavity is more steady and gradual. On the contrary for the maximum test conditions (figure 20) the increase in the swirl velocity from the inner to the outer radius is rather unsteady and this increase is much more rapid towards the outer radii near the shroud region.

Figures 21 and 22 show the swirl velocity variations along the radius of the cavity (figure 8) for the two operating conditions (table 1).. The horizontal scale in these figures represents the radial location in the cavity from the axis of rotation. For the test and measurement conditions (figure 21) the increase in the swirl velocity from the inner to the outer radius is steady, gradual and more linear in nature. On the contrary for the maximum test conditions (figure 22) rate of increase in the swirl velocity is more unsteady and non linear. Also as noticed for the maximum condition (figure 22) towards the inner radius of the cavity there is a very minimum increase in the swirl velocity but towards the outer regions near the shroud the rate of increase is significantly higher. This phenomenon of relatively lower rate of increase in swirl velocity at lower radii for the maximum conditions compared to the measured test conditions is attributed to the relative effects of the through flow and the rotating disks over the cavity flow. For the test measurement conditions (figure 21) due to the smaller mass of air, the effect of the rotating disk on the cavity flow is more dominant than the through flow. Hence the increase in the swirl velocities from the inner to the outer radii is steady and consistent. On the contrary for the maximum test conditions (figure 22) due to higher mass of air the through flow has it's greater influence into the lower radial regions of the cavity. Hence the increase in the swirl velocity is very minimal in the inner regions of the cavity (figure 22) but suddenly picks up in the outer regions towards the shroud because of the more dominant effects of the rotating disks and the rotating shroud. Also as observed from figures 21 and 22, for both the measurement and maximum test conditions the rate of increase in the swirl velocities is higher towards the cavity outer regions which is attributed to the higher tangential speeds of the rotor at larger radii and the additional effect of the rotating shroud over the cavity flow. Another key observation is that in case of the measurement test conditions the swirl velocity increases by about 11 times from the inner to the outer radius compared to 18 times for the

maximum test conditions. Although as expected the increase in the swirl velocity is higher for the maximum conditions but unexpectedly is not as high enough relative to the increase in the disk rotational speeds from the measurement to the maximum condition. This again is due to the fact that for maximum conditions the through flow shows it's greater influence into the cavity and slows down the rate of swirl velocity increase in the inner regions of the cavity.



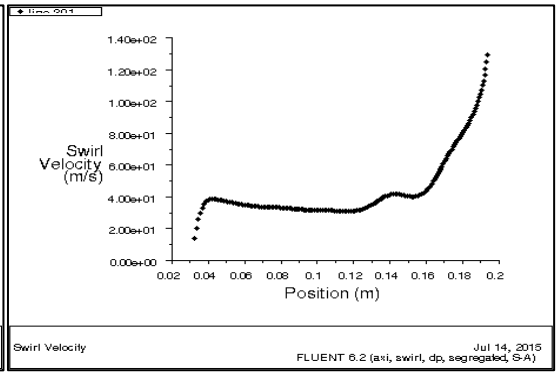
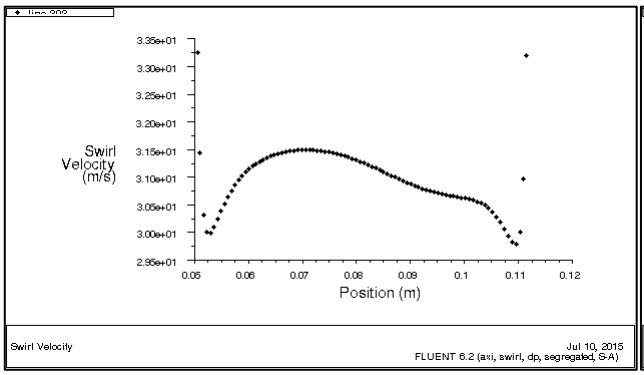


Fig.21.Swirl velocity variation along cavity radius for measured conditions Fig.22. Swirl velocity variation along radius for max conditions

Figures 23 and 24 show the swirl velocity variations across the width of the cavity (figure 9) for the two operating conditions (table 1). The horizontal scale in these figures represents the axial location across the cavity width. For both the measurement conditions (figure 23) and the maximum test conditions (figure 24) the maximum swirl velocities are observed very close to the two rotor walls and is attributed to the viscous effects of the near wall boundary layer. But across the cavity higher swirl velocities are observed closer towards the left rotating wall (figures 23 and 24) and this shift of higher velocities towards the left wall is more noticeable in case of the maximum test conditions (figure 24). This is due to the fact that the cross recirculation of the flow as observed in this study is from the right rotating wall towards the left rotating wall (figure 7). The mass of this recirculating flow merging with the radial outward flow along the left wall (figure 7) results in higher swirl velocities towards the left of the cavity. And this effect is more dominant in case of maximum condition (figure 24) because of higher mass of the recirculating cross flow compared to the test condition.



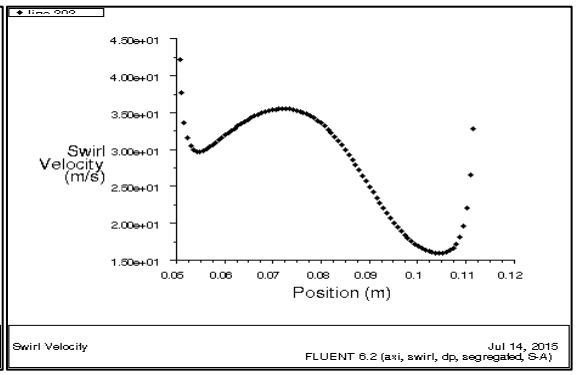


Fig.23. Swirl velocity variation along cavity width for test conditions Fig.24. Swirl velocity variation along cavity width for max conditions

Figures 25 and 26 show the swirl velocity variations along the through flow from the inlet to the exit (figure 10) for the two operating conditions (table 1). The horizontal scale in these figures represents the axial location of the through flow. As observed from these figures, the swirl velocity along the through flow increases from the inlet to the exit. Also as observed from these results (figures 25, 26) the increases in this swirl velocity is experienced only at the regions where the through flow crosses the rotor cavities and this increase is more significant for the maximum test conditions (figure 26). Hence at higher rotational speeds as a greater mass of the through flow gets ingested into the rotor cavities the induced swirl causes a more significant impact over the swirl velocities of the through flow.

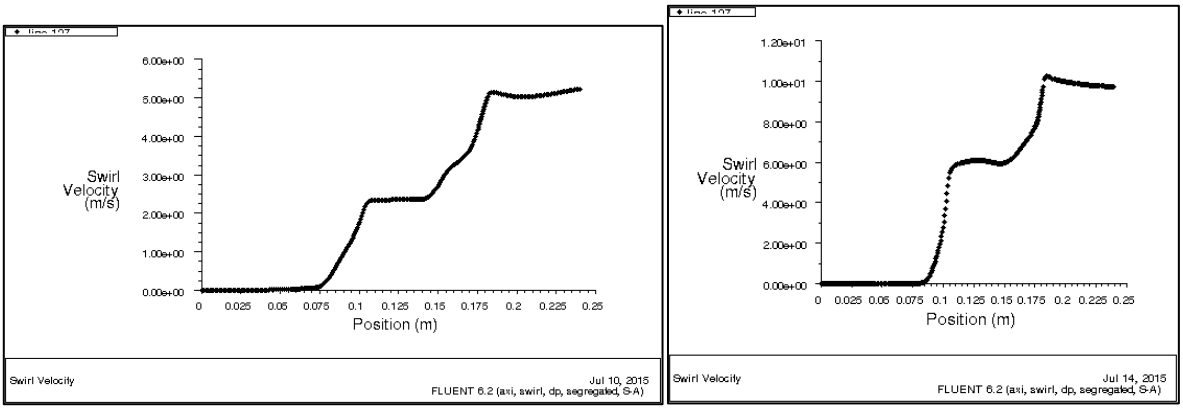


Fig.25. Swirl velocity variation along through flow for test conditions Fig.26. Swirl velocity variation along through flow for max conditions

3.4 The Flow Temperature Variations:

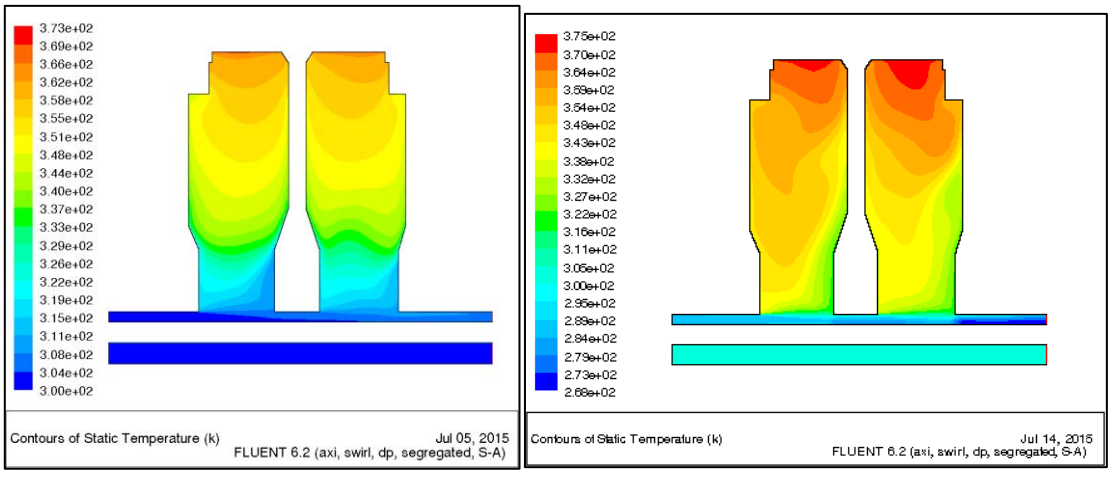
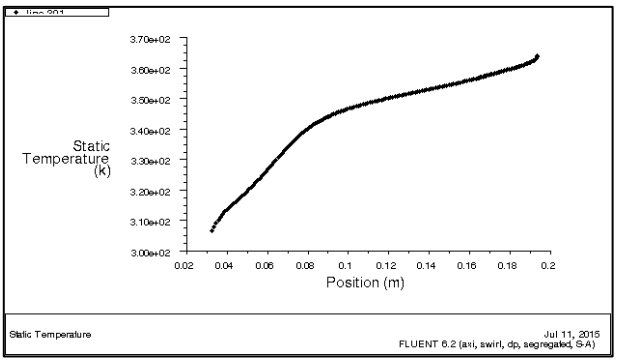


Fig. 27. Air temperature contours for test conditions Fig. 28. Air temperature contours for max conditions

Figures 27 and 28 represent the air temperature contours obtained for the two engine operating conditions listed in table1.

Figures 29 and 30 show the air temperature variations along the radius of the cavity (figure 8) for these operating conditions. The horizontal scale in these figures (29,30) represents the radial location in the cavity from the axis of rotation.

As observed from the temperature contours (figures 27,28) and the plots (figures 29,30) the cavity air temperature rises with the increase in the operating condition of the engine. This rise in the cavity air temperatures for the maximum test conditions is attributed to the increased levels of heat transfer between the hotter rotor and the cooler air caused by higher levels of buoyancy induced flow at higher rotational speeds.



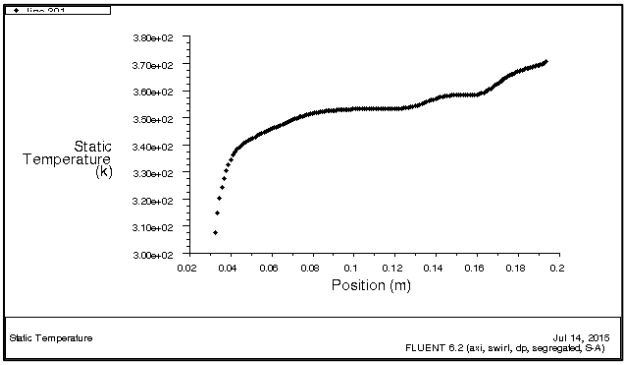


Fig.29. Air temperature variation along cavity radius for test conditions Fig.30. Air temperature variation along cavity radius for max conditions

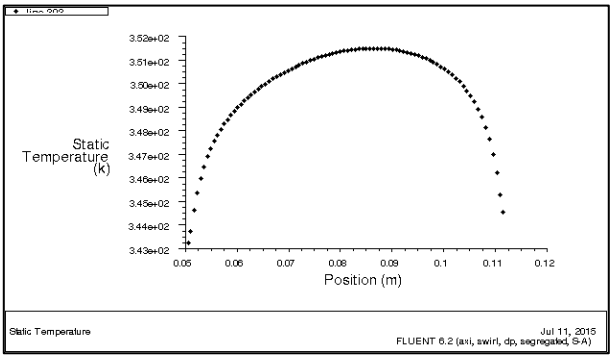
The results tabulated in table 2 indicate the percentage increase of air temperatures from the inner to the outer radius of the cavity for the two engine operating conditions. As observed (table 2) the impact of changes in the operating condition over the air temperatures is much more significant towards the inner regions of the cavity compared to the outer regions. This is attributed to the fact that at inner radii air is relatively cooler resulting in higher air densities enhancing the levels of buoyancy induced flow caused by the rotational effects of the rotor as compared to the outer radii of the cavity.

Table .2 Air temperature variations along the cavity radius for two operating conditions

Air Cavity Location	*Percent increase in air temperature*	
	Test Condition	Maximum Condition
Inner Cavity Radius	7	17
Middle Cavity Radius	17	22
Outer Cavity Radius	20	24

Figures 31 and 32 show the air temperature variations across the width of the cavity (figure 9) for the two operating conditions (table 1).. The horizontal scale in these figures represents the axial location across the cavity width. As observed from these results (figures 31,32) higher air temperatures are noticed towards the middle portion of the cavity width. This is a result of the higher rates of heat transfer from the rotating shroud which has the maximum temperature. Also as observed, with the increase in the operating condition,

the maximum temperature across the width cavity shifts towards the left rotating wall (figure 32). This is attributed to the fact that at higher operating condition there is an increased mass of cross flow (figure 5,7) from the right rotating wall towards the left rotating wall causing the maximum air temperature to shift towards the left of the cavity width.



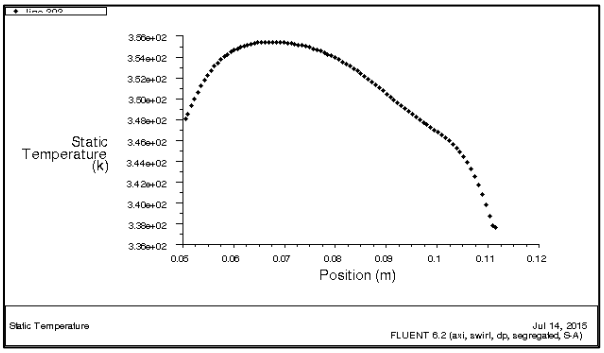
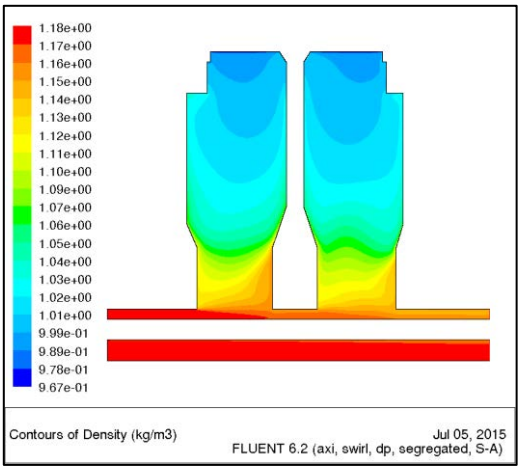


Fig.31. Air temperature variation along cavity width for test conditions Fig.32. Air temperature variation along cavity width for max conditions

3.5 The Flow Density Variations:



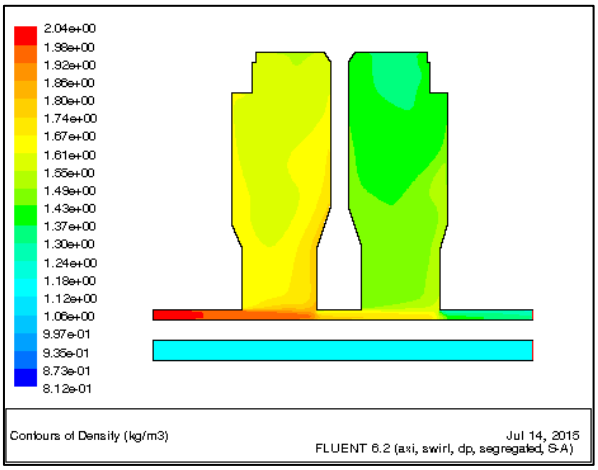


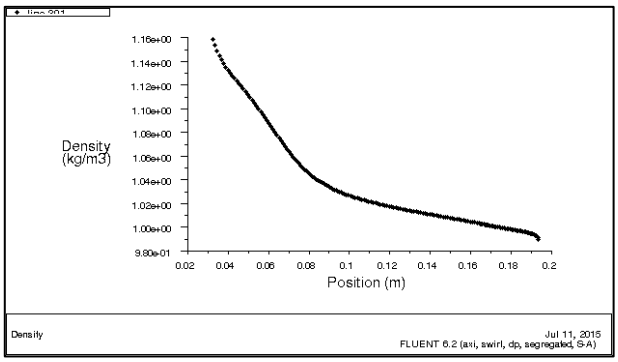
Fig. 33. Air density contours for test conditions Fig. 34. Air density contours for max conditions

Figures 33 and 34 represent the air density contours obtained for the two engine operating conditions listed in table1.

Figures 35 and 36 show the air density variations along the radius of the cavity (figure 8) for these operating conditions. The horizontal scale in these figures (35,36) represents the radial location in the cavity from the axis of rotation.

As observed from the density contours (figures 33,34) and the plots (figures 35,36) the air density inside the cavity rises with the increase in the operating condition of the engine. This rise in the air density for the

maximum test conditions is attributed to the increased mass of the through flow which is ingested into the cavity at higher rotational speeds.



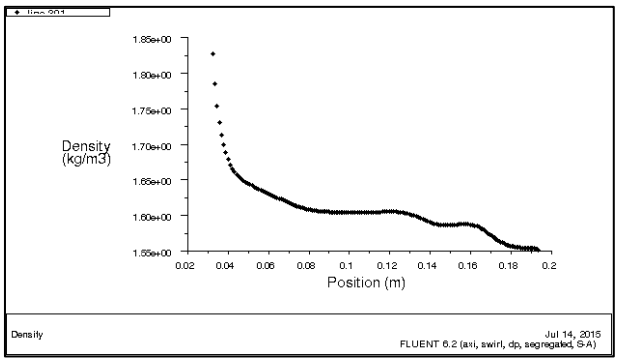


Fig.35. Air density variation along cavity radius for test conditions Fig.36. Air density variation along cavity radius for max conditions

The results tabulated in table 3 indicate the percentage decrease of air density from the inner to the outer radius of the cavity for the two engine operating conditions. As observed (table 3) the impact of the changes in operating condition over the air densities is more significant towards the inner regions of the cavity compared to the outer regions. This is attributed to the fact that at higher operating conditions, the mass of the through flow is higher which results in a more rapid decrease in air density as the air gets initially ingested into the cavity at the inner radii.

Table .3 Air density variations along the cavity radius for two operating conditions

	Percent decrease in density	
Air Cavity Location	Test Condition	Maximum Condition
Inner Cavity Radius	5	10
Middle Cavity Radius	10	12
Outer Cavity Radius	14	16

Figures 37 and 38 show the air density variations along the through flow from the inlet to the exit (figure 10) for the two operating conditions (table 1). The horizontal scale in these figures represents the axial location of the through flow. As observed from these figures, the air density along the through flow decreases from the inlet to the exit on account of the pressure differential maintained across the rotor. As observed from the results (figures 37,38) most of the pressure drop occurs in the regions of the through flow where the flow gets ingested into the rotor cavities. For the maximum condition (figure 38) the drop in pressure of the through flow across the cavity is 10 percent compared to only 2 percent for the test condition (figure 37). This shows that higher rotational speeds of the rotor show a significant impact on the pressure drop that occurs in through flow as it moves across these rotor cavities.

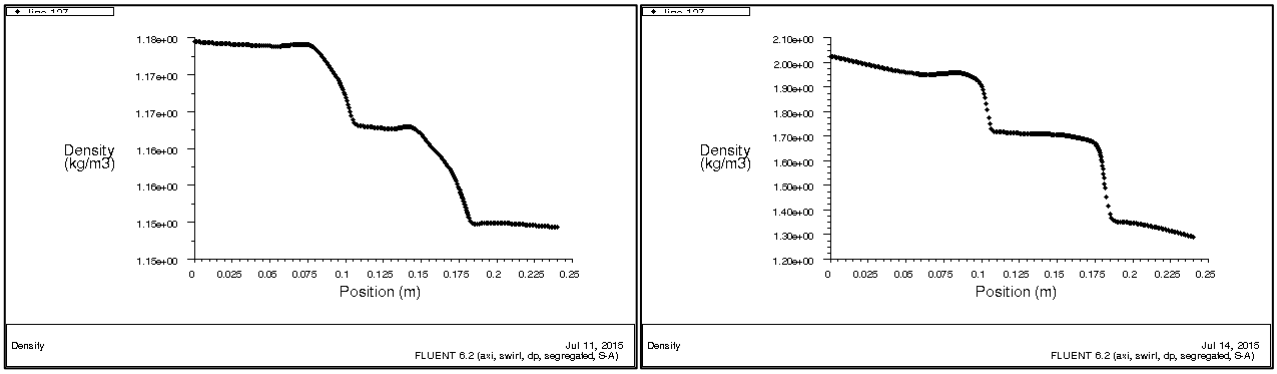
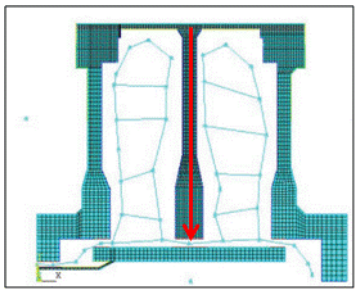


Fig.37. Density variation along through for test conditions Fig.38. Density variation along through for max conditions

4. Estimation of heat transfer coefficients and model validation with experimental results:

The convective heat transfer coefficients in the various regions of the rotor interacting with the secondary flow are estimated based on the correlations developed from the earlier experimental works. In the current study these heat transfer coefficients are estimated for the two engine operating conditions listed in table 1. The estimation of the heat transfer coefficients inside the rotating cavity (vertical faces of the disk) is based on the correlation developed from the experimental work done by Farthing et al. [10,13]. The equation represents laminar natural convection over a vertical plate. The heat transfer in the shroud region of the rotor is modeled as heat flow over a horizontal plate with the upper surface heated and the lower surface exposed to free convection with the effects of gravitation forces captured. The heat transfer correlation used for this case is based on the experimental work carried out by Lloyd and Moran [23]. The heat transfer over the exterior of the disks is modelled as a rotating disk in quiescent air. The correlation is selected based on the experimental work done by S. Harmand, J. Pelle [8] which involves a rotating disk in quiescent air. The heat transfer inside the annulus between the rotating disk and the shaft is modelled as an annulus flow and the correlation is based on the experimental studies carried out by S. Seghir-Ouali [6]. The heat transfer coefficients estimated from this correlation were checked against the experimental curves obtained by Gazley [12] who used data from an experimental set up with a long rotating cylinder inside a concentric stationary cylinder. The heat transfer over the outer face of the non-rotating shaft is modelled as an axial flow over a cylinder using the correlation developed by the experimental work carried out by Roland Wiberg [14]. The heat transfer phenomenon inside the non-rotating shaft is modelled as an internal duct flow using the standard correlation published in the Heat and Mass Transfer Data book [11].

The thermal boundary conditions estimated from the computational study were later applied in the *Ansys* (*FEM*) model to obtain the temperature distributions over the rotating compressor disks. The *Ansys* model with the applied thermal boundary conditions was validated against the experimental results available for the "test and measurement conditions" from the experimental work done by A. Gunther L. Heller [5]. The validation was done with the radial heat flux data available from the experimental results as shown in figure 40.



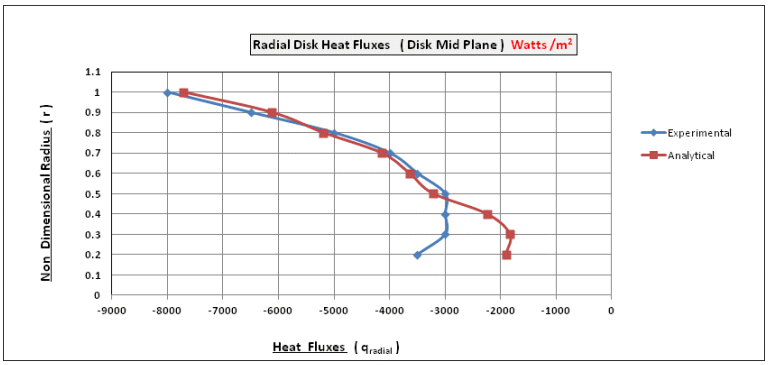


Fig.39 Region where radial heat fluxes are compared Fig.40. Comparison of radial heat fluxes of the analytical model with the experiment

As observed from the compared results in figure 40, the radial heat fluxes estimated using the computational model are in good agreement with the experimental results (within 10 per cent) with the exception of the very lower regions of the rotating disk. The deviation here is due to the sudden change in the thickness of the disk which gives a measurement error as quoted in the experimental work done by A. Gunther L. Heller [5].

5. Conclusions:

The design of the secondary flow system in an aircraft engine is vital in terms of lowering the temperature gradients experienced by the rotating compressor disks to enhance their field life. As it is almost impractical to conduct experiments for the large number of secondary flow design parameters and the range of engine operating conditions it becomes inevitable to build a computational model that closely simulates the thermal behaviour of the secondary flow system. In this study the secondary flow simulation is carried out using computational fluid dynamics (*CFD*) and the computer model used for these simulations is validated against the available experimental data.

During this study carried out using computational fluid dynamics *(CFD)* the distribution of the various thermal fluid parameters namely the flows, the velocities, the temperatures, the densities across the secondary flow system is investigated for the two operating conditions of the engine (table 1). These thermal fluid parameters are later used as boundary conditions in the Finite Element Model (*FEM*) to study the thermal impact of the engine design parameters and the engine operating conditions on the disk temperature gradients. The results obtained from the current *CFD* analysis are analysed and the important findings of the investigation are reported. The findings coming out of this investigation help in a better understanding of the complex thermal phenomenon occurring inside the secondary flow system and offers support in making secondary flow design improvements aimed at lowering the disk temperature gradients.

Acknowledgments

I would like to acknowledge the necessary support provided by the C.B.I.T and the Osmania University for the successful execution and completion of this research work

References

[1] TuckerP.G, Long C.A. (1995), CFD prediction of vortex breakdown in a rotating cavity with an axial through low of air, International Communications in Heat and Mass Transfer, Volume 22, Issue 5, September–October 1995, Pages 639-648

[2] K. Saunders, S. Alizadeh, (2007), The Use of CFD to Generate Heat Transfer Boundary Conditions for a Rotor-Stator Cavity in a Compressor Drum Thermal Model, ASME Turbo Expo 2007: Volume 4 : Turbo Expo 2007, Parts A and B
Montreal, Canada, May 14–17, 2007

[3] J. Michael Owen, Hans Abrahamsson, (2007), Buoyancy-Induced Flow in Open Rotating Cavities, J. Eng. Gas Turbines Power 129(4), 893-900 (Jan 11, 2007).

[4] Daniele Massini, Bruno Facchini, (2016), Experimental Investigation on Swirl and Heat Transfer Within a Rotor-Stator Cavity, ASME Turbo Expo 2016: Turbomachinery Technical Conference and Exposition, Volume 5A: Heat Transfer
Seoul, South Korea, June 13–17, 2016

[5] A. Günther, W. Uffrecht, L. Heller, S. Odenbach (2009), Experimental and Numerical Analysis of Heat Transfer in Compressor Disc Cavities for a transition between Heating and cooling flow. 8th ETC, Graz, 111

[6] S. Seghir-Ouali a, (2006), Convective heat transfer inside a rotating cylinder with an axial air flow, International Journal of Thermal Sciences 45 (2006) 1166–1178.

[7] Sparrow, E. M., and Leonardo Goldstein Jr., (1976), Effect of rotation and coolant through flow on the heat transfer and temperature field in an enclosure, J. Heat Transfer, 98, pp. 387-394.

[8] S. Harmand, J. Pelle, S. Poncet , I.V. Shevchuk (2013), Review of fluid flow and convective heat transfer within rotating disk cavities with impinging jet, International Journal of Thermal Sciences, volume 67 (2013) , 1-30

[9] Owen, J. M., and Pincombe, J. R., 1979, “Vortex Breakdown in a Rotating Cylindrical Cavity,” J. Fluid Mech., 90, pp. 109–127

[10] Farthing, P. R., Long, C. A., Owen, J. M., and Pincombe, J. R., (1992), Rotating Cavity With Axial Through flow of Cooling Air: Heat Transfer, J. Turbomach., 114, pp. 229–236

[11] CP Kothandaraman , S Subramanyan, Heat and mass transfer data book, 116-117, Fourth edition, New age international publishers.

[12] C. Gazley, Jr., (1958), Heat transfer characteristics of the rotation and axial flow between concentric cylinders,
ASME Trans. 80,79-90

[13] Farthing, P. R., Long, C. A., Owen, J. M., and Pincombe, J. R., (1992), Rotating Cavity with Axial Through flow of Cooling Air: Flow Structure, ASME J. Turbomach., 114, pp. 237–246.

[14] Roland Wiberg , Noam Lior, (2005), Heat transfer from a cylinder in axial turbulent flows, International Journal of Heat and Mass Transfer 48 (2005) 1505–1517.

[15] X. Luo, L. Wang, X. Zhao, G. Xu, H. Wu, (2014), Experimental investigation of heat transfer in a rotor–stator cavity with cooling air inlet at low radius, International Journal of Heat and Mass Transfer, Volume 76, September 2014, Pages 65-80

[16] Dr. K.E. Reby Roy and K. Madhusoodanan Pillai, Flow and Conjugate Heat Transfer Characteristics in a Rotating Disk Cavity with through-Flow, International Journal of Applied Engineering Research, Volume 7, Number 12 (2012) pp. 1429-1441.

[17] Sparrow, E. M., Buszkiewicz, T. C., and Eckert, E. R. G., 1975, “Heat transfer and temperature field experiments in a cavity with rotation, recirculation and coolant through flow,” J. Heat Transfer, 97, pp. 22-28.

[18] Xiang Luo, L. Wang, (2014), Experimental investigation of heat transfer in a rotor–stator cavity with cooling air inlet at low radius, International Journal of Heat and Mass Transfer 76:65–80.

[19] J. Michael Owen, Jonathan Powell, Buoyancy-Induced Flow in a Heated Rotating Cavity, Transactions of the ASME, Vol. 128, January 2006.

[20] C. A. Long and P. G. Tucker, Shroud Heat Transfer Measurements From a Rotating Cavity With an Axial Through flow of Air, J. Turbomach 116(3), 525-534.

[21] C. A. Long, Disk heat transfer in a rotating cavity with an axial through flow of cooling air, Int. J. Heat and Fluid Flow, Vol. 15, No. 4, August 1994

[22] Dayle C. Jogie, (2016), The study of fluid flow and heat transfer of a viscous incompressible fluid between a rotating solid disk and a stationary permeable disk using the Brinkman-Darcy model, Journal of Applied Mathematics and Mechanics, 96:5, 620-632

[23] Lloyd, J.R., Moran, W.R., (1974)., Natural convection adjacent to horizontal surfaces of various planforms", ASME Paper 74-WA/HT- 66.

[24] M.M. Rahman, J.C. Lallave, A. Kumar, (2008), Heat Transfer from a Spinning Disk during Semi–Confined Axial Impingement from a Rotating Nozzle, Int. J. Heat Mass Transfer 51, 4400–4414.

[25] D.A. Howey a, A.S. Holmes a , K.R. Pullen b, (2010), Radially resolved measurement of stator heat transfer in a rotor–stator disc system, International Journal of Heat and Mass Transfer 53, 491–501

[26] R. P. Roy, G. Xu and J. Feng, (2001), A Study of Convective Heat Transfer in a Model Rotor–Stator Disk Cavity, J. Turbomach 123(3), 621-632

A Self-study of Innovation in Quality Assurance at the Zimbabwe Council for Higher Education

Evelyn Chiyevo Garwe
Zimbabwe Council for Higher Education
Zimbabwe

Abstract

This paper presents a self-study of the innovative policies, practices, methods, systems and instruments that have been used by the Zimbabwe Council for Higher Education to assure quality in the constantly changing higher education environment. The aim of the paper is to provide information to countries still developing quality assurance frameworks. The author underscore the role of motivation in creating fertile ground for innovation and creativity.

Keywords: innovation, quality assurance, self-study, accreditation

Introduction

The Zimbabwe Council for Higher Education (ZIMCHE) was established through an Act of Parliament in 2006. ZIMCHE is the competent authority registering, accrediting, auditing and the holistic quality assurance of higher education institutions and their programmes. Quality assurance is targeted at safeguarding the quality of higher education in Zimbabwe. In pursuance to this goal, ZIMCHE develops and continuously improves policies, methods, standards, instruments and tools for use assuring and enhancing quality. This stems from the realisation that as systems evolve and the higher education arena changes, quality assurance (QA) bodies need to continuously adjust in order to achieve their goals. ZIMCHE finds it unnecessary to re-invent the wheel; it benchmarks its practices with other world class QA agencies, adapts and innovates.

The technologies of QA

In this paper innovation in QA is defined as the introduction of new or positive changes in policies, methods, systems and instruments that help to enhance quality. It is important to note that innovation does not necessarily allude to absolute novelty but includes the use of new ideas to build upon existing research, knowledge and practice in order to improve experiences and performance (Hesselbein *et al.,* 2002). Innovation empowers organisations with the flexibility that is necessary to survive in a dynamic higher education environment.

Zhang and Yongjian (2016) argue that the ideology of quality assurance in higher education has guided the current thinking and ideals of higher education. Accordingly, QA policies, standards, methodologies, instruments, tools and guidelines can be considered to be the technologies of QA. These differ depending

on the contexts of different countries. For example, accreditation, quality assessment, auditing, and benchmarking were the mainstay of quality assurance in the European Union higher education space (Zhao 2008). Quality can be assessed using objective measurements or indicators (Xu 2012) that enable quality enhancement and accountability. As Peter Ewell (2008) aptly assesses, no matter how good the QA technology used, it cannot cater for the whole barrage of emerging higher education complexities, hence the methodologies ought to be continuously improved and complimented by new ones. It is within the confines of this wisdom that this paper is premised on highlighting the QA technologies that have been adopted, adapted and created by ZIMCHE in its endeavour to assure and enhance the quality of higher education.

Methodology

This author of this paper utilises the self-study methodology because of its suitability for studying academic and professional settings (Borko, Liston and Whitcomb, 2007; Hamilton and Pinnegar, 1998, 2014; LaBoskey, 2004; Pinnegar, 1998; Pinnegar and Hamilton, 2009). Self-study is a planned and systematic self-strengthening process of institutional reflection and diagnosis that provides feedback on how well it is performing (Samaras, 2011). Self study was shaped by teaches who used reflective inquiry into their personal experiences as a way of improving practice (Lassonde, Galman & Kosnik, 2009; Samaras & Freese, 2009). Finally, action research contributed to the foundations of self-study. According to Feldman, Paugh and Mills (2004) action research provides a method to conduct systematic inquiry into teaching practices.

Although some critics have questioned the objectivity of the self-study methodology, advocates for its use argue that its self-introspection motive and improvement focus cultivates trustworthiness and transparency (LaBoskey, 2004; Mishler, 1990), In addition, self-study results in institutional learning, enhanced communication, readiness for change and effective mandate execution (Henkel 2004; Sallinen et al. 1994). This self-study methodology is grounded on the self-study theory which propounds that useful experience and good practices emanate from a process of continuous self-examination, amenability to change and interactivity (Bullough and Pinnegar, 2001; Dewey. 1938; Feldman, et al., 2004; Hamilton and Pinnegar, 1998; Loughran and Northfield, 1998). Wolf (1992) believes that the desire and ability to relate and recount one's experience develops knowledge and understanding of the profession. Hamilton and Pinnegar, (2014 p. 154) refer to the use of self-study in research as "intimate scholarship." Herein the author uses ZIMCHE as the organisational self and highlight ZIMCHE's experiences and innovative products in developing and rolling out a QA framework by adapting lessons from other torch bearer QA agencies to suit the Zimbabwean context as well as introducing innovations. As suggested by Erickson et al. (2010), the experiences and innovative practices of ZIMCHE will in turn be used as a compass by nascent QA bodies to effectively navigate their own QA pathway.

Innovation in QA at ZIMCHE

ZIMCHE policy framework

A key innovation was the development of a unique Act for ZIMCHE which empowers it not only with regulatory powers, but mandates it to also promote, advise and coordinate all issues that impact on the quality of higher education. Thus when registering, accrediting and auditing institutions, ZIMCHE focuses on both accountability and improvement. The benchmarking exercise that was carried out revealed that some QA agencies take the regulatory function only whilst some take a voluntary, self-improvement approach.

The process

The initial years after inception, ZIMCHE focused on creating instruments and tools for use in QA. ZIMCHE also worked on getting the by-in of HEIs and all is stakeholders. Awareness workshops were held at higher education institutions to disseminate ZIMCHE's mandate, philosophy and *modus operandi* to the academic fraternity. ZIMCHE also held workshops to develop standards, instruments, tools and methods for quality assurance. Peer Reviewers were identified according to the criteria defined by Council, these were inducted and trained on the various facets of the work they were engaged in ranging from programme assessment; assessment visits to HEIs, foreign qualifications and academic and institutional audits. ZIMCHE together with seasoned Peer Reviewers, HEI representatives and international QA experts, developed a Peer Review manual that marked a key innovation in this area. The manual includes the standard operation procedures for registration, accreditation, audits as well as assessment of foreign qualifications. It also goes into details on how to handle accreditation of the different academic disciplines.

According to Luckett (2006), quality assurance takes any of the following four models: bureaucratic, facilitative, managerial or collegial. At the institutional level, ZIMCHE puts the responsibility for QA to all levels: top management, senior management, middle management and at operational level. At the professional and academic level, ZIMCHE uses the collegial type of QA wherein staff and students are trained and encouraged to take charge of their work and to embrace constant improvement. Individuals, departments and institutions are given the responsibility to ensure quality. HEIs ensure quality in designing and implementing programmes using ZIMCHE standards and guidelines. On completion of programme design, HEIs submit these to ZIMCHE for accreditation. Institutions are then expected to complete a self-assessment report in preparation for the site visit. When carrying out site visits, student's views are also solicited in order to allow for triangulation with views from staff and peers.

ZIMCHE uses the managerial type of QA by encouraging HEI management to play a key role in ensuring quality. Vice Chancellors of institutions are expected to be the gate keepers of quality. Good governance, quality systems, strategic plans, student support etc. form part of the standards that HEIs are expected to implement. ZIMCHE encouraged HEIs to have institutional QA units (IQAU) that are responsible for promoting quality within institutions. Whist it did not prescribe on the exact structures for the units, ZIMCHE provided guidelines for setting up IQAUs. The HEIs who adopted the innovation of setting up

IQAUs acted as catalysts to the adoption of the approach by other HEIs since they became change agents in the higher education sector. One of the major achievements of ZIMCHE is the fact that all the 15 registered universities now have functional and robust IQAUs which have strengthened the culture of QA in HEIs. Management is responsible for reviewing the findings Peer Reviewers and overseeing the preparation of the institutional response.

ZIMCHE makes use of registration, accreditation and audits to monitor the standards of higher education provision in higher education institutions. Accreditation measures the alignment of institutions or programmes to the minimum ZIMCHE guidelines. It commences with the institution submitting an application accompanied by the appropriate accreditation fees. In the case of programme accreditation, the regulations for the programme are then sent to Peer Reviewers for assessment. The institution is then invited to submit a self-assessment report in preparation for a site visit. The site visit is undertaken by ZIMCHE officials and Peer Reviewers. Details of the review process are provided in Chapter … of this book. The recommendations of the content and on-site Reviewers are then given to the institution to solicit its input before the accreditation status is decided upon by ZIMCHE Council. The accreditation process used by ZIMCHE deviates somewhat from that the four- stage process reported to be used by most QA bodies as described by Ramadan et al, (2011). During the site visits, staff from some QA bodies play only a facilitatory role, whilst in some they partake in the evaluation (Stella, 2002). ZIMCHE plays a key role in driving the process of accreditation. In order to assure credibility and consistency, ZIMCHE orients and trains Peer Reviewers but gives the Peers the leeway to make independent suggestions and recommendations based on their varied expertise and experience. Whilst in other QA bodies accreditation is voluntary, in the case of ZIMCHE it is mandatory.

In utilising facilitative QA ZIMCHE uses audits to assess internal QA systems to improve quality. Depending on the severity of the issues concerned, the results can be improvement oriented or punitive. The *bureaucratic* type of QA is when ZIMCHE carries out institutional and programme audits as well as compliance visits.

Development and implementation of standards

ZIMCHE developed 15 standards to guide quality assessments and to ensure quality in higher education. This is in line with the accession by researchers that quality can only be improved through the use of measurements and benchmarks (Deming, 1968; Dill 1995, Fitz-Gibbon, 1996). The standards were distributed to HEIs who use them for internal quality assurance processes and to prepare for external quality assurance visits by ZIMCHE.

Conclusion

ZIMCHE's *Quality Assurance Framework* emerged through innovations based on best practices internationally. The need to maintain and improve standards in an era of changing models of teaching and learning demands that quality assurance agencies adopt innovative technologies that can weed out

malcontents in the education sector. Anchored in the management constructs of regulation, promotion and advisory, ZIMCHE uses innovative processes, instruments, tools to reinforce HEI capacity for continuously improving quality processes and outcomes, backstopped by the ZIMCHE minimum quality standards. This institutional (internal) quality assurance is balanced with rigorous external quality assurance practices to ensure and assure improvement of higher education provision.

References

Borko, H., Liston, D., and Whitcomb, J. (2007). Genres of empirical research in teacher education. *Journal of Teacher Education, 58*(1), 3-11.

Bullough, R. V., and Pinnegar, S. (2001). Guidelines for quality in autobiographical forms of self-study. Educational Researcher, 30(3), 13-22.;

Dewey, J. (1997). Experience and Education, New York: Touchstone.

Erickson, L.E., Griswold, W., Hohn, K.L. and Saulters, O.S. (2010). Enriching and Evaluating Sustainability Education Journal of Sustainability Education Vol. 1, 1-20

Ewell, P.T. (2008). Assessment and accountability in America today: Background and context. In Assessing and accounting for student learning: Beyond the spellings commission. *New Directions for Institutional Research (Special Issue Supplement)*, 7-17, 83-89.

Hamilton, M. L., and Pinnegar, S. (1998). Conclusion: The value and the promise of self-study. In M.L. Hamilton (Ed.), Reconceptualising teaching practice: Self-study in teacher education (pp. 235-246). London: Falmer Press.).

Hamilton, M. L., Pinnegar, S. (2014). Intimate scholarship in research: An example from self-study of teaching and teacher education practices methodology. LEARNing Landscapes 8(1), 153-171. http://www.learninglandscapes.ca/images/documents/ll-no15/mlhamilton.pdf.

Henkel, M., (2004). The demise of a dominant culture? Higher education institutions in transition, Learning and Teaching in the Social Sciences, 1(1), 21-32.

Hesselbein, F. Goldsmith, M and Somerville, I. (2002). Leading for Innovation and Organizing for Results San Francisco: Jossey-Bass.

LaBoskey, V. K. (2004). The methodology of self-study and its theoretical underpinnings. In J. J. Loughran, M. L. Hamilton, V. K. LaBoskey, and T. Russell (Eds.), *International handbook of self-study of teaching practices* (pp. 817-869). Dordrecht, The Netherlands: Kluwer Academic Publishers.

Loughran, J., and Northfield, J. R. (1998). A framework for the development of self-study practice. In M.L. Hamilton (Ed.), *Reconceptualizing teacher practice: Self-study in teacher education* (pp. 7-18). London: Falmer Press.

Luckett, K., (2006). The Quality Assurance of Teaching and Learning in Higher Education in South Africa: an analysis of national policy development and stakeholder response. PhD Thesis, University of Stellenbosch, South Africa.

Mishler E.G. (1990). Validation in inquiry-guided research: the role of exemplars in narrative studies. Harvard Educational Review 60 (4), 415-426.

Ramadan, F.I., Zaaba, Z. and Umemoto, K. (2011). Quality assurance of Egyptian higher education: a policy transfer perspective, *Literacy Information and Computer Education Journal (LICEJ*), Vol. 2 No. 1.
Sallinen, A., Konttinen, R. and Panhelainen, M. (1994). Interactive model of self-evaluation quality assessment at the University of Jyvaskyla - A pilot study, *Higher Education Management*, 6, (3), 357-375.
Stella A (2002). *External Quality Assurance in Indian Higher Education: Case study of the National Assessment and Accreditation Council (NAAC)* Paris, International Institute for Educational Planning.
Xu, D. S. (2012). Assessing top undergraduate education: Path and values -The American experience and its significance. *Research in Higher Education of Engineering* 3.
Zhang Yingqiang and Su Yongjian (2016). Quality Assurance in Higher Education: Reflection, Criticism, and Change, Chinese Education & Society, 49:1-2, 7-19, DOI: 10.1080/10611932.2016.1192382
Zhao, J. M. (2008). Beyond assessment - A vision for building a Chinese higher education quality assurance system *Research in Higher Education of Engineering* 6.

Using of undergraduate student's feedback, learning process and growth mindset to improve the teaching and learning at university

Jalberth Fernandes de Araujo, Izadora Soares Cardoso, Ariadne Caroline Silva Guedes, Ianca Rocha Ferreira, Helvio Rubens Reis de Albuquerque
Federal University of Campina Grande
Brazil

Abstract

Several researches indicate that undergraduate students are unsatisfied with their learning experience at university. One of the reasons is the non-effective communication between teachers and students. The non-effective communication may cause problems in teaching and learning, which are fundamental and professional skills that teachers and students must continually develop. Problems in teaching and learning impact directly the learning experience at university of the students, and improve the communication between teachers and students can solve the problems. The communication and, consequently, the teaching and learning, can be improved using the undergraduate student's feedback. In this paper, a methodology to improve the teaching and learning is presented. The methodology is based on the use of undergraduate student's feedback, and it was utilized in an electrical engineering classroom during one year. Based on the results, teaching, learning, communication, motivation, engagement and satisfaction of the teacher and students have improved correlating the methodology with the learning process and growth mindset.

Keywords: feedback; teaching; learning; communication; mindset.

1. Introduction

The world is changing faster than at any time in human history. Teachers and students are meeting the big global need in education. They have access to a lot of information and learning, making them more affordable and effective.

The access to a lot of information and learning makes the student do not solely depend on teachers for trivial information and makes the teacher's role more challenging with the advancement in technology. Today, teachers and students can use the advancement in technology correlated with the interactive and much-needed teaching-learning aids like videos, web links and online courses to enhance the education process. Thus, if teachers and students utilize the advancement in technology, not only the education process is improved, but also the learning experience.

The learning experience is impacted directly by the communication between teachers and students. A non-effective communication may cause problems in teaching and learning, which are fundamental and professional skills that teachers and students must continually develop. The problems may cause

dissatisfaction of teachers and students in their experience at university.

As the communication between teachers and students is a matter directly correlated with their learning experience and performance at university, several researchers have been exploring different solutions to improve the teaching and learning and, consequently, solve the reasons that make the communication non-effective between teachers and students.

One of the solutions explored was the frequency of interactions between teacher and student (Lamport, 1993). Investigations of the frequency of teacher-student interactions show that more often students have out-of-classroom interactions with their university teachers, the better the quality of the relationship and more connected the students to the university, improving their learning experience (Couture, 2016). However, the frequency of interactions does not enable conclusions about the quality of these interactions, as shown in the survey of Komarraju, Musulki and Bhattacharya (2010). Furthermore, not all interactions with university teachers are necessarily positive in nature, and thus do not automatically lead to positive outcomes, as said in Baumeister and Leary (1995).

Although the interactions may improve the learning experience, failures in communication between teachers and students can cause unknown expectations, problems with comprehending and uninteresting classroom lessons. The communications barriers certainly make it difficult for teachers and students, and many times, teachers fail to create engaging lessons and struggles to connect with their students on a one to one basis. Moreover, students also have unaddressed learning or speech difficulties and struggle to communicate in classroom settings. Sometimes, they have trouble comprehending lessons and organizing their thoughts. Because of hesitation, students often shut down, isolating themselves out of fear or embarrassment.

Currently, the teacher-student relationship and the education process are moving to a more rational and questioning atmosphere, where the teacher student bond is beyond the stereotypes and not defined by obedience and acceptance, like in earlier times. However, teaching settings tend to be more fragmented at university, with less frequent interactions between teachers and students. In addition, teaching is just one scholarly activity expected of university educators, with quality research typically receiving greater recognition than quality teaching in the academic community (Hagenauer and Volet, 2014).

Beyond interaction, another solution that have been studied was the care for students. The importance of the care concept for students is correlated with other factors, like respect and connectedness. These factors impact positively the communication between teachers and students (Komarraju, Musulkin, and Bhattacharya, 2010). They can improve the efforts, engagement, intrinsic motivation and results (Dweck, 2016) of the teachers and students and, consequently, their teaching and learning. Dweck (2016) shows that people who believes that the intelligence can be developed by hard work, strategy and orientation create a mindset, called growth mindset, that decide their potential and success. The work of Dweck (2016) is correlated directly with the success of the learning experience of teachers and students at university, and she proves that use the growth mindset can improve results of people, and, in this case, teachers and students.

Another solution was studied by Denzine and Pulos (2000). They presented that teacher approachability is an important quality that must be guaranteed in order to facilitate positive teacher–student interactions. Stephen, O'Connell and Hall (2008) showed that the approachability of lecturers is relevant not only for

teacher-student relationship, but also for an overall feeling of connectedness to the university and preventing students from becoming alienated from the university. Furthermore, Devlin and O'Shea (2012) presented the significance of approachable and available university lecturers for the adaptation process of first-year students from a low socio-economic background. Approachable lecturers and tutors who answered students' questions promptly, and clearly communicated expectations with regard to assignments, were described as very helpful for students' success in learning and adjusting to university.

Research by Palmer, O'Cane, and Owens (2009) shows that the likelihood of remaining at university was higher for students who developed a sense of belonging to the university, as their study satisfaction was increased through connectedness. Development of a feeling of belonging is of particular importance in the first year of study, as most decisions to drop out are made during this year. Furthermore, many first-year students enter university with unclear expectations and relatively high levels of uncertainty and anxiety, as presented in studies of Gibney, Moore, Murphy, and O'Sullivan (2011). Brinkworth, McCann, Matthews, and Nordstro¨m (2009) found that first year students had unclear expectations not only regarding their role as students, but also regarding communications between teacher and student at university. Over 80% of the sample expected to have 'ready access' to tutors and lecturers to facilitate successful study. If students fail to connect to the university and their study subject for whatever reason, as unclear expectations, as shown by Brinkworth, McCann, Matthews, and Nordstro¨m (2009), drop-out is often the result.

Although there is empirical support for the idea that peer relationships are the most important for students' sense of belonging, relationships with teachers and tutors also play an important role in students' decisions to complete their studies or to leave after the first year (Ramsay, Jones, and Barker, 2007). Furthermore, positive relationships with university teachers not only contribute to the retention of students but also facilitate other factors, such as commitment (Strauss and Volkwein, 2004), effort (Lundberg and Schreiner, 2004), motivation (Rugutt and Chemosit, 2009), satisfaction (Calvo, Markauskaite and Trigwell, 2010) engagement (Zepke and Leach, 2010), deep-learning approaches (Trigwell, 2005), achievement, and intellectual development (Halawah, 2006).

Observing the researches, it can be seen that the solutions of teaching, learning, communications and learning experience of teachers and students are directly correlated with mindset, mainly growth mindset, as studied by Dweck (2016). The teacher-student relationship clearly affects students' successful study progress, including factors such as course satisfaction, retention, learning approaches and achievement. On the other hand, teacher-student relationship also affects university teachers, for example through their adoption of particular teaching practices, which in turn affects teaching quality (Hagenauer and Volet, 2014). Thus, improving the communication between teachers and students, their learning experience, teaching, learning and satisfaction at university can be enhanced. The enhancing can be optimized combining methodologies based on undergraduate student's feedback, learning process and growth mindset, which is the goal of this paper.

2. Methodology

The methodology proposed in this paper was used in an electrical engineering classroom at Federal University of Campina Grande, Brazil, with 52 students coursing a discipline called electronics devices.

To collect the results, the methodology was applied during one year.

To improve the communication, teaching and learning between teacher and students, the authors of this paper used a methodology based on a combination of undergraduate student's feedback, learning process and growth mindset, as it is shown in Figure 1.

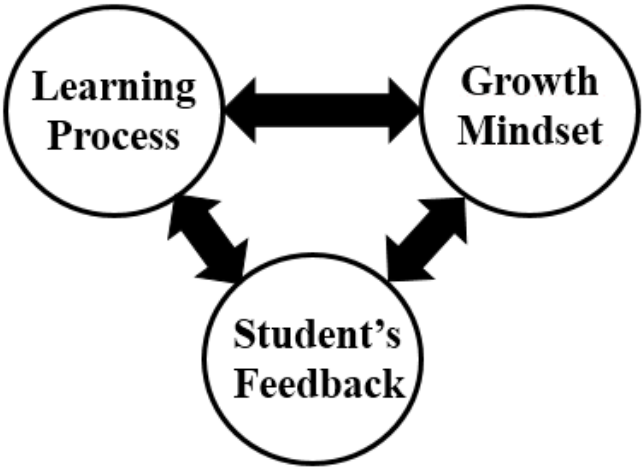


Figure 1. Combination of undergraduate student's feedback, learning process and growth mindset.

To understand the combination showed in Figure 1, it is necessary to explain how the learning process, the growth mindset and the student's feedback were used in the classroom.

Initially, teacher and students must use consciously the learning process, which is illustrated in diagram presented in Figure 2.

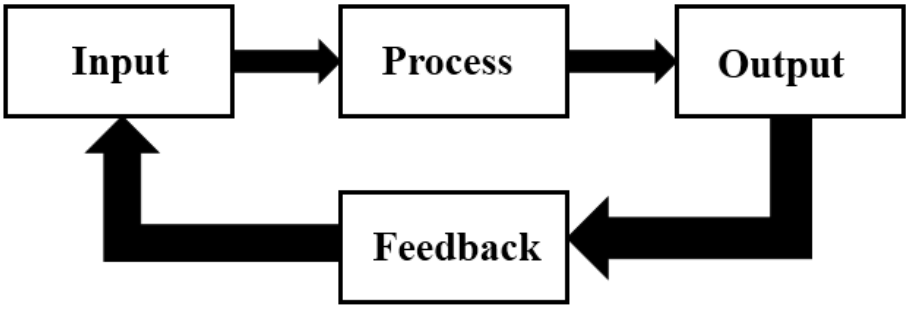


Figure 2. Learning process diagram.

In the learning process, the input is everything that teachers or students study, see, listen and live. The inputs are all the experience that teacher and students living during a course. The more inputs, the more processing can be done. Processing is the step that teacher or student make connections and combinations based on the inputs.

In the processing step, teacher uses the meaning learning to connect and combine the different inputs of students and facilitate the learning. The connection and combinations are made during the classes, studies, sleep and rest (Carey, 2015).

After the processing, teacher and students verify theirs learning, using the output step. The output step is based on the verification, proof and recognize of the learning. During the verification of learning, the

teacher and student can identify the gaps in teaching and learning (Khan, 2012).

The correction and close of the gaps are made during the feedback step, where teacher and student using the current learning as an input in the learning process. Using the verification of learning as an input provides new connections and combinations during the process step, and the new output is an optimized output, resulting in an improve of learning and teaching.

To reach the optimized learning and teaching, a growth mindset in teacher and students must be developed. Thus, the teacher must encourage their students to believe that with effort and hard work they can develop the optimized learning. The growth mindset was remembered during the course to the 52 students, in classes, tests and after tests.

To improve the teaching, the teacher encourages their students to answer a form, where they put their opinions about the explanation of the teacher, and suggestions to enhance the teaching. The student's feedback is used to enhance the explain of the teacher and improve their communication and, consequently, the teaching and learning.

5. Results

The most of teachers and students just teach and study without to concern with some method. The use of meaning learning, learning methods (Carey, 2015), growth mindset (Khan, 2012, Dweck, 2016) and learning process develop a mindset of learning in the students and improve their performance at challenges and tests during the course. As teacher and students were being trained, together, to learn and develop growth mindset, the teacher improves your explanation, consequently your communication with the students, and the students combined the growth mindset with the learning process to improve their learning. The results were more motivation, engagement, learning, hard work. These results impacted directly the performance in the tests. Despite the challenges in tests and nervousness, they use of methodology contributed for a better performance in the course, resulting in an approval of 88.46% of the students. The students that did not approved in the discipline, reported that it is not fault of the methodology, but personal factors in their lives.

The student's feedback was used to improve the teaching and communication of the teacher in relation with their students. A form in which the students answers questions for enhance the explanation of the teacher was used. The questions were:

1. How the teacher can improve their teaching methodology?
2. The tests were fair?
3. How was the learning experience with the teacher?

These three questions resulting in an improvement of communication, clarify, teaching and learning, because the students answered their opinion about the methodology used by the professor. The student is the element that use the methodology, thus them are the better element to give clarify to the teacher of how he can improve their explanation and communication.

Concerning to the first question, the students prefer explanations of theory interspersed with practical exercises. In explanations of theory and practical exercises, the teacher always mentioned that the students were able to learn anything, if they used their efforts and hard work. The teacher also highlighted that they

should give importance to the way they learned and studied, in order to give meaning to their learning and the result in test would be only a consequence to their approval in the discipline.

As the teacher explain not only the technical subject, but also the learning process and growth mindset, the students were trained to perform what they learned. As a result, 100% of the students answered that the tests were fair. Theses results imply that, despite the challenges in the tests, the students developed a growth mindset during the course. Moreover, a student said that the tests were a possible level to accomplish, without distractors. They said that because the teacher trained the students to the test, because he believes that test is not the focus, but the learn, which means that the teacher-student relationship was based on teaching and learning, not in test scores.

Regarding to the third question, some answers are below:

1. "The methodology was good, tests were fair, and the teacher always encouraged the students to learn and he mentioned applications during the classes."
2. "It was a great experience to have a teacher who cares about student (looking for a closer student-teacher relationship) and learning; who has no intention of failing, but of doing his fair work. I just want you to continue like this for the next classes. Teacher, you are great!"
3. "It was good, the animation and motivation of the teacher motivated us too, continue like this. This gives us hope for the course, among so many teachers disgusted with their work, you are an example to be followed."
4. "It was a very good experience, where we have a great learning about the subject of the discipline. The teaching methodology used by the teacher was of great help in fixing the content."
5. "Very positive experience. What impact me, especially, was the attention and patience with us when clarifying doubts. The teacher also demonstrated a lot domain of content and a serious commitment to our learning, believing in our potential and respecting our rhythm."

The answers of the third question indicate that the combination of undergraduate student's feedback, learning process and growth mindset improve the communication between teacher and students, their teaching, learning and learning experience. The methodology made the students more motivated, interested and engaged with the discipline and course, give to them more satisfaction.

6. Conclusions

As the goal of this paper, the using of undergraduate student's feedback combined with learning process and growth mindset improve the communication between teacher and student providing and enhancing motivation, engagement, satisfaction, teaching, learning and learning experience.

The methodology implies in a teacher-student relationship based on teaching and learning, not on the test scores.

Despite the methodology was applied in one discipline of the course of Electrical Engineering of Federal University of Campina Grande, in Brazil, it can be used in others disciplines and courses. The idea here is improving the teaching and learning of the teachers and students, become them better professionals of the future.

7. References

Baumeister, R. F., and Leary, M. R., "The need to belong: Desire for interpersonal attachments as a fundamental human motivation", Psychological Bulletin, 117, pp. 497–529, 1995.

Brinkworth, R., McCann, B., Matthews, C., and Nordstro¨m, K., "First year expectations and experiences: Student and teacher perspectives", Higher Education, 58, pp. 157–173, 2009.

Calvo, R. A., Markauskaite, L., and Trigwell, K., "Factors affecting students' experiences and satisfaction about teaching quality in engineering", Australasian Journal of Engineering, 16, pp. 325–338, 2010.

Carey, B., How we learn: the surprising truth about when, where, and why it happens, Elsevier, 2015.

Couture, R., "Impactful Academic Advising: What Students Recall Years Later", International Journal for Innovation Education Research, vol. 4, pp. 100-106, 2016.

Denzine, G. M., and Pulos, S., "College students' perceptions of faculty approachability", Educational Research Quarterly, 24, pp. 56–66, 2000.

Devlin, M., and O'Shea, H., "Effective university teaching: Views of Australian university students from low socio-economic status background", Teaching in Higher Education, 17, pp. 385–397, 2012.

Dweck, C. S., Mindset: the new psychology of success, 1st ed, Objetiva, 2017.

Gerda Hagenauer and Simone E. Volet., "Teacher–student relationship at university: an important yet under-researched field", Oxford Review of Education, 40:3, pp. 370-388, 2014.

Halawah, I., "The impact of student-faculty informal interpersonal relationships on intellectual and personal development". College Student Journal, 40, pp. 670–678, 2006.

Khan, S., The One World Schoolhouse: Education Reimagined. Intrínseca, 2012.

Komarraju, M., Musulkin, S., and Bhattacharya, G., "Role of student-faculty interactions in developing college students' academic self-concept, motivation, and achievement", Journal of College Student Development, 51, pp. 332–342, 2010.

Gibney, A., Moore, N., Murphy, F., and O'Sullivan, S., "The first semester of university life: 'Will I be able to manage it all?'", Higher Education, 62, pp. 351–366, 2011.

Lamport, M. A., "Student-faculty informal interaction and the effect on college student outcomes: a review of the literature", Adolescence, 28, pp. 971-990, 1993.

Lundberg, C. A., and Schreiner, L. A., "Quality and frequency of faculty-student interaction as predictors of learning: An analysis of student race/ethnicity", Journal of College Student Development, 45, pp. 549–565, 2004.

Palmer, M., O'Cane, P., and Owens, M., "Betwixt spaces: Student accounts of turning point experiences in the first-year transition", Studies in Higher Education, 34, pp. 37–54, 2009.

Ramsay, S., Jones, E., and Barker, M., "Relationships between adjustment and support types: Young and mature aged local and international first year university students", Higher Education, 54, pp. 247–265., 2007.

Rugutt, J., and Chemosit, C. C., "What motivates students to learn? Contribution of student-to-student relations, student-faculty interaction and critical thinking skills", Educational Research Quarterly, 32, pp. 16–28, 2009.

Stephen, D. E., O'Connell, P., and Hall, M., "'Going the extra mile', 'fire-fighting', or laissez-faire? Re-

evaluating personal tutoring relationships within mass higher education", Teaching in Higher Education, 13, pp. 449–460, 2008.
Strauss, L. C., and Volkwein, J. F., "Predictors of student commitment at two-year and four-year institutions", The Journal of Higher Education, 75, pp. 203–227, 2004.
Trigwell, K., "Teaching-research relations, cross-disciplinary collegiality and student learning", Higher Education, 49, pp. 235–254, 2005.
Zepke, N., and Leach, L., "Beyond hard outcomes: 'Soft' outcomes and engagement as student success", Teaching in Higher Education, 15, pp. 661–673, 2010.

Purpose in Life and Professional Life Project in College Students

Gladis Ivette Chan Chi Ph.D
ivette.chan@correo.uady.mx
Professor of the Faculty of Education
Autonomous University of Yucatan, Mexico

Nora Verónica Druet Domínguez Ph.D.
ddoming@correo.uady.mx
Professor and Administrative Secretary of
Autonomous University of Yucatan, Mexico

Gladys Julieta Guerrero Walker MA.Ed.
gwalker@correo.uady.mx
Professor and Director of
Autonomous University of Yucatan, Mexico

Abstract

The objective of this study was to determine the relation between the level of purpose in life and the level of dominion obtained by the students in the construction of a professional life project; after the implementation of a course based on the Logotherapy approach, which lasted a total of 64 hours. The areas worked were self-discovery, unicity, freedom, responsibility and self-transcendence. Logotherapeutic techniques of Socratic dialogue, role playing and cinema-logotherapy were used. The objective was to redirect the work carried out with students of the Bachelor Degree in Education at a Public University in the State of Yucatan, so that they could be aware of themselves, discover their potential and find their mission in life to give meaning to their chosen profession. The design of the study was pre-experimental, pretest-post-test, without control group; and the meaning of life test was administered to identify the level of Purpose in Life of the students. A rubric was used to evaluate the professional life projects that were developed by the students. The results showed that there is no relation between the level of Purpose in Life and the development of the professional life project, since the strengthening of the Purpose in Life did not necessarily imply the development of a professional life project in accordance with the potentials of the students, neither they managed to establish clear goals and specific commitments to achieve their goals.

Keywords: Education, Logotherapy Purpose in Life, Professional life project, Young people

INTRODUCTION

Higher education needs to develop a new model of education, based on a student-centered approach; therefore, it is necessary to make profound reforms as well as to extend the access policies to the diversity of people; to renew the contents, methods, practices and means of transmission of knowledge which must be based on new forms of collaboration between the community and the different sectors of the society

(UNESCO, 1998).

In this regard, Mexico faces important challenges in education, which involves improving the quality of educational services; to increase the levels of academic achievement, to reduce dropout rates and to provide equal access opportunities to education for children and underprivileged young people, and from indigenous families (Organization for cooperation and economic development, 2010).

The need to strengthen the Mexican educational system is stablished in the National Development Plan (2013-2018), as well as the need to provide the students with a quality education, which promotes their integral development, through innovation and the development of their human potential, and enabling them to write their own success story.

Higher education should be directed towards the development of competencies required for democratic, social and economic development, therefore, each student must obtain a solid mastery of disciplines and values corresponding to different professions (SEP - 2013-2018 education sector program). As well as to focus their efforts on providing learners the appropriate conditions for the full development of their potential, values, ecological awareness and citizenship. To strengthen the learner's skills in the management of their affections and emotions; and to contribute in the development of their values (SEP - sectoral education program, 2007-2012).

From this perspective, the Autonomous University of Yucatán focuses its efforts in developing the potential of students in the five dimensions of a human being, physical, emotional, cognitive, social and value-attitudinal. Its purpose is to contribute to a comprehensive training proposed in its educational model for the Integral Education (MEFI, 2012).

Therefore, institutions of higher education (IES), need to develop programs focused on addressing the holistic development of young people's recently admitted to the University, as well as to support them in their adaptation and proper transition in the educational program.

Consequently, it is important for young people to have a professional project that provide them with direction and guidance in their studies.

In this regard, Rojas (2004), says that education should focus on helping people identify their strengths, personal resources and values, enabling them to build a professional project, based on the development of their potential; likewise, according to Alejos and Sandoval (2010), it is a pillar that guides the training and development of human beings.

Along this line of thought, the school plays a relevant role in the training of students, since it must provide spaces for the development of attitudes and values that allow the learners to find a purpose in their life, as Frankl (2004), says that the meaning of life, also known as the purpose in life, represents a guide for the full development of man, and as a motivation or reason that drives people towards the achievement of a particular purpose.

So, when young people manage to find a purpose in their lives, activities are meaningful for them, they feel motivated and capable of stable commitments and respond to the construction of their professional life project, where the dreams, aspirations, goals, objectives and specific actions are structured and reflected, thus giving direction to the studies and promoting their proper decision making.

Studies carried out with college students show that people who have a purpose in their lives, perceive themselves as capable and responsible for their own lives (Magaña, Zavala, Ibarra, Gómez and Gómez, 2014), which can be seen through the establishments of goals according with their values (Kashdan and McKnight, 2009).

Also, Damon (2009), says that young people who have defined their purpose in life, find true relevance and significance in their academic experience, as well as in the tasks and demands of the academic institution. So that the students should have support networks, as well as personal tools to facilitate the

planning of their life in the future, with greater personal awareness and clarity in their purposes (Druet, Chan and Seville, 2013).

In a way that, it is precisely during the youth when self-determination is manifested in the lives of young people, leading to the choice of a profession, which constitutes one of the most important moments in their lives and in the development of a project of life (D'Angelo, 1986).

A life project is therefore a key aspect that guides, both the formation of the individual, as well as their human development. Since it represents an alternative in the lives of young people, which allows them to consider real goals and objectives towards a defined direction and which facilitates achieving them. (Alejos and Sandoval, 2010).

Therefore a professional project aims is: that students increase their degree of self-knowledge as well as exploring the closest career fields to the studies developed in general and finally determine the professional objectives, personal and material resources required for the developent of their project (Gallegos, 2005).

In this regard, the learners will be able to design a project of professional life, according to the level of self-discovery, so that they will be able to set goals based on their interests, skills, attitudes, values and knowledge acquired to guide their academic and professional development, especially in the early stages of their studies; which will also contribute to their integration and adaptation to the college environment.

Therefore, Purpose in Life is a motivator in the life of the people that allows them to guide their lives through establishing clear goals based on the development of their talents for the development of a project of professional life. The purpose of this paper is to determine the relation between both constructs, based on the teaching of a course designed with the logotherapy approach.

OBJECTIVES

General Objective

To establish the relationship between the purpose in life level and domain-level obtained in the rubric to assess the development of the professional life project, after attending a course based on the logotherapy approach.

Specific Objectives

To identify the Purpose in Life level of students recently admitted into a Bachelor's degree in Education at a public University in the State of Yucatan.

To design a rubric to assess the level of domain obtained by the students in the construction of a professional life project.

METHODOLOGY

A. Type of Study

A type of descriptive transactional study was used, consisting of measuring, evaluating or collecting data on different concepts, characteristics, dimensions or components of a phenomenon to investigate and that can be put under analysis (Hernández, Fernández and Baptista, 2006)

B. Design

The study design was of the type pre-test/post-test without a control group, which consisted of first administering a stimulus test or trial treatment, later on, the treatment test was administered again and at the end the stimulus was given a subsequent test called post-test. The use of this type of design, has an advantage, the existence of an initial reference point that provides information about the conditions under which the group was before applying the treatment (Hernández, Fernández and Baptista, 2010).

C. Sample

The sample was composed of 24 students from the Bachelor of Education in a public University of the State of Yucatan. 83% (20) were female and 16.66% (4) were male and their ages ranged between 17 and 31-year-old (Hernández, Fernández and Baptista, 2010).

INSTRUMENTS

D. Test on Purpose in Life

To determine the level of purpose of life we used the instrument Purpose in Life (life purpose), Crumbaugh & Maholick (1969), translated and adapted to Spanish by Noblejas de la Flor and whose purpose is to detect the level of purpose in life in the people. This instrument was based on the logotherapy approach by Viktor Frankl (1994), with a reliability of. 85, as reported by Crumbaugh (1973) and .92 when corrected by Spearman-Brown. It should be noted that in accordance with the objectives of the study, only the first part, 20 items, with polarity profiles and each item the subjects should classify and rate their degree of agreement or disagreement, using the seven points scale, where the number four position is considered as "neutral" and in positions one and seven different descriptive terms are used (see Appendix A).

E. Rubric for the construction of the Professional life project

To assess the construction of the Professional life project, developed by the students who participated in the course, a rubric of four levels of performance was designed with their respective scores, as following: outstanding (90-100 points), satisfactory (80-89 points), sufficient (70-79 points), uncredited (0-69 points) (see Appendix B).

F. Course based on the logotherapeutic Approach

The course was designed and delivered based on the perspective of logotherapy, with a total length of 64 hours, distributed in one hour and thirty minutes' sessions, the schedule was from 9:30 to 11:00 a.m., and these areas were addressed: self-discovery, uniqueness, freedom, responsibility and self-transcendence; and logotherapeutic techniques were used such as the Socratic dialogue, role playing, Cinema-logotherapy, Bibliotherapy and guided imagery. Through such techniques they aimed at directing the work done with young students recently admitted to a Bachelor's degree in education at a public University of the State of Yucatan, in order to strengthen their purpose in life and thus facilitating the construction of their professional life project.

G. Framing

The course was developed according to the approach of logotherapy, a purpose-centered psychotherapy which represents a positive and optimistic philosophy that provides support and protection to human beings. (Lucas, 2004, cited in Druet, Chan and) Durán, 2014), it is a strong motivator in the lives of the people and helps them to overcome obstacles and respond positively to life even in the most adverse circumstances. Finding a mission in life allows individuals to have clarity in their purposes, to strive to achieve their goals and to move forward even in the different situations they may face.

For this reason, the purpose of the course was that the participants will make contact with their resources, qualities, values and self-knowledge. The course was predominantly experiential, because from the experiences of the participants and each one of their companions, they were able to recognize themselves and reaffirm their self-concept, as well as to realize their willpower to achieve their goals and overcome the obstacles inherent to their stage of development and chosen career. They also found a purpose in their lives and in their careers, which facilitated the construction of their professional life project.

Studies carried out with college students, show that the strengthening of the purpose in life is strongly linked to their goal setting and thriving to achieve their dreams and ideals (Druet, Chan and Durán, 2014); It is precisely during the young years that the construction of a project of professional life becomes a real catalyst that promotes the academic and professional development of the students.

H. Techniques

Logotherapy techniques were used during the course, including the Socratic dialogue, including questions to promote reflection, in order to guide the participants to self-discovery and to make responsible decisions. The role playing technique was also used, in which the students adopt a different role and act in situations that would enable them to reflect and realize the importance that Purpose in life has in people's lives. Finally, the Cinema-logotherapy technique was used; by watching fragments of films or videos the participants were able to analyze and reflect on situations that carried a message for their lives.

II. Findings and Discussion

The results after the course was completed are presented below. The course was developed for recently admitted students to the Bachelor studies in Education in a Public University in Yucatán.

A table of contingencies was designed to present the findings from the administration of the Purpose in Life instrument (PIL) and the rubric on Professional life project. Subsequently Chi-squared statistical analysis was performed to find the relationship between these variables.

Figures and Tables

In the analysis of table 1, it can be observed that 8,33% (2) of the students with purpose in life, obtained a satisfactory dominion level and 4,16% (1) a level of sufficient dominion; whereas 12,5% (3) of the students with uncertainty obtained a level of excellent dominion in the development of their professional life project, which indicates that even when they presented uncertainty, they managed to construct a professional project based on the knowledge of their potentials as well as to identify a mission in their professional studies.

The above results show that in this study, the level of purpose in life is not directly related to the construction of the project of professional life that students developed, however, to determine this relationship non-parametric statistics of Chi-square, test was used, and the results are presented in table 2.

Table 1.

Diagnosis	Scores In the rubric	Levels of dominion according with the rubric						Total	
		Outstanding		satisfactory		sufficient			
		f	%	f	%	f	%	f	%
Purpose in Life	90-100	12	50					12	50
Uncertainty		3	12,5					3	12,5
Purpose in Life	80-90			2	8,33			2	8,33
Uncertainty				5	20.83			5	20,83
Purpose in Life	70-79					1	4,16	1	4,16
Uncertainty						1	4,16	1	4,16
Total		15	62,5	7	29,16	2	8,32	24	100

Level of Purpose in life in relation to the level of dominion obtained in the professional project

Note: f= Frequency; %= Percentage

As it can be seen in table 2, there is no relationship between the purpose of life level and the domain-level obtained by the evaluation rubric of the professional life project developed by the students; These results indicate that the purpose in life of the participants did not lead them to build a Professional life project consistent with their potentials, as they were not able to establish clear goals and specific commitments to achieve them.

Table 2.

	Value	gl	Sig. asymptotic (bilateral)
Pearson Chi-square	5,531[a]	2	063
Likelihood ratio	5,595	2	061
Linear to linear association	3,394	1	065
N valid cases	24		

Level of Purpose in life in relation to the level of dominion obtained in the professional project.

**P - value > 0.005*

Since it was also found that there were students who, although they showed uncertainty in your purpose in life, managed to establish goals, and even they made commitments to achieve each of them.

These results differ to those found in the study by Druet, Chan and Durán (2014), in the State of Oaxaca, who reported that the strengthening of the purpose in life in college students, was strongly associated with the goal setting and striving to achieve their ideals

III. CONCLUSIONS

The results of this study disclosed that even when college students showed a purpose in their lives and were able to identify their strengths and areas of opportunity, it is also true that the purpose of life is not directly related with the way in which they build their professional life project, since the goals established were unclear and the actions and commitments to fulfill them were also vague.

However, quite the opposite happens with those students who showed uncertainty in their purposes, as they were able to build a professional project with clear goals, specific actions and made commitments to achieve each one of the goals. They also presented creative and innovative projects that reflected their interest and motivation to help others, contribute to their education and being able to contribute with their expertise for the benefit of future students, in such way that they managed to identify their mission to study a degree in education.

The above conclusions made evident that the students managed to make contact with their strengths and values, as well as to identify a purpose in life, nevertheless, it is necessary to strengthen their self-confidence and to help them learn to believe in their skills. During the course, they participated and they were committed to the activities, however, they always mentioned that they were not sure that their projects were acceptable.

In conclusion, the Higher Education Institutions need to focus on strengthening the students Purpose in Life during the first semesters of the Bachelor's degree, as well as to support them in the development of a project of professional life that provide them guidance and direction, in order to guarantee their permanence in the institution and adequate adaptation to the college level. The lack of self-confidence also affects the establishment of support networks and appropriate interpersonal relationships with their peers and it may lead to their failure and even to drop-out school.

APPENDIX

Appendix A
Test of the purpose of life (PIL)

Name: _____ Date :_____
School: Semester: ___ Age:_ Sex: M___ F___

Instructions: In each of the following statements circle the answer that best reflects your perception. Observe that the numbers always go from one extreme to the opposite: "Neutral means that there is no preference for any of the two judgments; try using this response as little as possible"._

1. **Usually I am:**

Completely bored			Neutral			Very enthusiastic
1	2	3	4	5	6	7

2. **Life always seems to me:**

Interesting			Neutral			Completely monotonous
7	6	5	4	3	2	1

3. **In my life:**

I do not have objectives nor goals			Neutral			I have very clear goals and objectives
1	2	3	4	5	6	7

4. **My personal existence:**

It does not have any meaning nor purpose			Neutral			It is full of meaning and purpose
1	2	3	4	5	6	7

5. **Every day:**

It is something different			Neutral			It is exactly the same
7	6	5	4	3	2	1

6. **If I could choose I would prefer:**

To have never been born			Neutral			To live many lives like this one
1	2	3	4	5	6	7

7. After retiring:

I will do some interesting things			Neutral			I will do nothing the rest of my life, like I have always wanted to do
7	6	5	4	3	2	1

8. In the achievement of goals in my life:

I have not accomplished anything			Neutral			I have accomplished a lot, striving to achieve them
1	2	3	4	5	6	7

9. My life is:

Empty and just full of despair			Neutral			Is full of interesting things
1	2	3	4	5	6	7

10. If I died today, I would feel that my life:

It has been valuable			Neutral			It has not had any value
7	6	5	4	3	2	1

11. When I think about my life:

I often wonder why I do exist			Neutral			I always find a reason to live
1	2	3	4	5	6	7

12. The way in which I see the world, in relation to my life:

I am completely confused			Neutral			It fits with the meaning of my life
1	2	3	4	5	6	7

13. I am a person:

Very irresponsible			Neutral			Very responsible
1	2	3	4	5	6	7

14. Regarding freedom of man, I believe that:

Man is absolutely free to decide about his life			Neutral			Man is completely bound to the limitations of his heritage and environment
7	6	5	4	3	2	1

15. Regarding death:

I am ready and unafraid to die			Neutral			I'm not ready and I am afraid of dying
7	6	5	4	3	2	1

16. Regarding suicide:

I seriously thought about it as a way of escaping			Neutral			No, I have never thought about it
1	2	3	4	5	6	7

17. I believe that my ability to find meaning, purpose, and/or mission in my life is:

Excellent			Neutral			Practically zero

7	6	5	4	3	2	1

18. My life is:

In my hands and under my control — Neutral — Out of my hands and controlled by external factors

7	6	5	4	3	2	1

19. To face my daily tasks is:

A strong pleasure and satisfaction — Neutral — A painful and boring experience

7	6	5	4	3	2	1

20. I've discovered:

The lack of mission or purpose in life — Neutral — Clear goals and successful purposes in life

1	2	3	4	5	6	7

PART B

Instructions:

1. Write a paragraph about your goals and wishes both professional and personal.
2. To what extent are you reaching these goals?

Appendix A

Rubric for the construction of the Professional life project

Scores	Performance level	Description
0-69	Poor	Did not deliver the product, or the products do not meet the minimum requirements, therefore there is no evident analysis of strengths, values, resources and areas of opportunity that allow them to develop a project of professional life.
70-79	Enough	Strengthen their meaning of life, through the analysis of their strengths, values, resources and areas of opportunity that allow them to develop a project of professional life.
80-89	Satisfactory	Strengthen their meaning of life, through the analysis of their strengths, values, resources and areas of opportunity that allow them to develop a project of professional life.
90-100	Outstanding	Strengthen their meaning of life, through the analysis of their strengths, values, resources and areas of opportunity that allow them to develop a project of professional life.

REFERENCES

[1] Alejos, Y. & Sandoval, E. (2010). Significatividad del proyecto de vida en el estudiante de educación. Nueva Etapa, 14(3). Recuperado de http://revistas.upel.edu.ve/index.php/educare/article/viewFile/380/180.

[2] D'Angelo, O. (1986). La formación de los proyectos de vida del individuo. Una necesidad social. Revista Cubana de Psicología. III (2). Recuperado el 10 de octubre de 2015 de http://pepsic.bvsalud.org/pdf/rcp/v3n2/05.pdf

[3] Damon, W. (2009). The why question: Teachers can instill a sense of purpose. *Education Next*, 9 (3), 84-94.

[4] Druet, N., Chan, G., y Sevilla, D. (2013). Fortalecimiento del sentido de vida en la construcción del proyecto de vida profesional en jóvenes universitarios. *Revista ACADEMICUS* (2), 36-40. Recuperado el 10 de septiembre de 2015 de http://www.ice.uabjo.mx/images/academicus/Numero_2/AcademicusNo2.pdf

[5] Frankl, V. (2004). El hombre en busca del sentido. España: Herder

[6] Gallegos, S. (2005). El proyecto profesional: una vía para la inserción y un espacio de tutoría. Revista Educación y Ciencia. Nueva Época. 9 (17) (31), 41-52. Recuperado de http://www.educacionyciencia.org/index.php/educacionyciencia/article/viewFile/226/pdf

[7] Kashdan, T., & McKnight, P. (2009). Origins of purpose in life: Refining our Understanding of a live well lived. *Psychological Topics* 18, 303-316. Recuperado el 18 de marzo de 2016 de http://toddkashdan.com/articles/Kashdan%20&%20McKnight%20(2009)%20Origins%20of%20purpose%20in%20life.pdf

[8] Magaña, L., Zavala, M., Ibarra, I., Gómez, M. y Gómez, M. (2004). El sentido de vida en estudiantes de primer semestre de la universidad de la Salle Bajío. *Revista del Centro de*

Investigación. 6(22), 5-13 Recuperado el 10 de noviembre de 2015 de http://www.redalyc.org/articulo.oa?id=34202201

[9] MEFI (2012). *Modelo Educativo para la Formación Integral*. México: Universidad Autónoma de Yucatán.

[10] OCDE. (2010). *Acuerdo de cooperación México-OCDE para mejorar la calidad de la educación de las escuelas mexicanas*. Resúmenes ejecutivos de la Organización para la Cooperación y el Desarrollo Económicos. Recuperado de https://www.oecd.org/edu/school/46216786.pdf

[11] PND (2013-2018) *Plan Nacional de Desarrollo*. Gobierno Federal. Recuperado el 18 de noviembre de 2015 de http://www.sev.gob.mx/educacion-tecnologica/files/2013/05/PND_2013_2018.pdf

[12] Rojas, E. (2004). *La conquista de la voluntad: cómo conseguir lo que te has propuesto*. Madrid, España: Booket.

[13] Secretaría de Educación Pública (2007-2012). *Programa Sectorial de Educación 2007-2012*. Recuperado el 20 de octubre de 2015 de http://www.educacion.yucatan.gob.mx/showprograma.php?id=55

[14] Secretaría de Educación Pública (2013-2018). *Programa Sectorial de Educación 2013-2018*. México: SEP. Recuperado el 20 de octubre de 2015 de https://www.sep.gob.mx/work/models/sep1/Resource/4479/4/images/PROGRAMA_SECTORIAL_DE_EDUCACION_2013_2018_WEB.pdf

AUTHORS' PROFILE

Gladis Ivette Chan Chi

Yucatán, México, 19, July,1985

BA in Education by the Faculty of Education of the Autonomous University of Yucatán, Mérida, Yucatán, México, Degree received in 2009

Master in Educational Innovation by the Faculty of Education Autonomous University of Yucatán Mérida, Yucatán, México, Degree received in 2012

Doctor in Education by The Southeastern Center of Higher Education. Mérida, Yucatán, México, Degree received in 2017

She is currently a professor and tutor at the BA in Education at the College of Education of the Autonomous University of Yucatán, México, she has participated in research projects and has been a presenter in national and international conferences. Among her academic productions are books chapters and arbitrated, indexed articles in the area of education and counseling. Some of them are listed below:

1. Druet, D.N., Chan, C.G. and Cisneros, C.I. (2016). Investigación acción-participativa para atender el desarrollo humano de trabajadores administrativos y manuales de una Universidad. (Participative-action research to attend the human development of the manual and administrative workers in a University). In Lopez, G.G., Alamilla, M.P., Druet, D.N. and España, N.J. (2016). Sociedad, Desarrollo y Comunidad. Mérida, Yucatán, CEPSA.Pp.53-66. ISBN: 978-607-7824-96-1
2. Chan, C.G. and Druet, D.N. (2015). Entorno virtual: un recurso de apoyo para el tutor ("virtual environment : a support resource for the tutor". In "Innovación y Evaluación en la Educación Superior" (2015) Mérida, Yucatán, México, PEARSON, ISBN 978-607-32-3587-7
3. Cab, C.M., Chan, C.G., Cisneros, C.I. and Druet, D.N. (2014). "Taller Gestáltico para fortalecer la autoestima y prevenir el consumo problemático de bebidas alcohólicas en universitarios". ("Gestalt

workshop to strengthen the self-esteem and to prevent the problematic consumption alcohol in college students). “Cuadernos Hispanoamericanos de psicología" Bogota, Colombia. Universidad del Bosque. Colombia. Vol. 14. N° 2. Pp.. 75-84. ISSN: 1657-3412 (printed). ISSN: 2346-0253 (on line).

Dr. Chan is member of the Education and Counseling academic group at the UADY; She has been accredited Desirable Professor Profile PRODEP, and recognized by the institution where she works for practicing the four main functions of the university professor (teaching, counseling, research and management), she has also participated in peer-reviewing journal committees.

Nora Verónica Druet Domínguez

México, DF. 06, May, 1957

BA in Psychology by the College of Psychology at the Universidad Nacional Autónoma de México. Degree received in 1990.

Master in Humanist Psychotherapy by the University Institute Carl Rogers, Puebla, México, Degree received in 2004

Doctor in Humanist Education by the Humanist Institute of Sinaloa. Culiacan, Sinaloa, México. Degree received in 2008

She is currently the administrative secretary and a professor in the BA in Education at the College of Education of the Autonomous University of Yucatán, México, she has led research projects and has been a presenter in national and international conferences. Among her academic productions are books chapters and arbitrated, indexed articles in the area of education and counseling. Some of them are listed below:

1. Druet, D.N., Guerrero, W.G. y Romero, A.C. (2017). Fortalecimiento del sentido de vida en la construcción del proyecto de vida profesional en jóvenes universitarios. In Guerrero, W.G., Alcocer, V.E. and Pascal, L. (2017). Políticas públicas y administración en educación y formación. Ejemplos en países Latinoamericanos, Caribeños y Europeos. Universidad Autónoma de Yucatán - Ediciones de la Noche. Pp. 177-190. ISBN: 978-607-9490-41-6
2. Druet, D.N., Chan, C.G. and Cisneros, C.I. (2016). Investigación acción-participativa para atender el desarrollo humano de trabajadores administrativos y manuales de una Universidad. /Participative-action research to attend the human development of the manual and administrative workers in a University. In Lopez, G.G., Alamilla, M.P., Druet, D.N. and España, N.J. (2016). Sociedad, Desarrollo y Comunidad. Published by: CEPSA. Mérida, Yucatán. Pp. 53-66. ISBN: 978-607-7824-96-
3. Druet, D.N., Guerrero, W.G. y Mijares, G.C. (2015). Sentido de Vida como Herramienta en Orientación Vocacional. (Sense of life as a tool for career orientation) ACADEMICUS. Vol. 1 Number 7. Pp. 59-68. Oaxaca. ISSN: 2007-5170.

Dr. Druet is member of the Education and Counseling academic group at the UADY; She has been accredited Desirable Professor Profile PRODEP, as well as SNI (National Researchers System) and recognized for her participation as a journal reviewer and member of Thesis evaluation committees for professional examinations.

Gladys Julieta Guerrero Walker

El fuerte, Sinaloa 30 July, 1960.

BA in Psychology by the College of Psychology at the Autonomous University of Yucatán. Degree received in 2005.

Master in Humanist Psychotherapy by the University Institute Carl Rogers, Puebla, México, Degree received in 2007.

She is currently the Director and professor in the BA in Education at the College of Education of the Autonomous University of Yucatán, México, she has been a member of the standing legislative committee and Faculty representative and Member of the University Council.

Among her academic productions are books chapters and arbitrated, indexed articles in the area of education and counseling. Some of them are listed below:

1. Druet, D.N., Guerrero, W.G. y Romero, A.C. (2017). Fortalecimiento del sentido de vida en la construcción del proyecto de vida profesional en jóvenes universitarios. In Guerrero, W.G., Alcocer, V.E. and Pascal, L. (2017). Políticas públicas y administración en educación y formación. Ejemplos en países Latinoamericanos, Caribeños y Europeos. Universidad Autónoma de Yucatán - Ediciones de la Noche. Pp. 177-190. ISBN: 978-607-9490-41-6
2. Druet, D.N., Guerrero, W.G. y Mijares, G.C. (2015). Sentido de Vida como Herramienta en Orientación Vocacional. (Sense of life as a tool for career orientation) ACADEMICUS. Vol. 1 Number 7. Pp. 59-68. Oaxaca. ISSN: 2007-5170
3. Guerrero, J, Adan, S; Vermont, M; (2016) Interacción comunitaria de los estudiantes de la licenciatura en enseñanza del idioma inglés como cuentacuentos (pp.151-166).

Professor Guerrero is member of the academic group of education and counseling at the UADY; She has been accredited Desirable Professor Profile PRODEP.

An undergraduate forensic biochemistry laboratory experiment to detect doping in animal hair using LCMS

Iltaf Shah and S. Salman Ashraf
Department of Chemistry, College of Science, UAE University.
PO. Box 15551, Alain, UAE.
E-mail: altafshah@uaeu.ac.ae.

Abstract

Doping using performance enhancing banned substances is a serious problem in almost every sport competition. Not surprisingly, the detection of these contra banned drugs is an area of active and continuous improvement and innovation by bioanalytical chemists. Additionally, most students working out in the gym and taking part in various sports need to be made aware of the doping and the health problems associated with it. Science or STEM students, in particular chemistry students, must not only be made aware of these issues, but also be taught that chemistry (and science) can provide solutions to such real-life issues. To this end, a newly developed forensic laboratory experiment is described that guides students to learn liquid chromatography mass spectrometry instrumentation (LC-MS) to detect four common doping drugs cortisol, dexamethasone, methyl prednisolone and flumethasone in camel hair samples.

In addition, the project is also designed to reinforce the importance of hair analysis as an additional sample matrix, complementary to saliva, blood and urine tests, in doping applications. In addition to learning various aspects of sample preparation, extraction, and LC-MS principles, students will also learn how to validate this method according to Food and Drugs Administration guidelines for intra and inter day precision and accuracy, recovery, stability and linearity.

This "applied forensic science" experiment was successfully implemented in a biochemistry undergraduate research course to enhance students' learning of doping issues as well as important bio-analytical and forensic biochemistry concepts. Student survey confirmed that this laboratory experiment was successful in achieving the objectives of raising awareness of doping control in students and illustrating the usefulness of chemistry in solving real-life problems. This experiment can be easily adopted in an advanced biochemistry laboratory course and taught as an inquiry-guided exercise. Such hands-on and engaging experiments should be part of undergraduate curriculum to foster deeper interest and innovation in STEM subjects to better prepare the next-generation workforce in science and technology.

Keywords: Forensic Science, Doping, LC-MS, bioanalytical experiment, hands-on training, undergraduate research

1. Introduction

Doping is a serious problem in almost every sport played around the world involving humans and animals [1, 2]. Doping enhances the performance of a person or animal and give it a competitive edge over other athletes. But these performance enhancement drugs could also seriously damage the health of an athlete or animal later in their lives, and therefore the use of these performance enhancers are strictly prohibited in different sporting competitions [3, 4].

Hence, in recent years, there has been a concerted increase in scientific activities focused on doping awareness and research, all aimed to clean our sports. It is well recognized that the general public, young university sportsmen and college students should all be made aware of the seriousness of the doping challenges we face in the recent times [5, 6]. In addition, this experimental design will also improve critical thinking and generic transferable skills among young chemistry graduates as they are often found lacking these skills [7-9].

Camel racing is one of the most popular sports in the Arabian gulf countries and Australia. The winning camels are rewarded with cash prizes worth millions of dirhams [10, 11]. These awards can sometimes motivate some of the camel owners to cheat in order to enhance their camel's speed; by doping the camels with different steroids like glucocorticoids. Glucocorticoids are a class of corticosteroids that are illicitly used in human and animal's sports owing to their anti-inflammatory and mood elevating as well as euphoric properties [12-14]. According to reports from camel research centres, exogenous administration of glucocorticoids is a common cause of ban from the camel racing for participants. Four main glucocorticoids usually found in camel are hydrocortisone, dexamethasone, flumethasone & methylprednisolone. Cortisol and methylprednisolone are endogenously produced in camel while dexamethasone and flumethasone are synthetically produced.

Camel blood or urine samples are currently being analysed in accredited laboratories across the world for determination of endogenous and synthetic glucocorticoids in camels for doping control [15-17]. But major disadvantages of urinalysis and blood analysis is that it only provides short term information for drugs consumption [18]. It can also show false positive for accidental single intake of drugs [19]. Hair analysis on the other hand provides a wider surveillance window of detection (month to year) and full history of drug use [20].Hair testing is very stable, easy to ship and store, non-invasive, tamper resistant and most convenient technique for control of drug doping. Hair test can complement blood and urine analysis [21].

Many other relatively simple chemistry experiments have been published in the past that can be incorporated in undergraduate chemistry curricula to raise awareness of doping in sports among chemistry students, and to show how chemistry can be used to solve practical, real-life problems of doping in sports. For example, our laboratory has previously published relatively simple chemistry experiments that show the applicability the analysis of nandrolone and stanozolol in university students gym athlete [21]. We have also conducted a study on primary outcome measures for new university students which were calculated

based on the portions of fruit and vegetables consumed, physical activity levels, units of alcohol consumed and smoking status at 6-month follow-up. Where it was concluded that targeted health behaviour of new university students should therefore focus on single health behaviours [22, 23]. In another study the use of fat burner Dinitrophenol was analysed [24] and many other studies involving hair analysis in university students are discussed [23, 25, 26]. Similarly, others have published educational experiments on the doping in sports [4, 27].

Multiple methods have been published for the determination of glucocorticoids in human hair [28, 29]. Many methods have described the analysis of glucocorticoids in camel saliva [30, 31], urine [32], blood [33, 34]and faeces [35]. Our literature review indicates that no method has been reported previously for the analysis of glucocorticoids in camel hair.

Although very promising, unfortunately there are no published reports of such approaches being taught to undergraduate chemistry and biochemistry students. There are, however, a few interesting educational articles on teaching chemistry/biochemistry students about doping and doping education [36-38]. This article also describes an experiment that we have developed and successfully used in an undergraduate biochemistry laboratory. In addition to teaching students how drugs can incorporate into hair along with how hair analysis could be used for detection of various glucocorticoids in camel hair. The described experiment also emphasized various factors that can effect detection of drugs in hair, which involve contaminants sticking to hair, hair colouring, hair growth cycle, segmental analysis of hair and hair length. There were four main objectives for this biochemistry laboratory:

1-Raise student awareness about the issue of doping in sports and their adverse health effects
2-Teach undergraduate students an advanced bio-analytical instrument that can be used to address doping related questions
3-To stress the importance of science and chemistry in solving real-life problems
4-To promote interest and innovation in STEM students by engaging them in an inquiry-based learning exercise

Additionally, the experiment is designed to be taught in a fashion that encourages inquiry-driven learning about the various parameters (stability, linearity, precision, accuracy etc. that can affect the hair analysis in doping application. Specifically, of the four levels of inquiry-guided learning in science (confirmation inquiry, structured inquiry, guided inquiry, and open inquiry) [38, 39], the described experiment would be very suitable for confirmation and structured inquiry approaches. These two approaches are usually employed with students who have not had previous experience with inquiry-guided learning.

For the “confirmation inquiry” style of teaching this exercise, students will be provided with the specific questions (e.g. how hair analysis can complement urinalysis and blood analysis) and a detailed procedure of how to do this. The instructor will also tell them the expected result and the students will essentially

confirm the expected results. This approach will reinforce students' skills in following specific laboratory instructions, collecting, recording, and analysing data. If this experiment is taught using "structured inquiry" style, students will be provided with specific questions (e.g. how do hair analysis can complement urinalysis and blood analysis) as well as detailed procedures. However, unlike the confirmation inquiry style, they will not be informed about the expected results; rather students will be asked to use the data to come up with possible explanations for their observations.

2. Experimental Procedures

1.1 Safety Requirements and Hazards

1.1.1 Standards and reagents

Dexamethasone, flumetasone, methylprednisolone, hydrocortisone and hydrocortisone-9,11,12,12-d4 were all purchased from Labco Ltd UAE. Dichloromethane, methanol, pentane, formic acid was purchased from Emirates Scientific Supplies Ltd, UAE along with LC-MS grade water and acetonitrile. Glass test tubes (15 ml and 6 ml), Glass Pasteur pipettes, HPLC vials with caps (2 ml) were also bought from Emirates Scientific Supplies Ltd, UAE.

As with any laboratory-based experiment, students should wear gloves, safety glasses, and laboratory coats during the course of the experiment. Formic acid is perhaps the biggest hazard in this laboratory. Extreme care should be taken while using this acid, especially avoiding any spills or respiratory inhalation. Solvents like pentane can cause skin cracking and proper care is necessary while handling this solvent. Glucocorticoids are colourless compounds and students should be very careful while pipetting. Proper care should be taken when using other reagents. The CAS numbers of all the chemicals used are listed below:

Methanol- CAS Number: 67-56-1
Acetonitrile- CAS Number: 75-05-8
Pentane- CAS Number: 109-66-0
Formic acid- CAS Number: 64-18-6
Dexamethasone- CAS Number: 50-02-2
Flumethasone- CAS Number: 2135-17-3
Methylprednisolone- CAS Number: 83-43-2
Cortisol- CAS Number: 50-23-7

It is strongly advised that the MSDS of these chemicals should be printed and made available to the students before the laboratory starts.

1.2 Pre-laboratory Lecture & Post-laboratory Discussion

At the beginning of the laboratory, students are first given a "generic lecture" on glucocorticoids (hydrocortisone was chosen as an example in this case), and the various techniques available to detect

doping in sports, including LC-MS based approaches. At the end of this pre-laboratory lecture, students are informed about the exact nature of the laboratory and how they will be divided into 4 individual students, each testing a specific parameter that can effect doping in hair analysis. At the end of the laboratory, results from each of the 4 students are compared and discussed (as described later) to promote students to realize for themselves the importance of various parameters for efficient hair analysis for doping applications.

1.3 Specimens

Camel hair samples were collected from different breeds of camels kept in a farm in Al Ain, UAE. Hair samples from three racing camels were also obtained from a racing camel owner. The hair samples were collected from the crest of neck (mane) area of the animal, cut directly at the skin surface. This area was chosen because it shows less variability in hair growth. The hair samples were stored individually in labelled, sealed plastic envelops. The study protocols were approved by UAEU research ethics committee. Blank hair was received from a healthy, non-racing camel in the same manner.

1.4 Sample extraction

Camel hair samples were washed with dichloromethane for few minutes to remove any contaminants and foreign objects sticking to hair samples. The hair samples were dried under air and normal temperature. The dried hair samples were pulverized using Mini-ball mill Pulverisette 23, Fritsch Germany. 20 mg of grinded hair was weighed and 50 µl of internal standard hydrocortisone-d4 (concentration 1 ng/ml) was added to all hair samples except blank matrix samples. 1 ml of methanol was added to hair samples and then samples were sonicated for 2 hours in an ultrasonic bath (Branson 5800, Danbury USA) at 40° C. After ultra-sonication of samples for a minute, 1 ml pentane was added to the mixture. Samples were vortex mixed again for 2 minutes. Next the mixture was centrifuged at 1680xg for 10 minutes (Beckman TJ-6, Beckman UK). Few samples were re-centrifuged if clear extracts were not obtained. After centrifugation the top organic layer was separated into new Pyrex glass test tubes using Pasteur pipettes. The clear extract was evaporated using nitrogen gas sample concentrator at 40° C (Techne, Bibby Scientific USA). The dried extract was reconstituted with 100 µl of methanol. 4 µl was injected onto the LC-MS/MS system.

1.5 LC-MS/MS Analysis

The LC-MS/MS system comprised of an ACQUITY ultra pressure liquid chromatography (UPLC) class-1 system (Waters, UK) and advanced tandem quadrupole mass spectrometer XEVO TQ-S (Waters, UK). The column compartment in ACQUITY UPLC system was maintained at 50° C. An ACQUITY UPLC column BEH C18 (2.1 mm x 50 mm, 1.7 µm) was used for chromatography along with an ACQUITY UPLC BEH C18 VanGuard Pre-column guard, 130 Å, (2.1 mm X 5 mm,1.7 µm) for clean sample injections. Mobile phase flow rate was 0.5 ml/min. Mobile phase A consisted of 0.1% formic acid and 2 mM ammonium acetate in water, while mobile phase B consisted of 0.1% formic acid and 2 mM ammonium acetate in methanol. The gradient started with a 0.1 % mobile phase B, and changed to 99.9 % mobile phase B in 5 minutes, the gradient was kept for 4.9 minutes at this ratio. At 10 minutes the gradient

was equilibrated at initial ratio of 0.1 % mobile phase B and kept at this ratio for 1 minute. There was also a post time run of 2 minutes before the next injection to equilibrate the instrument.

Although the current exercise describes a single-timed assay, the same experiments can be carried out in continuous measurement mode. This modified experimental approach can allow students to calculate different concentrations of corticosteroids in camel hair to evaluate doping. Each of the 4 students carried out different part of the validation analysis like Intra–inter day precision and accuracy, Linearity, sensitivity and specificity, Extraction recovery and stability.

3. Validation

3.1 Calibration curve and analysis

The calibrants for analysis of hair samples were made by serial dilution of the top calibrant 2500 pg/mg in methanol. 20 mg camel hair was used The samples for the standard curve were processed as described in the materials and method section. The ratio of peak area of glucocorticoids to that of the internal standard was plotted versus the concentration of the glucocorticoids in the calibration standard and a least-squares linear regression analysis was performed. Values of unknown hair concentrations were determined from the regression line of this calibration curve. Quality controls were obtained by spiking corticosteroids into 20 mg of camel hair samples to produce concentrations of 156.2, 312, 625 and 1250 pg/mg. All solutions, calibrants and quality controls were stored at -20 °C with an expiry of 7 days, due to their short stability in methanol.

3.2 Student 1. Intra–inter day precision and accuracy

This student carried out the following experiments. The accuracy and precision of the assay was determined by analysing 20 mg camel hair samples spiked with four quality control (QC) samples of 156.2, 312, 625 and 1250 pg/mg of glucocorticoids. These QC samples were later assayed by LCMS/MS. To assess the inter-assay precision and accuracy, samples were analysed on five separate days. To assess the intra-assay precision, these same QC concentrations were analysed and compared during a single day.

3.3 Student 2. Linearity, sensitivity and specificity

This student carried out the following experiments. The ratios of glucocorticoids and internal standard responses were plotted by LC-MS/MS Quanlynx software (Quanlynx, an Application Manager included with Masslynx Software, is designed for quantitative analysis. Quanlynx automates data acquisition, processing and reporting) to determine the linearity. A calibration point was rejected as an outlier if the back-calculated concentration for a calibrator (on the basis of the corresponding calibration curve) deviated by more than 15 % at all concentrations covered by the calibration range, except at the lower limit of quantitation (LLOQ), where a deviation of 20 % was acceptable. A calibration curve was allowed with a minimum of four acceptable calibration levels.

The student calculated the specificity of the validated assay procedure by analysing 6 blank camel hair samples from camel not exposed to large concentrations of endogenous glucocorticoids. The analytical method was able to determine dexamethasone, flumethasone, methylprednisolone, hydrocortisone and hydrocortisone-9,11,12,12-d4 (internal standard) in camel hair without significant interference from other endogenous compounds.

3.4 Student 3. Extraction recovery

This student carried out the following experiment. The Absolute extraction recovery of glucocorticoids in camel hair were determined at three concentrations levels 312, 625 and 1250 pg/mg. The area ratio response of glucocorticoids to internal standard in the extracted sample divided by the area ratio response determined in an un-extracted sample and multiplied by 100 gave the percent recovery. These samples were extracted, as described earlier, except that the internal standard was added to the collected extract. The concentrations of the spiked camel hair samples were calculated from the curve and compared to the theoretical values in order to calculate the extraction recovery.

3.5 Student-4. Stability

Student 4 carried out the following experiment. The stability of camel hair was determined in processed sample extracts over at least 24 h period and also by three repeated freezing and thawing cycles. Stability of glucocorticoids in camel hair was tested at repeated freezing and thawing cycles.

Student prepared camel hair samples at concentration of QCL = 312 pg/mg, QCM = 625 pg/mg and QCH = 1250 pg/mg were subjected to three freezing and thawing cycles. The time span for freeze/thaw cycles was 72 h with each freeze/thaw cycle lasting for 24 h with time points 24, 48 and 72 h. The results obtained after each freezing and thawing cycle were expressed as a percentage change from the results for QCL = 312 pg/mg, QCM = 625 pg/mg and QCH = 1250 pg/mg in the intra-assay run. The test compound was considered to be stable if the percentage change from freshly prepared samples was within ±15 % of the nominally spiked level.

3. Results and Discussion

3.1 Camel hair analysis

All the four glucocorticoids were quantified in the camel hair samples along with a similar internal standard. 30 hair samples were obtained from a source farm in Al Ain. The owner disclosed giving medication to camels in the past year namely Terramycin and Trypanosoma vaccines. While 3 samples from racing camels were obtained from another camel owner in Al Ain. One of the racing camels were given corticosteroids for an injury.

Glucocorticoids (dexamethasone, flumethasone, methylprednisolone, hydrocortisone and hydrocortisone-9,11,12,12-d4 (internal standard)) were identified and quantified on the basis of their retention times and

the relative abundance of their respective product ions. The retention times, multiple reaction monitoring (MRM) transitions (showing precursor and product ions), respective molecular weights, cone voltages and collision energies are given in Table 1 below.

Table 1. Retention times, MRM transitions and conditions for glucocorticoids

Analyte	Retention Times	M. Wt. (M)	$[M-H]^-$ (-ve electrospray Ionisation)	Precursor - adduct $[M-H+HCOO^-]$	Fragments	Cone Voltage	Collision Energy
Hydrocortisone-9,11,12,12-d4 (Internal standard)	5.29	366.48	365.2	411.2	335.2	20	25
Hydrocortisone	5.09	362.47	361.2	407.2	331.2	20	20
					343.2		
					301.2		
Dexamethasone	5.82	392.46	392.2	437.2	361.2	20	20
					307.2		35
					325.2		
Flumethasone	5.67	410.45	409.2	455.3	305.2	20	35
					325.2		30
					379.2		20
Methylprednisolone	5.9	374.44	373.2	419.2	343.2	20	20
					309.2		35
					294.2		

3.2 Calibration curve and analysis

3.2.1 The following experiment was divided into 4 students as follows.

All the analytes, dexamethasone, flumethasone, methylprednisolone, hydrocortisone and hydrocortisone-9,11,12,12-d4 (internal standard) showed sharp, well-defined peaks at their respective retention times. Only two most sensitive MRM transitions (out of three as shown in Table 1 above) were chosen for the quantitative analysis of each glucocorticoid. The chromatogram shows internal standard on the top followed by flumethasone, dexamethasone, methylprednisolone, and hydrocortisone respectively.

3.2.2 Intra and Inter assay accuracy and precision (Student 1)

The inter-assay accuracy and precision were calculated from results obtained from quality control samples (N = 6) of hydrocortisone, dexamethasone, flumethasone and methylprednisolone analysed at four different concentration levels on three separate occasions (156.2, 312, 625 and 1250 pg/mg in hair samples representing LLOQ, QCL, QCM and QCH respectively), On the other hand, intra-assay accuracy and precision was calculated from QC's analysed on one occasion, see Table 2.

Table 2 Validation results showing intra and inter-day precision and accuracy and linearity

Analyte	QC's concentration	LOD/ LOQ	Linear range	r2	Intra-assay		Inter-assay	
	pg/mg	pg/mg			Precision, %CV	Accuracy, %	Precision, %CV	Accuracy, %
Hydrocortisone	312	0.15/78	78-2500	0.995	7.9	104.5	5.0	116.2
	625				3.4	98.5	2.9	105.5
	1250				4.7	100.6	1.1	97.4
Dexamethasone	312	0.15/0.30	19-2500	0.998	8.1	103.8	7.2	115.2
	625				2.6	97.8	3.5	107.5
	1250				4.2	95.2	5.3	101.3
Flumethasone	312	0.15/0.30	26-2500	0.998	8.6	96.8	7.5	118.4
	625				2.8	97.6	3.4	107.5
	1250				4.9	94.1	6.9	101.0
Methylprednisolone	312	0.15/0.50	0.5-2500	0.996	3.7	110.2	7.6	109.7
	625				4.1	111.8	3.3	102.9
	1250				7.0	104.1	3.9	101.0

LOD limit of detection, *% CV* coefficient of variation

3.23 Linearity, sensitivity and specificity (Student 2)

During the validation study, calibration curves were generated over a concentration range 0.15 to 2500 pg/mg. The method showed good sensitivity, specificity and linearity in the concentration range of 78, 19, 26, 0.5 to 2500 pg/mg for hydrocortisone, dexamethasone, flumethasone and methylprednisolone respectively. The curves were all linear with a mean coefficient of determination of 0.9998. The limit of quantitation was 78, 19, 26, 0.5 pg/mg for hydrocortisone, dexamethasone, flumethasone and methylprednisolone respectively. Using a signal-to noise ratio measure, the estimated limit of detection was 0.15 pg/mg for hydrocortisone, dexamethasone, flumethasone and methylprednisolone respectively. Furthermore, the percentage recovery of glucocorticoid samples, was well within the accepted limit of ±15 %, thereby showing no matrix effects as can be seen from the Table 3. No notable peaks were seen in the region of interest when six blank plasma samples were analysed. The retention time region of the chromatograph where glucocorticoid and internal standard was clear in these samples and demonstrated

the specificity of the validated analytical procedure. No interference from endogenous compounds or metabolites of glucocorticoids was found around the elution times, however few matrix peak was observed at a different retention time.

Table 3. Recovery of glucocorticoids when added to blank plasma showing no notable matrix effect (n = 6)

Concentration (pg/mg)	Recovery Mean ± SD (%)
156.2	98.75 ± 7.61
312.0	97.32 ± 4.22
625.0	99.20 ± 3.13
1250.0	98.59 ± 2.21

3.24 Recovery (Students 3)

We used 20 mg of camel hair incubated in 1 ml of methanol in an ultrasonic bath for 2 hours followed by liquid-liquid extraction using pentane produced a good recovery. Final recoveries were calculated during validation runs as shown in Table 2. The percent recovery of the three QC's is shown in Table 2.

3.25 Stability (Freezing and thawing cycles) (Student 4)

Three freeze/thaw cycles were performed at 24, 48 and 72 hours respectively. Quality controls at 3 different concentrations 312, 625 and 1250 pg/mg were analysed and compared for the 4 four glucocorticoids namely hydrocortisone, dexamethasone, flumethasone and methylprednisolone respectively. The samples were then extracted and injected. The mean concentrations of the stability samples were compared to the theoretical. The freeze/thaw cycle 1 shows quality controls analysed at time 0, then freeze/thaw cycle 2 shows quality control samples analysed at 24 and freeze/thaw cycle 3 at 48 hours respectively. The data indicated that the 4 glucocorticoids were stable in hair samples to at least three freezing and thawing cycles. The validation results indicated that the proposed method is more efficient in detecting the glucocorticoids, in camel hair even at very low levels when only ca. 20 mg hair was processed. Thus the, three freezing and thawing cycles showed that the 4 glucocorticoids were stable in camel hair. Many methods has been published for the determination of corticosteroids in human hair [40, 41], animal hair [19, 42-45] and currently there is no method reported for analysis of corticosteroids in camel hair.

3.26 Assay application

The hair analysis of 3 racing and 30 non-racing dromedary camels showed the following data for the four corticosteroids. Endogenous hydrocortisone was found in 13 camels in the range 30.7 to 935.35 pg/mg while in the rest hydrocortisone was lower than the limit of quantification. It was also interesting to note that 1130.15 was the hydrocortisone found in one of the racing camels along with high concentrations of

flumethasone 2575.5 pg/mg, methylprednisone 1155.8 and dexamethasone 29.3 pg/mg. Non-racing camels were also found with dexamethasone in the range 7.5-59.3 pg/mg, methylprednisolone in the range 5-66.25 pg/mg and flumethasone 0.7-1034 pg/mg. The concentrations of glucocorticoids found non-racing camel hair samples are shown in Table 4.

Table 4. shows the amount of glucocorticoids found in camel hair

Camel ID	Dexamethasone	Flumethasone	Hydrocortisone	Methyl prednisolone
	pg/mg	pg/mg	pg/mg	pg/mg
Camel 1	7.5	7.0	35.3	10.7
Camel 2	27.4	25.9	30.7	34.1
Camel 3	12.7	11.0	20.4	14.2
Camel 5	11.2	11.1	38.7	12.7
Camel 7	11.3	9.2	27.5	9
Camel 8	4.6	4.1	935.3	5
Camel 9	13948.9	14012.5	16406.1	13606.3
Camel 10	12.7	11.5	16.2	11.4
Camel 12	59.3	57.4	122.5	66.2
Camel 19	18.1	21.2	44.1	22.2
Camel 23	-	-	31.7	-
Camel 24	-	-	5.3	-
Camel 28	13.3	1034.8	-	-
Camel 29	29.3	2575.5	1130.1	1155.8
Camel 31	-	0.7	-	-

The newly developed and validated method could have far reaching impact in further studies of corticosteroids in camels. The proposed method might be applied to other human and animal hair samples as well in future studies for accurate quantitation of corticosteroids. This new method will also be instrumental in any future drug studies to control doping in racing camels.

3.27 Additional Suggested Points for Discussion (Post-laboratory)

Why is Hair analysis in doping application important? (All students)

Why hair analysis is preferred over blood and urine analysis? (Student 1)

How hair test is complementary technique to blood and urine analysis? (Student 2).

How the segmental analysis in hair important? (Student 3).

Lastly, what other glucocorticoids could be beneficial for doping test? (Student 4).

4. Student Survey

During the course of the laboratory sessions, it was obvious that the students remained engaged throughout the whole time, seemed to enjoy the experimental part, and participated actively in the data comparison and discussions at the end of the laboratory sessions. However, to gain a more quantitative assessment, an anonymous student survey was carried out using SurveyMonkey.com website. The result of the survey, as shown in Table 5, was very positive and seemed to indicate that the vast majority of the students enjoyed the laboratory session and found it a very useful experience. Furthermore, we were pleased to receive the feedback that the two main objectives of the laboratory were achieved: the students felt that after the laboratory they had a better awareness of issues related to doping in sports and a better appreciation of how chemistry can be applied to solve real life doping issues. As further evidence that such "applied" technology laboratories strongly resonate with chemistry students, when asked if they would like to see more such examples of how chemistry can solve real-life problems, all the students unanimously indicated "strongly agree or agree." Hence, we strongly believe that incorporating such laboratory experiments in chemistry curricula will be most beneficial to undergraduate chemistry students.

Table 5. Results from the student survey carried out anonymously after the laboratory session. Students' responses to a few selected questions (anonymous survey, n = 4).

	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	N = 4 respondents					
1	I found this unit very useful	54%	42%	4%	0%	0%
2	The unit taught me new and valuable skills	23%	50%	27%	0%	0%
3	This unit made me more aware of issues related to doping issues	65%	23%	12%	0%	0%
4	I already knew most of the content presented	19%	23%	35%	23%	0%
5	I think this unit (this new information) will help me with my other classes	23%	58%	19%	0%	0%
6	The unit was too much work and took too much time	8%	4%	15%	42%	31%
7	I have a better appreciation of how Chemistry can be applied to "real life" doping problems	54%	42%	4%	0%	0%
8	It was not a very interesting or useful unit and was a waste of my time	0%	0%	0%	35%	65%
9	I enjoyed this unit and was glad that we took it in this class	69%	27%	0%	4%	0%
10	It will be nice to have more examples of how "chemistry can solve real-life problems"	85%	15%	0%	0%	

5. Conclusions

The newly developed and validated method for the determination of corticosteroids in camel hair is rapid (11 min), sensitive, specific, reproducible and robust, and very sensitive. It utilizes pentane a less toxic solvent for extraction. Due to the very small variability and high reproducibility this method has been proved to be suitable for use in further doping studies in animals especially camels, which also demonstrates the possible adequacy of this assay for clinical studies in animal's health and disease. The new hair test is a new ground breaking innovation to add in camel's blood and urine tests already in place for camel's health and disease. This new test will complement blood and urine test and provide a longer window of detection for corticosteroids in camel health and disease and doping control in camel racing around the world.

Graduating Chemistry students should not only be trained in the technical aspects of the discipline, but also be well-versed in current global issues of doping in sports and doping control. The experiment presented here offers a unique opportunity to expose chemistry students to critical doping problem and to showcase the applicability of chemistry to help solve real-life problems. In addition to raising awareness among students and highlighting applied biochemistry, various parameters that can directly affect hair analysis were studied and discussed. Furthermore, the inquiry-based and critical-thinking nature of the experiments ensures that students learn on their own the various validation parameters that can affect validation processes. Based on personal experience and student feedback, it is believed that such experiments can be an engaging and interactive way to achieve the aforementioned educational objectives.
The authors graciously acknowledge the generous funding from United Arab Emirates University (UAEU) to Iltaf Shah. UAEU Start Up Research Funding Grant #31S213.We are also thankful to Dr Salah Gariballa for providing samples for this study.

6. Acknowledgements

The authors graciously acknowledge the generous funding from United Arab Emirates University (UAEU) to Iltaf Shah. UAEU Start Up Research Funding Grant #31S213.

7. References

[1] R.I. Wood, Anabolic–androgenic steroid dependence? Insights from animals and humans, Frontiers in neuroendocrinology 29(4) (2008) 490-506.
[2] R.I. Holt, I. Erotokritou-Mulligan, P.H. Sönksen, The history of doping and growth hormone abuse in sport, Growth Hormone & IGF Research 19(4) (2009) 320-326.
[3] J. van Amsterdam, A. Opperhuizen, F. Hartgens, Adverse health effects of anabolic–androgenic steroids, Regulatory Toxicology and Pharmacology 57(1) (2010) 117-123.

[4] A.M. Kindlundh, D.G. Isacson, L. Berglund, F. Nyberg, Doping among high school students in Uppsala, Sweden: A presentation of the attitudes, distribution, side effects, and extent of use, Scandinavian journal of social medicine 26(1) (1998) 71-74.
[5] C.E. Yesalis, M.S. Bahrke, Doping among adolescent athletes, Best Practice & Research Clinical Endocrinology & Metabolism 14(1) (2000) 25-35.
[6] A. Kindlundh, D.G. Isacson, L. Berglund, F. Nyberg, Factors associated with adolescent use of doping agents: anabolic-androgenic steroids, Addiction 94(4) (1999) 543-553.
[7] S.S. Ashraf, S.A. Marzouk, I.A. Shehadi, B.M. Murphy, An integrated professional and transferable skills course for undergraduate chemistry students, Journal of Chemical Education 88(1) (2010) 44-48.
[8] V.K. Tucci, A.R. O'Connor, L.M. Bradley, A three-year chemistry seminar program focusing on career development skills, Journal of Chemical Education 91(12) (2014) 2071-2077.
[9] W. Kerr, R. Murray, B. Moore, D. Nonhebel, An integrated communication skills package for undergraduate chemists, J. Chem. Educ 77(2) (2000) 191.
[10] S. Khalaf, Poetics and politics of newly invented traditions in the Gulf: Camel racing in the United Arab Emirates, Ethnology (2000) 243-261.
[11] S. Khalaf, Camel racing in the Gulf. Notes on the evolution of a traditional cultural sport, Anthropos (1999) 85-106.
[12] R. Calfee, P. Fadale, Popular ergogenic drugs and supplements in young athletes, Pediatrics 117(3) (2006) e577-e589.
[13] M. Duclos, Evidence on ergogenic action of glucocorticoids as a doping agent risk, The Physician and sportsmedicine 38(3) (2010) 121-127.
[14] N. De Clercq, J. Vanden Bussche, S. Croubels, P. Delahaut, L. Vanhaecke, Plackett-Burman design as a tool to develop a generic extraction for U-HPLC-Orbitrap-MS analysis of glucocorticoids in livestock urine, 14th International symposium on Advances in Extraction Technologies (ExTech 2012), 2012.
[15] N. Al Katheeri, I. Wasfi, M. Lambert, A.G. Albo, C. Nebbia, In vivo and in vitro metabolism of dexamethasone in the camel, The Veterinary Journal 172(3) (2006) 532-543.
[16] I. Wasfi, On the Pharmacokinetics/Pharmacodynamics, Detection Time and Metabolism of Drugs in Racing Camels: 17 Years of Experience, Keynote Presentations 32.
[17] N. Al Katheeri, I. Wasfi, M. Lambert, A. Saeed, Pharmacokinetics and pharmacodynamics of dexamethasone after intravenous administration in camels: effect of dose, Veterinary research communications 28(6) (2004) 525-542.
[18] R. Gow, S. Thomson, M. Rieder, S. Van Uum, G. Koren, An assessment of cortisol analysis in hair and its clinical applications, Forensic science international 196(1) (2010) 32-37.
[19] M.D. Davenport, S. Tiefenbacher, C.K. Lutz, M.A. Novak, J.S. Meyer, Analysis of endogenous cortisol concentrations in the hair of rhesus macaques, General and comparative endocrinology 147(3) (2006) 255-261.
[20] P. Kintz, M. Villain, V. Cirimele, Hair analysis for drug detection, Therapeutic drug monitoring 28(3) (2006) 442-446.

[21] N. Deshmukh, I. Hussain, J. Barker, A. Petroczi, D.P. Naughton, Analysis of anabolic steroids in human hair using LC–MS/MS, Steroids 75(10) (2010) 710-714.
[22] D. Cameron, T. Epton, P. Norman, P. Sheeran, P.R. Harris, T.L. Webb, S.A. Julious, A. Brennan, C. Thomas, A. Petroczi, A theory-based online health behaviour intervention for new university students (U@ Uni: LifeGuide): results from a repeat randomized controlled trial, Trials 16(1) (2015) 555.
[23] T. Epton, P. Norman, A.-S. Dadzie, P.R. Harris, T.L. Webb, P. Sheeran, S.A. Julious, F. Ciravegna, A. Brennan, P.S. Meier, A theory-based online health behaviour intervention for new university students (U@ Uni): results from a randomised controlled trial, BMC public health 14(1) (2014) 563.
[24] A. Petróczi, J.A.V. Ocampo, I. Shah, C. Jenkinson, R. New, R.A. James, G. Taylor, D.P. Naughton, Russian roulette with unlicensed fat-burner drug 2, 4-dinitrophenol (DNP): evidence from a multidisciplinary study of the internet, bodybuilding supplements and DNP users, Substance abuse treatment, prevention, and policy 10(1) (2015) 39.
[25] I. Shah, A. Petroczi, M. Uvacsek, M. Ránky, D.P. Naughton, Hair-based rapid analyses for multiple drugs in forensics and doping: application of dynamic multiple reaction monitoring with LC-MS/MS, Chemistry Central Journal 8(1) (2014) 73.
[26] E. Aidman, A. Petroczi, I. Hussain, N. Deshmukh, T. Nepusz, M. Uvacsek, M. Toth, J. Barker, D. Naughton, Beyond self-report in doping: Validating declared substance use in sport with hair sample analysis, Journal of Science and Medicine in Sport 13 (2010) e19-e20.
[27] K.V. Mills, Biochemistry in an undergraduate writing-intensive first-year program: Seminar courses in drugs and bioethics, Biochemistry and Molecular Biology Education 43(4) (2015) 263-272.
[28] J.-S. Raul, V. Cirimele, B. Ludes, P. Kintz, Detection of physiological concentrations of cortisol and cortisone in human hair, Clinical Biochemistry 37(12) (2004) 1105-1111.
[29] B. Sauvé, G. Koren, G. Walsh, S. Tokmakejian, S.H. Van Uum, Measurement of cortisol in human hair as a biomarker of systemic exposure, Clinical & Investigative Medicine 30(5) (2007) 183-191.
[30] Y.N. Majchrzak, G.F. Mastromonaco, W. Korver, G. Burness, Use of salivary cortisol to evaluate the influence of rides in dromedary camels, General and comparative endocrinology 211 (2015) 123-130.
[31] H. Mohamed, Factors affecting cortisol status in camels (Camelus dromedarius), Journal of Animal and Veterinary Advances 5(4) (2006) 307-309.
[32] G. Berlyne, R. Shainkin-Kestenbaum, S. Shany, J. Finberg, R. Yagil, Renal physiology of the dromedary camel, The Japanese Journal of Nephrology 20(9) (1978) 1015-1021.
[33] N. Kataria, A. Kataria, Use of blood analytes in assessment of stress due to drought in camel, Journal of camel practice and research 11(2) (2004) 129-133.
[34] E. Elias, S. Weil, Serum cortisol levels in camels (Camelus dromedarius) during the reproductive cycle, Comparative Biochemistry and Physiology Part A: Physiology 94(4) (1989) 787-790.
[35] O.-E. Sid-Ahmed, A. Sanhouri, B.-E. Elwaseela, I. Fadllalah, G.-E.E. Mohammed, E. Möstl, Assessment of adrenocortical activity by non-invasive measurement of faecal cortisol metabolites in dromedary camels (Camelus dromedarius), Tropical animal health and production 45(6) (2013) 1453-1458.
[36] M.H. Evans, Understanding drugs: A new interdisciplinary course, J. Chem. Educ 61(8) (1984) 671.

[37] S.K. Lunsford, W. Slattery, An interactive environmental science course for education science majors, J. Chem. Educ 83(2) (2006) 233.
[38] D. Lokken, The determination of alcohol content of beer: A general and analytical experiment with high student interest value, J. Chem. Educ 52(5) (1975) 329.
[39] R.L. Bell, L. Smetana, I. Binns, Simplifying inquiry instruction, The Science Teacher 72(7) (2005) 30.
[40] I. Shah, A. Petroczi, M. Uvacsek, M. Ránky, D.P. Naughton, Hair-based rapid analyses for multiple drugs in forensics and doping: application of dynamic multiple reaction monitoring with LC-MS/MS, Chemistry Central Journal 1(8) (2014) 1-10.
[41] T. Stalder, C. Kirschbaum, Analysis of cortisol in hair–state of the art and future directions, Brain, behavior, and immunity 26(7) (2012) 1019-1029.
[42] H.M. Bryan, A.G. Adams, R.M. Invik, K.E. Wynne-Edwards, J.E. Smits, Hair as a meaningful measure of baseline cortisol levels over time in dogs, Journal of the American Association for Laboratory Animal Science 52(2) (2013) 189-196.
[43] E. Russell, G. Koren, M. Rieder, S. Van Uum, Hair cortisol as a biological marker of chronic stress: current status, future directions and unanswered questions, Psychoneuroendocrinology 37(5) (2012) 589-601.
[44] N.H. Fourie, R.M. Bernstein, Hair cortisol levels track phylogenetic and age related differences in hypothalamic–pituitary–adrenal (HPA) axis activity in non-human primates, General and comparative endocrinology 174(2) (2011) 150-155.
[45] T.Ø. Bechshøft, C. Sonne, R. Dietz, E.W. Born, M.A. Novak, E. Henchey, J.S. Meyer, Cortisol levels in hair of East Greenland polar bears, Science of the Total Environment 409(4) (2011) 831-834.

Methodology of power analysis in Michel Foucault's thought

Humberto Ribeiro Junior
Full Professor
Master Program in Public Security, Vila Velha University (UVV),
Espírito Santo, Brazil.

Rayane Marinho Rosa
Mster Program in Social Sciences, Federal University of Espírito Santo (UFES),
Espírito Santo, Brazil.

Heitor Brandão Dorneles Junior
Master Program in Public Security, Vila Velha University (UVV),
Espírito Santo, Brazil.

Abstract

This work seeks to reconstruct Michel Foucault's power analysis methodology in order to understand how he overcomes the classical theories of power by proposing a way of seeing power as a relation that occurs between subjects. In order to do so, the relations between truth and power will be analyzed, as well as the methodological premises elaborated by the author in his main works on power.

Keywords: truth; power; subject; method.

1. Introduction

This article has as main objective to identify the conceptual and methodological bases from which Michel Foucault constructs his analytic of power. Thus, the intention was to verify to what extent the Foucauldian power analysis methodology can serve as a basis for contemporary studies on the institutional mechanisms of intervention on the life of individuals and the population.

Therefore, in order to understand how Foucault overcame the classical theories of power, notably the contractualist theory of sovereignty, it will be necessary to follow three steps: 1) demonstrate how the author reconstructs the classical theories of the subject and especially the theories of the truth; 2) investigate how these notions of power and truth influence and articulate with Foucauldian research on power; 3) explore the way in which his power analysis methodology was developed.

So, in the first place, we will seek to understand how the author redefined his own reflection on the subject and the truth from a conception according to which knowledge has no nature or essence, but is the result, the effect, of struggles, of social forces and of power games historically situated. In sum, we will try to understand how he breaks with universalist and essentialist conceptions on behalf of a perspectivist and historicist view.

From this, the intention was to investigate if and how this conception of subject and truth overflowed for the analyzes of power undertaken by Foucault and how he reunites the dimensions of truth and power. Therefore, there will be an attempt to evaluate to what extent the author builds a critique of modern and contemporary political philosophy, woven from the elements of the medieval monarchies - and the end of them - and for what reasons his proposal is more adequate to think about the challenges imposed by contemporary power practices.

Lastly, it will be sought to minimally systematize what Foucault established throughout his work as *indications, premises or methodological precautions* for the power analysis, which allow to account for this new dynamic perceived by him.

2. Truth and power in Michel Foucault's thinking

For some interpreters of Michel Foucault's thinking (MACHADO, 2007), the question of power is not, at least not explicitly, the oldest challenge formulated by him. The problem that would have guided his studies for nearly a decade after the publication of his doctoral thesis *History of Madness in the Classical Age* were the processes of truth formation.

In this sense, Lechuga-Solís (2007: 64) asserts that

> As a whole, Foucault's work can be considered a *philosophy of truth* which is characterized by showing that this is not a universal proposition valid for every moment and every place, but that each society has its own *general policy* on it.[1] (our emphasis)

In fact, in working with the problem of truth, Foucault profoundly innovated the approach of the predominant philosophy in France of his time. He attempted to go beyond the framework of Kant's transcendental philosophy and the notion of the Marxism ideology, as well as various premises of Platonism, to think the truth as "the set of procedures that allow each moment and each one to utter statements that will be considered true" (FOUCAULT, 2006: 233).

In other words, this author sought to redefine his own reflection on truth. Therefore, his concern was not to discover *what was* or *which was* the truth, nor which would be the possibility conditions of the subject's knowledge, but *how* and *under what conditons* a given discourse was elevated to the status of truth.

In order to do so, Foucault refers to Nietzsche, because he finds in him precisely "a type of discourse in which the historical analysis of the subject's own formation is made, the historical analysis of the birth of a certain type of knowledge, without ever admitting the preexistence of a subject of knowledge" (FOUCAULT, 2003: 13).

This means that knowledge itself, knowledge as such, is not natural, is not something given to human beings in a *priori* manner either for its reason, or by a metaphysical entity - or even by the two concomitantly. Knowledge is produced within a concrete history, by concrete subjects, who have passions, instincts, interests, etc.

However, from the 1970s, on the one hand, with the maturation of the debates surrounding the processes of truth formation and, on the other hand, with the fact that it has approached other objects of research, Foucault advanced in his investigations in the sense of demonstrating that these discursive practices are, above all, strategic relations of struggle and power. In short, after Nietzsche, Foucault realizes that the

relation between *knowledge and things to know* is arbitrary, of force, of violence, and not a peaceful and naturally established relation.

In this way, this could be considered as a major turnaround in the studies on power. The main innovation lies in the way he related these two themes, truth and power, not only as autonomous instances that complement or influence each other,[2] but from their immanent interfaces, from the way one produces and is produced by the other. The author states:

---

[1] "En su conjunto, la obra de Foucault puede ser considerada como una filosofía de la verdad que se caracteriza por mostrar que ésta no es una proposición universal válida para todo momento y todo lugar, sino que cada sociedad tiene su propia política general al respecto" (LECHUGA-SOLÍS, 2007: 64).

[2] In a simplified way, this would be the case with Marxism. Power and truth are related as autonomous institutions: the ruling class (power) uses the ideological processes to mask the truth, with power being on one side and truth on the other.

> We should admit rather that power produces knowledge (and not simply by encouraging it because it serves power or by applying it because it is useful); that power and knowledge directly imply one another; that there is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations. These "power-knowledge" relations are to be analyzed, therefore, not on the basis of a subject of knowledge who is or is not free in relation to the power system, but, on the contrary, the subject who knows, the objects to be known and the modalities of knowledge must be regarded as so many effects of these fundamental implications of power-knowledge and their historical transformations. In short, it is not the activity of the subject of knowledge that produces a corpus of knowledge, useful or resistant to power, but power-knowledge, the processes and struggles that traverse it and of which it is made up, that determines the forms and possible domains of knowledge (FOUCAULT, 2002: 27).

It is important to realize in this way, that the fluidity he gave to the notion of truth - from the idea that there is not *a truth*, but *relations of truth*, *processes of truth production* - ends up overflowing to his notion of power. That is, power could not be seen as something fixed, unitary, global, or concentrated in some instance as the state. If there are *truth relations*, there are also *power relations*.

In short, for Foucault, there is no such a thing as *the power*. Power is not something that one holds, it is not a property, something that some owns to the detriment of others distanced from it. What exist are practices, mechanisms, technologies, strategies, power relations diffusely exercised within the most different social relations (MACHADO, 2007).

For this philosopher, thinking power would be thinking of the various power relations that exist, for example, between men and women, parents and children, teachers and students, doctors and patients. Moreover, it would be to think that in each of these thousands (micro)relations there are confrontations, combats, opposition of forces, struggles and resistance. They are not peaceful or pre-defined relations (FOUCAULT, 2006: 231).

But as Foucault turns his eyes on this microscopic capillary perspective, or rather, on this microphysics of power, he withdraws from the state or state apparatuses its absolute monopoly. He does not believe that

these power relations have been absorbed, confiscated, or oriented by the state power.

One cannot deny that there is a State and that it also exercises a power. However, this is a type of power relation among several that are transversally crossed and that mutually influence one another. According to Foucault,

> If it is true that these small power relations are often commanded, induced from above by the great powers of the state or by the great class dominations, it must be said that, inversely, a class domination or a state structure can only function if there are, on the base, these small power relations (2002: 231).

Much less could one follow the procedures of traditional political theory, which centered its studies of power in the state. For Foucault, besides it being not the absolute source of all social power, the exercise of its power depends not only on legislations or the Law, but on a series of infinitesimal mechanisms linked to the production of knowledge, for example, on crime, disease, madness, etc. (MACHADO, 2007).

However, above all, Foucault was a critic of the approach from which the traditional theories of power – among which can be inserted from legal theories of medieval monarchies to liberal contractualism - explored its object. Normally they speak of law, legislation, legitimacy, limits and origins of power, while for him it was important to analyze the techniques, mechanisms, strategies that organize the way that power dominates and makes one obey (FOUCAULT, 2006: 267).

Thus, Foucault's proposal, as he explains in the first volume of the *History of Sexuality*, is to produce not a *theory*, but an *analytic of power* aimed at "a definition of the specific domain formed by the relations of power and the determination of the instruments which allow us to analyze it" (FOUCAULT, 2009: 92).

That would mean abandoning traditional representations of power. His purpose, therefore, is to construct an analytic of power that concentrates neither on the law nor on its capacity for interdiction. These are not the only forms of exercising power, not even the most important ones, one must go beyond the classical model of sovereignty.

On the other hand, the Marxist answer also did not prove sufficient to subsidize an analytic that could understand this multiple object that is power. He would question precisely how this Marxism understood power always in a secondary position in relation to the economy. To the extent that, in this perspective, the role of power would be to maintain relations of production and class domination, and its only historical reason for existence would be economy itself.

However, Foucault understood that even though power relations are extremely linked to economic relations, it would not be possible to defend the existence of a direct and unequivocal subordination of power to the economy, not even that all power relations are based on economic relations. Not all power comes from economics and not all domination is of class.

Hence, the analytic of Foucauldian power could not depend neither on the structure of traditional theories of power nor on the Marxist criticism. He would thus initiate the development of his own methodology, which would be better suited to the understanding of this *microphysics of power*.

3. Power Analysis Methodology

In an interview given in 1977, Foucault makes clear his view of the method. He claims:

> I do not have a method that would apply, in the same way, to different domains. On the contrary, I would say that it is the same field of objects, *a domain of objects that I seek to isolate, using instruments found or forged by me, at the exact moment I do my research,* but without privileging the problem of method in any way. In this sense too, I am by no means some structuralist. Since the structuralists of the 1950s and 1960s were essentially aimed at defining a method that would be universally valid for a whole series of different objects: language, literary speeches, reports, iconography, architecture... This is not absolutely my problem: I try to make this kind of layer, I would say this interface, as modern technicians say, the interface of knowledge and power, truth and power. That's it. That's my problem. (FOUCAULT, 2006: 229)

With regard to his analytic of power, that is precisely what happened. Foucault did not propose a research methodology so he could, from there, investigate its object. His method of analyzing power emerged, between comings and goings, from the ramifications of his researches that revolved around *Discipline and Punish*.

In this work he sought to make a genealogy of modern punitive power, especially the figure of the prison sentence, which had taken the place of torture as a general form of punishment, the main type of punishment of criminal law.

It turns out that the research ended up demonstrating that the prison sentence was not a specialized structure within a branch of the law, but part of a new power technology that was consolidated in modern societies and that Foucault would call *disciplinary power*.

In this way, prison was inscribed in a broader framework of institutions aimed at the normalization of individuals, the creation of *docile bodies,* and which therefore acted no longer on the body, as was the case with medieval tortures, but on the soul of those subjected to their networks of power.

In short, the research that began having as one of the main objects the prison sentence, now realized to be impossible to understand it disconnected from all other existing mechanisms of power, even outside the scope of criminal justice.

Therefore, using Deleuze's words (2005: 50), Foucault had to "invent a new conception of power". Or perhaps, lined up with what he said in the passage that opens this topic, the needs of his object made it necessary to forge new instruments of analysis. After all, it was not possible to account for this new conception of power by using the tools offered by traditional theories, even those elaborated after the decline of feudalism - whether it was contractualism or Marxist criticism.

For this reason, in the face of the fact that his instruments of analysis were being constructed as he deepened his research on power, Foucault did not come to systematize a definitive method for this. However, at different moments in his work he alerted us to what he would sometimes treat as *prescriptions of prudence*, sometimes as *questions of method*, or as *methodological postulates of analysis of power*.

The main texts in which the author constructs, reinforces and lapidates some methodological indications that become essential for the construction of an analytic of power are: *Discipline and Punish* (2002); *Society must be defended* (2005); *The History of Sexuality, v. 1, An Introduction* (2009); and *Security, Territory, Population* (2008). However, it is not possible to leave aside Gilles Deleuze's detailed

analysis of Foucault's (2005) work for a discussion on this topic.
So, although it has never seemed to be the intention of the author to systematically list them, this research covered the work of Foucault with the objective of recovering and systematizing these main precautions of method exposed by him as fundamental to proceed to an analytical of the power. From this work, nine postulates were found (some with derived propositions) more recurrent in his texts about the power, which we will list next:

1) Power should not be analyzed at the level of intention or decision
Power relations are both intentional and non-subjective at the same time. Although there is an instance that applies them, this does not mean that they result from a rational choice or decision of a subject, or from a government or an economic elite. This intention appears as real and effective practices of power and, to that extent, does not depend on a subject or group (FOUCAULT, 2009: 105).

2) One should not regard power as a phenomenon of mass and homogeneous domination
Power is not constituted as an essence or attribute subject to being acquired or appropriated by qualifying some (dominant) to the detriment of others (dominated), because for the philosopher one must understand power as a relation, a series of force correlations that, through struggles and clashes, is changing and can be embodied in the state apparatus, legislation and social hegemony. In short, power transits through individuals, it traverses them, and thus, depending on the relation that is established, people may be in a position to be submitted to that power, but also in position to exercise it (FOUCAULT, 2005: 32-35).
An important proposition deriving from this postulate is that *power is not owned by a class or by anyone.* It is a strategy and its effects are attributed to maneuvers, tactics, techniques, operations. This does not mean there is a denial of the existence of classes and their struggles, but there is an extension of this perspective to a scenario in which it is possible to perceive that amongst great conflicts there are innumerable points of confrontation, struggle, and possibility, at least transitory, of inversion of the forces game.

3) *Power should be analyzed at its extremities*
Research on power cannot focus on its regulated and legitimate forms, regulations, and laws. Power must be analyzed precisely where it becomes capillary, at its extremities, where, going beyond rules, it consolidates itself in techniques, it is invested in institutions and provides instruments for material intervention - even violent ones (Foucault, 2005).
In fact, as Foucault did in *Discipline and Punish* (2002), it is not a matter of seeking to establish the grounds of the power to punish, where its legitimacy comes from, but to perceive how punishment is consolidated in a set of local and material institutions, and how it is exercised in all its expression.

4) *Not perceiving power as a deduction from the center to the periphery (or from top to bottom)*
According to Foucault, there is no global matrix that reverberates from top to bottom on more and more restricted groups or increasingly peripheral instances. The point would be to make an ascending analysis

of power, from its infinitesimal mechanisms to the more general forms of global domination, trying to understand how the former are annexed by the latter. In his words:

> I think we have to analyze the way in which the phenomena, techniques, and procedures of power come into play at the lowest levels; we have to show, obviously, how these procedures are displaced, extended, and modified and, above all, how they are invested or annexed by global phenomena, and how more general powers or economic benefits can slip into the play of these technologies of power, which are at once relatively autonomous and infinitesimal (FOUCAULT, 2005: 36).

By that, the author is clearly trying to avoid the Marxist hypothesis that it would be possible to deduce all relations of power from the general phenomenon of domination of the bourgeois class. For him, the key would be to think how, historically and from below, the mechanisms of repression, exclusion, punishment, of power in general, became, in a given moment, in a precise conjuncture, politically useful or economically profitable and, therefore, absorbed or incorporated by a particular political group or social class.

Therefore, *(4.1) power is not subordinated to any mode of economic production or infrastructure*, even though this does not mean that there is no relation between the mechanisms of power and the economic instances. These relations can be established according to the utility or profit that certain mechanisms of power may represent, without, however, having a prior subordination or connection between one and the other. (DELEUZE, 2005)

5) *The power is exercised from the formation of knowledge devices*

One of the crucial elements for the analytic of power is the fact that it is directly connected to the truth. Multiple relations of power permeate, cross, constitute the social body, but are not capable of dissociating from or functioning without a formation and circulation of truthful discourse. We are submitted by power to the production of truth and we only exercise power through the production of truth (FOUCAULT, 2005: 28).

However, Foucault insists that the relations between truth and power cannot be confused with an ideological dimension, or rather with the power being exercised by the ruling class through ideology. For the author, the ideology is always in opposition to something that would be the truth, it hides the truth. That means to say there is somewhere an absolute, transcendental truth that we can unmask as soon as we overcome the ideological processes, something that Foucault profoundly disagrees with. In this way, power is not exercised through ideology, insofar as it does not abstract or conceals truth, but it *produces* truth and is sustained by it (FOUCAULT, 2007: 07).

6) *Power is not grounded in itself*

Power is not autonomous, nor is it autogenetic, it is not grounded in itself, it does not exist alone. This means there is no way to separate power relations from other relationships, such as production or family relationships. The mechanisms of power are the intrinsic part of all these relationships, they are concomitantly their effect and their cause. For this reason, for example, there are no relations of power *plus* production relations, just as there are no production relations without power relations (DELEUZE, 2005:

42). Power relations are not in a position of exteriority with respect to other kinds of relationships, but they are immanent to them.

7) *Power is omnipresent*

Power is everywhere, not because it encompasses everything, but because it comes from everywhere (FOUCAULT, 2009: 103). Power relations are plural, multiple, and scattered throughout social relations. In this sense it is wrong, for example, to think of power as located only in the state apparatus, just as it is wrong to think that private powers are or are influenced by the power of the state. In fact, the state appears as an "overall effect or result of a series of interacting wheels or structures which are located at a completely different level, and which constitute a "microphysics of power" (Deleuze, 2005: 42).

However, this does not mean that there are no power relations that occur from the state or within certain global strategies. Although power is diffuse, according to Foucault, *double conditioning* prevails over it: no local power mechanism could function if, through a series of successive sequences, it did not eventually enter into an overall strategy; at the same time, no overall power strategy would produce effects if it were not supported and fixed in precise and localized power relations (Foucault, 2009: 110). In short, "power is local since it is not global, but it is not local or localizable since it is diffuse" (DELEUZE, 2005: 43).

8) *Where there is power there is resistance*

It is not because power manifests itself in a sparse and capillary way that we would always be subjected to it, in a necessarily inevitable and inescapable way. An important feature of power relations is that resistance points exist throughout their network, and the very functioning of power involves the production of resistance (FOUCAULT, 2009).

It should be clear, however, that this does not mean that resistances are a byproduct of power relations, something like a passive reverse bound to infinite defeat and submission. They present themselves as *the other* power, their irreducible interlocutor, always present and, therefore, interior to the relations of power. Therefore, the mechanisms of power must always be understood from this correlation of forces between *powers-resistances*.

9) *One must perceive power in the tactical polyvalence of speeches*

It is in discourse that power and knowledge are articulated, and precisely for this reason one must conceive discourse as a series of multiple and discontinuous segments without a uniform or stable tactical function. There is no discourse of power, on the one hand, and a counter discourse, on the other. "Discourses are tactical elements or blocks operating in the field of force relations; there can exist different and even contradictory discourses within the same strategy; they can, on the contrary, circulate without changing their form from one strategy to another, opposing strategy" (FOUCAULT, 2009: 112-113).

For this reason, a single discourse, with the same form, can serve different (even opposing) strategies, without this homogeneity being verified. That is, the same discourse can both support processes of production of truth, as it can be, on the contrary, a critical instrument within this tactical polyvalence.

It is worth mentioning that, for Foucault, the analytic of power should not serve to produce imperative

discourses in the sense of fighting this or that. At most, it perceives some key points, some force lines, some locks and blocks within the real force fields of the power dynamics, that is, the points at which the struggle may be most tactically effective. However, always recognizing that this can only be done gradually and within concrete historical situations, never in abstract (FOUCAULT, 2008).

In this way, following the nine assumptions listed from the Foucauldian works on power, the aim was to outline his investigative tools that were being constructed insofar as he focused on the research of an analytic of power. By moving away from the traditional representations of power, Foucault made possible the development of a methodology that was deeply innovative. Not a theoretical, abstract, and universal foundation that could be as misguided as those he had so severely criticized, but a proposal for new methodological foundations and new instruments that could help us understand the historical and localized practices of power.

4. Conclusion

In this article, we sought to identify and systematize the conceptual and methodological bases from which Michel Foucault organized his analysis of power. Starting from the way he interprets the production of truth as a relation of dispute, we reached the way the author thinks power equally as a relational process. From there, it was analyzed how the traditional methods of interpreting power, whether it was contractualism or Marxism, did not prove sufficient to understand the multiple ways from which power relations are established.

Although Foucault had clearly pointed out that he did not intend to establish a method that could be equally applied to different domains, within the construction of his methodological procedures of power analysis, it was possible to enumerate some postulates that were constructed at the time of the development of his research, and perceived from the demands that his object of study imposed.

Therefore, this research sought to systematize the methodological indications developed by Foucault in his works on power. We came to nine postulates that prove to be essential to sustain critical analyzes of power even today.

Being faithful to the author, one cannot try to universalize this methodological perspective at the risk of incurring an insoluble contradiction. It is important to understand that it presents itself as a starting point for investigations concerning the forms and devices of power exercise, based on a multiple, heterogeneous and decentralized dynamic, even in the conditions presented by contemporaneity.

5. Acknowledgement

The research was financed by *Coordenação de Aperfeiçoamento de Ensino Superior – CAPES* and by *Universidade Vila Velha* (UVV).

6. References

DELEUZE, Gilles. Foucault, Edições 70, Lisboa, 2005. (DELEUZE, Gilles. Foucault, The Athlone Press, 1988)

FOUCAULT, Michel. A verdade e as formas jurídicas, NAU Editora, Rio de Janeiro, 2003. (Truth and juridical forms In: Foucault, Power, ed. James D. Faubion, New Press, New York, 2000).

FOUCAULT, Michel. Em defesa da sociedade, Martins Fontes, São Paulo, 2005. ("Society must be defended", Picador, New York, 2003).

FOUCAULT, Michel. História da Loucura na Idade Clássica, Perspectiva, São Paulo, 2007. (Madness and Civilization: A history of insanity in the age of reason, Vintage Books, New York, 1988).

FOUCAULT, Michel. História da Sexualidade I: a vontade de saber, Edições Graal, Rio de Janeiro, 2009. (The History of Sexuality, v. 1, An Introduction**,** Vintage Books, New York, 1990).

FOUCAULT, Michel. Poder e saber. In: Estratégia, poder-saber. Ditos e escritos IV, Forense universitária, Rio de Janeiro, 2006. (Pouvoir et savoir, "Kenryoku to chi: entretien avec S. Hasumi engistré à Paris le octobre 1977", Dits et Écrits II, Éditions Gallimard, Paris, 2001)

FOUCAULT, Michel. Segurança, território, população, Martins Fontes, São Paulo, 2008. (Security, Territory, Population, Picador, New York, 2007).

FOUCAULT, Michel. Vigiar e punir, Vozes, Petrópolis, 2002. (Discipline & Punish: The Birth of the Prison, Vintage Books, New York, 1995).

LECHUGA-SOLÍS, Graciela. Breve introducción al pensamiento de Michel Foucault, Universidad Autónoma Metropolitana, Cidade do México, 2007.

MACHADO, Roberto. Introdução: por uma genealogia do poder. In: FOUCAULT, Michel. Microfísica do poder, Edições Graal, Rio de Janeiro, 2007.

Team Based Learning: An Innovative Teaching Strategy for Enhancing Students' Engagement

Ibrahim Abd El Latif Ibrahim, Wafaa Fathi Sleem
Nursing Administration, faculty of Nursing,
Mansoura University, Egypt.

Abstract

Background: *Team based learning is a strategy that combines features of student-centeredness and problem solving attributes. It also enhances students' engagement which achieve desired outcomes such as retention; academic achievement and improved critical thinking.* ***Aim****: The present study aimed to investigate the effect of implementing team based learning on students' engagement in nursing administration course.*

Subjects and Methods*: A quasi experimental design was used. The study sample included 251 students who were studied nursing administration course during the first term of academic year 2015/2016, they were divided into two groups: experimental group (n=128) and control group (n=123). Data was collected by using four tools: Team based learning knowledge questionnaire, Readiness Assurance Test for Team based learning, Students' engagement questionnaire, Preference between team based learning and traditional learning questionnaire.*

Results: *There was highly statistically significant difference between experimental and control groups regarding academic challenges, active and collaborative learning, students - staff interactions and total students' engagement domains .there was no statistically significant difference between experimental and control groups regarding enriching educational experiences and supportive learning environment domains. The majority students of experimental group preferred team based learning more than traditional learning.*

Conclusion*: Implementing team-based learning method in nursing administration course enhances students' engagement, especially academic challenges, active and collaborative, student-staff interactions domains. The majority of the students were preferred team based learning method more than traditional method.*

Recommendations: *Team based learning method should be implemented in nursing administration course and other nursing courses in the faculty. Feedback questionnaire should be administered to collect views of students and meeting with students to let them express about their opinions after studying assigned courses.*

Key words: Nursing Administration Course, Student Engagement, Students, Team based Learning

Introduction

One of the worldwide trends of teaching in faculties has been a circulated toward greater student-centered, integrated, scientific application models. In addition, teaching strategies that raise problem solving and active study are steadily being encouraged. An instance of this kind of strategy that combines features of student-centeredness and problem-solving attributes is Team Based Learning (TBL) [1,2,3].

TBL is an active instructional strategy and small group learning approach that provides students with chances to apply theoretical knowledge through a series of activities that includes work individually, teamwork and provides feedback immediately. It is used for more than 100 students in large classes or smaller ones with less than 25 students, students are divided into group, each group consists of 5-7 learners in a single lecture hall [4,5].

Application of TBL carries repeated series of the following 3 levels: 1st section: learners study and look at material independently outside class; 2nd section: an individual readiness assurance test (IRAT) is answered through learners to assess their basic understanding of data and theories learnt in section I. The identical test is administered to pre-assigned group of 5 to 7 learners. The team bureaucracy a settlement approximately each solution in this group readiness assurance test (GRAT), 3rd section: students act in groups on assignments that offer the opportunities to apply knowledge in actual-world complicated situations [6].

TBL enhances peer teaching and learning, promotes active learning and engagement of students with course material and in-magnificence activities, inspire college students to take obligation for their own learning, and enables students to efficiently apply their course concepts in practice[7]

Student engagement is "the time and energy students devote to educationally sound activities inside and outside the classroom and the policies and practices that institutions use to encourage students to participate in these activities" .Student engagement can be assessed by the extent to which college students were engaging in educationally effective practices [8].Student engagement is complex; it includes many factors that interact in multiple ways to enhance engagement such as students and teachers. [9]

Student engagement has three dimensions. (1) Engagement behaviorally: Students who are engaged behaviorally having behavioral norms, as attending and participation, and would show absenteeism of negative or disruptive behavior. (2) Engagement emotionally: Students who engage emotionally would experience affective responses such as enjoyment, interest, or a sense of belonging. (3) Engagement cognitively: in this dimension students would be participated in their learning, would seek to go beyond the requirements, and would enjoy with challenges [10].

Student engagement has been found as a robust predictor of student positive behaviors and achievement. Students' engagement with high level is connected with higher test scores and attendance, even performance improvement. In the opposite way, students with low engagement levels are at risk of disrupting behaviors in lecture hall, absenteeism, and dropping out. Enhancing student engagement may help prevent these poor student outcomes [11].

Significance of the study:

Utilizing advanced teaching method of teaching will help students to have ability to translate and practice evidence into practice, problem solving skills, value the patient's perspective, collaborate with other members of the health care team, and be able to adapt to change. TBL is one of advanced teaching methods which will effective in selling student engagement; promote a deeper understanding of course content, and facilitating application of concepts in complex situations.

Aim of study

The study aimed to investigate the effect of implementing team based learning on students' engagement in nursing administration course and determine students' preference between TBL and traditional method among experimental group (study group) after implementing team based learning.

Research hypothesis:

H1: TBL will enhance students' engagement.

H2: Students will prefer TBL more than dedicated lectures (traditional method).

Subjects and Methods

1-Research Design:

A- Quasi experimental design was used.

2-Setting:

The study was conducted at nursing administration department, faculty of nursing, Mansoura University. The faculty of nursing was established at 1994, it consists of eight academic nursing departments namely; nursing administration department, community health nursing department, critical care nursing department, psychiatric nursing department, medical-surgical nursing department, maternity and gynecological nursing department, pediatric nursing department, and gerontological nursing department.

3- Subjects

The study sample included 251 students who were studied nursing administration course during the first term of academic year 2015/2016.they were divided into two groups: experimental group (n=128) and control group (n=123).

4-Tools of data collection

Data was collected by using four tools: TBL knowledge questionnaire, Readiness Assurance Test for Team based learning, Students' engagement questionnaire, Preference between TBL and traditional learning questionnaire.

1- <u>TBL knowledge questionnaire:</u>

It was developed by the researchers based on literature review [12,13,14,15]. The questionnaire consisted of two parts as follows:

The first part was concerned with personal characteristics of the students such as: age, gender, marital status, residence during studying, current level of the study, and previous academic achievement. The

second part was concerned with students' knowledge and experience about TBL, it was included 24 statements. These statements categorized into three domains as follow; principles of TBL, phases of TBL and benefits of TBL.

The response for the items were either Yes or No, its scores were 1 for No and 2 for Yes.

2- Readiness Assurance Tests for TBL

It was developed by the researchers guided by **Ahmed (2013))**[16], and contained two modules, the first modules' test was consisted of 18 multiple choice questions and the second modules' test was consisted of 20 multiple choice questions, each modules' test was applied twice through Individual Readiness Assurance Test (IRAT)and Group Readiness Assurance Test (GRAT).

Scoring system:

The response was zero for wrong answer and 1 for correct answer, the total score for the first modules' test was 18 marks and the total score for the second modules' test was 20 marks. Based on cut of point the total score of each module's test was classified into two categories which was used as indicator for students' readiness for TBL:

≥ 65 % indicated readiness for TB and < 65 % indicated that does not ready for TBL.

3- Students 'engagement questionnaire

It was developed by the researchers based on review literature **(16,17,18,19).**

This tool was aimed to assess quality and extent to which students engaged effectively in educational practices associated with high levels of learning and development.

It was included 42 items categorized into five domains namely as follows: Academic challenge, Active and collaborative learning, student-staff interaction, enriching educational experiences, supportive learning environment.

Scoring system:

The responses for the items were on 4 point likart scale ranging from never, very little or have not decide to very often, very much or done, these items were scored respectively from 1 to 4. The responses for academic challenge's items (8 –12) were on 4 point ranging from zero to ≥11, these items were scored respectively from 0 to 3. The responses for supportive learning environment's items (4-6) were 8 point ranging from not available to excellent, these items were scored respectively from 0 to 7 **(16,17,18,19).**

4- Preference between TBL and traditional learning questionnaire: It was developed by the researchers and guided by **Ahmed (2013)**[20].This tool was aimed to identify students' preferences for TBL or traditional lectures. This tool was included 20 items categorized into 3 domains namely: students' behavior according to TBL, faculty instructor – students' interaction according to TBL and learning environment according to TBL.

Scoring system:

The responses for the items were on 3 point likart scale ranging from disagree to agree. These were scored respectively from 1 to 3. Total score was determined as prefer TBL ≥ 75 % and does not prefer TBL< 75 % **Ahmed (2013)**[20].

Methods:

Review of literature related to the aim of this study; tools of data collection were translated into Arabic by the researchers. Then it was reviewed by three experts. It was tested for its reliability by using Cronbach alpha test which indicated that TBL knowledge questionnaire, Cronbach alpha= 0.9. Students' engagement questionnaire, Cronbach alpha =0.8.Preference between TBL and traditional learning questionnaire, Cronbach alpha =0.9.

Pilot study was conducted on 29 student who were studying nursing administration course during the first term of academic year 2015/2016, After the development tools of data collection to identify potential problems and obstacles that may be faced during period of data collection, also it assisted to estimate the needed time to complete the questionnaire, it was filled within 15 to 20minutes by every student. Students included in pilot study were excluded from the total studied students. Data obtained from pilot study were analyzed.

Implementation of TBL:

TBL was implemented in nursing administration course based on review literature through dividing students experimental (study) group who were studying nursing administration course during first term of academic year 2015/2016 into (20) teams; each team was consisted from five to seven students and two module of nursing administration course were implemented using TBL, the first module was consisted of three lectures (planning - policies ,Rules and Regulations - budget), also the second module was consisted of three lectures(organizing- organizational structure - job analysis and job description) these modules were implemented through administrating **seven session**.

First session was for orienting students about TBL and having study materials about first module, **second session**, students had RATs (IRAT –GRATs)and immediate feedback was given to students based on their answer in RATs, at the end mini-lecture was given about planning. **Third session**, discussion was managed and mini-lecture was given about policies, rules and regulations. **Fourth session**, discussion was managed and mini-lecture was given about budget, students had study materials about second module. **Fifth session**, students had RATs (IRAT-GRATs), immediate feedback was given to students, discussion was managed and mini-lecture was given about organizing. **Six session,** discussion was managed and mini-lecture was given about organizational structure. **Seven session,** discussion was managed and mini-lecture was given about job analysis and job description. Each session was lasted for one hour weekly for seven weeks.

Ethical Considerations

- Ethical approval was obtained from the research ethics committee of the Faculty of Nursing – Mansoura University.
- An official permission from the dean of the faculty of nursing to conduct this study.
- Privacy and confidentiality of the collected data were assured.
- Participation in research is voluntary and Participants were assured that withdrawing from the study will be at any stage without responsibility.

Statistical analysis

- By using SPSS (Statistical Package for the Social Sciences, version 22, SPSS Inc. Chicago, IL, USA) collected data were organized, tabulated and statistically analyzed. For quantitative data, the mean, standard deviation, Frequency and percentage were calculated. For qualitative data, comparison between two mean was done using T-test (independent T-test & paired T –test). P- Value, which was ≤ 0.05 and 0.01 were reflected as statistically significant.

Results

Table (1): personal characteristics of the studied sample, this table shows that the total studied sample were 251 students was divided into two groups (experimental group was consisted of 128 students and control group was consisted of 128 students). The majority of both groups were aged from 20 and more years, female, single, muslin, their residence during academic year, level of the study and previous academic achievement were rural, third level and very good respectively.

Table (2): Students' knowledge domains related to TBL among experimental group before and after implementing TBL method. This table shows comparison between students' knowledge domains mean score related to TBL before and after implementing TBL method among experimental group. According to the table there was statistically significant difference between principles of TBL, phases of TBL, benefits of TBL and total students' knowledge domains mean score related to TBL before and after implementing TBL method among experimental group (P=0.00).

Table (3): Students' knowledge domains related to TBL among control group before and after implementing TBL method. This table shows comparison between students' knowledge domains mean score related to TBL before and after implementing TBL method among control group. According to the table there was no statistically significant difference between principles of TBL, phases of TBL, benefits of TBL and total students' knowledge domains mean score related to TBL before and after implementing TBL method among control group.

Table (4): Readiness Assurance Tests for Team based learning among experimental group. This table describes students' readiness level for TBL among experimental group. According to the table the majority students of experimental group are ready to use TBL.

Table (5): Students' engagement domains among experimental group before and after implementing TBL method.

This table shows comparison between students' engagement domains mean score before and after implementing TBL method among experimental group. According to the table there was highly statistically significant difference between academic challenges, active and collaborative learning students – staff interactions , supportive learning environment and total students' engagement domains before and after implementing TBL method among experimental group **(P = 0.000 , 0.01 , 0.01 , 0.001, 0.000 respectively**).but there was no statistically significant difference between enriching educational experiences domain before and after implementing TBL method among experimental group (**P = 0.32**)

Table (6): Students' engagement domains among control group before and after implementing TBL method, This table shows comparison between students' engagement domains mean score among control group before and after implementing TBL method. According to the table there was no statistically significant difference between academic challenges, active and collaborative learning, students – staff interactions, enriching educational experiences, supportive learning environment and total students' engagement domains before and after implementing TBL method among control group (P=0.22 , 0.39 , 0.45 , 0.36, 0.22, 0.90 respectively).

Table (7): Preference level for TBL among experimental group after implementing TBL method in nursing administration course, According to the table the majority students (90.6 %) of experimental group preferred TBL more than traditional learning

Table (1): personal characteristics of the studied sample

Characteristics	Experimental group (n=128)		Control group (n=123)		Total (n=251)
	No	%	No	%	
Age (years)					
• 18-	5	3.9	5	4.1	10
• 20-	123	96.1	118	95.9	241
Mean (SD)	20.14 (0.48)		20.33 (0.67)		20.23 (0.59)
Gender					
• Male	18	14.1	34	27.6	52
• Female	110	85.9	89	72.4	199
Marital status					
• Single	125	97.7	121	98.4	246
• Married	3	2.3	2	1.6	5
Religion					
• Muslim	128	100.0	123	100.0	251
Residence during academic year					
• Urban	59	46.1	23	18.7	55
• Rural	69	53.9	75	61.0	144

Current level of the study					
• Second level	10	7.8	8	6.5	18
• Third level	118	92.2	115	93.5	233
Previous academic achievement					
• excellent	40	31.2	20	16.3	60
• very good	82	64.1	86	69.9	168
• good	4	3.1	13	10.6	17
• Acceptable	2	1.6	4	3.3	6

Table (2): Students' knowledge domains related to TBL among experimental group before and after implementing TBL method.

TBL domains	Experimental group		T Value	P Value
	Pre TBL	Post TBL		
	Mean (SD)	Mean (SD)		
▪ Principles of TBL	12.32 (3.07)	19.96 (1.87)	24.04	**0.000****
▪ Phases of TBL	7.75 (1.86)	13.43 (1.21)	28.23	**0.000****
▪ Benefits of TBL	6.74 (1.82)	11.38 (1.05)	23.07	**0.000****
Total	26.81(6.60)	44.78 (3.56)	26.15	**0.000****

*** Statistically significant at p ≤ 0.05**

**** Highly statistically significant at p ≤ 0.01**

Table (3): Students' knowledge domains related to TBL among control group before and after implementing TBL method.

TBL domains	Control group		T value	P Value
	Pre TBL	Post TBL		
	Mean (SD)	Mean (SD)		
▪ Principles of TBL	12.48 (3.22)	13.08 (2.02)	1.77	0.07
▪ Phases of TBL	7.81 (1.83)	8.16 (1.30)	1.75	0.08
▪ Benefits of TBL	6.90 (1.97)	7.18 (1.24)	1.32	0.19
Total	27.20 (6.98)	28.43 (3.88)	1.73	0.08

*** Statistically significant at p ≤ 0.05**

**** Highly statistically significant at p ≤ 0.01**

Table (4): Readiness Assurance Tests for Team based learning among experimental group

TBL modules		Ready for TBL (≥65%)		Not ready for TBL (< 65%)	
		No	%	No	%
1st module	IRAT (n=128)	125	97.66	3	2.34
	GRAT (n=20)	20	100.0	0	0.0
2nd module	IRAT (n=128)	126	98.44	2	1.56
	GRAT (n=20)	20	100.0	0	0.0

Table (5): Students' engagement domains among experimental group before and after implementing TBL method

Students' engagement domains	Experimental group		T value	P Value
	Pre TBL	Post TBL		
	Mean (SD)	Mean (SD)		
▪ Academic challenges	24.39 (5.23)	29.07 (4.97)	7.53	**0.000****
▪ Active and collaborative learning	19.35 (3.83)	20.52 (3.75)	2.60	**0.01****
▪ Students – staff interactions	9.17 (3.38)	10.21 (3.44)	2.39	**0.01****
▪ Enriching educational experiences	26.33 (4.70)	25.82 (4.99)	0.99	0.32
▪ Supportive learning environment	20.85 (5.47)	23.02 (5.02)	3.42	**0.001****
Total	100.11 (14.76)	108.67 (15.39)	4.63	**0.000****

*** Statistically significant at p ≤ 0.05**

**** Highly statistically significant at p ≤ 0.01**

Table (6): Students' engagement domains among control group before and after implementing TBL method

Students' engagement domains	Control group		T value	P Value
	Pre TBL	Post TBL		
	Mean (SD)	Mean (SD)		
▪ Academic challenges	24.89 (4.97)	25.56 (4.21)	1.21	0.22
▪ Active and collaborative learning	19.71 (3.80)	19.30 (3.94)	0.85	0.39
▪ Students – staff interactions	9.61 (3.37)	9.34 (3.12)	0.75	0.45
▪ Enriching educational experiences	26.41 (4.73)	25.87 (4.70)	0.91	0.36
▪ Supportive learning environment	21.53 (5.33)	22.69 (7.09)	1.55	0.12
Total	102.17 (16.46)	102.79 (15.28)	0.32	0.74

*** Statistically significant at p ≤ 0.05**

**** Highly statistically significant at p ≤ 0.01**

Table (7): Preference level for TBL among experimental group after implementing TBL method in nursing administration course

Preference level for TBL	Post TBL	
	Experimental group	
	No	%
Preferred ≥75% (45-60)	116	90.6
Not preferred <75% (20-44)	12	9.4
Total	128	100.0

Discussion

Nowadays, active learning strategies are utilized in teaching programs to improve quality of learning process and improve students engagement learning process and achieve high levels of it, one of these strategies is team-based learning (TBL). It builds learners' strengths by providing them opportunities to work effectively and collaborate as a team to achieve a common objective of learning, it also improved student engagement, presence, learning attitude, quality of communication process and maintain better academic performances [21,22,23].

Discussion of the study findings will includes four main divisions based on the aim of this study:

I. Students' knowledge and experience regarding TBL:

The present study revealed that students' knowledge regarding TBL (principles, phases and benefits) was enhanced and the difference between two studied groups (experimental and control group) was statistically significant. It may be due to orientation session about principals, phases and benefits of TBL before starting the modules which they were studied. These results agreed with **Corbridge et al (2013)**[24] who reported that students have favorable knowledge and experience regarding TBL after implementing TBL in a nurse practitioner curriculum.it also in the same line with **Mennenga (2012)**[25] who reported that contributors had a generally favorable experience and knowledge regarding TBL after developing Psychometric testing of the TBL student assessment tool.

II. Nursing administration students' readiness assurance to TBL:

The present study revealed that the majority of experimental group was ready to use TBL method in studying nursing administration course. This may be due to orientation session about principals, phases and advantages of TBL before starting the modules which may be enhanced the students' enthusiasm and readiness toward this method. These results agreed with **Ahmed (2013)**[20] who revealed that the majority of nursing-interns were ready for using team based learning approach during implementing team building strategies program at Benha University hospital.

It also in the same line with **Clark et al. (2008)**[26], who pronounced that students were actively prepared and organized for their TBL sessions more than they did for their traditional lecture because of their choice to do nicely at the Readiness Assurance Tests.

III. Students' engagement in nursing administration course:

The present study revealed that TBL enhanced students' engagement in nursing administration course more than traditional method of teaching among experimental group as compared with control group especially academic challenges, active and collaborative learning, students-staff interactions domains and the difference between two studied groups (experimental and control group) was statistically significant. It may be due to students' interaction and working together during TBL sessions.

These results agreed with **Huang, et al (2016)**[27]who informed that the application of TBL increased students' engagement in ophthalmology clerkship curriculum. It also in the same line with **Punja, et al (2014)**[21]who reported that team-based learning session improved student engagement and enhanced their understanding of course content also Similarly with **McMullen et al (2013)** [28]who revealed that TBL result in extensive enhancement in engagement amongst psychiatrists as compared to getting to know or learning through traditional lectures. These results also congruent by **Tan, et al (2011)**[29] who revealed that TBL increased students' engagement in clinical neurology course more than traditional method, similarly with **Chung, et al (2009)** [30] who revealed that implementing TBL in medical ethics education increased student satisfaction and engagement more than conventional didactics.

Concerning academic challenges domain, the present study revealed that TBL enhanced academic challenges domain among experimental group as compared with control group and the difference between two studied groups (experimental and control group) was statistically significant. This may be due to TBL helped students to be accountable for preparation and studying lecture before coming to class or it may be due to TBL helped students to work hard to meet lecturers' expectation. These results agreed with **Haj-Ali & Al Quran (2013)** [31] who reported that feeling with competition among teams made learning process more enjoyable and inspired them to be more prepared for class. Faculty members noted that students came prepared; they were aware and engaged during sessions. It also in the same line with **Wiener &Marz (2009)**[32]who revealed that implementing TBL in the intensive course format enhanced academic challenges among students and helped them to give their best through their participating in team assignment.

Concerning active and learning domain, the present study revealed that TBL increase active and collaborative learning domain among experimental group as compared with control group and the difference between two studied groups (experimental and control group) was statistically significant. This may be due to TBL encouraged students to ask questions, contribute to discussions or work with their colleagues on team assignments. These results agreed with **Altintas, Altintas&Caglar (2014)**[33]who showed that TBL was an efficient and effective approach to support active learning for fifth-year medical students who were attending an ophthalmology course. Also it is consistent with **Clark et al (2008)**[26]who founded that students in the TBL case management course rated participation significantly higher than those in the lecture-based pharmacology course.

Concerning students-staff interactions domain, The present study revealed that TBL increase students-staff interactions domain among experimental group as compared with control group and the difference between two studied groups (experimental and control group) was statistically significant. This

may be due to TBL helped students to discuss assignments with teaching staff, discuss ideas from their readings, lecture with teaching staff outside the theater or receive timely feedback from staff on academic performance. These results agreed with **Clark & Nguyen (2008)**[34]reported that students who were used TBL participated in lecture hall activities more than students in the traditional learning course. Similarly with **Hunt, Haidet, Coverdale & Richards (2003)**[22]found that TBL improving interactions among students and between students and the instructor.

Concerning enriching educational experiences domain, the present study revealed that TBL didn't enhance enriching educational experiences domain among experimental group and control group and the difference between two studied groups (experimental and control group) was not statistically significant. This may be due to all students have the same economic, social and ethnic backgrounds so they have the same educational culture and experiences. These results agreed with **Levine et al (2004)**[35]who reported that students were perceived team-based learning as led to a more enjoyable and engaging learning experience and greater learning effectiveness as compared with traditional lectures.

Concerning supportive learning environment domain, the present study revealed that TBL increase supportive learning environment domain among experimental group as compared with control group and the difference between two studied groups (experimental and control group) was not statistically significant. This may be due to TBL environment helped students to improve their academic achievements or TBL environment helped students to be more socialize through interactions with their teaching staff, colleagues or working within teams.

These results agreed with **Cho et al (2010)**[36]who reported that TBL create the most appropriate educational environment for learning. It also congruent by **Parmelee & Michaelsen (2010)**[7]who said that TBL can shift students to knowledge application and critical thinking, create a positive classroom learning environment, and increase active learning.

VI. Students' preference between TBL and dedicated lectures (traditional method):

,the present study revealed that the majority of the experimental group preferred TBL method more than traditional method of teaching. This may be due to TBL method helps students to gain and retain studying material, communicate effectively with teaching staff to understand studying material or TBL created an effective learning environment.

These results agreed with **Frame, et al (2015)**[37]showed that students at Cedarville University School of Pharmacy who had two TBL courses first then went back to lecture based learning were preferred TBL more than traditional lecture, similarly with **Altintas, Altintas&Caglar (2014)** [33]who showed that most of the fifth-year medical students were preferred TBL implementation in an ophthalmology course more than traditional lecture method, also consistent with **Livingston, Lundy & Harrington, (2014)** [38]who reported that physical therapy students were preferred TBL method in studying gross anatomy course. These results are not consistent with **Lubeck , Tschetter&Mennenga (2013)**[39]who reported that although some students enjoyed TBL, others voiced concern and frustration with the lack of lectures and their own

responsibility in the learning process, these results in contrast with **Bick et al. (2009)**[40]who reported that students were preferred lectures to TBL during their study which was aimed to evaluate the use of TBL in a clinical medicine course in a first year medical curriculum.

Conclusion

Implementing team-based learning method in nursing administration course enhances students' engagement, especially academic challenges, active and collaborative, student-staff interactions domains. The majority of the students were preferred team-based learning method more than traditional method.

Recommendations

- TBL method should be implemented in nursing administration course
- Students should be prepared for their new roles in active learning methods through hands-on orientations to new processes, expectations, and criteria for performance, as well as transparently and repeatedly explaining the pedagogical rationale for implementation.
- Feedback questionnaire should be administered to collect views of students and meeting with students to let them express about their opinions after studying assigned courses.
- Teaching staff should attend ongoing development program to enhance their teaching skills
- Further research should implement TBL method in other nursing courses which will help to assess effectiveness of TBL through evaluating students' performance and academic achievement .

Conflict of interest

The authors declare that they have no competing interests.

References

1. **Hook KM, Pfeiffer CA. 2007.**Impact of a new curriculum on medical students' interpersonal and interviewing skills. Med Educ 41(2):154–159
2. **Wijnen-Meijer M, Ten Cate TJ, Van der Schaaf M, Borleffs JC. (2010).** Vertical integration in medical school: Effect on the transition to postgraduate training. Med Educ 44(3):272–279.
3. **Inuwa, I. M., Al-Rawahy, M., Roychoudhry, S., &Taranikanti, V. (2012).** Implementing a modified team-based learning strategy in the first phase of an outcome-based curriculum – Challenges and prospects. *MedicalTeacher*,*34*,492–99. http://doi.org/10.3109/0142159X.2012.668633.
4. **O'Malley, K.J., Moran, B.J., Haidet, P., Seidel, C.L., Schneider, V., Morgan, R.O., et al. (2003).**Validation of an observation instrument for measuring student engagement in health professions setting. Evaluation & the Health Professions, 26, 86-103.

5. **Kelly, P.A., Haidet, P., Schneider, V., Searle, N., Seidel, C.L., & Richards, B.F. (2005).**A comparison of in-class learner engagement across lecture, problem-based learning, and team learning using the STROBE classroom observation tool. Teaching and Learning in Medicine, 17, 112-118.
6. **Tai, B. C., &Koh, W. P. (2008).** Does Team Learning Motivate Students' Engagement in an Evidence-based Medicine Course? *Annals of the Academy of Medicine Singapore*, *37*(12), 1019–1023.
7. **Parmelee, D. X. &Michaelsen, L. K. (2010).** Twelve tips for doing effective team-based learning (TBL). Medical Teacher, 32, 118-122. doi: 10.3109/01421590903548562
8. **Hall, S., &Turi, D. M. (2012).** The Relationship between Student Engagement and the Development of Character in Mission Driven Faith-Based Colleges and Universities as Measured by the National Survey of Student Engagement.
9. **Zepke, N., & Leach, L. (2010).** Improving student engagement: Ten proposals for action. Active Learning in Higher Education, 11(3), 167-177.
10. **Fredricks, J.A ., Blumenfeld, P.C . and Paris, A.H . (2004)** School Engagement: Potential of the Concept, State of the Evidence. Review of Educational Research .74 (1), pp. 59–109
11. **Shuhui, L. I. N., &Yunchen, H. (2015).** Examining Teaching Charisma and Its Relation to Student Engagement, *10*(6), 1–8. http://doi.org/10.3968/5631
12. **Michaelsen, L. K., Sweet, M., &Parmalee, D. (2008).** The essential elements of Team-Based learning. Directions for Teaching and Learning, 1–18. http://doi.org/10.1002/tl
13. **Mennenga, H. A. (2010).** Team-based Learning : Engagement and Accountability with Psychometric Analysis of a New Instrument, 19-46.
14. **Michaelsen, L. K., and Sweet, M. (2011).** Team-based learning. *New Directions for Teaching and Learning*, *2011*(128), 41–51. http://doi.org/10.1002/tl.467
15. **Parmelee, D., Michaelsen, L. K., Cook, S., and Hudes, P. D. (2012).** Team-based learning: A practical guide: AMEE Guide No. 65. *Medical Teacher*, *34*(5), e275–e287. http://doi.org/10.3109/0142159x.2012.651179
16. **National Survey of Student Engagement (2010).** The NSSE 2010 report. Retrieved from http://nsse.indiana.edu/pdf/US_paper_10.pdf on 20,augst,2016
17. **Reeve, J., & Coates, H. B. (2011).**Student Engagement Questionnaire, 1–6. Retrieved from https://www.acer.edu.au/files/AUSSE_2011_SEQ.pdf on 20,may,2016
18. **ISSE. (2013).** The Irish survey of student engagement. Retrieved from http://studentsurvey.ie/wordpress/wp content/uploads/2013/12/ISSE_Survey_final2013.pdf on 5,april,2016
19. **National Survey of Student Engagement (2015).** The NSSE 2015 report retrieved from http://nsse.indiana.edu/pdf/survey_instruments/2015/NSSE%202015%20-%20US%20English.pdf on 20,may,2016
20. **Ahmed.I.S (2013):** Study the effectiveness of implementing team buildingstrategies program for nursing interns by using Team based learning at Benha university hospital. Unpublished doctorates thesis

21. **Punja, D., Kalludi, S. N., Pai, K. M., Rao, R. K., &Dhar, M. (2014).** Team-based learning as a teaching strategy for first-year medical students. The Australasian Medical Journal, 7(12), 490–9. http://doi.org/10.4066/AMJ.2014.2244
22. **Hunt, D., Haidet, P., Coverdale, J., & Richards, B. (2003).** The effect of using team learning in an evidence-based medicine course for medical students. Teaching and Learning in Medicine, 15(2), 131-139.
23. **Haidet P, Morgan R, O'Malley K, Moran B, Richards B (2004)**. A controlled trial of active learning versus passive learning strategies in a large group setting. Advanced Health Sciences Education; 9(1):15-27
24. **Corbridge SJ, CorbridgeT,Tiffen J, Carlucci M (2013)**. Implementing team- based learning in a nurse practitioner curriculum. Nurse Educ.38: 202–205.
25. **Mennenga, H. a. (2012).** Development and Psychometric Testing of the Team-Based Learning Student Assessment Instrument. Nurse Educator, 37(4), 168–172. http://doi.org/10.1097/NNE.0b013e31825a87cc
26. **Clark, M., Nguyen, H., Bray, C., & Levine, R. (2008).** Team-based learning in an undergraduate nursing course. Journal of Nursing Education, 47, 111-117.
27. **Huang, Z., Li, M., Zhou, Y., Ao, Y., Xin, W., Jia, Y.,Cai, Y. (2016).** Modified Team-Based Learning in an Ophthalmology Clerkship in China, 1–11. http://doi.org/10.1371/journal.pone.0154250
28. **McMullen, I., Cartledge, J., Levine, R., &Iversen, A. (2013).** Team-based learning for psychiatry residents: a mixed methods study. BMC Medical Education, 13(1), 124. http://doi.org/10.1186/1472-6920-13-124
29. **Tan, N. C., Kandiah, N., Chan, Y., Umapathi, T., Lee, S., & Tan, K. (2011).** A controlled study of team-based learning for undergraduate clinical neurology education. BMC Medical Education, 11(1), 91. http://doi.org/10.1186/1472-6920-11-91
30. **Chung, E.-K., Rhee, J.-A., Baik, Y.-H., & a, O.-S. (2009).** The effect of team-based learning in medical ethics education. Medical Teacher, 31(11), 1013–7. http://doi.org/10.3109/01421590802590553
31. **Haj-Ali, R., & Al Quran, F. (2013).** Team-based learning in a preclinical removable denture prosthesis module in a United Arab Emirates dental school. Journal of Dental Education, 351–7. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/23486901
32. **Wiener, H., Plass, H., &Marz, R. (2009).**Team-based learning in intensive course format for first-year medical students. Croatian Medical Journal, 50(1), 69–76. http://doi.org/10.3325/cmj.2009.50.69
33. **Altintas, L., Altintas, O., &Caglar, Y. (2014).** Modified use of team-based learning in an ophthalmology course for fifth-year medical students. Advances in Physiology Education, 38, 46–8. http://doi.org/10.1152/advan.00129.2013.
34. **Clark, M., & Nguyen, H. (2008).** Team-based learning in an undergraduate nursing course. The Journal of Nursing. 47(3), 111–7. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18380264\nhttp://europepmc.org/abstract/MED/18380264

35. **Levine, R. E., O'Boyle, M., Haidet, P., Lynn, D. J., Stone, M. M., Wolf, D. V., &Paniagua, F. A. (2004)**. Transforming a clinical clerkship with team learning. Teaching and Learning in Medicine, 16(3), 270-275.

36. **Cho, A., Han, S., Yoon, S., Park, J., Yoo, N., & Kim, S. (2010).** Methods of Effective Team-Based Learning Administration and Expected Effects on Medical Education Korean J. Med. Educ. 2010, 22(1), 47–55. http://doi.org/10.3946/kjme.2010.22.1.47.
37. **Frame, T. R., Cailor, S. M., Gryka, R. J., Chen, A. M., Kiersma, M. E., & Sheppard, L. (2015).** Student perceptions of team-based learning vs traditional lecture-based learning. American Journal of Pharmaceutical Education, 79(4). http://doi.org/10.5688/ajpe79451
38. **Livingston, Lundy & Harrington, (2014).** Physical therapy students' perceptions of team-based learning in gross anatomy using the Team-Based Learning Student Assessment Instrument. *Journal of Educational Evaluation for Health Professions*, *11*(1), 1–10. http://doi.org/10.3352/jeehp.2014.11.1
39. **Lubeck P, Tschetter L, Mennenga H.(2013).** Team-based learning: an innovative approach to teaching maternal-newborn nursing care. Journal of Nursing Education. 2013;52(2):112-115.
40. **Bick RJ, Oakes JL, Actor JK. (2009):** Interactive Teaching: problem solving and integration of basic science concepts into clinical scenarios using team-based learning. Journal International Association Medical Science Education. 2009;19(1):26-34.

EMPLOYER PERCEPTIONS AND ATTITUDES TOWARDS AGRICULTURAL UNIVERSITY TRAINING IN KENYA

Cecilia Moraa Onyango (Corresponding author)
Dept. of Plant Science and Crop protection, University of Nairobi P.O.Box 29053 -00625 Nairobi.
Email:ceciliam.onyango@gmail.com. Tel: 254715606563.

Catherine Nkirote Kunyanga
Dept. of Food Science, Nutrition and Technology, University of Nairobi P.O.Box 29053 -00625 Nairobi. Email: ckunyanga@uonbi.ac.ke. Tel: 254722873357

Davis Njuguna Karanja
Dept. of Veterinary Pathology, Microbiology and Parasitology, University of Nairobi P.O.Box 29053 -00625 Nairobi. Email:dnkaranja@uonbi.ac.ke. Tel: 254722557883

Raphael Githaiga Wahome
Dept. of Animal Production, University of Nairobi P.O.Box 29053 -00625 Nairobi. Email: rgwahome@gmail.com. Tel: 254722244620

Abstract

Agriculture is the backbone of most Sub-Saharan African economies accounting for 40 % of the GDP and 80% employment. Yet agricultural graduates have not been able to "hit the ground running" upon graduation. This study assessed the quality of agricultural graduates from Kenyan Universities in terms of relevance to job market demands. A mixed method approach was used to collect data through a personal interview survey and focus group discussions involving 54 public and private organizations. Descriptive statistics was used to generate means and frequencies to validate the study hypotheses. Results indicated that employers' main concern on quality of graduates were poor interpersonal (> 90%), communication (53%), practical (>90%) and character (78%) skills. Further future agriculture will be impacted by competencies in practical skills (56%) and training in contemporary issues like climate change (17%). Success of agricultural production to a large degree depends on the human resources available within the sector. If the quality of university graduates is poor, it negatively affects the entire knowledge chain. This research also has an implication for university administrators and policy makers in training holistic graduates that meet employers' and socio-economic development needs. Integrating job market requirements into university curricula can improve the quality of graduates that directly impact agricultural productivity for economic development and poverty reduction.

Keywords: Employer perceptions; agricultural training; graduates; university curriculum; Kenya

1. Introduction

The world population is projected to reach 9.15 billion by 2050 with over 70 percent of that population living in urban areas (FAO 2012) and it is expected to increase exponentially over the next 30 years. This increase will impact world agriculture and hence require agricultural graduates who understand the complexities of how to meet the demands of producing and marketing agricultural products. Besides, employers demand graduates with relevant skills and competencies that meet current and future growth areas in agriculture (Seth, Heinert, and Grady 2016). In majority of Sub-Saharan African countries, agriculture is the backbone of their economies, accounting for up to 40 percent of the gross domestic product, 15 percent of exports, and 60–80 percent of employment (Schaffnit-Chatterjee 2014; World Bank 2008). However, Africa's hunger and poverty situation is projected to get worse by the year 2020 with an increase in the number of children that are malnourished (Dramé-Yayé, Chakeredza, and Temu 2011). Research, extension, marketing, credit, and policy institutions are not providing sufficient support to smallholder agriculture, which is central to advancing agriculture in the region. Underlying problems include inadequate emphasis on effective and relevant tertiary agricultural training and an inability to attract the best students into agriculture (Dramé-Yayé, Chakeredza, and Temu 2011).

University graduates are entering a workforce where practical skills and competencies are important; yet, majority of the graduates have limited hands-on experience. As a result, employability of agricultural graduates from most African universities has been low and many lack the competence and experience to establish their own enterprises. Yet, agricultural training plays a major role in capacity building for growth in the agricultural sector contributing to sustainable development and food security (Birhanu 2010). This is precipitated by the increasing demands on African agriculture that necessitates innovative production, processing and marketing of agricultural commodities (Kidane and Worth 2014). Further, agricultural training is important to achieve a high agricultural productivity and developing highly skilled and competent graduates required for proper functioning of agricultural systems (RayChaudhuri 2010). Training of students at the university must stimulate students to learn, to seek information and to critically synthesize information and knowledge, and also offer possibilities for applying their acquired skills.
The main aim of the study was to assess the current employer perception and thinking of agricultural training in the Kenyan Universities so that training programs at the university are aligned to the job market demands. It was expected that the results of the study will be used to strengthen the relationships between the universities and the employers. This will lead to enhanced communication between universities and the industry resulting in industry performance improvements as well as quality graduate training.

2. Materials and Methods

A mixed method approach consisting of a cross-sectional survey was carried out with both descriptive and analytical component. It involved data collection using semi-structured interviews, administered through questionnaires to employers on their knowledge on perceptions and attitudes of agricultural graduates in the sector. A survey was conducted covering both public and private organizations employing first degree

graduates for the last ten (10) years, from 2004 to 2013 with establishments nationwide. In addition, we sought for information among the key managers in the agricultural industries from production to processing sectors using key informant interviews and focussed group discussions to substantiate information obtained from the personal interviews and/or their recorded data.

2.1 The survey instrument

Semi-structured questionnaires used were designed using theory of change approach to evaluate quality of agricultural graduates. The instrument was divided into five sections: Characteristics of firm/ demographics; interpersonal, communication, practical and character skills. Under each section, questions revolved around expected graduate abilities and capabilities under the prevailing employer conditions going by current university curricula, Commission of University Education guidelines (CUE 2014), scientific knowledge available (Biggs 2003; Nyaigotti-Chacha 2004). and researchers' experiences and insights.

2.2 Sampling approach

Nairobi County was purposively selected as the main capital city in Kenya and the largest urban centre which hosts 80% of the agricultural industry sector. The population was divided into different clusters based on the agricultural industry segments. These included physical production (in put suppliers, production firms, agro-processors) and service provision (marketers, research, extension, regulatory). This was followed by stratifying each cluster based on the operations and specializations (input suppliers, production firms, agro-processors, marketers, research, extension, regulatory). Within each stratum, a random sampling technique was used to select the population sample of interest.

2.3 Methodology

A stratified simple random sampling on the basis of their operations in the value chain i.e. input suppliers, production, agro-processors, marketers and information was adopted in the selection of 50 sample establishments covered by the survey with the industry as the strata. The Cochan's sample size formula (Cochran 1977) was adopted for the computation of sample size:

$$N_o = \frac{z^2 pq}{e^2} \quad \text{.....Equation 1}$$

Where, N_o is the sample size, z is the selected critical value of desired confidence level, p is the estimated proportion of an attribute that is present in the population, q p = −1 and e is the desired level of precision. Equation 2 was used to calculate the final sample size

$$n = \frac{n_o}{1+\frac{n_o-1}{N}} \quad \text{.....Equation 2}$$

Where, n is the final sample size, n_0 is the sample size derived from equation (1) and N is the population size.

The sample size by category was proportionally allocated based on the number of firms in the sampling

frame. The survey was done in the headquarters/placement offices of the companies/organizations. The target respondents of the survey were the immediate supervisors of the graduates or persons at senior level who have knowledge of the performance of the graduates.

After the survey, focus group discussions comprising of 25 participants and 10 key informants consisting of employers, university lecturers and policy makers were conducted to validate the survey results. Both qualitative and quantitative data was collected.

2.4 Data Quality Control

Training of the research assistants and pre-testing of the data collection tools was done to enhance thorough data collection. A review of the questionnaires was done at the end of each interview. The primary investigator went through the day's questionnaires to ensure data was complete, accurate and had no omissions. Supervision during data collection also helped in ensuring a quality job was done.

2.5 Data analysis

The data was statistically analyzed for means and frequencies using SPSS version 15.0(SPSS 2006). Binary and categorical variables were summarized using frequencies and percentages.

3. Results

3.1 Characteristics of the firms

In total, 54 firms/organisations were surveyed of which 63% were private entities, 22% were public institutions and 15 % were non-governmental organizations (Figure 1). Assessing the education background of the respondents, 54.7% had attained a Master of Science degree while 32.1% had a BSc. degree from a recognized university either in the country or abroad. Of all the establishments sampled, 89% had employed graduates from universities within the last 10 years. This was an indication that apart from government ministries, private companies and non-governmental organizations employ a large percentage of Agriculture graduates in Kenya.

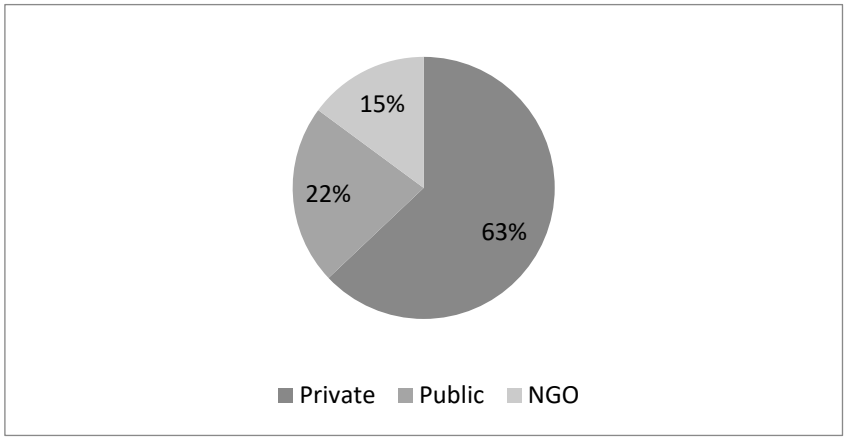


Figure 1: Business nature of Organization covered during the survey

3.2 Employer perception on level of skills and competences of agricultural graduates

Several concerns were raised by the employers on the level of competences of agricultural graduates from Kenyan universities. On interpersonal skills, 21% of the employers indicated that students are not able to make decisions, are not able to relay clear instructions to their subordinates (11%),) are poorly equipped with customer handling skills as "graduates feel that they know more" than everyone else (15%), lack entrepreneurial skills (19%) and cannot develop feasible plans for the development of the firm (26%) (Figure 2)

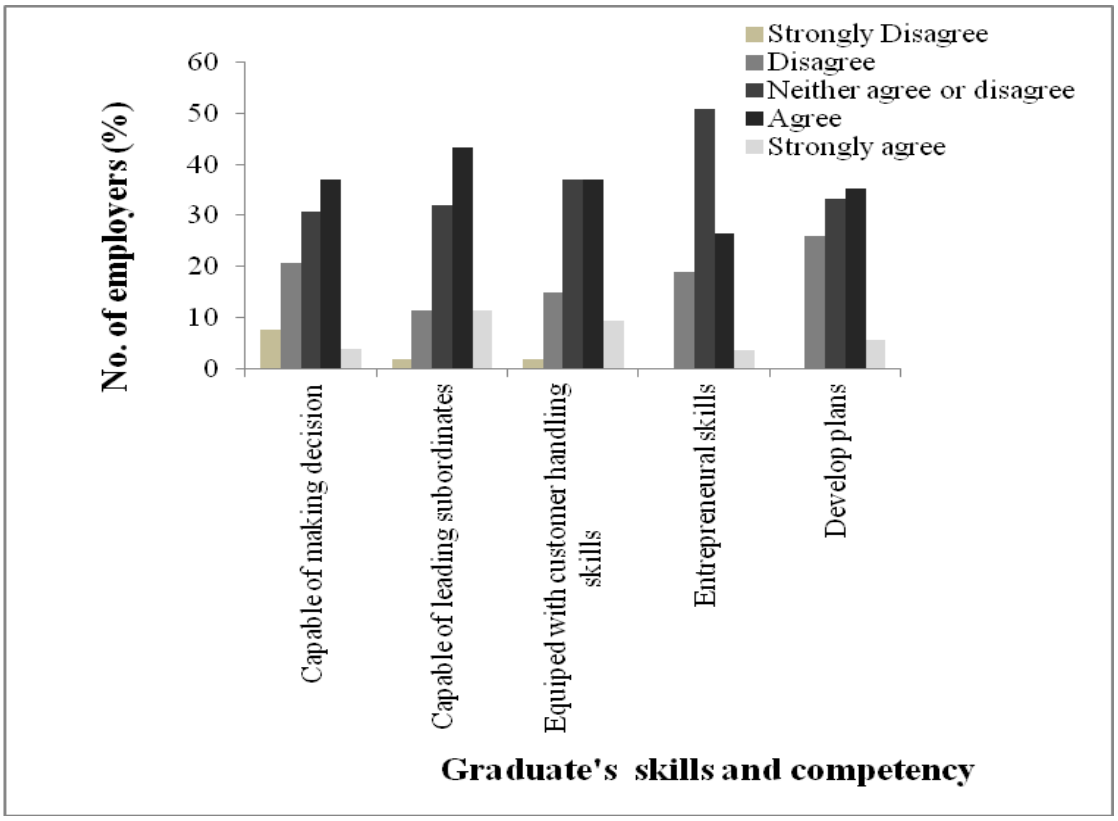


Figure 2: Employer's opinion on graduate's interpersonal skills

On communication skills, 22 % of the employers reported that the graduates cannot effectively speak in public (Figure 3), lack content/ shallow and lack business language and they do not know how to compile management report.

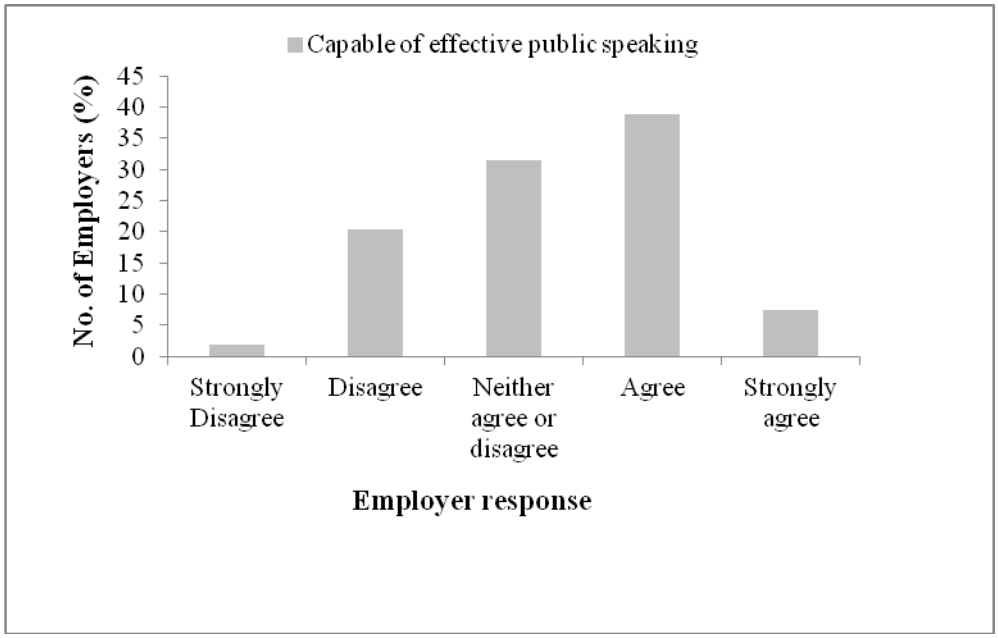


Figure 3: Employer's opinion on graduate's communication skills

While on technical skills, the results of 17% of the employers indicated that graduates are theoretical and cannot effectively apply the knowledge in their work while 17% indicated that the graduates lack practical skills - they are not familiar with materials, equipment & procedures (Figure 4) in use with the organizations and hence cannot perform a critical evaluation and judgment on work related problems. Inadequate hands-on experience among graduates was stressed by the employers as a hindrance to quality performance. On character skills, 9% of the employers reported that graduates are neither dependable nor reliable and 13% pointed out dishonest of graduates depending on the environment (Figure 5). Employers reported low level of discipline among the undergraduates to their employers, fellow employees and to the customers.

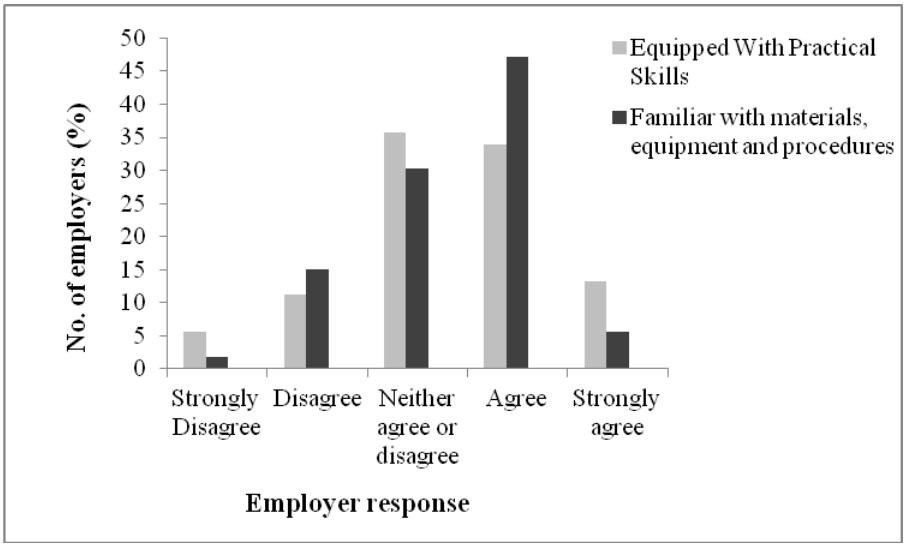


Figure 4: Employer's opinion on graduate's technical skills

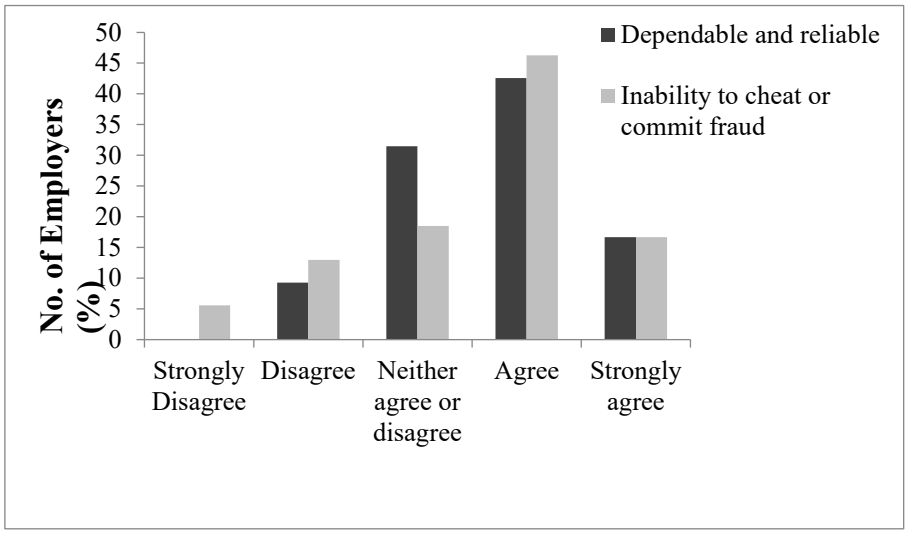


Figure 5: Employer's opinion on graduate's character skills

On general satisfaction with work performance of the graduates, only 57 % of the employers were satisfied by the performance of the graduates. For the remaining percentage, 26 % were neither satisfied nor dissatisfies, 15% were not satisfied and about 2% were very disappointed by the performance of the graduates (Figure 6).

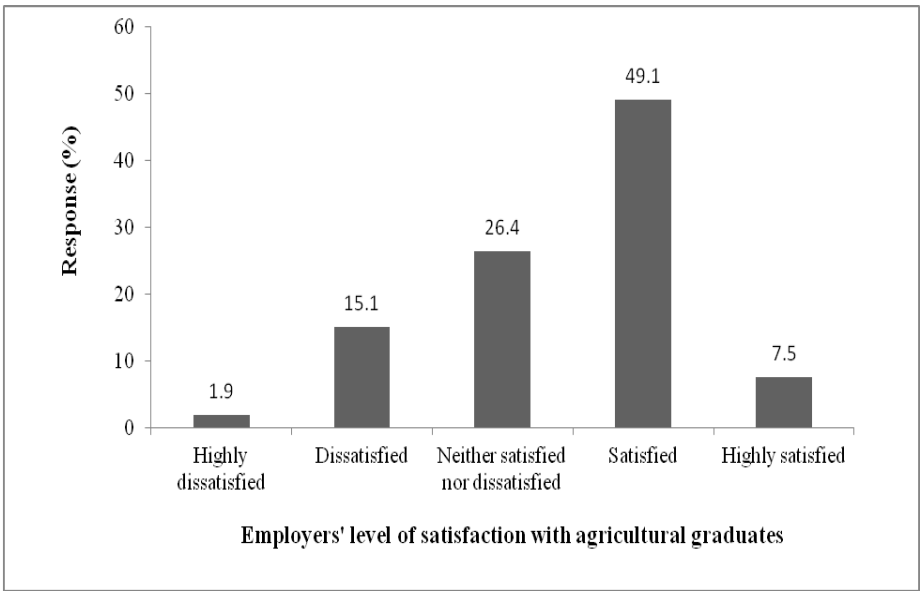


Figure 6: Employer's level of satisfaction with agricultural graduates from Kenya Universities

The other concerns raised by the employers included, computer illiteracy, lack of information among the students, especially current issues. Also, gaps in BSc. training was raised, as programs taught are not up to date i.e. much of the training is based on medium to high potential agricultural areas and no dry land coverage yet the climate has changed. Link between universities and research stations is also lacking. Poor perception of students toward agriculture as a profession is said to hinder the ultimate performance of an individual within the program. In general the main areas of dissatisfaction were lack of professionalism

and innovativeness, lack of resource management skills and poor leadership skills**.** The results indicated that the growth areas that will impact agriculture in the future were mainly competencies in the use of practical skills (56%) and training in contemporary issues such as climate change (17%) (Figure 7).

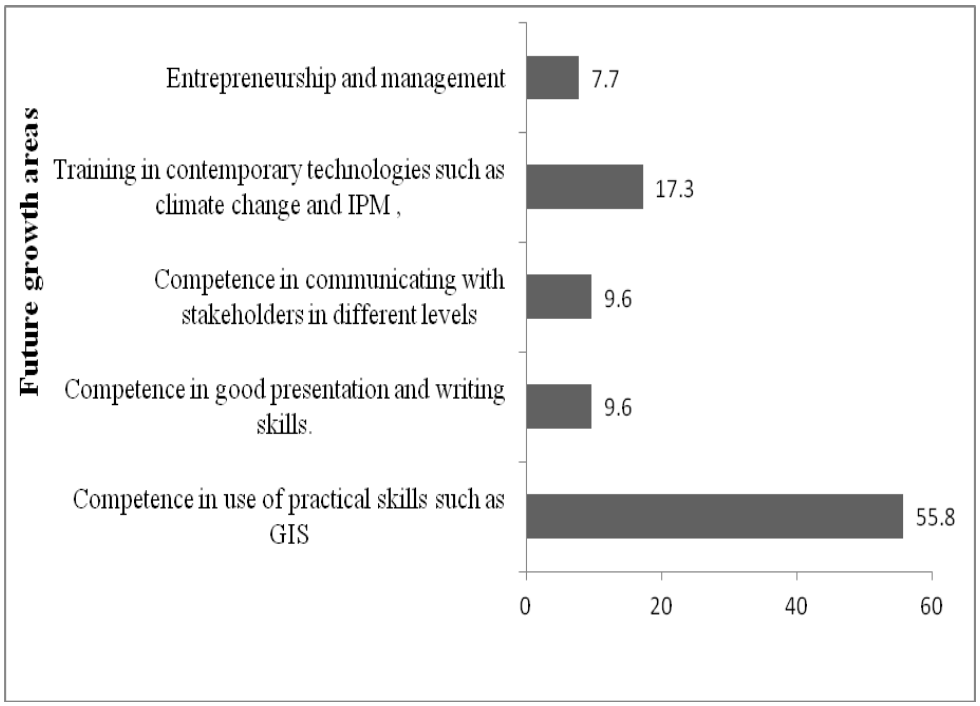


Figure 7: Future growth that will impact agricultural productivity in Kenya

4. DISCUSSION

The study found out that employers were not satisfied by the quality of graduates from Kenyan universities. These results imply gaps in training programs offered at the Kenyan universities, together with a serious disconnect between university curricula and industry needs. While an emphasis on expansion has seen the higher education sector in Sub-Saharan Africa grow from 2.3 million in 1999 to 6.6 million in 2013, quality of graduates trained has received less emphasis leading to increasing unemployment of graduates hitting the labour market (Ligami 2016; Tristan et al. 2014; Omolo 2010). The main challenges in the current university curriculum are as a result of teaching and research approaches that remain organized along a linear vision of science; many African agricultural universities operate in isolation, with insufficient linkages to the agricultural industry and other research organizations (Kristin, Javier, and David 2008). In response to industry demands for competent graduates, colleges of agriculture need to better integrate technical, practical, communication and character skills in the curriculum. This is in line with what has been reported by Dramé-Yayé, Chakeredza, and Temu (2011) who found similar gaps in certificate, diploma and graduate training offered by institutions in Sub-Saharan Africa. Rukuni (2002) and Vandenbosch (2006) emphasize the need to improve the performance of research, extension, marketing, credit, and policy institutions. Very little focus, however, has been given to attracting the best students from high school and to offering effective and relevant higher education in agriculture (Dramé-Yayé, Chakeredza, and Temu 2011). Strong agricultural education and training systems are fundamental to the quality of human resource capacity and ultimately to the agricultural productivity gains that are necessary for

economic growth and poverty reduction in developing countries (Kruijssen 2009). Therefore, there is need to improved linkages between training institutions and industry players, regular reviews of curricula to ensure quality and relevance (Leite, Baggett, and Radhakrishna 2004) a balance between theoretical and practical course content, and incorporation of an entrepreneurial/business-oriented perspective in courses offered at the university. Brett Alpert, Stanford university's associate dean of career education argues that "A broad-based curriculum is certainly beneficial in helping students develop the combination of leadership skills, critical thinking skills and technical expertise needed to successfully navigate workplace and societal challenges and opportunities – while enabling them to find success not only in their careers, but in life more generally".

In addition, the relationships between universities and employers (industry) of graduates is important due to a rapid increase in competition and technology, a decrease in government support for universities, as well as the need for the industry to cut down on training costs and to increase profits (Quester and Baaken 2005; ARC 2001)

It should be noted that as long as graduates' skills, knowledge, and experience fail to satisfy industry requirements, improving the profession's reputation and hence marketing it to new students will remain a challenge. Use of industrial attachment and internship are likely to benefit the training program. Our thought is that the government and regulatory bodies in agricultural training are unaware of the importance, risks, and complexity of the agricultural sector, and, hence may not see the importance of stream lining the university training with the job market needs. Hence, issues on quality and relevance of higher education in agriculture, including linkages to industry, urgently need to be addressed. Integrating job market requirements into university curricula can improve the quality of graduates that directly impact agricultural productivity necessary for economic development and poverty reduction.

5. Conclusion

Agricultural training still plays an important role in the structural support and sustainability of the agri-food sector. It produces graduates to the agri-food industry, without whom it would be difficult to sustain the ever changing environment in the agricultural sector. Generally the result of this study gave a clearer picture of the current knowledge and skills required by the job market in the Agriculture graduates. Much is still required to be done by the Universities to help in producing all-round students for job markets, though some require an individual's initiative. Review of curriculum with complete involvement of employers is mandatory to fix these disjunctions. Inclusion of employers' demands in the review such as training of graduates on hard skills/practical knowledge relevant to work environment, Agribusiness and good communication skills is mandatory to ensure production of graduates who meet the job market demands. For the development of sustainable agricultural sector to meet future demands, holistic students are required with almost all basic qualities. Hence, critical enabling factors need to be established across the industry value chain to increase successes and initiate a positive feedback loop that will improve the reality and perceptions of agriculture as a field of endeavour. To this end, university training needs to be market driven with clear values on the goals and relationships within the agricultural sector.

Based on the findings of this study, it is recommended that for improved quality and future growth of agricultural field, agricultural graduates should be trained on communication and practical skills. This can be achieved through continuous student attachments/internships in agricultural industries to promote interactions between the training institutions and the employers to expose graduates to the working environment. In addition, curriculum should be designed to incorporate hands-on and scientific writing skills. Major consideration should be given to the training of agricultural graduates on resource management and interpersonal skills. Special and urgent attention needs to be given to current global issues such as climate change and competencies in practical skills such as GIS to enhance a broader perception of the agricultural graduates. Finally, it is essential to strengthen linkages between agricultural training institutions and the industry in order to develop graduates who meet the expectations of the job market.

6. Acknowledgement

The authors acknowledge the contributions of Eric Ogumo; Coca cola company; Jared Onduso, Monsanto; Rose Ngina, Vegpro; Hilary Otieno, IPNI; Eric Manyasa, ICRISAT and Susan Asala, Farm concern International and the numerous participating employers and consultants.
This work was financially supported by ACP-EU Co-operation Programme in Higher Education (EDULINK II), (EuropeAid/132023/D/ACT/ACPTPS)

7. References

[1] F.M. Birhanu, "Biotechnology and the Future of Africa's Agriculture: Society of International Economic Law." Paper presented at the Second Biennial Global Conference of the Society of International Economic Law, Barcelona, Spain. 2010

[2] W. G. Cochran, "Sampling techniques (3rd ed.)". John Wiley & Sons, New York, 1977.

[3] A. Dramé-Yayé, S. Chakeredza**,** and A. Temu, "Why do agricultural faculties fail to attract the best students?" Paper presented at the ASTI–IFPRI/FARA Conference. Agricultural R&D: Investing In Africa's Future-Analyzing Trends, Challenges, and Opportunities. Accra, Ghana. December 5–7, 2011.

[4] FAO, "World Agriculture towards 2030/2050" The 2012 revision. Food and Agriculture Organization of the United Nations, ESA working Paper No. 12-03. www.fao.org/economic/esa, 2012 Accessed December 5th 2017

[5] T.T. Kidane and S.H.Worth, "Student Perceptions of Agricultural Education Programme Processes at Selected High Schools in KwaZulu-Natal Province, South Africa". The Journal of Agricultural Education and Extension 2014, 20(4), pp. 381-396. DOI: 10.1080/1389224X.2013.872046

[6] Kristin, E. D., E. Javier and J. S. David, "Strengthening Agricultural Education and Training in sub-Saharan Africa from an Innovation Systems Perspective: A Case Study of Mozambique". The Journal of Agricultural Education and Extension, 2008, 14(1) pp. 35-51. DOI: 10.1080/13892240701820371

[7] F. C.T. Leite, C.D. Baggett, and R.B. Radhakrishna, "Educational reform as innovation: A qualitative

study on the perceptions of Brazilian agricultural school teachers". The Journal of Agricultural Education and Extension 2004, 10(4), pp. 171-179. DOI: 10.1080/13892240485300191a

[8] C. Ligami, "Universities and the quest for employable graduates". University world news, the Global Window on Higher Education, Issue No: 432, 2016

[9] S. RayChaudhuri, "Hidden Attributes of Human Resources for Successful Innovation", 2010, http://dx.doi.org/10.2139/ssrn.1589399. Accessed October 18th 2017

[10] M. Rukuni, "Africa: Addressing Growing Threats to Food Security". Journal of Nutrition 2002, (132) pp.3443S–3448S

[11] C. Schaffnit-Chatterjee, "Agricultural value chains in Sub-Saharan Africa. From a development challenge to a business opportunity". Deutsche Bank AG, Deutsche Bank Research, 60262 Frankfurt am Main, Germany, 2014.

[12] B. H. Seth and R.T. Grady "Globalizing the Undergraduate Experience in Agricultural Leadership, Education, Extension, and Communication". Journal of Agricultural Education, 2016, 57(1) pp. 42-55. doi: 10.5032/jae.2016.01042

[13] SPSS, "SPSS for Windows" SPSS Inc. 2006.

[14] T.T. McCowan, T. Reilly, and D. Steven, "Can higher education solve Africa's job crisis? Understanding graduate employability in Sub-Saharan Africa", British Council, Policy brief, 2014

[15] O.J. Omolo, "The Dynamics and Trends of Employment in Kenya". IEA Research Paper Series, No. 1, Nairobi: Institute of Economic Affairs, 2010

[16] T. Vandenbosch, "Post-Primary Agricultural Education and Training in Sub-Saharan Africa: Adapting Supply to Changing Demand", Nairobi, World Agroforestry Centre, 2006

[17] World Bank, "Cultivating Knowledge and Skills to Grow African Agriculture". A Synthesis of an Institutional, Regional, and International Review, Washington, DC. 2008

Effects of Drug and Substance Abuse on Primary School Pupils' Academic Performance in Kakuma Refugee Camp, Turkana County, Kenya

Immaculate Muthikwa1, Lucy Kibera1

ABSTRACT

This study investigated the effect of the drug and substance abuse on primary school pupils' academic performance in Kakuma refugee camp, Turkana County, Kenya. Specifically, the study sought to determine the extent of drug and substance abuse among pupils, establish whether peer influence led to drug and substance abuse among pupils and determine the influence of drug and substance abuse on pupils; academic performance. The study was guided by Albert Bandura's social cognitive theory of 1986. The research used descriptive survey design and stratified sampling technique. The sample size compared 200 pupils, 20 guiding and counseling teachers, ten headteachers and one education officer. The study used questionnaires to gather quantitative data which was analyzed using SPSS package and was after that presented in frequencies tables and graphs. On the other hand, qualitative data was solicited through focus discussion groups and was processed through content analysis and summarized in thematic areas. The findings indicated that alcohol was the commonly abused substance. The majority (65%) of teacher counselors stated that drug and substance abuse and was most commonly available at 55% among pupils who abused drugs and alcohol. As a result, most of the pupils (58.8%) expected to attain between 201-250 marks at Kenya Certificate of Primary Education in 2017. The prevalence of abuse of alcohol was at 55% followed by tobacco and bhang at 45% and 35% respectively. The results have further revealed that the causes of alcohol and drug abuse included peer pressure influence with (75%), idleness (65%), lack of parental guidance (40%), availability of drugs in schools (35%) and influence of extended family (25%).

Key Words: Drug and Substance Abuse, Academic performance, Addiction, Refugee, and peer

INTRODUCTION

Background to the Study

Drug and substance abuse refer to the usage of drugs for other reasons that are not medicinal, and therefore, they affect wellness of an individual negatively physically, socially, and cognitively (Kuria, 1996). For instance, drug and substance abuse can affect an individual's cognitive ability in relation to the person's lack of concentration in school work and memory loss (Ndetei et al., 2009) opined that medically, drug abuse is the use of drug to the extent that it produces definite impairment with regard to social, psychological or physiological functioning of the user.

According to the US Department of Human Health Services 200 million people or about 5 percent of the world's population, aged between 15-64 years have abused drugs at least once in the previous months (World Drug Report, 2009). Research has shown that drug abuse amongst the young happens mostly in school (Eneh & Stanley, 2004). One of the important psychological phenomena observed during the period of adolescence is experimentation new experiences such as drug and sex-related activities (Graham, Turk & Verhulst, 1999).

Wechsler (2002) noted that drug and substance abuse was prevalent in Pakistan schools. Indeed, Khattak, Iqbal, and Ullah (2012) established that Pakistan had an around 25 to 44 percent of pupils who indicated to have used drugs and alcohol and increasing rates that have become a challenge and concern for Pakistani schools and colleges. Alcohol consumption and illegal drug use are linked to some problems for students. Cloninger (1983) found that alcohol consumption is linked to relationship problems, issues in employment and academic performance among the students who use them.

Drug abuse is also common in Africa. In Sub-Saharan Africa, studies show that individuals who start drinking in SSA countries (for example, Liberia, Sierra Leone, Sudan, Ethiopia, Congo, Burundi, Rwanda) have either gone through or are currently experiencing major conflicts, war, genocide with all the attendant complications on its displaced or post-conflict populations. Such conflict and instability have been observed to increase drug abuse use and HIV vulnerability in the Sub Saharan Africa (Lewinsohn, 2007).

In Kenya, there is also a high rate of drug and substance abuse among pupils receiving education from public institutions (Ogek-Ogunde et al., 2004). NACADA (2002) reported that an estimation of 70 percent of the pupils in primary schools in Kenya had taken alcohol, 22% tobacco, 2% bhang and miraa 5% respectively. Refugees who have been living in Kenya at Kakuma refugee camp are not an exception.

Kakuma Refugee Camp (KRC) was founded in 1992 to cater for children and youth fleeing violent conflict in Sudan and Somalia. Over the years refugees from 20 other nations have sought protection in Kakuma. According to United Nations High Commissioner for Refugees (UNHCR, 2004), 55 % of Kakuma's population is aged 17 years or under. Exposure to extreme stressors (trauma) increases the risk for a range of mood and anxiety disorders, including Post-Traumatic Stress Disorder (PTSD) (Agaibi and Wison 2005; Cohen and Hien, 2006). It is conceivable therefore that refugees who are young and are in their adolescent stage are likely to be more vulnerable to drug abuse compared to those who are not refugees.

Refugees living in camps often face a myriad of health and social problems including unemployment, poverty, violence, insecurity, and lack of essential daily needs. Such problems can lead to frustration, depression, and involvement of some into drug abuse. A study titled "Behavioural Surveillance among Refugees and the surrounding population in Kakuma" by United Nations High Commissioner for Refugees (UNHCR) in 2004 reported that 2% of primary school going respondents had shared a syringe with each other to inject drugs. It was important to investigate whether drug and substance abuse has increased in

schools in Kakuma Refugee Camp and their effects on the academic performance of pupils at the primary level of education in Kakuma Refugee Camp. This is because the academic performance standards of most schools in Kakuma Refugee Camp has been less than 50 percent out of the 500 total marks a child is supposed to attain at Kenya Certificate of Primary Education (KCPE) (Lutheran World Federation (LWF), Department of Education, 2014).

Statement of the Problem

The United Nation High Commissioner for Refugees (UNHCR) has committed a lot of money and effort towards the control and fought against drugs and substance abuse. International Rescue Committee (IRC) to has been very active in Kakuma Refugee Camp sensitizing especially the youth on the dangers of drug and substance abuse. To effectively control this problem, these organizations coupled with other stakeholders have initiated programmes and activities to enhance academic performance by keeping the youth away from drugs. However, despite all these efforts geared towards improving the academic performance in primary schools in Kakuma Refugee Camp, the mean scores are low. By available information, there is evidence that critical study on the effects of drug abuse on the academic performance of pupils in primary school among pupils in Kakuma Refugee Camp has been minimal. This study, therefore, sought to establish the extent to which drug and substance abuse are used among primary school pupils in Kakuma Refugee Camp in Kenya. Also, the study examined whether peer pressure and parental influence have contributed to drug and substance abuse among primary school pupils in Kakuma Refugee Camp.

Objectives of the Study

The primary goal of the study was to establish the influence of drug and substance abuse on the academic performance of primary school pupils in Kakuma Refugee Camp, Kenya. The specific objectives sought to:

1. Determine the extent of drug and substance abuse among primary school pupils in Kakuma Refugee Camp.
2. Establish whether peer influence leads to drug and substance abuse among pupils in public primary schools in Kakuma Refugee Camp.
3. Determine whether parents who took drugs and alcohol in Kakuma Refugee Camp influenced their children to abuse drugs and alcohol.

Research Methodology

The descriptive survey method was found appropriate for data collection because large qualities of data can be collected from large numbers of respondents through structured questionnaires. The subjects targeted by the study were surveyed in their natural environment. The method also facilitated the researcher. Out of 19 public primary schools in Kakuma Refugee Camp, 10 of them were randomly selected. The random sampling method was used to select the pupils. From each school, two teachers were selected randomly (1 male and one female) from the guidance and counseling department making a total of 20

teachers. Also, 1 (one) education officer and ten headteachers from the ten selected primary schools participated in the study. Therefore, in total the selected sample had 231 participants. The research instruments for this study comprised two sets of questionnaires questionnaire for pupils, teachers and an interview schedule for head teachers and an education officer respectively. Data collected was analyzed by use of Statistical Package for Social Science (SPSS). The findings were analyzed using descriptive statistics.

Study Findings

Parents' and Guardians' level of education

Before presenting findings related to the objectives, results of parental and guardian background regarding the level of education have been presented. This is critical because of parents' level of education impact on children's academic performance and behavior. The pertinent findings are contained in Table 1.

Table 1: Parents and guardian's level of education

Level of education	Father		Mother		Guardian	
	n	%	n	%	n	%
No formal education	2	2%	6	10%	4	11%
Primary level	16	20%	20	34%	2	5%
Secondary level	30	37%	18	31%	12	34%
College /Diploma level	21	26%	8	15%	13	36%
University level	12	15%	6	10%	5	14%
Total	**81**	**100%**	**58**	**100%**	**36**	**100%**

The findings in Table 1, indicate that (37%) and 26% respectively of the fathers had secondary level while (26%) had secondary and college/diploma level of education. The study further found out that a large number (31%) of the mothers had a secondary level of education while (15%) of the guardians had college/Diploma level of education. Most of the parents had a secondary and post-secondary education. This means that their challenge was not education but probably, emotional instability because of their refugee status, leading to idleness, lack of material resources and many others and therefore they had not been able to guide their children properly. The education officer was of the opinion that parents could have played a major role in controlling the drug and alcohol abuse among the school going, children.

The **first** objective investigated the extent to which drug and substance were being abused among the primary school pupils them by asking teacher counselors to indicate drugs and substances they thought were commonly abused by pupils. The results are illustrated in Table 2.

Table 2: Teacher Counselors' Responses on drugs and substance abuse among primary schools pupils in Kakuma Refugee Camp

Drugs commonly abused	Easily Available		Available		Less Available		Rarely Available		Not used at all		Total	
	n	%	n	%	n	%	n	%	n	%	N	%
Alcohol	11	55	4	20	2	10	3	15	3	15	20	100
Tobacco	9	45	6	30	3	15	1	5	1	5	20	100
Bhang	7	35	3	15	5	25	3	15	2	10	20	100
Khat	5	25	3	14	8	40	2	10	2	10	20	100

According to the results in Table 2, (55%) of teacher counselor respondents stated that alcohol was the most commonly abused and most available followed by tobacco with 45% and bhang at 35%. Further, some 25% of teacher counselors stated that Khat was easily available to the pupils. This means that the pupils abused alcohol more than tobacco, bhang, and Khat respectively. The education officer too indicated that alcohol was the most commonly abused substance followed by tobacco. He further stated that the pupils were able to get the alcohol easily from the bars through elders who bought it on their behalf. There were also hawkers who sold the drugs and illegal substances to pupils. However, the regular users of hardcore drugs such as cocaine and heroin seem fewer compared to those of cigarette and alcohol, the study has argued that the major cause of concern is that high consumption of these by young people is likely to predispose them to become addicted thus, threatening their health, safety, and opportunities to pursue education. In turn, their engagement in drug and substance abuse would inflict difficulties on their families and friends.

The **second** objective sought to establish the influence of peer pressure on drug abuse among primary school pupils. The pertinent responses from teacher counselors indicating why they engaged in drug and substance abuse are summarized in Table 3.

Table 3: Teacher counselors responses on reasons on the influence of peer pressure, idleness, parental experience, availability of drugs and influence of extended family

Reasons for engaging in drug abuse	Strongly agree		Agree		Disagree		Strongly disagree		Total	
	n	%	n	%	n	%	n	%	n	%
Peer pressure	14	75	2	10	2	10	1	5	19	100
Idleness	13	65	4	20	0	0	3	15	20	100
Lack of Parental guidance	8	40	1	5	5	25	6	30	20	100
Availability of drugs in schools	7	35	6	30	4	20	3	15	20	100
Influence of extended family members	5	25	4	20	6	30	5	25	20	100

The findings in Table 3 reveal that majority of teacher counselors respondents (75%) strongly agreed that peer pressure caused them to engage in drug abuse. The other reasons why pupils abused drugs included idleness with (65%), parental influence (40%), availability of drugs in schools (35%) and influence of extended family members at (25%). The education officer too ranked peer pressure as the first reason why the pupils engaged in drug and substance abuse. Further, teacher counselors also indicated that lack of proper parental guidance of the pupils with 45% made them indulge in drug and substance abuse. Studies carried out locally and elsewhere have indicated a strong linkage between alcohol and drug abuse by young people. Again, it has been observed that indigenous cultures in Africa generally, restricted the use of alcohol to senior age groups and special occasions (Gitahi and Mwangi, Daily Nation April 2, 2007). This practice enabled parents and old members of the society to monitor young children against taking and abusing alcohol.

Sources of Drug and Substance Abuse among Pupils

The study again sought information from teacher counselors on what they thought were likely sources of drug and substances that being abused by pupils. The pertinent analysis of the possible sources of drugs and substance abused by teacher counselors is presented in Table 4.

Table 4: Teacher counselors responses on possible sources of drugs and substance abused by pupils

Source of drugs	Strongly agree		Agree		Disagree		Strongly disagree		Total	
	n	%	n	%	n	%	n	%	n	%
Available at home	13	65	0	0	0	0	7	35	20	100
Available in the village	13	65	4	20	0	0	3	15	20	100
Available in school	12	60	5	25	2	10	1	5	20	100
Sold at the market	8	40	3	15	7	35	2	10	20	100

The data in Table 4 reveal that 60% of the teacher respondents strongly agreed that the source of drugs was from the school. Some (40%) of the respondents also strongly agreed that the drugs were being sold at the market. Majority 65% of pupils strongly agreed that the drugs used by the pupils were available at home and in the village respectively. By these results, it can be concluded that the drugs and alcohol were readily available at home, in the village school. The education officer concurred with this finding.

The third objective investigated the effects of drug abuse on pupils' academic performance. The results emanating from teachers responses are captured in Table 5.

Table 5: Teachers' responses on the effects of drugs on pupils' academic performance

Effects of drug on academic performance	Very great Extent		Great Extent		Average Extent		Little Extent		No Influence		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Poor discipline	18	90	1	5	1	5	0	0	0	0	20	100
Absenteeism	16	80	3	15	0	0	0	0	1	5	20	100
Poor grades	12	60	4	20	0	0	2	10	2	10	20	100
Suspension	10	50	4	20	3	15	3	15	0	0	20	100
Failure to do class assignments	10	50	4	20	3	15	0	0	3	15	20	100
Dropping out from school	9	45	4	20	5	25	2	10	0	0	20	100
Repeated class/exam	8	40	4	20	4	20	4	20	0	0	20	100
Low concentration in class	7	35	5	25	0	0	8	40	0	0	20	100
Non-participation in co-curricular activities	4	20	2	10	3	15	7	35	4	20	20	100

The findings in Table 5 indicate that majority of the teacher respondents (90%) indicated that drug use among the pupils to a very great extent resulted in poor discipline. The findings further indicated that most of the teachers (80%) said that use of drug and substance abuse contributed to school absenteeism at 80%. Also, they contributed to absenteeism by 80%. Again 60% of teachers stated that drug use among pupils contributed to poor grades, suspension with (50%), failure to do the assignment at 50% dropping out of school (45%), repeating class (40%), and low concentration (35%) among others. These findings have supported those of Bawkin and Bawkin (2005) that indicated that an addicted pupil was likely to show a decline in academic performance, frequent absenteeism, loss of interest in school work and weakened motor coordination, poor health, and lack of interest in old friendships.

To gain further insight into the effects of drug and substance abuse pupils were asked to indicate whether such pupils got on well with other pupils and staff. Their responses are captured in Table 6.

Table 6: Peer relationship between pupils who used drugs and those who did not

Types of relationships	Strongly Agree		Agree		Not sure		Disagree		Strongly Disagree		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Advise them not to take drugs	96	55	40	23	27	15	0	0	12	7	175	100
Don't associate with me	90	51	37	21	30	17	6	3	12	7	175	100
They reported them to teachers	50	30	36	20	16	9	13	7	60	34	175	100
Become friends	12	7	16	8	8	4	89	51	50	30	175	100

The findings in Table 6 indicate that 51% and 30% of the pupil respondents disagreed and strongly disagreed that the pupils became friends with pupils who used drugs. On the other hand, 51% of them indicated that they strongly agreed that they did not associate with drug and substance abuse. Over one third (34%) of the pupils said that they reported the drug abusers to teachers while some 55% indicated they did not advise their fellow pupils not to take drugs. This may be attributed to the fact that drug and substances are violent and therefore feared to be the target of their violence.

It has been established that drug and substance abuse also has a negative influence on pupils' behavior and interior negative effect on their interaction with teachers, pupils, and academic performance. Teachers were asked to indicate the types of behaviors they associated pupils who abused drugs. The findings on effects of drugs on pupils' behavior are presented in Table 7.

Table 7: Teacher responses on the effect of drugs on pupils' behavior and academic performance

Effects of Drug Abuse on behavior	Yes		No	
	n	%	n	%
Low concentration in class activities	19	95	1	5
Not able to handle class activities after taking drugs	18	90	2	10
Rude to teachers	17	85	3	15
Failure to understand during lessons	16	80	4	20
Fighting with other children	15	75	5	25
Drop out of school	15	75	5	25
Likely to be involved in sexual activities	14	70	6	30
Display violent behavior	14	70	6	30
Likely to be involved in crime	13	65	7	35
Likely to suffer from HIV/AIDS diseases	12	60	8	40
Poor academic performance	12	60	8	40
Become a street child	9	45	11	55

The information in Table 7 has shown that 90% of teacher respondents indicated that drug abuse among the pupils made them unable to handle class activities. Further, 95% of teacher respondents stated drug and substance abuse contributed to low concentration in class activities. Again, some 80% of teacher respondents stated that drug abuse interfered with comprehension of lessons taught. Drug abuse among the pupils also led to fighting with other children and rudeness with 75% and 85% respectively. Other behaviours associated with drug and substance abuse included pupils' involvement in crime at (65%), sexual activities (70%), suffering from HIV/AIDS diseases (60%), dropping from school (75%), manifestation of violent behavior (70%), and likelihood of becoming a street child (45%) respectively. Finally, (70%) of teachers respondents indicated that drug and substance abuse resulted in poor academic performance. The education officer concurred with teacher respondents' findings that drug and substance abuse among the pupils influenced their behavior and academic performance negatively. The Education Officer too established that indiscipline seemed to be manifested mostly by pupils who indulged in drug and substance abuse.

Further, teachers were requested to predict the mean grade they expected pupils in primary schools in Kakuma Refugee to attain at Kenya Certificate of Primary Education, given the prevalence of drug and substance abuse among pupils.

The findings on marks which standard seven pupils expected to attain at Kenya Certificate of Primary Education in 2017 by teacher respondents are presented in Table 8.

Table 8: Scores which standard seven pupils expected to attain at Kenya Certificate of Primary Education in 2017 by teacher respondents

Range of Expected Scores at K.C.P.E	Frequency	Percentage
100-150	0	0
151-200	5	29.4
201-250	10	58.8
251-300	2	11.8
Total	**17**	**100**

The analysis in Table 8, has revealed that 58.8% of guiding and counseling teachers indicated that the pupils would get a grade of between 201-250 marks at Kenya Certificate of Primary Education in 2017. This seems to indicate that many pupils might not attain over 250 marks out of 500 marks in KCPE. The expected poor academic performance may be attributed to lack of concentration in class due to the negative influence of drug and substance abuse.

Similarly, pupils were asked to suggest the mean grade they expected to achieve at Kenya Certificate of Primary education. The findings on marks which standard seven pupils expected to attain at Kenya Certificate of Primary Education in 2017 by pupil respondents are presented in Table 9.

Table 9: Marks which standard seven pupils expected to attain at Kenya Certificate of Primary Education in 2017 by pupil respondents

Range of Expected Scores at K.C.P.E	Frequency	Percentage
100-150	10	5.7
151-200	17	9.7
201-250	86	49.1
251-300	42	24
Over 300	20	11.4
Total	**175**	**100**

The analysis in Table 9 has shown that 49.1% of pupil respondents stated that they would get between 201 and 250 marks at Kenya Certificate of Primary Education in 2017. The pupil respondents assessment of the grade they are likely at Kenya Certificate of Primary Education is lower than that of teacher-counselor. The grades predicted by pupils appear to be more realistic. Poor academic performance may be linked to poor concentration associated with drug and substance abuse.

Suggestions on how to improve Academic Performance

As far as pupils were concerned, the school management should maintain discipline among the pupil though some pupils indicated that the teachers were too strict when dealing with them. Teachers thus should try to understand the predicament of pupils instead of concluding them. The teachers on their part suggested that the pupils should attend counseling sessions more often so that they can to learn the dangers of drug and alcohol abuse on their academic performance. The guiding and counseling teachers again highlighted the

need for more training for guidance and teacher counselors to enable them to acquire adequate knowledge and skills necessary for effective handling challenges faced by pupils.

Further, the Education Officer indicated that one of the corrective measures should be employed to curb the drug and substance abuse menace to ensure that there are canteens and shops located near the schools because they were used for peddling drugs. The pupils should also be checked by teachers and prefects as a way of ensuring that they do not bring drugs and other alcohol-related substances to school.

The head teachers on their part advocated for enhancement of security in the area of Kakuma Refugee Camp. This would assist in curbing illegal trade in harmful drugs and related substances in the community and around the schools. Also, law enforcers and school management should ensure that people used to operate businesses near schools do not sell drugs and other substances harmful to the well-being of students.

Summary Findings

By findings, it can be concluded that alcohol is the commonly abused among the drug and substance abused among the pupils and was readily available. The type of drugs and substances abused include alcohol (55%), tobacco (45%), bhang (35%) and khat (25%). Further, peer pressure was cited as one of the reasons that make pupils engage in drug abuse followed by idleness, parental influence, easy access to drugs and influence of extended family members. It can also be concluded that the drugs and alcohol are available in the refugee camp, thus making them easily accessible to pupils. Drug abuse among the pupils makes them unable to handle class activities. Drug abuse also causes low concentration in class activities, including the inability to understand lessons. Drug and substance abuse also leads to fighting among pupils and rudeness to teachers. The other negative effects of drugs and substance abuse include crime, sexual activities, dropping out of school, poor academic performance, violent behavior and infection from sexually transmitted disease such as HIV/AIDs.

Further, teachers (58.8%) indicated less than 50% of pupils would score between 201-250 marks at Kenya Certificate of Primary Education in 2017, and as a result, many pupils would not attain good grades to transit to the secondary level of education. The projections of pupils' academic performance by teachers and pupils seem to suggest drug and substance abuse contribute to poor academic performance.

Recommendations

The pupils should be sensitized to the dangers of drug and substance abuse. They should be encouraged to seek counseling or rehabilitation services to help them quit the vice. This can be done through the invitation of guest speakers on the dangers of drugs and substance abuse by school authorities.

Every school should be mandated to have pupils checked when coming to school to make sure they are not in possession of drugs and harmful substances. The school management should be advised of the need to maintain discipline in school.

Finally, parents should be counseled on the impact of drug and substance on their children's academic performance. This can be done through meetings for parents and through invitation by school management during which parents would be given information on the dangers of drug and substance abuse by their children about their health and academic performance.

Area of Further Research

The following are areas which have been suggested for further research;

i. The effect drug and substance abuse on class attendance and retention among primary pupils.
ii. The effectiveness of guidance and counseling teachers in curbing drugs and substance abuse in primary schools.

REFERENCES

Agaibi, C. E., & Wilson, J. P. (2005). Trauma, PTSD, and Resilience: A Review of the Literature. *Trauma, Violence, & Abuse*, 6(3), 195-216.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bawkin H., & Bawkin, R. (2005). *Behaviour Disorders in Children*. London: W.B. Saunders.

Cloninger, C. R. (1983). *Genetic and environmental factors leading to alcoholism*. Minneapolis, MN: Johnson Institute.

Cohen, L. R., & Hien, D. A. (2006). Treatment Outcomes for Women With Substance Abuse and PTSD Who Have Experienced Complex Trauma. *PS*, *57*(1), 100-106.

Eneh, A. U., & Starnley, P. C. (2004). Drug use by secondary school students in East Africa. *Journal of Medicine*, *13*(1).

Graham P., Turk J., & Verhulst F. (1999). *Child psychiatry: a development approach*. Oxford, UK: Oxford University Press.

Haynie, D. (2002). *The Relative Nature of Peer Delinquency Quantitative Criminology,*2,99-134.

Khattak, M., Iqbal, M.N., & Ullah, I. (2012). *Influence of drugs on students' performance: A qualitative study in Pakistan university students*. Pakistan Press.

Kuria, M.W. (1966). *Drug abuse among urban as compared to rural secondary schools students in Kenya*: *a short communication.* East Africa.

Lewinsohn, H. (2007). Immune dominant tuberculosis CD8 antigens preferentially restricted by HLA-B. *PLoSPathog* 3:1240- 1249.

Masita, M. (2004). Initiatives in Counteracting Drug Abuse. *Journal on Social and Religious Concern,* Volume 17, No 3-2004. Substance Abuse: Sources and Cures.

NACADA. (2002). Report Situation Assessment of Drugs and substance abuse. Nairobi.

Ndetei, D. M., Khasakhala, L. I., Mutiso, V., Ongecha-Owuor, F. A., & Kokonya, D. A. (2009). Patterns of Drug Abuse in Public Secondary Schools in Kenya. *Substance Abuse*, *30*(1), 69-78.

United Nations High Commissioner for Refugees (UNHCR). (2004). *Behavioral Surveillance among Refugees and the surrounding population in Kakuma*.

Wechsler, H., Dowdall, G., Maenner, G., Gledhill-Hoyt, J., & Hang, L. (1998). Changes in Binge Drinking and Related Problems among American College Students between 1993 and 1997: Results of the Harvard School of Public Health College Alcohol Survey. *Journal of American College Health*, 47(2), 57-68.

World Drug Report (2009) UNODC.

The Role of Nurses in the Treatment and Care of HIV/AIDS patients - based on the dimensions of health care.

Glodiana Sinanaj[1], Arjan Harxhi[2], Brunilda Subashi[3]
[1]Faculty of Technical, Medical Sciences, Tirana, Albania
[2,] University of Medicine, Faculty of Health Science, Tirana, Albania
[3]Research Center for Scientific Research, Universiteti "Ismail Qemali" Vlore, Albania

Abstract

There is a lack of nursing studies that are specifically focused on assessing and caring for people living with HIV / AIDS to improve their quality of life. Little is known about the current situation regarding the care of persons living with HIV / AIDS. This cross-sectional, descriptive and analytical study will try to identify the assessment of nursing care in order to promote a better understanding of nursing care. A structured self-administered questionnaire administered from April 30 to June 15, 2014, was used for data collection.The participants were 55 patients, whose average age was 33.3 ±7.98 years, ranging from 20 to 55 years of age, out of which 24 (43.6%) of patients were female, while 31 (56.4% of them were males). They had different socioeconomic and educational levels. Regarding the biological dimension of nursing care, despite a positive trend in patient care estimation, differences between individual patient groups are observed based on the educational level.So patients with secondary and higher education are more likely to positively assess nursing care by the biological dimension versus 8-year-old patients. While with the psychological dimension and with other dimensions such as spiritual, social, stigmatization and discrimination there is no statistically significant relation between the socio-demographic characteristics of patients.Among the 5 dimensions, it is noticed that patients have evaluated less positively stigma, discrimination, compared to other dimensions. So patients are noticed a dissatisfaction with the fact that they are treated by nurses at the time of health care. The Nursing School to increase the development and implementation of quality research should identify the feelings, experiences, experiences and meanings of HIV/AIDS patients on nursing care. HIV / AIDS is a growing risk of modern times, requiring long-lasting research and research.

Key words: HIV / AIDS, nursing care, healthcare dimensions.

1. Introduction

Human Immunodeficiency Syndrome (AIDS) is a disease that is showing an alarm worldwide as one of the most life-threatening diseases, a problem that transcends all societies. It has caused the infection of many people, from newborns, to adult individuals, and today is one of the biggest social problems due to the different forms of infection[1]. According to the United Nations (UNAIDS) and the World Health

Organization (WHO) on the occasion of the World AIDS Day, in December 2001, AIDS was the most devastating disease humanity has ever faced. Since the epidemic began, more than 60 million people are infected with HIV and AIDS all over the world, 25 million people have died from the virus and is the fourth leading cause of mortality. About one third of people currently living with HIV / AIDS are between 15 and 24 years old[2].The person with HIV / AIDS is biologically, psychologically, socially and spiritually affected when faced with an incurable disease and has the tendency to be stigmatized by the general population. Infected people are immersed in emotions such as anxiety and guilt; face the loss of economic security, sexual function, self-respect, intimacy, fear, anger, hostility, stress, interpersonal relationships damaged to bring their beliefs and values into play. For effective participation of nursing nursing care in HIV / AIDS patients, it is implied assistance in meeting emotional and spiritual needs, which should provide the essential requirements to maintain anxiety and emotional distress in a person with HIV. According to De Sousa et al, health professionals working with HIV in the state of the hospital environment have many obstacles in the care process[5]. During hospitalization, the HIV / AIDS patient may rarely take full care of his / her own needs so that it can be observed in various health institutions during the hospital stay by the nurses the aid is minimal or because of the fear of infection, or for any other cause related to the disease, which leads to an attitude of indifference, discrimination, marginalization to the patient who experiences the feelings of isolation and loneliness. The nursing care offered is fast, without further contact with the patient and in other cases the waiting is long for treatment. Following the questions the patient has, it is noticed that responses from nurses are very sharp and often unanswered. These facts are apparent through evidence collected by infectious disease patients and other rooms of the QSUT hospital during the professional practices performed during the treatment, which increases the patient's difficulty in accepting his illness, becoming an obstacle to boosting patient healing and stability, which is evidenced by the feeling of helplessness and frustration reflected several times as aggressive and rebellious behavior. This attitude of the nurse to the HIV patient must change for a culture of acceptability and professional responsibility, performing a full care in all its dimensions.

1.1 Formulation of the problem

The HIV / AIDS epidemic has caused a number of reactions, and the stigma is one of them. These reactions come from individuals, communities, and even nations, and during this time it is passed from sympathy to caring for silence, denial, fear, anger, and even violence. [37] People living with HIV / AIDS and those affected by epidemics often find it impossible to live an equal, dignified and free life, as their rights are often violated based on their status as HIV-infected. This includes the right to privacy, confidentiality, access to comprehensive medical and sexual and reproductive health services, employment, education, freedom of movement, and the right to travel. Learning HIV status through laboratory diagnosis is always for the individual concerned a traumatic and life-changing experience. [38] Difficulties are related to discrimination and stigmatization, complicating the coping process and related to the need to apply holistic care models that address the psychological, spiritual, and physical dimensions of people living with HIV infection. [39] Together, these stigma-related experiences can contribute to the stress and adaptability of people living with HIV. [40, 41, 42] People with HIV infection have high rates of stressful life events.

In particular, HIV sees individuals in the face of multiple challenges that could damage their coping resources and impede their psychological adaptation to the ongoing demands of chronic and stigmatizing disease management. [43] There is a strong link between experiencing the stigma associated with HIV and reporting poor access to medical care. Studies show that people who experience high levels of stigma are more likely to disregard the regime of HIV medication. [44] In addition, research has shown that rapid progression of the disease is associated with low levels of social support. [45] Stigmatization can make PJHA(persons that live with HIV/AIDS) to renounce the right to healthcare services, may reduce their desire to go HIV-tested, affecting early prevention and treatment efforts. [46] Barriers to care relate to the social stigma surrounding HIV / AIDS in Albania or the lack of information on both patients and service providers. [47] Lack of access to medicines affects health deterioration, moreover reducing the ability to earn income and lowering self-esteem. [48] The need to travel long distances to benefit from health services is another major challenge facing the PJHA. [49] Although AIDS has already been considered a chronic and manageable disease for many, [50] PJHA still experiencing side effects due to medication. Physical symptoms and physical physical alterations experienced by WHO significantly affect career, daily roles, and quality of life. [51] The United Nations Commission on Human Rights explicitly acknowledges that "access to medicines in the context of epidemics such as HIV / AIDS is one of the key elements for achieving progressively and full compliance with the law every man to the enjoyment of the highest achievable standard of mental and physical health "(UN, 2001). Antiretrovirals have been designated as major medicines (OBSH, 2007). Data also show that antiretroviral therapy significantly improves the quality of life of people living with HIV if they start treatment early. [52] Studies in many countries of the world and especially in developed countries underline the pain relief and symptom management, psychological support, spiritual support, food and financial support as the main needs for palliative care. [53,54,55] Where the needs for palliative care are met, it is mainly due to the support that families and relatives offer. [55, 56, 57] HIV / AIDS can lead people to poverty, due to reduced work skills and increased medical costs. There is a growing need to address concerns about the work of people living with HIV because they are living longer and healthier as a result of drug treatment. [58, 59] Because of the constraints that result from the health status, as well as stigma and discrimination, PJHA face many barriers when they try to find or keep their jobs. [60, 61] The stigma that accompanies HIV has caused many people living with this disease to lack adequate care and social support and to experience a low level of emotional well-being compared to the general population. [62] Stigma plays an important role in people's decision to detect their HIV status in family, friends, and often has a negative effect on the quality of their relationship. The way of detection, residence and the fact that it belongs to minority communities are additional factors that affect the non-detection of HIV and the isolation of these persons. [63] Reducing social exclusion, along with social and emotional support, can lead to greater social cohesion and improve health. [64] Social support plays a critical role in helping people overcome epidemic structural inequalities and serve as barriers to treatment, testing and other essential services. Social support is particularly appropriate for HIV, as it can address issues of gender inequality, stigma and discrimination that exacerbate the situation of marginalized groups. Social support helps ensure that income is regular, helps to ensure living and expands the source of income (UNAIDS, 2010). PJHA need constant care that focuses on the rights and problems

they face in everyday life. Comprehensive care and treatment includes more than antiretrovirals, specifically involves the treatment of opportunistic infections, appropriate nutrition, psycho-social care and other essential health and social services. HIV and AIDS related intimidation and discrimination are widely known as barriers to provide appropriate health care, appropriate social and psychological support, and appropriate medical treatment. [65] Stigma affects the life experiences of an individual infected with HIV and his family. Often stigmatization is more severe for people living with HIV / AIDS than the disease itself. Stigma and discrimination leads to a crisis of identity, isolation, loneliness, low self-esteem and lack of interest in treating AIDS. [66] At the community level, fear of stigma and discrimination can cause pregnant women to avoid voluntary counseling and testing, which in the early stages helps to reduce the possibility of transmitting the HIV virus from mother to child. [67] Even family members of the infected individual also suffer from stigma and discrimination. [68] The United Nations, human rights activists and many organizations emphasize these issues in order to reduce the heavy burden of stigmatization and discrimination against PJHA. [69] For HIV-infected women, psychosocial issues such as HIV positive status detection, stigma, HIV testing, care, poverty, and gender roles are unique challenges and stressors. [70, 71] These stressors escalate when an HIV-infected individual is a woman who is simultaneously infected with HIV and cares for young children. [70] HIV / AIDS affects the productive and reproductive roles of women who are increasingly intertwined with the global market. Because of the gender roles embedded in many traditional societies, widows face a loss of support to live in the cases when their husbands die and leave them without income or property rights. [72] HIV / AIDS is related to sexual and reproductive rights. The social and cultural dimension of sexual and reproductive activity protects and violates gender inequalities and increases the vulnerability to HIV infection on both sides, both men and women. HIV / AIDS is related to sexual and reproductive rights. The social and cultural dimension of sexual and reproductive activity protects and violates gender inequalities and increases the vulnerability to HIV infection on both sides, both men and women. There have been documented incidents of women living with AIDS, who have asked for termination of pregnancy and who have been forced to sterilize. [73] Frequently, women living with HIV / AIDS are not given adequate information on pregnancy and breastfeeding. [74] Women often face a tough decision about breastfeeding as a preferred cultural option. A decision not to breastfeed children can lead to a forced discovery of the HIV positive status of women. [75] Women also reported courtly and hostile attitudes by service providers, including testing without obtaining consent and denial of service. [76] Another important issue is the discovery of HIV status. This is especially difficult in PJHA cases due to the very high stigma associated with this disease. The stigma on HIV / AIDS has been very pervasive, affecting all parts of the world. For example, studies in the United States have reported cases of rape and abuse of PJHA or persons believed to have had the disease. [77, 78,79] Some studies reported cases of WHO that were abandoned by the family, separated from their partners (especially women), killed, isolated, expelled from their communities at the time they discovered their HIV status positive. [80, 81, 82, 83] Increasing attention to status discovery and partner's announcement in HIV control programs is also supported by empirical evidence that it is an effective strategy for preventing HIV transmission to sexual partner at risk and for the promotion of early diagnosis, and which promotes treatment in those who are infected. [84, 85] Possible motivation to report to a sexual

partner is also influenced by the ethical responsibility of patients and concern for partner health, the desire for social support, the severity of the disease, various cultural factors [86] and the very important role of counselor [87]. However, it is worrying that only a small number of HIV-positive persons currently inform their sex partners about their status [88, 89] The low rate of detection of HIV positive status eventually leads to the possibility of cardiac arrest as long as such patients would prefer not to be discovered in the community. [88] It also leads to the loss of opportunities for preventing new infections at risk partners and the inability to have access to HIV services both for patients and partners. Respecting the confidentiality of patients is one of the main principles in medical ethics and also a legal duty that service providers owe their patients. However, respect for absolute confidentiality has been a subject of debate [87]. With the emergence of the HIV / AIDS epidemic this debate is about whether confidentiality should be compromised when HIV positive patients refuse to volunteer those who may be at risk of infection, especially sexual partners. [90, 91] In Albania there are no studies focusing on the rights of persons living with HIV / AIDS. During these years there has been greater attention in preventing this disease and in assessing the populations (groups of the population) with dangerous behaviors. Consequently, it is important to learn more about the experiences, experiences and attitudes that PJHA has developed as a result of new social, economic and health needs.

1.2. Determination of research / study

As mentioned, there is a shortage of nursing studies in Albania that are particularly concerned with assessing and caring for people living with HIV / AIDS to improve their quality of life. Our study is the first in this area. It reflects the importance of patient health care in the context of the HIV / AIDS epidemic, based on their experiences and experiences, assessing the perceptions of people living with HIV / AIDS.

1.2.1 The importance of research / study

Personal significance. This study is of personal importance as the professional skills gained during the course of the study, thanks to the ideas and criticisms of the scientific leader for respecting the criteria of the methodology.

Social significance. The study has social significance since HIV / AIDS has been named by many as the most devastating crisis in human health history. In recent years, this phenomenon has also affected Eastern European countries, including Albania, countries that, although still low in numbers, have the fastest rates of disease spreading

Scientific significance. HIV / AIDS is a growing risk of modern times, requiring long-lasting research and research.

2. Research Methodology

This is a cross sectional, descriptive and analytic study conducted in 55 patients diagnosed with HIV at QSUT between April 30 and June 15, 2014. They had different socioeconomic and educational levels. Informed consent was obtained at the time of data collection, and confidentiality and anonymity were assured.

Inclusion Criteria: Included in the study of patients diagnosed with HIV
Exclusion Criteria:Patients not diagnosed with HIV

2.1.The process of data collection

a. *Review of literature*. All elements of the research were reviewed to evaluate only the data with scientific or legal evidence (10 January - 15 September).

b. *Classification of information*. Classification of information was made from general concepts to specific ones and from international and national data. Each paragraph reduced, you set a specific number in the bibliography.

c. *Choice of instrument*. Some studies on nursing and nursing care were seen on HIV patients and one of them was selected from which two self-administered questionnaires were adapted. From April 30 to June 15, questionnaires were delivered to infectious services, pediatricians at QSUT and SRV.

d.*Pretest*. Two questionnaires were prepared as an applied instrument, a questionnaire for the identification of nursing care for HIV patients, which was tested in three Infective Service and Pediatric Nurses who were not included in the study to see if the questionnaires whether or not they contained incomprehensible or biased meaning. It was observed that questionnaires were not problematic in terms of questions. Also, the second questionnaire was compiled to identify perceptions of HIV patients on nursing care.

e.*Testing*. From 15 May to 15 June, questionnaires were delivered to the infectious services, and the Pediatricians of QSUT and SRV. Testing was done directly and the nurses had the time to answer the questions.

f. *Grouping and counting*. Questionnaires were grouped according to the respective services. The counting was done with the SPSS 17.0 and Excel statistical program, obtaining information presented in tables and graphs.

g. *Coding*. Data entry into the computer and editing. In each question with respective categories, they are placed by a number.

2.2. Material and procedure

Some studies on nursing and nursing care were seen on HIV patients and one of them was selected from which two self-administered questionnaires were adapted. The questionnaire was divided into several sections: it included the overall demographic characteristics of the patients involved in the study and the assessment of nursing care based on the dimensions of health care.

2.3. Statistical analysis

Statistical data analysis was performed in SPSS (Statistical Package for Social Sciences, version 18.0). For continuous variables - sizes were presented as arithmetic, median and fashion averages as well as dispersion sizes - Standard deviation variance (SD). For categorical variables, absolute and relative frequencies were presented.

2.3.1. Statistical Tests Used

Used:

Hi-square test (χ2): for comparing the percentage of categorical variables,

Logistic regression - Chance probability OR with confidence interval 95% CI

- Evaluating the health care accompaniment in the different dimensions addressed.

Mann Whitney U test, for comparing the age of the patients by sex.

3. Results

3.1. Demographic characteristics

The sample consisted of were 55 patients, whose average age was 33.3 ±7.98 years, ranging from 20 to 55 years old.

Table1 Summary table on the demographic characteristics of patients

Variables	**Patients (n=55)**		**P**
	N	**%**	
Gender			
Females	24	43,6	
Males	31	56,4	p=0.7
Age (average , SD)	33,3 (7,98)		
Birthplace			
City	45	81.8	p≤0.001
Village	10	18.2	
Educational level			
Secondary	9	16.3	
University	34	61.8	
Master	12	21.8	p≤0.001
Marital status			
Single	21	38.2	p≤0.001
Married	10	18.2	
Widowed	12	21.8	
Divorced	1	1.8	
Coexistence	11	20.0	
Profession			
Student	10	18.2	p=0.6
Domestic	2	3.6	
Employee dependent	22	40.0	
Independent worker	8	14.5	
Unemployed	13	23.6	
Student	10	18.2	

24 (43.6%) of patients were women, while 31 (56.4%) were males.

The mean age of male patients in the study is 33.2 ± 8 years, while the average age of women is 33.4 ±8 years, statistically significant difference between them (Mann Whitney U = -3.6, p = 0.8)
It is noted that 78.2% of patients or 43 patients were born in rural areas versus 21.8% of patients born in urban areas with statistically significant differences between them (p≤0.05).
Among the interviewed patients, it was noted that:
- 9 patients (16.1%) had 8 years of education,
- 34 patients (61.8%) had secondary education and
- 12 patients (21.8%) were university graduates
Thus it is noticed that there is a dominance of patients who have completed secondary education (61.8%), with statistically significant difference between them (p≤0.05)
We see the distribution of the patients involved in the study according to their civil status. Thus:
- 21 patients (38.2%) found to be single,
- 10 patients (18.2%) were married,
- 12 patients (21.8%) were found to be widows,
- only one patient (1.8%) turned out to be divorced and
- 11 patients (20%) were currently living together.
It is noted that there is a dominance of single patients followed by widows, followed by cohabitation and fewer cases of married patients and only one patient case who was divorced, with statistically significant difference between groups (p = 0.001)
Regarding the occupation of patients:
- 22 or 40% of them were employed dependent on one institution,
- 13 patients or 23.6% of them were unemployed,
- 10 patients or 18.2% of them were students,
- 8 patients or 14.5% of them were self-employed / self-employed
- 2 patients or 3.6% of them were housewives with statistically significant changes (p = 0.006)

Table 2 Shows theAssessment of nursing care based on the biological dimension

Statement	Always	Usually	Anytime	Rarely	Never
Explanation of procedures by the nurse	8 (14,5)	34 (61,8)	11 (20,0)	0 (0,0)	2 (3,6)
Concern about hygiene	3 (5,5)	15 (27,3)	26 (47,3)	10 (18,2)	1 (1,8)
Fulfillment of nutrition needs	0 (0,0)	15 (27,3)	21 (38,2)	17 (30,9)	2 (3,6)
Nursing attention to problems	2 (3,6)	4 (7,3)	26 (47,3)	22 (40,0)	1 (1,8)
Assistance to moving difficulties	3 (5,5)	16 (29,1)	25 (45,5)	10 (18,2)	1 (1,8)
Provide solutions to sleep problems	10 (18,2)	28 (50,9)	12 (21,8)	5 (9,1)	0 (0,0)
Information on oral hygiene	4 (7,3)	24 (43,6)	19 (34,5)	7 (12,7)	1 (1,8)
Care shown during administration of medications	17 (30,9)	23 (41,8)	14 (25,5)	1 (1,8)	0 (0,0)

Regarding the biological dimension of nursing care, despite a positive trend in patient care estimation, differences between individual patient groups are observed based on the educational level.

Table 3 Evaluation of nursing care based on spiritual dimension

Statement	Always		Usually		Anytime		Rarely		Never	
	N	%	N	%	N	%	N	%	N	%
The nurse offers spiritual help to cope with your illness (regarding the god)	0	0	4	7,3	20	36,4	22	40,0	9	16,4
Discovering the nurse's values of love and hope during your society as a spiritual experience	0	0	4	7,3	29	52,7	13	23,6	9	16,4
The nurse helps you discover your belief in god (or a force majeure) by respecting your beliefs	0	0	2	3,6	18	32,7	27	49,1	8	14,5
The nurse shares her spiritual experience and motivates you to approach the master	0	0	1	1,8	12	21,8	26	47,3	16	29,1
When you need the support of a priest, pastor, or others for your spiritual need, the nurse helps you with their presence	0	0	1	1,8	15	27,3	26	47,3	13	23,6

Regarding the spiritual dimension, there is no significant statistical link between the socio-demographic characteristics of patients.

Table 4 Evaluation of nursing care based on the social-family dimension

Statement	Always	Usually	Anytime	Rarely	Never
Knowledge of family conflicts	1 (1.8)	32 (58.2)	14 (25.5)	5 (9.1)	3 (5.5)
The nurse helps the patient's family in the process of adapting to the disease	3 (5.5)	29 (52.7)	17 (30.9)	3 (5.5)	3 (5.5)
Prepare family for home care	1 (1.8)	18 (32.7)	3 (5.5)	3 (5.5)	3 (5.5)
Taking measures for integration and achieving a proper relationship with society	6 (10.9)	29 (52.7)	16 (29.1)	1 (1.8)	3 (5.5)
Emotional support of the family members by the nurse	5 (9.1)	27 (49.1)	15 (27.3)	5 (9.1)	3 (5.5)

Preparing the family to accept the patient's illness	2 (3.6)	33 (60)	15 (27.3)	2 (3.6)	3 (5.5)
The nurse speaks of the values that help you improve the current situation	2 (3.6)	16 (29.1)	21 (38.2)	8 (14.5)	8 (14.5)

* Numeric values for each of the categories are displayed in the form: n (%).

Regarding the family dimension, there is no significant statistical link between the socio-demographic characteristics of patients.

Table 5 Evaluation of nursing care by the psychological dimension based on the demographic characteristics of patients

Psychological Dimension	**Positive rating N (%)**	**OR ***	**95% CI***	**P****
Gender				
Females	24 (43.6)	ref		
Men	30 (54.5)	0.4	0.01-10.6	0.6
Birthplace				
City	43 (78.2)	ref		
Village	11 (20.0)	0.8	0.03- 20.7	0.9
Educational level				
8 year education	8 (14.5)	ref		
Secondary Education	33 (60.0)	1,3	0.04-35.2	0.9
University	13 (23.6)	1.6	0.02-87.8	0.8
Marital status				
Single	21 (38.2)	ref		
Married	9 (16.4)	0.14	0.00-3.9	0.2
Widowed	12 (21.8)	0.6	0.1-31.1	0.3
Divorced	1 (1.8)	0.7	0.0-4.9	0.2
Coexistence	11 (20.0)	0.6	0.2-6.4	0.4
Profession				
Student	10 (18.2)	ref		
Household	2 (3.6)	0.3	0.0-15.2	0.5
Employee dependent	21 (38.2)	0.7	0.2-18.2	0.8
Independent worker	8 (14.5)	0.8	0.1-45.2	0.9
Unemployed	13	1.2	0.0-70.3	0.9

* Chance Relationship (OR) and Lower and Upper Confidence Rate 95%

** P value (statistical significance)

A $p < 0.05$ for the difference according to square square test statistic.

Male patients are 0.4 times more likely to evaluate positively nursing care by the psychological dimension compared to women without statistically significant change (OR = 0.4, 95% CI-0.01-10.6)
Patients from the village are 0.8 times more likely to evaluate positively the dimension of nursing care psychiatry compared to patients from the city, statistically significant (OR = 0.8, 95% CI: 0.03-20.7)
Patients with secondary education are 1.3 times more likely to assess positively nursing care versus 8 year old patients (OR = 1.3; 95% CI: 0.04-35.2); as well as university-educated patients are 1.6 times more likely compared to 8-year-old patients without statistically significant change (OR = 1.6; CI95%: 0.02-87.8)
Married patients are 0.14 times more likely to assess positively nursing care compared to single-sex patients, statistically significant (OR = 0.14, 95% CI: 0.0-3.9). Thus, widest patients have 0.6 times more unlikely to evaluate positively nursing care, statistically significant difference (OR = 0.6, 95% CI: 0.1-31.1). Divorced patients are 0.7 times more likely to assess positively nursing care compared to single-sex patients, statistically significant (OR = 0.7, 95% CI: 0.0-4.9). Patients in coexistence are 0.6 times more likely to positively evaluate nursing care without statistically significant change (OR = 0.6, 95% CI: 0.2-6.4). Dependent workers are 0.7 times more likely to assess positively nursing care in the psychological dimension compared to student patients, statistically significant (OR = 0.7, 95% CI: 0.2-18.2); Independent workers are 0.8 times more likely to be compared to student patients, with statistically significant difference (OR = 0.8, 95% CI: 0.1-45.2), while unemployed patients are 1.2 times more likely to assess positively the care nursing by the biological dimension versus the sudents without statistically significant changes (OR = 1.2, 95% CI: 0.0-70).

Table 6 Estimation of nursing care based on the dimension associated with stigma, discrimination

Statement	Always	Usually	Anytime	Rarely	Never
Do you think that health personnel find it hard to take care of you?	6 (10,9)	13 (23,6)	5 (9,1)	4 (7,3)	27 (49,1)
Exclusive or special hospitals should be created for people with HIV / AIDS.	4 (7,3)	1 (1,8)	14 (25,5)	9 (16,4)	27 (49,1)
Perceive that nurses should avoid all contact with people with HIV / AIDS.	1 (1,8)	1 (1,8)	2 (3,6)	9 (16,4)	42 (76,4)
Conversation or random contact with a person with HIV can infect other people.	11 (20)	6 (10,9)	3 (5,5)	11 (20)	24 (43,6)
In cases of hospitalization according to nurses, people with HIV / AIDS should be isolated?	26 (47,3)	22 (40)	2 (3,6)	2 (3,6)	3 (5.5)

Does the nurse show particular care to a patient with HIV?	9 (16,4)	6 (10,9)	3 (5,5)	17 (30,9)	20 (36,4)
Do you think that the nurse is afraid of being sick of SIDA when he or she meets people with AIDS.	1 (1,8)	2 (3,6)	4 (7,3)	19 (34,5)	29 (52,7)
He perceives that the nurse is afraid of spreading the HIV virus to other people during the care.	1 (1,8)	4 (7,3)	10 (18,2)	28 (50,9)	12 (21,8)

So, we see that, according to patient statements, we have a dominance of the common case of nursing staff explaining the procedure they are going to do.

4. Discussion

Early studies have portrayed nursing staff (along with other health care workers) as frightened, ill-informed and discriminating. to contact with HIV-AIDS patients. [93] In the studies on continuing education and training of nurses related to HIV-AIDS, deficiencies have been identified in the provision of healthcare, the appropriate training for the treatment of HIV patients, especially in non-physical and biological dimensions. With the availability of antiretroviral treatments, HIV is increasingly known as a chronic disease with which people live for many years. [94] Therefore, undertaking this study and recommending continuing the study of this broader field is very important.Regarding the demographic characteristics of the patients, no statistically significant difference was observed among the age-group infirms <30 years (33.8%), 30-40 year old (24.7%), 41-50 age group nurses and those aged older than 50 years (15); while among men (15.6%) and females (84.4%) a statistically significant change was observed.

In our study, as in other studies [95], the average age of patients was 33.3 ± 7.9 years. The age ranged from 20 to 55 years. Comparing with studies such as Hinkin's, Charles H., et al., (2004) [96] where age ranged from 25-69, or Cysique, Lucette A, (2006) where ages ranged from 28-59 years; we can say that in our sample we have a younger age group. Among the patients 43.6% (24 cases) were women and 56.4% (31raste) were males. According to the IPH report (2015) so far, between 70% (613raste) men and 30% (257 cases) of women with male HIV positive male and female farms. The mean age of male patients in the study is 33.2 ± 8 years, while the average age of women is 33.4±8 years, statistically significant difference between them (Mann Whitney U = -3.6, p = 0.8).Patients with secondary education are 12.1 times more likely to evaluate positively nursing care versus 8-year-old patients; as well as patients with university education are 4.4 times more likely compared to 8 year old patients with statistically significant change (OR = 4.4; CI95%: 0.1-66.9).Patients reported statistically significant differences between their education level, with the largest proportion of patients with secondary education (61.8%) followed by those with higher education (21.8%) and fewer than those with education 8 years old (16.1). It is noted that there is a dominance of single patients followed by widows, followed by cohabitation and fewer cases of married patients and only one case of divorced patient with statistically significant difference between groups (p =

0.001) .78.2% of patients or 43 patients were born in rural areas versus 21.8% of patients born in urban areas.

It should also be noted that patients who have been hospitalized for several weeks of treatment are dominated by patients compared to patients who have months of hospitalization or those who have only a few days. It is noticed that we have very few patients who have been diagnosed with HIV for a few weeks, compared to those who have been diagnosed with their disease for years and months, with a significant difference between them ($p \leq 0.05$).Among the 5 dimensions, it is noticed that patients have evaluated less positively stigma, discrimination, compared to other dimensions. So, among patients, there is a dissatisfaction with how they are treated by nurses at the time of health care.

Acknowledgments

I would like to thank all those who supported me and contributed to realism of this paper.

Thank:

• The scientific leader of this paper Prof. Assoc. Arjan HARXHI for advice and the assistance provided for the realization of this paper.

• All staff of the Ambulatory Center near the Infectious Diseases Service in QSUT, as well as all persons living with HIV / AIDS, who agreed to share with their experiences and evocations.

• All my colleagues and friends for inspiration and encouragement on the journey of long and important part of this paper.

• My family of care and support to successfully complete this process search.

Thanks to everyone!

References

ACIPRENSA. (n.d.). *La Iglesia ante el SIDA*. Retrieved from https://www.aciprensa.com/sida/iglesia.htm

Alarcón Rivas, H. A. (2012, Mayo 2). *CUIDADO INTEGRAL DE ENFERMERÍA SEGÚN LOS PACIENTES HOSPITALIZADOS CON VIH/SIDA EN EL HOSPITAL NACIONAL.* Retrieved from Cybertesis - URP: http://cybertesis.urp.edu.pe/bitstream/urp/326/1/Alarcon_ha.pdf

Alarcón Rivas, H. A. (2012, MAYO 2). *http://cybertesis.urp.edu.pe/bitstream/urp/326/1/Alarcon_ha.pdf.* Retrieved from Cybertesis - URP: http://cybertesis.urp.edu.pe/bitstream/urp/326/1/Alarcon_ha.pdf

De Sousa Paiva, S., Gimeniz GalvãoV, M. T., Freitag Pagliuca, L. M., & Okino Sawadda, N. (2006). USO DEL PROXEMIA COMO MODELO TEÓRICO PARA EL ANÁLISIS DE LA COMUNICACIÓN CON PORTADORES DE SIDA. *Enfermería Global , Vol. 5* (Núm. 1), 8.

DELGADO PANEZ, M. A. (n.d.). *PERCEPCIÓN DEL PACIENTE CON SIDA SOBRE EL CUIDADO QUE BRINDA LA ENFERMERA EN EL SERVICIO DE INFECTOLOGÍA DEL HOSPITAL NACIONAL*

DOS DE MAYO 2007. Retrieved from SIDA STUDI: http://www.sidastudi.org/es/registro/d25f08042719e3560127861610ce00f6

Harxhi, al., D. e., Agolli, & Irida. (2015). Challenges of Persons Living With HIV/AIDS in Albania Utilizing the Framework of Human Rights." . *International Journal ANGLISTICUM, Literature, Linguistics & Interdisciplinary Studies , Vol 4* (No 6), 169- 176.

Jhonstan Mantilla, C. (2006). *Actitudes del paciente con VIH/SIDA hacia su seropositividad en el Hospital Maria Auxiliadora. Octubre 2005.* Retrieved from http://cybertesis.unmsm.edu.pe/bitstream/cybertesis/1303/1/Jhonston_mc.pdf

MINISTERIO DE SALUD DEL PERÚ. (2013, Noviembre). *ANÁLISIS DE LA SITUACIÓN EPIDEMIOLÓGICA DEL VIH/SIDA EN EL PERÚ, 2013*. Retrieved from http://www.dge.gob.pe/portal/docs/ASISVIH2013.pdf

MINSA, OPS/OMS, 2006. (2006). *Normas para la Atención Integral a las personas con VIH*. Retrieved from Ministerio de Salud, PANAMA: http://www.paho.org/pan/index.php?option=com_docman&view=download&category_slug=publications&alias=276-normas-para-la-atencion-integral-a-las-personas-con-vih-1&Itemid=224

Nunn, A., Wagner, H., Kamali, A., & Kengeya-Kayondo, J. (1995, may 9). Migration and HIV-1 seroprevalence in a rural Ugandan population. *AIDS* , 503-6.

ONUSIDA MEXICO. (n.d.). *PERÍODO EXTRAORDINARIO DE SESIONES DE LA ASAMBLEA GENERAL SOBRE EL VIH/SIDA*. Retrieved from http://www.cinu.org.mx/temas/vih_sida/eventos/p_x26_ag.htm

Slideshare. (n.d.). Historia de las epidemias y pandemias. Retrieved from https://es.slideshare.net/Eiza_16_Virgo/historia-de-las-epidemias

Tesis de Investigadores. (2011, may 6). *Participación del Profesional de Enfermería en la satisfacción de las necesidades emocionales y espirituales del enfermo con SIDA hospitalizado en Unidad clínica de medicina del Hospital Central de Maracay*. Retrieved from Tesis de Investigadores: http://tesisdeinvestigadores.blogspot.al/2011/05/participacion-del-profesional-de.html

UNAIDS. (2011). *INFORME DE ONUSIDA PARA EL DÍA MUNDIAL DEL SIDA | 2011* . Retrieved from UNAIDS: http://www.unaids.org/sites/default/files/media_asset/JC2216_WorldAIDSday_report_2011_es_1.pdf

UNAIDS. (2013). *Informe mundial ONUSIDA, informe sobre la epidemia mundial de SIDA 2013*. Retrieved from UNAIDS: http://www.unaids.org/sites/default/files/media_asset/UNAIDS_Global_Report_2013_es_1.pdf

EFFECTS OF FISCAL DECENTRALIZATION ON POVERTY REDUCTION IN KENYA

Mwiathi Peter Silas (Ph.D)
Department of Economic Theory, Kenyatta University,
Nairobi, Kenya.

Prof. Nelson H.W.Wawire (Ph.D)
Department of Applied Economics, Kenyatta University,
Nairobi, Kenya.

Perez A. Onono Okelo (PhD)
Department of Applied Economics, Kenyatta University

Abstract

The Kenya government has instituted fiscal decentralization over the years to promote social economic development, reduce poverty and income inequality and ensure balanced regional development. Despite these efforts, poverty levels have remained high in Kenya. The literature on the relationship between fiscal decentralization and poverty has been rather inconclusive about the effects of fiscal decentralization on poverty. The main objective of this paper was to analyse the effects of fiscal decentralization on poverty in Kenya. Using cross-county panel data from 2002 – 2014 and published data from government agencies, UNDP reports and World Bank reports, the paper estimated various empirical models to analyse the effects intergovernmental transfers, sub-national own-source revenue and county expenditure on poverty in Kenya. The study established that the effect of fiscal decentralization on poverty depends on the nature of decentralization and the extent of fiscal decentralization as well as the county specifics. The paper therefore, recommends the need for for county governments to have adequate own-source revenue to finance their expenditure as opposed to relying on intergovernmental transfers from national government.

Key Words: Fiscal Decentralization, Poverty Reduction

1. Introduction

There is no consensus among the economists on the assignment of functions between the central and sub-national governments. Some economists have wished-for assigning more competencies to sub-national governments to promote economic development. The main argument is that fiscal decentralization increases overall government efficiency (Oates, 1972; 1999). Fiscal decentralization brings the government closer to the people and the local public officials are better informed about local needs and therefore more able to set optimal mix of local policies than are central government bureaucrats. The increase in efficiency contributes to economic growth and poverty reduction. Based on these ideas, many countries all over the world have started to allocate more and more competencies to sub-national jurisdictions. While the

theoretical justification for fiscal decentralization is sound, its practicability differs in federal systems, based on historical antecedents and culture.

In theory fiscal decentralization should have positive effects on poverty reduction since it is likely to make the voice of the poor better heard; improve their access to and the quality of public goods and services and reduce their vulnerability. Fiscal decentralization offers the opportunity to set up democratic institutions in which the poor can actively participate, decide and lobby for their interests. The proximity and information advantage of the local government may lead to a better matching of local needs and better policies. This will bring about efficiency gains, in particular in the area of service delivery in terms of access, quality and targeting. Enhanced efficiency in service delivery can directly improve access by the poor to basic services, such as education, health, water, sewage and electricity. Public participation and capacity of citizens to monitor local officials is higher in a decentralized system. Thus, there are opportunities for an increase in transparency and accountability leading to a reduction in corruption and an overall improvement in local governance. This is expected to help in reducing the vulnerability of the poor. Good governance has been found to improve a variety of outcomes, such as school achievement, quality of life indicators, or even GDP growth (Kaufmann et al. 2000).

However, according to Bardhan and Mookherjee (1998), these benefits of decentralized service delivery can depends on the level of capture by local elites and on the level and nature of local inequality. If there is local capture and the interests of the local political elites are not aligned with those of the local poor, decentralization may work against the wellbeing of the poor. According to OECD (2005) only one third of the analysed countries where fiscal decentralization had actually led to improvements in poverty reduction. In the majority of the countries, fiscal decentralization had no impact at all. In countries where the state lacks the capacity to fulfill its basic functions and in environments with high inequalities at the outset, there is a definite risk that decentralization will increase poverty, rather than reduce it (Bardhan & Mookherjee, 1998). This ambiguity suggests that the link between fiscal decentralization and poverty reduction is not clear-cut and that the outcome is largely influenced by country specificities, as well as by the structure and design of fiscal decentralization.

1.1 Fiscal Decentralization in Kenya

The history of fiscal decentralization in Kenya dates back to independence. Successive Kenya governments have attempted fiscal decentralization as a way of ensuring the country achieves equitable development across the many regions, economic growth and poverty reduction. The *Sessional Paper No. 10 of 1965* established the principle of State directed development and decentralization of planning based on local inputs as a means of improving socio-economic well being of rural communities (Republic of Kenya, 1965). In 1971, Kenya initiated integrated decentralized planning under Special Rural Development Programme (SRDP) that was managed by the Ministry of Finance and coordinated by the National Rural Development Committee (NRDC). This led to establishment of District Focus for Rural Development Strategy (DFRDS) in 1983 with the Rural Development Fund (RDF) to finance the initiative at District level.

In 1999 in order to improve service delivery by local government for poverty reduction, reduce regional disparity and to enable the local authorities to reduce their debts burden the government introduced Local Authority Transfer Fund (LATF) (Republic of Kenya, 1999) that transferred five percent of total income

tax to 175 local authorities. LAFT constituted the major source of revenue to Local Authorities (Las) and continued till 2013 when the LAs were replaced with the current system of devolved government. In 2003 the Constituency Development Fund (CDF) was established through an act of parliament with the primary objective of addressing poverty at grassroots level by dedicating a minimum of 2.5 percent of ordinary national revenue to constituencies. Republic of Kenya (2010 and 2012) made the County the focus of planning in Kenya. The Constitution of Kenya 2010 instituted devolved political system, explicitly requiring the national government to transfer certain powers to county governments and at least 15 percent of the national revenue be given to county governments.

2. Literature Review

2.1 Theoretical Literature

This study was based on the theory of fiscal decentralization that examines the channels through which fiscal decentralization affects poverty and income inequality. Much of the underlying theory of fiscal decentralization is based upon Musgrave's (1939) functions of government. Musgrave (1939) defined the main economic role of government as threefold that is Allocation distribution and stabilization. According to Musgrave (1956) the role of government in maximizing social welfare through public goods provision (allocation) should be assigned to the lower tiers of government following the principal of subsidiarity also referred to as the efficiency criteria which states that goods and services should be provided at the lowest tier of the government.

Tiebout (1956) presented a model in which efficiency in public goods consumption is associated with competition among local jurisdictions, whereby individuals are sorted according to their preferences for public goods and services. Individuals will vote with their feet and locate to jurisdictions that offer the bundle of public services and taxes they like best. Pareto efficiency will be achieved without government intervention.

2.2 Empirical Literature

Von Braun and Grote (2000) conducted a cross-country analysis with a sample of 50 countries and concluded that decentralization served the need of the poor, as captured by the HDI. This study emphasized on the need to consider simultaneously political, administrative and fiscal aspect of decentralization process in order to truly assess its impact on the poor. Lindaman and Thurmaier (2002) also used cross-section analysis to examine the impact of fiscal decentralization on HDI and find evidence of positive and significant relationship between different measures of fiscal decentralization and basic needs in education and health. The key weakness of this study is that it never controlled for variables that have widely been established to be important determinant of regional inequality, especially within the context of developing countries like Kenya. Such factors are demographic characteristics of the household such as educational attainment, ethnicity and household size. The study also used a very small sample hence difficult to generalize the findings.

Galasso and Ravallion (2005) using Bangladesh's Food-for-Education program dataset concluded that pro-poor program benefits increased with decentralization. In a similar study, Bardhan and Mookherjee (2004) found that decentralized management advanced poverty alleviation goals in West Bengal, India.

Based on the literature review it is quite obvious that there are still knowledge gaps to be filled as far as the links between fiscal decentralization poverty is concerned. The existing literature on the relationship between fiscal decentralization and poverty does not provide any conclusive result. This ambiguity could be explained by the different empirical models used as well the cross-country data and the time periods studied. In addition, it is not expected that the results for particular countries and time periods need to hold true for other countries and time periods where decentralization may have taken very different forms and structure. In other words, the question of the effect of fiscal decentralization on regional inequality is very much empirical in nature and may vary according to the institutional and political structure of the country in question.

3. Methodology

The paper employed panel data for the period 2002 to 2013, collected from government and UNDP publications to analyse the effects of fiscal decentralization on poverty. Panel data analysis allows control for unobserved county heterogeneity. Moreover, it will help to decompose components of variance and to study the dynamics of change contained in both the endogenous and exogenous variables from the sample. Furthermore, the combination of time series with cross-sections enhances the quality and quantity of the data set in ways that would be impossible using only one of these two dimensions.

The paper adopted the model developed by Kanbur and Feroni (1991), Faguet (2004), Yao (2007) and Besley and Coate (2003), but will explicitly introduce the poverty and inequality dimension.

To determine the effect of fiscal decentralization on poverty reduction the following equations following Yao (2007) and (Sepulveda, 2010) were estimated.

$$P_{it} = \alpha_{i0} + \beta_1 FDT_{it} + \beta_2 E_{it} + \beta_3 TD_{it} + \beta_4 W_{it} + \beta_5 FR_{it} + \beta_6 N_{it} + \beta_7 Y_{it} + \beta_8 H_{it} + \varepsilon_{it} \dots (1)$$

$$P_{it} = \alpha_{i0} + \beta_1 FDR_{it} + \beta_2 E_{it} + \beta_3 TD_{it} + \beta_4 W_{it} + \beta_5 FR_{it} + \beta_6 N_{it} + \beta_7 Y_{it} + \beta_8 H_{it} + \varepsilon_{it} \dots (2)$$

$$P_{it} = \alpha_{i0} + \beta_1 FDE_{it} + \beta_2 E_{it} + \beta_3 TD_{it} + \beta_4 W_{it} + \beta_5 FR_{it} + \beta_6 N_{it} + \beta_7 Y_{it} + \beta_8 H_{it} + \varepsilon_{it} \dots (3)$$

$$i = 1,.,.,.,n\ ;\ t = 1,.,.,.,T$$

Where P is poverty head count. FDT_{it}, FDR_{it} and FDE_{it}, were intergovernmental transfers, county own-source revenue and county expenditure respectively used one at a time, depending on the model specification. The study used several measures of fiscal decentralization constructed by Segarescus (2005) that allowed for various dimension of fiscal decentralization. This is because no single indicator is able to adequately capture the real level of fiscal decentralization of a country. E is Education indicator, W measure access to improved source of water, FR is fertility rate, N is population density, Y is per capital income, H is household size and TD is total age dependency ratio., ε_{it} is the idiosyncratic disturbances, n is the number of cross-sectional units (counties) and T is the number of time periods (years).

4. Empirical Findings

4.1 Descriptive Statistics

Descriptive statistics were used to show the basic characteristics of the data used in this study. These included the percentages of fiscal decentralization indicators, mean, variance and standard deviation of main variables used in this study. Table 4.1 presents summary of descriptive statistics for key study variables.

Table 4.1: Summary of Descriptive Statistics

Variable			Measure of Dispersion			No. of Observations
	Mean	Median	Minimum	Maximum	Standard Deviation	
Share of Intergovernmental Transfers (%)	2.127	1.75	0.319	15.412	1.63	329
Share of own county Revenue (%)	37.72	40.89	0.759	90.17	23.39	329
Share of county expenditure (%)	0.146	0.059	0.006	1.424	0.209	329
Headcount poverty (%)	41.27	39.1	17.6	87.5	12.96	329
Per Capita Income (PPP)	978.99	841	170	4038	614.39	329

Source: Study Data (2016)

The data presented in table 4.1 shows that on average from 2002 to 2014, each county received 2.127 per cent of total intergovernmental transfers, with a range of between 0.319 per cent and 15.412 per cent. The descriptive statistics also shows that the share of county own revenue in total county revenue ranged from 0.759 per cent to 90.17 per cent with a mean of 37.72 per cent. This observation suggested that the proportion of own-source revenue collected by the county governments is low compared to overall revenue. This is below the UNDP recommendation of 50 per cent plus or minus 10 per cent of the total sub-national government financial resources. This could be attributed to weak local revenue base and weak revenue administration in most counties in Kenya. Therefore, county governments in Kenya have very little control over their revenues.

On the side of expenditure decentralization, the share of county government expenditure in total government expenditure ranged from 0.006 per cent to 1.424 per cent with a mean of 0.145 per cent over the study period. The wide range between the maximum and the minimum values for all the variables suggests a large heterogeneity across the counties. The standard deviation for all the variables which is the standard summary statistics for variations over time indicates adequate variable variation over the study period and across the panel supporting regression analysis.

The descriptive statistics of fiscal decentralization indicators, poverty and human development index by county are presented in the table 4.2.

Table 4.2: Descriptive Statistics from 2002 - 2014

	Share of Inter-governmental transfers (%)		Share of County own Revenue (%)		Share of County Expenditure (%)		Poverty Head Count (%)	
COUNTY	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Baringo	1.6707	0.1639	33.6628	20.5858	0.0898	0.1020	43.9714	6.4020
Bomet	1.6804	0.1208	37.1945	23.7816	0.1052	0.1153	43.2857	10.3075
Bungoma	2.9328	0.1289	29.8311	17.8633	0.1549	0.1597	37.7714	9.0728
Busia	1.9917	0.2037	36.1391	20.1383	0.1015	0.1079	45.4000	10.9854
Elgeyo-Marakwet	1.2247	0.1491	32.2654	20.9198	0.0625	0.0779	43.6000	7.2991

COUNTY	Share of Inter-governmental transfers (%)		Share of County own Revenue (%)		Share of County Expenditure (%)		Poverty Head Count (%)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Embu	1.5502	0.0798	41.2342	23.7423	0.0899	0.0919	31.3929	6.0612
Garissa	1.6850	0.3465	22.0737	14.7601	0.1011	0.1465	47.6000	9.1928
Homa Bay	2.4414	0.2155	27.9936	17.7791	0.1221	0.1349	43.8000	3.2244
Isiolo	0.7409	0.2662	59.5715	37.8368	0.0663	0.0701	49.1714	11.1898
Kajiado	1.4275	0.1741	43.6967	21.0471	0.0987	0.1053	35.9714	6.6314
Kakamega	3.8600	0.2724	31.9128	18.7529	0.1824	0.1728	41.1286	5.8585
Kericho	1.6786	0.0528	43.4479	24.4581	0.1040	0.0965	32.0857	6.5193
Kiambu	3.6791	0.5395	52.0254	22.0522	0.2690	0.1788	23.1286	3.4884
Kilifi	2.6582	0.1436	39.4751	22.4098	0.1618	0.1619	47.1714	8.8366
Kirinyaga	1.3984	0.0727	46.3165	26.8544	0.0793	0.0635	27.5000	2.4549
Kisii	2.8800	0.1602	32.5357	20.1127	0.1520	0.1609	36.5357	12.0304
Kisumu	2.3188	0.5872	36.2626	19.2016	0.1862	0.1153	39.7714	4.8321
Kitui	2.5312	0.2641	34.1343	20.5297	0.1325	0.1544	51.3429	6.5742
Kwale	1.6203	0.2103	30.8407	17.8775	0.0901	0.1117	49.4571	15.6509
Laikipia	0.9749	0.3396	56.2818	22.4838	0.0983	0.0743	38.6571	8.6002
Lamu	0.5861	0.1312	32.5260	20.8171	0.0283	0.0393	37.6000	3.9119
Machakos	2.6945	0.1438	52.7801	24.1503	0.2003	0.1734	40.9286	7.4049
Makueni	2.1660	0.1731	28.8929	17.3342	0.0979	0.1093	45.1714	11.3648
Mandera	1.7220	1.0334	21.5601	14.5774	0.1314	0.2114	60.8714	19.9897
Marsabit	1.3231	0.4108	31.9385	21.6170	0.0761	0.1098	60.4000	12.4121
Meru	2.9432	0.1981	34.2451	19.5958	0.1415	0.1396	33.3786	1.9418
Migori	2.1383	0.1393	34.3529	19.9278	0.1218	0.1299	42.9071	4.8791
Mombasa	3.5465	1.2981	55.2815	16.7135	0.3252	0.0856	31.6286	4.9138
Murang'a	2.2802	0.1988	44.4056	24.2205	0.1307	0.1279	34.4929	0.9436
Nairobi City	10.6809	4.1333	66.0357	12.5900	1.2684	0.1132	23.4714	5.1729
Nakuru	3.7484	0.5379	49.1682	18.8598	0.2578	0.1537	30.4714	4.1121
Nandi	1.6816	0.1266	29.7606	17.3089	0.0897	0.1066	37.4143	3.3608
Narok	1.5786	0.2884	70.9232	30.7474	0.1932	0.1331	44.2429	2.4946
Nyamira	1.4174	0.1353	18.8316	11.3470	0.0736	0.0912	38.8714	10.3532
Nyandarua	1.7396	0.1847	41.3945	25.2662	0.0980	0.0937	32.6143	4.8988
Nyeri	2.0922	0.1778	47.7996	24.8393	0.1394	0.1197	26.9429	3.8375
Samburu	0.8983	0.2841	53.6684	32.7264	0.0738	0.0755	59.5857	9.3498
Siaya	2.0759	0.1648	26.5150	16.4584	0.0924	0.0927	39.2857	3.5097
Taita Taveta	1.2267	0.0918	44.3639	26.7712	0.0720	0.0804	38.4714	8.7346
Tana River	1.0489	0.2934	23.4541	15.6033	0.0416	0.0579	58.9000	11.5009

	Share of Inter-governmental transfers (%)		Share of County own Revenue (%)		Share of County Expenditure (%)		Poverty Head Count (%)	
COUNTY	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Tharaka Nithi	0.9952	0.1999	34.3018	21.2407	0.0626	0.0724	36.1857	3.5503
Trans Nzoia	1.6213	0.1797	37.3899	22.0961	0.0997	0.0986	34.6286	5.3807
Turkana	2.1824	1.4226	12.1964	7.8714	0.1454	0.2048	62.5714	18.3609
Uasin Gishu	2.1834	0.2352	49.2104	24.8100	0.1537	0.0939	28.8571	6.9258
Vihinga	1.5220	0.1173	27.2807	16.3546	0.0770	0.0877	34.5143	5.4771
Wajir	1.7053	0.6671	18.8880	12.8974	0.1193	0.1758	62.8857	15.0193
West Pokot	1.2395	0.2959	19.1834	11.8144	0.0783	0.1099	53.8000	10.6532
All	**2.1273**	**1.6307**	**37.7286**	**23.3888**	**0.1455**	**0.2094**	**41.2731**	**12.9606**

Source: Republic of Kenya (various issues) & UNDP (various issues)

Table 4.2 shows that on average Nairobi City County received the lion share of intergovernmental transfers of 10.68 per cent per year compared to Lamu County that received the least share of 0.586 per cent of total government transfers. On the share of own-source revenue, on average, Narok County had the highest share of own-source revenue which constituted 70.9 per cent of its total revenue followed by Nairobi City County and Isiolo with 66.04 per cent and 59.57 per cent respectively. Turkana County had the least proportion of own source revenue of 12 per cent of its total revenue. This implies that Turkana County depended on National government intergovernmental transfers to finance 88 percent of its expenditure.

In terms of expenditure Nairobi City County had the highest share of county expenditure to total government expenditure with an average 1.2684 per cent over the study period. The poverty head count shows that Kiambu and Nairobi Counties were least poor with a poverty head count averaging 23 per cent over the study period. Turkana and Wajir Counties were the poorest with an average of 63 per cent of their population below poverty line over the study period. Nairobi City County had the highest Human Development Index (HDI) with a mean of 0.69 over the study period followed by Nyeri County with a mean of 0.62 over the study period while Turkana County had the lowest HDI with a mean of 0.295 over the study period. It can be seen that counties with greater own source revenue are fairing well in terms of human development compared to those that are highly dependent on intergovernmental transfers to finance their functions, an observation that is consistent with the second-generation literature on fiscal federalism (McKinnon, 1997; Qian & Weingast, 1997; Goerl & Seiferling, 2014).

4.2 The Panel Unit Test Results

The estimation was preceded by a pretest of panel unit root. This paper employed the -Pesaran-Shin (IPS) and Levin Lin Chu panel unit root tests to test stationarity of the series. The *t-bar* statistics reveal that all the variables except the share of county expenditure in total government expenditure (expenditure decentralization) were stationary at levels. However, after first differencing expenditure decentralization attained stationarity. The implication is that while all other variables were integrated of order zero, the expenditure decentralization was integrated of order one. To avoid spurious result this variable was first differenced in the estimation models thus captured as a growth of share of county expenditure in total government expenditure.

Diagnostics Tests Results

Before interpretation of the results of the study models, various diagnostic tests were conducted on each model. This was in order to find out the best estimation method and also to validate the results. It is a prerequisite that for a classical linear model, the error term be normally distributed, with a zero mean and constant variance (Gujarat, 2004). Likewise the residuals should be free of heteroskedasticity and autocorrelation. The diagnostics tests that were conducted were Hausman test in order to ascertain the most appropriate model and method of estimation between; Fixed Effects Model (FEM) and Random Effects Model (REM), Multicollinearity test, Heteroskedasticity test and serial correlation test were also performed.

4.3 Results

To analyze the effects of fiscal decentralization on poverty incidence, the study regressed poverty headcount index on three fiscal decentralization indicators one at time and other independent variables. In the first empirical specification, fiscal decentralization was captured by the share of intergovernmental transfers to county government, in the second, it was captured by the share of county own revenue and in the third, it was captured by the share of county expenditure in total government expenditure. The first, indicator of fiscal decentralization the share of intergovernmental transfers to sub-national government was used to capture the effects of central government grants to counties. The transfers are designed to play an equalizing role and to reduce differences in fiscal capacity across jurisdictions (OECD, 2009). However, they reduce the sub-national government policy autonomy.

The second indicator the share of county own revenue in total county revenue captured the degree of autonomy and discretion of county governments in revenue and expenditure responsibilities, and finally the share of county expenditure in total government expenditure captured the spending responsibilities of county governments. The three fiscal decentralization indicators were used in this manner because no single indicator is able to adequately capture the real level of fiscal decentralization of a country (Sacchi & Salotti, 2011). In addition, the three dimensions of fiscal decentralization are implemented simultaneously in Kenya. To account for the effects that other socio-economic factors might have on poverty the study included per capita income, total dependency ratio, fertility rate, education, household size, population density, access to improved water source, number of constituencies in a county and dummy for marginalized counties as control variables as derived from the literature review. The estimated models are presented in table 4.3.

Table 4.3: Effect s of Fiscal Decentralization on Poverty Head count

Independent Variables ▼	Dependent Variable: Poverty (Headcount)		
	(1)	(2)	(3)
Share of intergovernmental Transfers in total Intergovernmental Transfers (%)	5.0179** (1.9686)		
Share of intergovernmental Transfers in total Intergovernmental Transfers Squared	-0.1362* (0.0695		
Share of county *i* own revenue in total county *i* Revenue (%)		-0.6048**	

		(0.0584)	
Share of county *i* own revenue in total county *i* Revenue Squared		0.0068**	
		(0.0008)	
Δ Share of county *i* expenditure in total government expenditure (%)			4.3605**
			(1.4049)
Δ Share of county *i* expenditure in total government expenditure Squared			-9.3708
			(5.0797)
Per Capita Income	-0.0052**	-0.0055**	-0.0047**
	(0.0012)	(0.0012)	(0.0014)
Total Dependency (%)	0.0356	0.0003	-0.0187
	(0.0432)	(0.0390)	(0.0476)
Fertility Rate	-2.7838*	0.8446	-3.0216
	(1.4324)	(1.3776)	(1.6458)
Household Size	-1.0309	0.7322	0.0708
	(0.9202)	(0.8517)	(1.0362)
Education (%)	-0.1980**	-0.1822**	-0.2198**
	(0.0441)	(0.0400)	(0.0507)
Access to Improved water Source	-0.0965**	-0.0824**	-0.1096**
	(0.0321)	(0.0400)	(0.0378)
Population Density	-0.0037	-0.0054**	-0.0092*
	(0037)	(0.0027)	(0.0039)
No. of Constituencies in County	2.8200**	1.5801	1.9199**
	(0.4617)	(0.4315)	(0.4890)
Marginalization Dummy*Share of Intergovernmental Transfer	7.8672**	-0.1972**	5.3790**
	(2.1648)	(0.0351)	(1.02310
Constant	53.6385**	60.7727**	70.1411
	(10.3949)	(8.1665)	(10.8369)
Observations	329	329	282
Adjusted R-Squared	0.7803	0.8205	0.7790
F- statistic	21.4432**	27.3099**	18.3769**
Prob(F-statistic)	0.0000	0.0000	0.0000
Durbin-Watson stat	1.6519	1.4641	1.5807
Hausman Test	127.8079**	54.0815**	33.0270**
Turning point of the intergovernmental effects (%) when MD = 0	18.42%	44.47%	0.23

*Robust Standard errors in parentheses; ** significant at 1%; * significant at 5%;* Δ *refers to change*

The fixed effect robust option results for the effects of inter-government transfers, own source Revenue and county expenditure on poverty incidence are presented in table 4.3 column (1), column (2) and column (3) respectively. The Hausman Chi-square statistic obtained were all statistically significance at one per

cent level of significance. This implied that fixed effects model was the most appropriate. To control for heteroskedasticity, heteroskedasticity robust standard errors were used.

The results show the share of intergovernmental transfers to county government had a positive and statistically significant coefficient at one percent level of significance. While the square of the share of the intergovernmental transfer (quadratic specification) had a negative and statistically significant coefficient at one percent level of significance. The results suggest that increase in the share of intergovernmental transfers to counties would increase the poverty if implemented at very low levels in the county but if above 18.42 percent it will reduce poverty head count. Thus, the effects of intergovernmental transfers on poverty will depend on the extent of intergovernmental transfers. Given the quadratic nature of the effects of intergovernmental transfers on poverty head count, marginal analysis would imply that the effect of intergovernmental transfers on poverty depends on the extent of intergovernmental transfers. This could partially explain the mixed results on the relationship between fiscal decentralization and poverty reduction outcomes from the empirical literature (Bardhan & Mookherjee, 1998; OECD, 2005; Galasso & Ravallion, 2005).

The findings suggest that the share of intergovernmental transfer is likely to contribute to increasing the extent of poverty but at a decreasing rate. Implying that there is a certain critical level, beyond which any further increase in the share of intergovernmental transfers to sub-national governments may actually lead to decline in poverty levels in Kenya. The coefficients show that a one percentage point increase in the share of intergovernmental transfers to county *i* increases the overall poverty headcount in county *i* by [5.0179-2(0.1362)(FD_T)+7.8672MD] *ceteris paribus*. For example, on average level of share of intergovernmental transfer a one percentage point increase in the share of intergovernmental transfer will increase poverty by [5.0179-2(0.1362)(2.127)+7.8672MD] This transit to 12.3057 and 4.4385 percentage points in marginalized and other countries respectively *ceteris paribus*. 2.127 is the mean value of the share of intergovernmental transfers in the study sample.

The critical level of intergovernmental transfer beyond which the sign of the marginal effect is reversed, is obtained by simply taking the partial derivative of poverty equation with respect to share of intergovernmental transfers, equating to zero and solving for FD_T.

$$\frac{\partial P}{\partial FD_T} = 5.0179 - 2(0.1362)FD_T + 7.8672MD = 0 \rightarrow FD_T^* = \frac{5.0179 + 7.872MD}{2(0.1362)}$$

$$= 18.42\% \; given \; MD = 0$$

Specifically, an increase in intergovernmental transfers increases the poverty up to a critical intergovernmental transfer threshold equal to approximately 18.42 per cent for non-marginalized counties. Deepening intergovernmental transfers beyond 18.42 per cent will reduce poverty levels in Kenya. All counties were found to be below this threshold with exception of Nairobi City County before the year 2013. This finding supports the traditional theory of fiscal federalism according to which sub-national governments should play a minimum role in redistributive policies, which are in fact better accomplished by the central governments for better equity and efficiency reasons (Tiebout, 1956; Stigler, 1957; Musgrave, 1959; Oates, 1972). The results are also supported by others empirical studies such as Martinez-Vazquez (1982), Beramendi (2003), Enikolopov and Zhuravskaya (2003), Neyapti (2006), Sepulveda and Martinez-Vazquez (2010), Saachi and Salotti (2011).

Possible explanation why increase in the share of intergovernmental transfers to county increases poverty could be because an increase in intergovernmental transfers to sub-national governments reduces the ability of national governmental to deal with pro-poor programs. Again, the mere presence of fiscal decentralization might also negatively affect the national preferences for poverty reduction and other outcomes like economic growth, macroeconomic stability and regional disparities which could in turn contribute to increasing the extend of poverty (Sepulveda and Martinez-Vazquez, 2010). Secondly, sub-national governments received transfers which otherwise could be devoted to poverty reduction by national government, and they may be using those funds for different purposes. In addition, most intergovernmental transfers are conditioned to specific functions such as wages for sub-national government public servants, special projects and programmes such as health and infrastructure that have long-run social benefits to society. Thus, sub-national government could be restricted on utilization of those funds and therefore cannot use it in implementing pro-poor programs. Thirdly sub-national governments are less effective than the central government in the implementation of pro-poor programs (Oates, 1972). According to Enikolopov and Zhuravskaya (2003) weak institutions at sub-national government that presents opportunity for elite capture and exploitation by sub-national bureaucrats and elites could also be another explanation.

The estimated coefficient of share of county own-source revenue was negative and statistically significant at one per cent level of significance. The coefficient of its square is positive and statistically significant at one percent level of significance. The results suggests that increasing the share of own revenue will lead to reduction of poverty but at a decreasing rate up to some critical point. The marginal effect of the share of own revenue on poverty given by the partial derivative of the poverty equation with respect to share of own county revenue is therefore given by $[(\mathrm{FD_R}).\ \frac{\partial P}{\partial FD_R}]$ shows that the effect of the share of county own revenue on poverty depends on the level of county own revenue share. The results also suggest that, there is a critical threshold beyond which the effects of share of county own revenue on poverty is reversed. This is determined at the level of own revenue share at which the marginal effect is equal to zero according to first order conditions. The solution gives FD_R^* equal to 58.97 per cent and 44.47 per cent for marginalized counties and other counties respectively. Thus, increase in the share of own county revenue beyond 44.47 per cent leads to increase in poverty in non-marginalized counties.

The finding suggests that poverty is likely to be reduced when the fiscal decentralization process involves real increase in local governments' autonomy, increasing that autonomy of sub-national governments over the revenue and expenditure is important in poverty reduction.

As share of own local revenue of sub-national government in total revenue increases, poverty levels decline. This is because when constituents contribute to county revenue they are more likely to demand transparency and accountability from the county government which might lead to efficient use of resources. The larger the share of sub-national expenditure that is financed via own local revenue collections, the more accountable sub-governments becomes to their constituents, who apparently would correctly evaluate the performance of sub-national government and either punish or reward elected officials in the voting booth. This accountability mechanism in turn serves as an incentive for local governments to make more responsible and efficient tax and spending decisions towards raising the welfare of the constituents.

Alternatively autonomy of sub-county governments is improved as more own local revenue is raised and therefore the sub-county governments are more likely to meet their constituents preferences. In Kenya county governments do have autonomy and discretion on the use of own source revenue most of which is spend on transfer programs such as bursary funds, construction of houses for elderly, youth programs among other programs which impacts positively on households' income and welfare thus reducing poverty. The findings on the effects of own source revenue on poverty is consistent with Sepulveda (2010) that found a negative effect of revenue decentralization on poverty headcount using a cross-country data. However, the findings contradict the traditional normative recommendation in the theory of fiscal federalism that redistributive policy should be exclusively the function of central governments (Tiebout, 1956; Masgrave, 1959; Oates, 1972). One reason for this departure is that the key assumption of household mobility behind the normative recommendation is not met in reality in Kenya. This is because the direct distributive policies of sub-national governments in Kenya do not differ much from jurisdiction to jurisdiction, in which case no significant migration movements are induced (richer households from and poorer households into jurisdictions with more redistribution). In addition, traditional fiscal federalism theory is based on perfect and costless inter-jurisdiction mobility which is also not met in reality in Kenya. With imperfect or cost mobility sub-national governments may become more effective and even efficient in the implementation of redistributive policies. Thus, positive redistribution outcomes are feasible and sustainable at the sub-national level when sub-national autonomy is present to a large extent.

This finding supports the second generation theory of fiscal federalism that pointed out that fiscal decentralization may give rise to a more balanced distribution of resources across space (Gil et al., 2004; McKinnon, 1997; Qian & Weingast, 1997), to such an extent that it may even offset the effects of the loss of redistributive power by the central government (Prud'homme, 1995).

From the results, at higher degree of own county revenue share beyond the critical threshold, sub-national governments may pursue different redistribution policies that may undermine the redistributive power of the national government thus increasing the extent of poverty. Alternatively, it could be that beyond the critical threshold further decentralization might trigger a race-to-the-bottom competition across jurisdictions leading to tax rates that are too low compared to the social optimum (Keen & Kotsogiannis, 2002). This may lower revenues available to promote redistribution policies within each county resulting to increasing poverty levels. Finally taxes raised by sub-national governments are mainly indirect taxes which tend to be more regressive and property taxes which are generally less progressive than the tax mix used by the central government. Thus as sub-national governments strive to raise more these taxes mitigate progressivity of the national tax system burdening poor more.

The results in table 4.3column (3) indicate that the coefficient of the growth of the share of sub-national government expenditure in total national government expenditure was positive and statistically significant at one per cent level of significance while the coefficient in the quadratic specification was negative and statistically significant at one per cent level of significance. This implies an inverted U shape relationship between poverty and expenditure decentralization. That is an increase in the share of county expenditure will initially increase poverty but beyond a certain threshold it will work to reduce poverty. Starting from no fiscal decentralization ($FD_E = 0$), a move towards fiscal decentralization will first increase poverty, up to critical threshold where more fiscal decentralization appear to have a positive effects on poverty reduction. The critical threshold of expenditure decentralization is 0.52 per cent and 0.23 per cent for marginalized counties and other counties respectively. This implies that, on average, when sub-national

government expenditure growth is above 0.52 per cent it will reduce poverty in marginalized counties. These results support the previous findings using the inter-governmental transfers.

This is because sub-national governments do not get more directly involved in the provision of services that most immediately help the poor but at higher levels of expenditure decentralization, sub-national government could use their proximity advantage to effectively implement anti-poverty programs. In addition, sub-national governments may face perverse incentives and pursue imprudent expenditure policies. If unchecked, county leaders could use their offices to benefit powerful subgroups or interests. From a political economy point of view, county governments may be more prone to elite capture and less willing to trade-off narrow local interests for national greater good (Keen & Kotsogiannis 2002). Moreover, it is possible that different results on the expenditure side could be obtained with a more detailed disaggregation of county expenditures considering the expenditure composition and which type of expenditure is decentralized. For example, health, welfare, education, agriculture among others. Considering this, further research focusing on the expenditure composition and which type is decentralized is strongly encouraged.

The result supports the traditional theory of fiscal federalism (Tiebout, 1956; Stigler, 1957; Musgrave, 1959; Oates, 1972). According to this theory sub-national governments should not play any role in redistributive policies, which are in fact better accomplished by the central governments for better equity and efficiency reasons. The result are also similar to those of Sepulveda and Martinez-Vazquez (2011) who found that the coefficient of the expenditure decentralization to be positive and statistically significant. However, these results contradict Sacchi and Salotti (2011) who found that the coefficient of the expenditure decentralization to be statistically insignificant. This difference in finding could be due to the nature and the manner in which the fiscal decentralization is implemented coupled with differences in institutional and legal framework on which the decentralization is anchored.

Typically, since increased sub-national government own revenue is good for poverty reduction, it is logical to expect same for expenditure. Interestingly, the reverse is the case. By implication, there seem to be a missing link between public revenue generation and spending at sub-national government levels in Kenya. There are various explanations for this which could be: public fund misappropriation at sub-national government; the local bureaucrats lacks the prerequisite knowledge in executing public policies and thus end up embarking on white-elephant projects that will not improve the welfare of the people; fiscal indiscipline; exclusion and local elite capture; weak institutions and legal framework within which local bureaucrats operates.

5. Conclusion

This paper analysed the effects of fiscal decentralization on poverty reduction in Kenya. Since fiscal decentralization in Kenya is implemented in various forms such as intergovernmental transfers, own source revenue assignment and expenditure decentralization, the effects of each of these were analyzed. The conclusions from the findings are presented in the following paragraphs.

From the findings related to intergovernmental transfers the study concludes that intergovernmental transfers increase poverty incidence at low levels below 18.42 per cent. Beyond 18.42 per cent intergovernmental transfers would reduce poverty headcount. On the effects of own source revenue the study concludes that increase in own revenue at levels below 44.47 percent leads to reduction in poverty

levels. In the case of expenditure decentralization, share of county expenditure was shown to initially increase poverty incidence at low levels below 0.52 per cent. Beyond 0.52 per cent share of county expenditure would reduce poverty incidence. The study shows that there are differences in the effects of fiscal decentralization on poverty incidence between marginalized counties and other counties, with the effect on poverty incidence being higher for marginalized counties compared to other counties.

Based on the above empirical findings, this study concludes that fiscal decentralization has distributive effects. The effect of fiscal decentralization on poverty reduction outcomes and human developments depends on the nature and design of fiscal decentralization, the extent of fiscal decentralization and county specifics.

REFERENCE

Bardhan, P., and Mookherjee, D. (2004). Poverty alleviation effort of West Bengal panchayats, *Economic and Political Weekly*.

Bardhan, P., and Mookherjee, D. (2005). Decentralizing antipoverty program delivery in developing countries. *Journal of Public Economics,* 89(4), 675-704.

Beramendi, P. (2003). Political Institutions and Income Inequality: The Case of Decentralization. Discussion Paper SP II 09, WZB.

Besley, T., and Coate, S. (2003). Centralized versus decentralized provision of local public goods: A political economy approach. *Journal of Public Economics,* 87(12), 2611-37.

Commission on Revenue Allocation. (2013). *County Budgets 2013-2014*. Nairobi: Commission on Revenue Allocation.

Commission on Revenue Allocation. (2011). *Criteria for Identifying Marginalized Areas for Purposes of Equilization Fund*. Nairobi: Commission on Revenue Allocation.

Enikolopov, R., and Zhuravskaya. (2003). Decentralization and political institutions: CEPR *Discussion Papers*: 3857.

Ezcurra, R., and Pascual, P. (2008). Fiscal decentralization and regional disparities: evidence from several European Union countries, *Environment and Planning* A. 40(5), 1185– 1201.

Faguet, J. (2004). Does decentralization increase responsiveness to local needs? Evidence from Bolivia. *Journal of Public Economics* 88, 867-894.

Galasso, E., and Ravallion, M. (2005). Decentralized targeting of an antipoverty program. *Journal of Public Economics* 89(4), 705-27.

Gil C., Pascual, P., and Rapun, G. (2004). Regional economic disparities and decentralisation. *Urban Studies*, 41(1), 71-94.

Goerl, C.A., and Seiferling, M. (2014). "Income Inequality, Fiscal Decentralization and Transfer Dependency," *IMF Working Paper* 14/64 (Washington: International Monetary Fund)

Greene, W. H. (2003). *Econometric Analysis*. New Jersey: Pearson Education, Inc. Upper Saddle River,

Greene, W.H. (2006). *Econometric Analysis,* 6th Edition, New Jersey: MacMillan Publishing Company.

Gujarati, D.N. (2004). *Basic Econometrics,* 4th edition. New York: Mcgraw Hill Inc.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica*, 46(1), 1251 - 1272.

Im, K. S., Pesaran, M. H. and Shin, Y. (1997). "Testing for Unit Roots in Heterogeneous Panels", *Journal of Econometrics,* Vol.115, 53-74.

Kanbur, R. (2002). Conceptual challenges in poverty and inequality: One development economist's perspective. Department of Applied Economics and Management; Cornell University.

Kanbur, R., and Feroni, M. (1991). Poverty conscious restructuring of public expenditure. In A. Chhibber and S. Fischer (eds.), Economic Reform in Sub-Saharan Africa: The World Bank.

Kanbur, R., and Zhang, X. (2005). Fifty years of regional inequality in China: a journey through revolution, reform and openness. *Review of Development Economics*, 9(1), 87-106.

Kaufman, M., Swagel, P., and Dunaway, S. (2003). Regional Convergence and the Role of Federal Transfers in Canada. *IMF Working Paper* 0397.

Keen, M., and Kotsogiannis, C. (2002). Does Federalism Lead to Excessively High Taxes? *American Economic Review*, 92 (1), 363-370.

Kenya Institute of Public Policy Research and Analysis. (2012). Kenya Economic Report 2012: Creating an Enabling Environment for Stimulating Investment for Competitive and Sustainable Counties. Nairobi: Kenya Institute for Public Policy Research and Analysis.

Kenya National Bureau of Statistics and Society of International Development, (2013). Exploring Kenya's Inequality: Pulling Apart or Pooling Together? Nairobi: Kenya National Bureau of Statistics and Society of International Development

Lessman, C. (2012). Regional inequality and decentralization: an empirical analysis. *Environment and Plannning* A, 44, 1363-1388.

Lessmann, C. (2009). Fiscal decentralization and regional disparity: evidence from cross-section and panel data, *Environment and Planning* A, 41, 2455–2473.

Lindaman, K., and Thurmaier, K. (2002). Beyond efficiency and economy: An examination of basic needs and fiscal decentralization. *Economic Development and Cultural Change,* 50 (4), 915-34.

Martinez-Vazquez, J., and McNab, R. (2003). "Fiscal Decentralization and Economic Growth", *World Development*, 31(9), 1597-1616.

Martinez-Vazquez, J., and McNab, J. (2001). Fiscal Decentralization and Economic Growth. *International Studies Programme Working Paper*, Georgia State University.

McKinnon, R. I. (1997). Market-preserving scal federalism in the American monetary union. In M. Blejer and T. Ter-Minassian (editors), Macroeconomic Dimensions of Public Finance: Essays in Honour of Vito Tanzi, pp. 73-93. London: Routledge.

Musgrave, R. (1959). *The Theory of Public Finance*. New York: McGraw-Hill.

Musgrave, R. A., and Musgrave, P.B. (1989). *Public Finance in Theory and Practice*, 5th ed. Singapore: McGraw-Hill.

Neyapti, B. (2006). "Revenue decentralization and income distribution." *Economics Letters* 92:409-416.

Oates, W.E. (1968). The theory of public finance in a federal system. *Canadian Journal of Economics* 1, 37-54.

Oates, W. E. (1972). *Fiscal Decentralization*. New York: Harcourt Brace Jovanowich, Inc.

Oates, W. E. (1993). "Fiscal Decentralization and Economic Development", *National Tax Journal*, 46 (2), 237-243.

Oates, W.E. (1999). "An Essay on Fiscal Federalism." *Journal of Economic Literature*, 37, 1120-1149.

Oates, W. E. (2005). "Toward a Second-Generation Theory of Fiscal Federalism" *International Tax and Public Finance,* 12(4), 349–373.

Oates, W. E. (2006). On the Theory and Practice of Fiscal Decentralization. In: The Tiebout Model at Fifty, ed. William A. Fischel. Cambridge, M. A: Lincoln Institute of Land Policy, 1-32.

Organization for Economic Cooperation and Development. (2005). "Fiscal autonomy of sub-central governments." Organization for Economic Cooperation and Development Network on Fiscal Relations Across Levels of Government Working Paper No. 2.

Organization for Economic Cooperation and Development. (2009). "Taxes and Grants: On the Revenue Mix of Sub-Central Governments," Working Paper No. 7 (Paris)

Organisation for Economic Co-operation and Development. (2011). *Divided We Stand: Why Inequality Keeps Rising*. Paris: OECD Publishing.

Pindyck, R. S., and D. L. Rubinfeld. (1998). *Econometric Models and Economic Forecasts*. New York: Irwin/McGraw-Hill Companies Inc.

Prud'homme, R. (1995). The Dangers of Decentralization. *The World Bank Research Observer*, 10, 201-26.

Qian Y., & Roland, G. (1998). "Federalism and the Soft Budget Constraint." *American Economic Review*, 88(5), 1143-62.

Qian, Y., and Weingast, B. (1997). Federalism as a commitment to preserving market incentives. *Journal of Economic Perspectives*, 11, 83-92.

Republic of Kenya. (1965). Sessional paper No. 10 of 1965: *African socialism and application to planning in Kenya.* Nairobi: Government Printer.

Republic of Kenya. (2007a). *Kenya Roads Act, 2007.* Nairobi: Government Printer.

Republic of Kenya. (2007b). *Kenya Vision 2030: A globally competitive and prosperous Kenya.* Nairobi: Government Printer.

Republic of Kenya. (2007c). Kenya Integrated Household Budget Survey 2005/2006. Nairobi: Government Printer.

Republic of Kenya. (2006). *Energy Act, 2006*. Nairobi: Government Printers.

Republic of Kenya. (2003a). *Constituency Development Fund (CDF) Act, 2003*. Nairobi: Government Printers

Republic of Kenya, (2003b). *Economic recovery strategy for wealth and employment creation,* 2003 – 2007. Nairobi: Government Printer.

Republic of Kenya. (1998). *Local Authority Transfer Fund (LATF) Act No. 8 of 1998*. Nairobi: Government Printers.

Republic of Kenya. (1969).*Transfer of Functions Act, 1969*. Nairobi: Government Printers.

Republic of Kenya. (2010).*Constitution of Kenya 2010*. Nairobi: Government Printers.

Republic of Kenya. (2012). *County Government Acts 2012*. Nairobi: Government Printers.

Republic of Kenya. (1963). *Constitution of Kenya, 1963*. Nairobi: Government Printers.

Republic of Kenya. (1964). *Constitution of the Republic of Kenya (Amendment), 1964*. Nairobi: Government Printers.

Republic of Kenya, (1984). District Focus for Rural Development. Nairobi, Government Printer.

Republic of Kenya. (2015). *The County Allocation of Revenue Bill, 2015*. Nairobi: Government Printers.

Republic of Kenya. (2014). *The County Allocation of Revenue Bill, 2014*. Nairobi: Government Printers.

Republic of Kenya. (2014). *County Governments Annual Budget Implementation Review Report 2013-2014*. Nairobi: Government Printers.

Republic of Kenya. (2015). *County Governments Annual Budget Implementation Review Report 2014-2015*. Nairobi: Government Printers

Rodríguez-Pose, A., and Ezcurra, R. (2011). 'Is fiscal decentralization harmful for economic growth? Evidence from the Organization for Economic Cooperation and Development countries,' *Journal of Economic Geography* 11(4), 619–643.

Rodriguez-Pose, A., and Gill,N. (2004). Is there a global link between regional disparities and devolution? *Environment and Planning A*, 36(12), pp. 2097-2117.

Rodríguez-Pose, A., and Ezcurra, R. (2010). Does decentralization matter for regional disparities? A cross-country analysis, *Journal of Economic Geography*. 10: 619–644.

Saachi, A., and Salotti, S. (2011). Income Inequality, Regional Disparities, and Fiscal Decentralization in Industrialized Countries. Collana del Dipartemento di Economia, Universita degli Studi Roma Tre.

Sepulveda C F, Martinez-Vazquez J, (2010). ``The consequences of fiscal decentralization on human development and income inequality", WP 10-02, International Studies Program, Andrew Young School of Policy Studies, Georgia State University, http://aysps.gsu.edu/isp/ files/ispwp1002.pdf

Sepúlveda, C., and Martínez-Vázquez, J. (2011). The Consequences of Fiscal Decentralization on Poverty and Income Inequality, *Environment and Planning* C: Government and Policy. 29, 321–343.

Shah, A. (2007). Jostering Responsiveness and Accountable Governance: Lessons from Decentralization Experience. Presented at the World Bank Conference on Evaluation and Development, April 12, Washington, D. C.

Shankar, R., and Shah, A. (2003). Bridging the economic divide within countries - a scorecard on the

Smoke, P. (2001). *Fiscal Decentralization in Developing Countries. A Review of Current Concepts and Practice;* Geneva, UNRISD.

Smoke, P. (2000). *Beyond Normative Models and Donor Trends: Strategic Design and Implementation of Decentralization in Developing Countries,* mimeo, Management Development and Governance Division, New York, United Nations Development Programme.

Sorens J. (2010). The institutions of fiscal federalism, Publius: *The Journal of Federalism* 41(2), 207– 231.

Sorens, J. (2014). Does Fiscal Federalism Promote Regional Inequality? An Empirical Analysis of the Organization for Economic Cooperation and Development, 1980-2005. Regional Studies.

Stegarescus, D. (2005). Public Sector Decentralization: Measurement Concepts and recent International Trends. Centre for European Economic Research *Discussion Paper No.04-74*

Tanzi, V. (1996). "Fiscal federalism and decentralization: A review of some efficiency and macroeconomic aspects", in M. Bruno, and B. Pleskovic (eds.), *Annual World Bank conference on development economics, 1995*, Washington, D.C.: World Bank, 295-316.

Tiebout, C. M. (1956). A Pure Theory of Local Expenditure, *Journal of Political Economy*, 64, 416-424.

Torres, O. (2010), *Panel Data Analysis, Fixed and Random Effects*, New Jersey: Princeton University education.

Tresch, R.W. (2002). *Public Finance*: *A Normative Theory*, 2nd edition, NewYork: Elsevier Science, USA.

Tselios, V., Rodríguez-Pose, A., Pike, A.J., Tomaney, J., and Torrisi, G. (2012). "Income inequality, decentralization, and regional development in Western Europe," *Environment and Planning*, 44, 1278-1301.

United Nations Development Programme, (2010). *Kenya Human Development Report 2009: Youth and Human Development-Tapping the Untapped Resource*. Nairobi: United Nations Development Programme

United Nations Development Programme. (2014). *Human Development Report.* New York: United Nations Development Programme

United Nations Development Programme. (2013). *Kenya National Human Development report.* New York: United Nations Development Programme

United Nations Development Programme. (2000). Overcoming human poverty: United Nations Development Programme poverty report 2000. New York: United Nations Development Programme.

Von Braun, J., and Grote, U. (2000). "Does Decentralization Serve the Poor?" Center for Development Research, University of Bonn, Germany.

Weingast, B. (1995). The economic role of political institutions: market-preserving federalism and economic development. *Journal of Law, Economics and Organization,* 11(1), 1-31.

Wildasin, D.E. (1994). "Income redistribution and migration" *Canadian Journal of Economics*, 27,637- 656

Widhyanto, I. (2008). Fiscal Decentralization and Indonesia Regional Income Disparity (1994 2004). *Jurnal Keuangan Publik.* 5 (1), 19-53

Wooldridge, J. M. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.

Wooldridge, J. M. (2004). *Introductory Econometrics*: *A modern Approach* 2nd Edition. Cambridge, MA: MIT Press.

World Bank. (2006). Strenghtening Bank Group Engagement on Governance and Anticorruption. Washington, D.C.: Joint Ministerial Committee of the Boards of Governors of the World Bank and the International Monetary Fund on the Transfer of Real Resources to Developing Countries.

World Bank. (2000). *World Development Report 1999/2000*: Entering the 21st Century, Washington, DC: World Bank.

World Bank. (2002). *Empowerment and Poverty Reduction:* A Sourcebook. Washington DC: Prepared by Poverty Reduction and Economic Management staff, World Bank.

World Bank. (1995). *Development in Practice: Priorities and Strategies for Education*. Washington DC: World Bank.

World Bank. (1997). China 2020: Development Challenges in the New Century. Washington, DC, The World Bank.

World Bank. (2003). *Cities in transition: urban sector review in an era of decentralization in Indonesia.* East Asian Urban Working Paper Series, Discussion Paper No. 7. The World Bank.

World Bank. (2009). *Fiscal Management in India*. Washington, DC: World Bank.

Yao, G.A. (2007). "Fiscal Decentralization and Poverty Reduction Outcomes: Theory and Evidence." Dissertation, Georgia State University,

Effects if Training on Quality of Clinical Coding at Mbagathi County Referral Hospital, Nairobi City County, Kenya

Gachoka, J. K.[3], Otieno, G. O.[4], Yitambe, A. O[5].

ABSTRACT

Introduction: Professionals from various cadres in the health sector raise concerns regarding the poor quality of clinical coding leading to lack of evidence-based practice. Assessing the quality of the clinical coding in one of Nairobi City County's major hospital would be a step towards establishing the exact gaps in quality of the coding process and outcome. Training the professionals would also foster better clinical coding practice in one of the major facilities nationally.

Method: The study aimed at establishing the quality of clinical coding within Mbagathi County Referral Hospital, and thereafter determined the effect of training on the established clinical coding quality. An interventional trial study design was used, with a quality of clinical coding checklist used classify codes assignment or lack of which. The sample included 320 patient files selected randomly from a month-long list of patients.

Results: The study found out that the overall baseline code quality was slightly above average given that majority (55%) of the code assignment were good as established by a composite score of the various coding quality attributes assessed. Given the need for training based on the low quality, a training intervention was then conducted based on the needs identified. An indexing database was also installed for the coders to use in encoding the codes assigned. Code quality improved to 77% after the training. Code completion was excellent at the facility, as established from the 97% of the files that were completely coded at baseline and later improved to 99%. Notably, also, is that the hospital improved its coding of procedures and death certification by 32 and 53% respectively. The hospital also started using the indexing tool that was introduced as an intervention.

Conclusions: The health facility could act as a good benchmark for code completion. However, code completion without accuracy in the code assignment invalidates the overall quality of coding. Code accuracy improved with the training almost immediately after the interventions. More practice would for sure lead to better clinical coding accuracy.

Keywords: *Quality, Clinical Coding, Code completeness, Code accuracy*

[3] Health Information Specialist, Kenyatta National Hospital
[4] Senior Lecturer, Kenyatta University
[5] Senior Lecturer, Kenyatta University
Corresponding Author: **Gachoka, J. K.** (josphatkiongo@yahoo.com)

Introduction

The International Classification of Diseases (ICD) and ICP are the standard clinical coding tools used in diagnostics for epidemiology, clinical purposes and health management (WHO, 2015). It includes an analysis of specific population groups and their general health status. The tool is used to monitor the incidence or prevalence of specified diseases and other health related problems thus providing an overall picture of the health status of countries and populations. Clinical coding is used widely in the health sector by nurses, physicians, other healthcare providers, health information officers and managers, researchers, health information technology workers, insurers, policy-makers and patient organizations to do a classification of diseases and other health related problems recorded in the different forms of health and vital records like health records and death certificates. The records enable the storage and easy retrieval of information on diagnostics for purposes of clinical, epidemiological and quality as well as the compilation of national statistics on mortality and morbidity by the WHO Member States. Finally, clinical coding also facilitates decision making on reimbursement and resource allocation by countries (ICD, WHO, 2010).

Consistency in Clinical classification of diseases and medical procedures has been a huge challenge in the health sector, both locally and internationally. This is despite the globally approved use of ICD-10 and ICPM. In the global perspective, these coding tools serve well for comparability across nations. The current internationally available training modules endorsed by WHO are custom-made for the developed world, although the application of those modules is limited. South Africa has also made good use of the curriculum due to the capacity within the country's hospitals; the implication therefore is that the existing curriculum is best suited to well-established health systems. Locally, in Kenya, despite the setting up of the Disease Surveillance and Response Unit (DSRU), internal inconsistency of disease and medical procedure classification still remains a challenge thereby hindering the unit's early detection of outbreaks (Mwangi, 2012). The quality of clinical coding in Kenya is 33% - below the WHO standards (Gachoka & Gichuhi, 2015).

Accuracy of the codes, the completeness of codes as well as the timeliness of code assignment are key components that have compromised the quality of clinical coding. As such inadequacy of resources cannot be blamed for the below-par quality of clinical coding in most health institutions. Universality in disease classification, coupled with periodic training on clinical coding relevant to the local context holds promise for both disease surveillance as well as improvement of healthcare quality.

Professionals from various cadres in the health sector raise concerns regarding the poor quality of clinical coding leading to lack of evidence-based practice. In Kenya, training more professionals in the medical field on disease and procedural coding is fundamental in eliminating the inconsistency. Resultantly, there would be accurate research, improved adherence to the set standards, improved reliability of data on cause of death and higher capacity to conduct ICD certification and coding (GOK, MOH, 2015). Tailor-made procedures for disease classification for particular contexts often translate to better consistency of responses and diagnoses as attested by medical practitioners (MSF, 2015). Training on disease and procedural coding is useful for uniformity and continuity in statistics of morbidity and mortality for evidence-based decision making and international and national comparability (GOK, MOH, 2015). The system of classification diseases employed in the ICD system is a complicated model and demands a lot and continuous training to

adequately understand. Over time, in countries like Kenya, health information systems, health data and disease classification professionals have been involved in the clinical coding process, yet the variation in results still exists. Several studies conducted within the field of classification of disease, the effectiveness of the ICD and the challenges that face the implantation of the ICD codes reveal particular gaps in training. There is also the potential in the study providing a fine base for establishment of the exact disease burden in the nation as well as ways of improving health reporting. The study will also provide information that would enable NHIF which is now the main health insurance provider to be more objective in the reimbursement of funds.

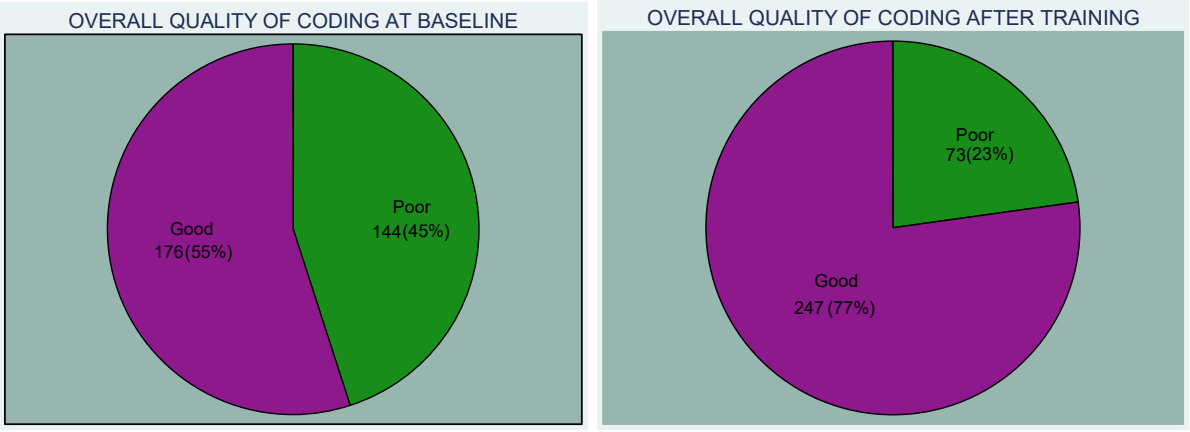
Methods

The study was conducted as a form of an Interventional trial that will use a before-and-after study design with mixed-method (quantitative/qualitative) approaches. A clinical audit was conducted to establish the baseline quality of clinical coding. Training was conducted based on the identified needs from the first clinical audit. Afterwards, a follow-up clinical audit was conducted to establish the effect of that training – first on the overall quality of clinical coding, and then on individual coding components. A sample of 320 files was randomly selected and coding quality checked, based on a pre-designed checklist. A unique serial number was assigned to each checklist providing reference to each of the audited files. The attributes of clinical coding quality that were assessed were diagnosis reporting, code assignment for diseases, external causes of injuries, medical procedure coding, causes of death, interpretation of medical abbreviations and indexing. The quality of clinical coding was assessed for each of these attributes. Based on the ratings for each attribute, a composite score was arrived at which was then used as an indication of the overall quality of clinical coding. The analysis was structured in such a way as to categorize the files based on single diseases (dubbed simple files) or comorbidities (dubbed complex files), and also comparisons made for various subsections. The audited files were from four subsections: Medicine [1], Paediatric [2], Surgery [3] and Obs/Gyn [4].

Results

Accuracy

A composite score was derived from the scores obtained in the various attributes of clinical coding quality. After-which, a mean score was obtained from the nonmissing codes for each case. The overall code accuracy was Fair given that slightly more than half (55%) of the code assignment were well coded. After training, however, the overall quality of clinical coding improved by 18%.



Completeness

The completeness of the codes for disease classification was exemplary with 97% of the audited files found to be having at least a code assigned for the disease-related codes. All the incomplete cases lacked at least one attribute two attributes in the audit tool, given that single diseases and comorbidities were treated as different entities. After the training, the completeness improved to 99%, with the 1% comprising of unreported cases – that is beyond the effect of the clinical coders. Although marginal, the improvement based on the Pearson chi-square and a Fisher's exact p-value of <.05, reveals a statistically significant difference after training.

Disease Code Completeness	Frequency (%)			Chi-square (p-value)
	Complete	Incomplete	Total	
Before Training	310 (96.8%)	10 (3.2%)	320 (100.0%)	2.827 (0.0445)
After Training	317 (98.8%)	3 (1.2%)	320 (100.0%)	

Simple Files

The baseline quality of clinical coding for simple files was above average, given that 75% (181) of the files were coded appropriately for the single diseases. The quality of disease coding for simple files good for 83% (222) files during the follow-up audit.

	Coding Quality		
Single diseases	Wrongly Coded	Well Coded	Total
Before Training	60 (25.0%)	181 (75.0%)	241 (100.0%)
After Training	19 (8.9%)	222 (92.1%)	241 (100.0%)

Comorbidities (Complex Files)

A total of 79 files had comorbidities. Less than half of the complex files (47%) were well coded. The definition for appropriate codes for comorbidities was determined by the correct code assignment that covered all conditions that a patient had. After training – which involved the explanation of the importance of using a single code for multiple conditions – the proportion of well coded complex files rose to 71%, representing one of the best improvements after training.

Comorbidities coding quality	Wrongly coded n	%	Well coded n	%	Total	
Before Training	42	(53.2%)	37	(46.8%)	79	100.0%
After Training	23	(29.1%)	56	(70.9%)	79	100.0%

External Causes of Injuries and Disease

Code assignment for external causes of injuries and disease was required for only 74 files – all of which came from Surgery, Paediatrics and Obs/Gyn specialities. Of all those files, the codes were either missing or wrongly assigned for 24 cases bearing. The effect of training was that 87% of the 74 cases were coded appropriately.

External Causes of injuries coding	Not/Wrongly coded n	%	Well coded n	%	Total	
Before Training	24	(32.4%)	50	(67.6%)	74	100.0%
After Training	10	(13.5%)	64	(86.5%)	74	100.0%

Procedures

43 files were assessed for surgical procedures quality of coding both in baseline and follow-up audit. In the baseline assessment, only 17 (40%) were well coded. The rest of the files were not coded at all. There is then the impression that had the codes been assigned, probably, the accuracy would have been great. After training, the quality of clinical coding improved by close to twice the baseline quality (72%), an indication that while at baseline, the quality of clinical coding was marred by code incompleteness, the result after training was wholly based on poor code accuracy.

Comorbidities coding quality	Not/Wrongly coded n	%	Well coded n	%	Total	
Before Training	26	(60.5%)	17	(39.5%)	43	100.0%
After Training	14	(27.9%)	31	(72.1%)	43	100.0%

Causes of Death and certification

This was the most poorly coded section with less than 10% of the 30 deceased cases appropriately coded and certification done accordingly.

Conclusion

The baseline quality of clinical coding of single diseases at Mbagathi County Referral Hospital was found to be slightly above average, although with great room for improvement. The interpretation of medical abbreviations was also good by the clinical coders given that 80% abbreviations were well interpreted with the most misinterpreted abbreviations including rare occurrences. The biggest challenge at baseline involved medical procedure coding as well as death certification. At baseline, the following conclusions were drawn, some of which were used to design the training tool:

- First, the hospital's clinical coders are more comfortable coding the single disease cases, and in so doing, they work rather efficiently, as seen in the cumulative 85% accurately coded and the less than 5% code-incomplete files.
- Secondly, relating to the overall quality of clinical coding of complex files, the meagre 36% of files that were well coded shows just how difficult the clinical coders at the facility found to code comorbidities.
- Thirdly, coding quality of external causes of injuries was the poorest attribute. This was observed by the either lack of codes or the wrong code assignment for all the cases that were assessed on this criterion.
- Finally, there was good quality of medical procedure coding, as given the accuracy of the files that were coded. However, the glaring lack of code among approximately 90% of files that required assignment of at least a procedure code is alarming.

Upon training, a follow-up audit was conducted one month after the training. The results showed massive improvements, with 32% and 53% increases in the proportions of well coded medical procedure and death certification respectively. All round improvements were also observed in code completeness, single disease coding, multiple diseases coding, and external causes of injuries coding with the rates improving by 2%, 17%, 24% and 19% respectively. The clinical coders also started indexing the clinical codes following the training. It is expected that after a few months, the quality of clinical coding will be even better given that the clinical coders will have practiced the knowledge they gathered during the training and made it more of a routine as suggested by Stausberg *et al. (2008)*.

References

De Vaus, D. (2013). *Surveys in social research.* Routledge.

Diabetes, N. H. S. (2015). Coding, Classification and Diagnosis of Diabetes. *MPs*. & Royal College of General Practitioners.

EAPHLN. (2013). *Communicable Disease Burden Kenya 2009 - 2013.* Nairobi: The East Africa Public Health Laboratory Network - Kenya .

Leekam, S. R., Libby, S. J., Wing, L., Gould, J., & Taylor, C. (2002). The Diagnostic Interview for Social and Communication Disorders: algorithms for ICD-10 childhood autism and Wing and Gould autistic spectrum disorder. *Journal of Child Psychology and Psychiatry*, *43*(3), 327-342.

Lobbestael, J., Leurgans, M., & Arntz, A. (2011). Inter-rater reliability of the Structured Clinical Interview for DSM-IV Axis I disorders (SCID I) and Axis II disorders (SCID II). *Clinical psychology & psychotherapy*, *18*(1), 75-79.

Medecins Sans Frontieres (MSF). (2015, June 2nd). *Kenya: MSF concerned with the rapid spread of the cholera outbreak*. Retrieved October 29, 2015, from Medecins Sans Frontiers: http://www.msf.org/article/kenya-msf-concerned-rapid-spread- cholera-outbreak

Mwangi, L. W. (2012). *A clinical audit of emergency caesarean deliveries at Kenyatta National Hospital* (Doctoral dissertation, University of Nairobi, Kenya).

Simon, J., Bakr, W. S., Ma, R., Tai, M. E., Preiss, P. M., & Greiner, M. (2011). Quantum simulation of antiferromagnetic spin chains in an optical lattice. *Nature*, *472*(7343), 307-312.

Stausberg, J., Lehmann, N., Kaczmarek, D., and Stein, M. (2008) "Reliability of diagnoses coding with ICD-10." *International journal of medical informatics* 77, no. 1. pp. 50-57.

World Health Organization (WHO) (2004). *International Statistical Classification of Diseases and Related Health Problems 10th Revision.* Geneva: World Health Organization.

World Health Organization (WHO) (2005). *History of the development of ICD.* http://www.who.int/classifications/icd/en/HistoryOfICD.pdf, .

World Health Organization (WHO). (2006). *International Statistical Classification of Diseasesand Related Health Problems. .* World Health Organization: http://www.who.int/classifications/icd/en/.

World Health Organization (WHO). (1992). International Statistical Classification of Diseases and Related Health Problems. The 10th Revision, Volume 1, Geneve.