MINERAL EXHIBITION AND INTERACTIVE TRAINING AND LEARNING AT UGANDA NATIONAL MUSEUM

ODONG ALEX

REG: 15/U/14592/GMVP/PE

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DECEMBER, 2017

DECLARATION

I Alex Odong, declare that this thesis is my own original work and that it has not been presented to any institution for any award.

Signature:..

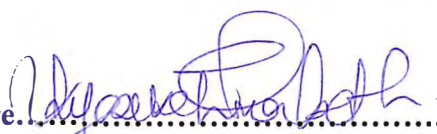Date:.....11/12/2017......................

APPROVAL

This action research dissertation "Mineral Exhibition and interactive training and learning at Uganda national museum" was done under our supervision. It was submitted to the graduate school for examination with our approval as supervisors of the student.

Signature..

Associate Professor: John Baptist Matovu

Principal Supervisor

Date:......11/12/2017............

Signature..

Dr. Elizabeth Kyazike

Second supervisor

Date:......11/12/2017............

DEDICATION

I dedicate this thesis to my family: My wife Sandra, my children Timothy and Noelia. Dedications also goes to my brothers and sisters and in a special feeling of gratitude, I also dedicate it to my lovely Mother, Adoch Dorothy whose words of encouragement inspired me to peruse this master degree up to the end.

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AR- Action Research

ALS   -Action learning strategy

ART   -Action research Tradition

COP   - Community of Practice

FGD   - Focus Group Discussion

FW   - Future workshop

GEAP - Getty East African Program

ICOM - International council of Museums

IKS   - Indigenous Knowledge System

KyU   - Kyambogo University

LB   - Log Book

MC   - Museum Curators

MTWA- Ministry of Tourism, Wildlife and Antiquities

MVP   - Masters in Vocational Pedagogy

NCHE - National Council of Higher Education

NMK   - National Museum of Kenya

NORHED- Norwegian Program for Capacity Development in Higher Education and Research for Development

PAR   - Participatory Action Research

PS   - Practical Skills

QRD   - Qualitative Research Design

SA   - Situation Analysis

SCA   -Student Centered Approach

SCL   -Student Centered Learning

UNM   - Uganda National Museums

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ABSTRACT

The main purpose of this study was to improve mineral exhibitions and train curators to bring about interactive learning at Uganda National Museum

To accomplish this task, a qualitative pedagogical Action Research Approach was adapted. This entailed the use of methods like; group discussion, dialogue, reflective logs, applied learning scenarios, unstructured interview, conversation and participant's observation. In the implementation of these methods, two learning environments were considered at Uganda National Museum; first was the museum entrance hall in which discussions, presentation and, lessons were conducted and secondly, mineral section where theory gained from discussion at entrance hall was put into practice.

The researcher used a Situation Analysis (SA) and Future Workshop (FW) as appropriate tools to assess and analyze issues that have affected exhibitions and informal training needed for museum curators to facilitate practical interactive teaching and learning of from the exhibitions. This exercise involved categories of different stakeholders for instance the staff from department of Uganda National Museums, schools, interns and tourists that are the key stakeholders.

However, there are numerous factors that have affected the general professional practice of museum curators but the researcher choose to deal with those that concerns me as a facilitator of exhibitions and learning since that is where the researcher had mandate and capacity to influence and cause some changes for the improvement of the general professional practice of Uganda National museum curators

As a master's research student of Vocational Pedagogy I have been exposed to the Student Centered Approach (SCA) learning which inspired me into improving my practice; from delivering content to the learners to , facilitating knowledge creation. This eventually motivated me to carry out a research on to how to develop practical ability in facilitating interactive learning processes, while working with curators at the Uganda museum.

The researcher fund out that learning that takes place at Uganda National Museum were mainly passive learning, therefore he introduced interactive learning for mineral exhibitions and also improved on mineral exhibition in science and industry gallery.

CHAPTER ONE:

INTRODUCTION

1.0 Introduction

In this research report, the researcher looked at himself as a curator in facilitating interactive exhibitions, teaching and learning at the Uganda Museum and how one can employ the technical vocational professional practice while facilitating learning processes using learner-centered approaches and improving exhibitions as well as with emphasis on the aspect of practical interactive learning and teaching of exhibitions by curators. This action research study seeks to address challenges that have affected the exhibition galleries in Uganda National Museum (UNM) and the museum curator (MC) with informal training to adopt the practical skills in facilitating interactive learning and teaching of exhibitions to the visitors.

This chapter represents the background of the study which gives an insight into the basis, purpose why it. It also outlines the personal background as a means of creating awareness to the reader of this work about who, the source of inspiration, interest and courage for the researcher that enabled him to carry out this study. In this chapter, the problem statement was derived from the findings of situation analysis and future workshop which enabled the researcher to state the problem under investigation, the objectives, purpose of, research questions, significance and the scope of the study that have guided the whole research process of this project are all in chapter 1

1.1 Background of the Study

The Uganda National Museum started as far back as 1902, when ethnographical specimens were collected from all over the country. In that year, the special commissioner, Sir Harry Johnston sent a directive to all the colonial agents throughout the country to collect ethnographic objects in order to set up a museum. This was cited by Louise, M. Demming (1966) History of Uganda Museum.

In 1908 the Uganda National Museum was officially established and opened to the public in a small Sikh Temple at Lugard's Fort on Old Kampala Hill, under the Botanical Forestry and scientific Department, with the chief forestry officer as the officer in charge.

Thereafter the collection increased at a faster rate and the place become overcrowded in a tinny floor space. It was physically impossible to display all the specimens for public viewing.

The collections too soon started frightening many local people as they consisted of mainly fetishes, charms and horns. Therefore the community then began to refer to the museum as "Enyumbay'amayembe" because the collections of artifacts brought at the museum at that time were main got from witch doctors (The House of fetishes) and the curator as "Omukulu w'amayembe" (The Head of fetishes). Some even believed that these fetishes gave strength to the colonial government.

In 1941 Margaret Trowel, the founder of the school of Fine Art by then Makerere College, took over the duties of the Curator. Therefore in that year the collections in the museum were transferred from Old Kampala hill to a larger space at Makerere School of Fine Art. Funds were raised and a permanent home was established at Kitante Hill, plot 5 Kira road where it was officially opened in 1954 in its current location.

Beside the national and regional museums, there are also community museums in all the four regions of Uganda like Igongo cultural center museum in western Uganda, Busoga cultural museum in eastern Uganda and Ham Mukasa museum in central Uganda, that were initiated by individuals, families or groups who have collected artifacts, oral history, and other elements of the local culture. The museums have made an effort to link past and future through their collections, which are accessible to schools, researchers, local residents and foreign tourists. In 2010 Community Museums agreed to form an association owned by the museum owners themselves called the Uganda Community Museums Association (UCOMA). In 2011, with support from the Cross Cultural Foundation of Uganda (CCFU) UCOMA was registered as a Non-Governmental Organization (NGO) with the National Non-Governmental Organization Board.

The Uganda National Museum's Mission statement is "to impart knowledge of culture and national heritage to the present and future generations for their enjoyment" Her Mandate is to "Promote, protect and present the cultural and natural heritage of Uganda through collection, conservation, preservation, study and information dissemination for delectation and education".

The aims of the Uganda National Museum (UNMM) are to portray Uganda and the activities of its people by preserving and disseminating information about it and its people to the visitors.

The objectives of Uganda National Museums are to Conserve, preserve and document important collections, research about the natural and cultural heritage, exhibiting and interpretation of specimens for public study and enjoyment. The education section endeavors to be an important arena for the understanding of cultural diversity to disseminate information and knowledge concerning Uganda's heritage through activities also include outreach programs to selected schools, the organization of seminars, workshop, conduct, conducted tours, demonstrations, music recital and dance.

Uganda National Museum is a custodian for cultural heritage, the exhibition provides platform for stakeholders such as schools, foreign visitors, local visitors and researchers for public study and enjoyment. The facilitators of the exhibitions are Museum curators, sometimes known as a Museum Docent who provide cultural or historical information about a museum's collection to visitors via organized walk-throughs of the exhibitions galleries and must stay current on the museum's exhibits and policies by attending training courses and lectures.

A curator is one who is responsible for the quality of the museum tour and provides a meaningful performance (Holloway, 1980; Overend, 2012). A curator is also like tour guides who are the only persons whom the tourist interacts with during the tour and they make a significant impact on the tourist's experience (Schmidt, 1979; Holloway 1981; Ap and Wong, 2001)

The researcher observed that the technical team at the Uganda Museum handle basically maintenance of permanent exhibitions rather than upgrading exhibition galleries and the teaching and learning form exhibitions is not practically passed on well to the visitors because the curators have never received formal training which could be attributed to lack of skills in museum pedagogical practices. This was deduced   from visitors' comments in the registration book that many of the Museum curators are poor in facilitating the teaching and learning from exhibitions to visitors which has resulted to inadequate information and lack of interactive teaching and learning from exhibitions.

This therefore compelled the researcher to involve stakeholders in analyzing the existing gaps in exhibition galleries to identify the training needs for museum curators. As a result of that, we come up with the interventions to upgrade mineral exhibition and train museum curators to acquire better skills in teaching and learning from interactive mineral exhibition.

The researcher carried out an investigation on the educational background of museum guides and discovered that only the senior conservator and education officer had educational background of teaching and guiding, unlike rest of the Uganda museum attendants/guides had educational background linked to tourism and the majority learnt through adaption, assimilation and accommodation at the Uganda National Museum.

Personal Background

In regards to my career growth, I have been a freelancer practitioner in the field of art mainly handling contemporary art and design. I have had encounters with several art professionals from the British Museum and National Museum of Kenya (NMK) working with museums as curators from related fields of specialization for varying reasons to build my career. Consequently, I was motivated to become a conservator/exhibitions officer at the Uganda National Museum and later got involved fully in designing exhibition concepts in the field of museology at Uganda National Museum located at Kitante Hill, plot 5 Kira road Kampala

As an exhibitions officer I got involved in several learning processes and demonstration of exhibition design concepts at the Uganda National museum. My basic knowledge in museum pedagogical practice is connected my trade which has enabled me showcased good exhibitions in some of ethnography galleries at Uganda National Museum. Furthermore, I was motivated to seek knowledge in vocational pedagogy to foster and strengthen the technical team involved in exhibitions design concepts in order to upgrade exhibitions galleries at the Uganda National museum and as well as train curators to facilitate interactive teaching and learning from mineral exhibition.

The knowledge acquired in work process analysis for vocational pedagogy opened my mind to critical thinking and analysis of situations. As a professional artist with pedagogical practice at hand, I observed that there are differences in the way Uganda

Museum curators facilitating learning and teaching from exhibitions which don't match with museum pedagogical practice observed during the Getty East African Program (GEAP) I attended in Nairobi.

The interactivity between participants of Getty East Africa Program and trainers were very essential, the forum encouraged discussion and exchange of ideas. Theoretical learning was interwoven with practical application through activity based sessions. The pace of the workshops was provided with plenty of opportunity for repeated practice on new skills and one-on-one work. Throughout the workshops, trainers discussed strategies of theoretic learning that are interwoven with practical application through activity based session on exhibitions that enabled participants to employ them and disseminate the training skills acquired to their colleagues following the workshop. As a result of this program we managed to upgrade some of the showcases at the Uganda National Museum such as the bark cloth, adornment, Stool in Uganda, basketry and bark clothing making in Uganda.

Reflecting upon the mode of teaching and learning in vocational study, the researcher agreed that such a mode of training if adopted by the curators at the Uganda National museum will cause a lot of changes in improving exhibitions and curatorial practices because the museum pedagogical practice empathizes theoretical learning that are always interwoven with practical application. For the case of mineral exhibition, the researcher worked in line this pedagogical practice adopted from the training attended in Nairobi and developed a storyline of mineral exhibition, conducted mock up exhibition and mounted a full flagged interactive exhibitions of mineral. The researcher also facilitated the teaching and learning from interactive mineral exhibitions which involved workshop training with theoretical learning that were interwoven with practical application like demonstration of mineral search hidden and crossword puzzle filling in science and industry gallery.

On the contrary at the Uganda National Museum, the technical team in charge of exhibitions merely does maintenances of the existing exhibitions rather than practical structured activities of upgrading the exhibition galleries. This is partly because they have minimum or no skills in pedagogical practice and curatorial aspects of museology in

order to improve on exhibitions and yet there's also lack of capacity building for curators at the UNMM. It is from this background that I was prompted to involve the stakeholders in analyzing the existing gaps in exhibition galleries to identify the training needs of the museum curators.

The researcher is a student under the NORHED project pursuing a master's Degree (MA) in Vocational pedagogy at Kyambogo University. He also holds a Bachelor's degree in Industrial and Fine Art from Makerere University, He works as a conservator exhibitions officer at the Uganda National museums in the Department of Museums and monuments (UNMM).

1.2 Situation Analysis

The purpose of the situation analysis to the researcher was to understand how different stakeholders were affected by the proposed intervention and to identify stakeholders' priorities in addressing the problem of mineral exhibitions and needs for training museum curators in order to facilitate interactive teaching and learning from mineral exhibitions, to understand the situation in which the intervention/ program was implemented, to identify a suitable place for the project/program implementation, to understand the details of the problem of exhibitions its causes and what is already being done to address it and to identify constraints and opportunities of the intervention.

The findings from the situation analysis conducted at the Uganda National Museum was based on the on the issues raised by the key stakeholders for instance the staff, visitors and administrators who revealed that there is need for formal training of museum guides to facilitate interactive learning and teaching using the exhibitions while there was also the need for upgrading mineral exhibition in order to attract more visitors and also provides formal training for the curators to facilitate effective teaching and learning by the museum visitors.

During the workshop which were conducted later (Figure 1) with the stake holders, a number of challenges were identified and these were un functional policy , inadequate financing, and lack of awareness of the importance of Uganda National Museums in Uganda's development agenda, lack of implementation structures, inadequate information and limited professional skills for museum personnel. Out of those challenges the most

pressing challenge identified was that of upgrading mineral exhibition and bring about interactive learning at Uganda Notational Museum. Figure 1 depicts education officer raising issues concerning exhibitions and training needs for curators.

Figure 1: **Group discussion during situation analysis at UNM resource center**

Source: Workplace survey data, Uganda Museum July 2017

1.2.1 Statement of Motivation

In the 2007, Uganda National Museums and Monuments policy, it was stated that, the annual number of visitors at the Uganda National Museum had increased from 34% to 39%. However, a report from the Ministry of Tourism Wildlife and Antiquities revealed that the turn up of visitors at the museum for both international and local had dropped drastically compared to the previous years. The exhibition section and education unit had always been collaborating closely to facilitate exhibitions to enhance teaching and learning since the museum was opened in 1954.

The knowledge acquired in work process analysis for vocational pedagogy opened my mind to critical thinking and analysis of situations. As a professional artist with pedagogical knowledge I observed that there are differences in the learning and demonstration of exhibitions and the museum pedagogical practice. The researcher further noticed that since the museum was opened, the exhibitions in the galleries had

never been upgraded while the museum curators had also never had any formal training to enable them facilitate accurate teaching and learning to visitors.

It is on this basis that I was prompted to organize a future workshop where stakeholders analyzed the existing gaps in exhibitions galleries and training needs for the museum curators.

The researcher was therefore prompted to conclude that the *"low turn up of visitors"* at the UNMM was as a result of the old exhibitions in the galleries and *"lack of formal training to foster interactive teaching and learning to visitors"*. This research is geared towards improving exhibitions and capacity building of museum curators to facilitate better teaching and learning from exhibitions to visitors.

1.3 Statement of the Problem,

The Uganda National Museum is a non-profit making Government Institution in the service to the society, that is open to the public, which acquires, conserves researches, communicates and exhibits for purposes of study, education and enjoyment, material evidence of people and their environment. The Exhibitions at Uganda National Museum are the public face of museums, therefore effective presentation of collections and information in exhibitions is an activity unique to museums and it is through these exhibitions that majority of the people know museums.

The situation analysis conducted at the Uganda National museum clearly revealed that there are many challenges facing exhibitions and the curators. The stakeholders cited that curators lacked of formal training and most of the exhibition in galleries are outdated, characterized with outdated labels and graphics, dirty showcases, broken glasses, misplaced and disorganized artifacts which has led to inadequate information, poor dissemination of information, lost interest in visiting museum and miss interpretation of information to the public.

The researcher was compelled work on mineral showcase which had been out of display for a couple years and the purpose of this study was to upgrade mineral exhibitions to meet the standard and train curators to acquire better skills in order to facilitate teaching and learning that are interactive with the visitors at Uganda National Museum.

1.4 Purpose of the Study

The purpose of the study was to upgrade mineral showcases and develop a formal training session for curators to facilitate interactive teaching and learning at the Uganda National Museum using the exhibitions.

1.5 Objectives of the Study

i. To upgrade mineral exhibitions at the Uganda National Museum.

ii. To Carry out of formal training for curators to facilitate interactive teaching and learning of at the mineral exhibitions section for visitors of the Uganda National Museum

Research Questions

Four research questions guided this study that were derived from the specific objectives in 1.7.2 above. The research questions were;

i. How can mineral exhibitions be improved at Uganda National Museum.

ii. How can formal training of curators could be facilitated to promote interactive teaching and learning of mineral exhibitions to visitors?

1.6 Justification of the Study

The situation analysis conducted at the Uganda National museum clearly showed that there are very many challenges facing exhibitions especially mineral exhibition in the galleries and the lack of formal education for curators to facilitate interactive teaching and learning at the exhibitions by the visitors. It was observed that majority of the curators were trained on job but had basics of tourism. Thus it was noticed from the registration book that some curators don't pass on adequate information about the exhibitions for the intended purpose of interactive teaching and learning. Therefore, the researcher was compelled to improve on the mineral exhibitions which was in a sorry state and also train curators to facilitate interactive teaching and learning at the Uganda National Museum.

The human resource skill development strategies, according to the National museum and monuments policy, 2015 on human resource skill development strategies, it stipulated

that the department shall support development of staff skills and reskilling in museology and exhibition designs, strengthen the skill exchange program nationally, regionally and international. However, the researcher found out that nothing has been done in regards to implementation of this policy. Consequently, this has resulted into substandard exhibitions and passive teaching and learning of exhibitions. This therefore justifies why the researcher together with the stakeholders decided to change the role of museum curators in the exhibitions space and adopted a pedagogical mode for training that would improve on their practical ability in facilitating interactive exhibitions at the Uganda National Museum.

The passive teaching and learning at the Uganda National Museum has persisted for a couple of years. This is where curatorial practice of teaching and learning at the Uganda Museum makes the museum audiences/ visitors are mainly observers while the curators/guides do dominate the teaching and learning process using exhibitions at the Uganda museum.

For the effective presentation of collection of artifacts in exhibitions and formal training to museum curators to facilitate interactive learning and teaching to the audience. Therefore our point of departure for this action research mainly looked at improving the mineral exhibition and training curators to facilitate interactive teaching and learning at Uganda National Museum. This study is an action research based that is intended to help in monitoring and evaluating the project.

Science and industry gallery is one of most visited gallery by visitors, this is because of the newly exhibited oil and gas exhibitions which has over shadow all other sections like hydroelectricity power, forestry in Uganda, transport in Uganda, sport in Uganda and malaria consortium. Mineral exhibition also lies within the section of science and industry gallery although it was destroyed and abandoned in the section of hydroelectricity power, we collectively decided to work on the mineral exhibition and brought it back on display and it's currently located in former place of malaria consortium.

1.7 Significance of the Study

This project is based on self-reflective study and use of teamwork with the aim of improving exhibitions to promote the, teaching and learning for both museum curators and the audience of the Uganda National museum. The study unveiled the challenges associated with exhibitions at Uganda National Museum and factors that have affected facilitation of effective interactive teaching and learning using the exhibitions by the curators to the museum audience.

However as a result of this, appropriate interventions were designed together with the stakeholders to solve the problems facing exhibitions in the galleries and lack of formal training for museum curators. The experiences acquired from the whole research study, have enhanced knowledge, abilities and understanding of carrying out action research which has had a positive impact on the improvement of my own practice and that of the curators at the Uganda National Museum.

The significance of this study will benefit MVP students at Kyambogo University as point of references and the same will it will benefits museum workers and other professional researcher in the resource center. To the general public, this study will attract more visitors to the museum because of the improvement made on mineral exhibitions.

This study will also benefit other collaborating museum in east Africa who has been working closely with Uganda National Museum.

Limitations of the research

There were a number of limitations that were experienced in the course of this research which might have impacted on the activities and the results of this study process however remedies were sought to ensure that the research is carried out. Such limitations are elaborated below.

Limited time for the research meetings, where only three hours were allocated for each meeting with stakeholders were actually not very adequate to enable me undertake all the activities that I had planned to do with my participants. However we managed to do what we could afford within the stipulated time. The meetings were flexible where by some

participants could leave before the end and it's the results of what was done that are presented in the chapter of findings.

Limited tools and materials especially for the carpenter made it hard for us to supervise the technical team during the implementation stage. This was because the workshop at the Uganda Museum had old tools and machines for the carpenter's work and most of the tools were down. The carpenter only had access to tools from the retired senior carpenter who was always not available at the workplace. To ensure that there was supervision and guidance for the carpenter, the site technician at the department of woodwork always stepped in to help the carpenter with the tools and any other assistance whenever needed.

Funding was another big challenge. As one may be well aware convincing a Ugandan civil servant to attend a meeting without facilitations is like a nightmare. This was solved using my personal savings to at least provide some teas to entice participants to attend the meetings.

1.8 The scope of the Study

The content scope of this action research project is based on the objectives and the questions of this study. In the first and the second objectives, the emphasis was on upgrading mineral exhibitions and formal training for the curators to facilitate interactive teaching and learning for the audience who come to the Uganda Museum. In the third and the fourth objectives, emphasis was on implementing the approved interventions and monitoring and evaluating of the outcomes of the interventions that were considered. In this study, the geographical and content scope were as follows.

Geographical scope

The study looked at factors that are affecting mineral exhibitions in the galleries at the Uganda National Museum (UNM) and lack of formal training for museum curators to facilitate interactive teaching and learning from the exhibitions for to the visitors who come at Uganda National Museum.

Content Scope

The attention was focused on improving exhibitions and the education section to provide formal training for curators in order to facilitate interactive teaching and learning from the exhibitions by the visitors.

Table 1: *Present findings on mineral exhibition upgrading.*

Variable indicators	Strategy used	Activities done	Result achieved
Poor labels, No introductory panel, Non laminated label	Upgrading mineral exhibition	Designed standard label, introductory panel, laminated label and replaced	Improved labels, introduced introductory panel and laminated it
Old and dirty showcases		Refurnished the showcase of mineral	Well maintained showcases
Broken glass on one of the showcase		Purchased new glass and replaced it	A standard showcase
Disorganized artifacts		Reorganized the artifacts in the showcases	Well organized artifact in showcases
Abandoned and poorly maintained showcases		Repaired the showcase and put in on displayed	Well varnished showcases.
Displaced mineral showcase and abandoned in hydroelectricity section		Reassembled the showcases in malaria consortium section	Fully flagged showcases on display
No three dimension layout plan for mineral exhibitions		Redesigned a three layout design for mineral exhibition flow	Improved design layout

Source: Workplace survey data, Uganda Museum July 2017

Table 2: *The researcher carried evaluation on the training conducted at Uganda museum and below is a presentation of the findings on training curators.*

Variables indicators	Strategy used	Activities done	Results achieved
Passive learning	Training to facilitate interactive exhibition	Demonstration of the learning procedure	Knowledge and skills,
		Audience interact with mineral	Creativity, problem solving, hands on experiences in discovering minerals

Source: Workplace survey data, Uganda Museum July 2017

Time scope of the study

The study started from December the 12th 2016 with future workshops lasted up to the implementation which ended on June 30th 2017. the period allocated for the accomplishment of this study was in terms of two quarters that is from February to April and May to July 2017 at the Uganda National Museum in order to enable the researcher to complete this assignment for the award of Master's Degree in Vocational Pedagogy (MVP).

Table 3: *Proposed time frame*

Period	Planned activity
12th December 2016 -30th June 2017	• Seeking for acceptance/permission from KyU to carry out the study in the institution • Carrying out future workshop and situation analysis to ascertain challenges that are affecting exhibitions and curators. • Orientation of the participants to the purpose and research problem • Implementation of the study project • Transcribing and recording data Report writing, submission of the report and defending the master thesis

Key terms used in the study

Mineral: is an element or chemical compound that is normally crystalline and that has been formed as a result of geological processes" (Nickel, E. H., 1995)

Exhibition: is an organized presentation and display of a selection of items which usually occur within museums, galleries and exhibition halls.

Training: is the process of learning the skills you need to do a particular job or activity.

Learning: is a process of gaining knowledge or skill by studying, practicing, being taught, or experiencing something.

Museum: is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment.

CHAPTER TWO:

LITERATURE REVIEW/THEORETICAL FRAMEWORK

2.0 Introduction

This chapter focused on the theories, views and concepts from different scholarly articles that are related to the current study. Mikkelsen (2005) argued that, theories help to frame the way we think and approach a study topic. Theories give us concepts, provide basic assumptions, direct us to important questions and suggest ways for us to make sense of data. In other words theories make us to think through our research and actions. They help us to increase our awareness of the interconnections and of the broader significance of information. Theories help us to link a single study to the immense base of knowledge to which other researchers subscribe. Mikkelsen (2005) further argues that when we fail to make our theories and assumptions explicit we may fall into a trap of making hazy decisions, thinking, faulty logic and imprecise concepts. In regards to the above statements, the researcher found it vital to carry out a study of some theories cited in this report so as to be able to contextualize the research and to have a valuable base of existing knowledge in order to refer to them where need arises.

This chapter is thus intended to build the researchers' understanding of the theories and concepts related to the problem under investigation so as to build a knowledge base from where discussions of the solutions for the research questions of this study emanated. It presents theories and concepts related to teaching and learning, knowledge creation as well as educational research and action research approach in particular. The theories discussed are those that were found to be significant and fundamental in directing efforts to improve exhibitions as well as imparting formal training for museum curators to facilitate interactive teaching and learning of mineral exhibitions to visitors.

2.1 Why improve exhibitions galleries

Until about twenty years ago, museums generally developed their exhibitions using a "linear" or "curatorial" model. One individual (generally a curator) had sole responsibility for development and implementation and, under his or her supervision, the exhibition moved sequentially from one support professional to the next. In the linear

model, it is still common in some natural history and many art museums, the curator has both authority and responsibility for the exhibition.

In the past 20 years, the organizational structures and processes used to create exhibitions have undergone major changes. These changes are in part due to transformations within traditional museums, the emergence of new types of museums are in responses to societal changes. Traditional, collections based museums have experienced increased professionalization and specialization among staff, pressure to include more complex exhibition technologies and approaches within exhibitions, and deliberate efforts to incorporate education personnel in exhibition planning.

One result is that in these museums, even in the most conservative among them, responsibility for exhibition development is now shared among multiple players, and, at a minimum, they give lip service to an inclusive process. In contrast, the focus on audience rather than collections at children's museums and science centers calls for particular, specialized skills in exhibition development. For example, individuals with expertise in child development and early childhood education make exhibitions in children's museums, and those with expertise in teaching scientific concepts and informal science education are employed in science centers. Source, The making of exhibitions: Purpose, Structure, Roles and Process (2002). Smithsonian Institution.

Well much as in the olden day's exhibitionist developed their exhibitions using a linear or curatorial model using which dictates a sole responsibility for development and implementation exhibition under one person's supervision, therefore this model of linear or curatorial approach has phased out because the museum moved sequentially from one support professional to the next stage. However this practice of linear or curatorial model still reflected at Uganda Museum whereby a curator of those day still believes to have authority and responsibility for the exhibition. To the researcher, the explains why exhibition mounted during the time opening Uganda museum have never been changed, therefore this study seek for more complex exhibition and to incorporate education personnel in exhibition planning that is why the research looked improving mineral exhibition and training museum curators.

2.2 The Team Approach to Exhibition Making

A major force in the move away from the traditional "linear" approach occurred in the late 1970s with the Kellogg Projects is known for its long tradition of supporting continuing education, became interested in the Exploratorium's approach to the teaching of science to the public. The Exploratorium's organizational structure, exhibition development process, and focus on exhibits that "work" for visitors embodied the characteristics of what has become known as the "team approach," in which several professionals interact and share creative responsibility throughout the process.

In 1979, Kellogg funding enabled the Exploratorium to conduct workshops for other museums, so that museum professionals could learn new ways to make exhibits. Several years later, in spring 1982, Kellogg funded the Field Museum of Natural History and the Smithsonian's Office of Museum Programs to undertake education related projects. In 1982 Field staff had completed a new permanent exhibition, Maritime Peoples of the Arctic and Northwest Coast, using a team approach. Its Kellogg Project focused on workshops on museum education and exhibition design. Within five years, staff from 80 museums had participated in its workshop on the team approach to exhibition design.

The Field made a distinction between a "committee" and a "team" that is still useful in looking at the variation in exhibition development structures and processes today. They felt that a committee guides an exhibition, while a team works to create it. According to the Field, a committee is any group of people that works to accomplish some end. On a team, however, the mix of people is crucial. There are particular areas of expertise that must be represented, and individual team members have a responsibility to represent a particular point of view. Majority rule and reliance on position of authority are not the interaction styles for a team; compromise and collaboration are (Munley, 1986, p. 31). Source, The making of exhibitions: Purpose, Structure, Roles and Process (2002). Smithsonian Institution. The Kellogg Projects in museum education. Washington, DC: The Kellogg Projects in Museum Education.

There are strong advocates for museums to support a full range of visitor evaluation activities during development. Downey (2002), for example, urges museums to develop audience input at three stages in the process: before design (concept assessment), during

design (prototyping) and post installation (evaluation). At present, while many policies and some procedures specify visitor input and assessment, the evidence suggests that implementation of a complete approach is limited. Museums are more likely to conduct post opening evaluations than to include either concept assessment or prototyping as part of the exhibition development. The "original" Field Museum team specified three kinds of expertise and related responsibilities (Munley, 1986, p. 31)

Curator; the curator provides the scholarly expertise based on knowledge of the collection. As a subject matter specialist, the curator is responsible for establishing the overall concept of the exhibit.

Designer; the designer is responsible for the visual appearance and coherence of the exhibit. The designer's expertise assures that the material is set out in an appealing, understandable, and attractive manner.

Educator; the educator establishes the link between the content of the exhibit and the museum audience. The educator is a communication specialist who understands the ways people learn, the needs that museum audiences have, and the relationship between the museum's program and the activities of other educational institutions, including schools. The educator plans evaluation activities that will examine the exhibit's success in meeting its intended objectives and communicating with visitors.

The team approach stresses roles and process, the team needs to establish shared goals and objectives for the exhibition, share and balance authority and responsibility for a project's vision and outcome, and reach agreement by consensus. The original shift from linear to team model represented an attempt to negotiate authority between subject matter or content experts (curators, for the most part) and subject matter interpreters (educators, primarily). At the extreme, in the linear model, the curator has complete authority; in the team approach, the emphasis on consensus somewhat dilutes curatorial authority. Aside from consensus as a process, the most innovative component of the Field's team approach to exhibition design was the formalization of the role of museum educators. Source, the Kellogg Projects in museum education. Washington, DC: The Kellogg Projects in Museum Education.

The research would like to agree and emulate the team approach which stresses roles and process of the making of exhibitions which clearly define expertise and related responsibility in the exhibition making process. This has really made the researcher know who were very important in the study of improving mineral exhibition at Uganda National Museum.

2.3 Current Exhibition-making Models

Over the past several years, members of the museum community have engaged in a lively discussion about organizational aspects of exhibition development in publications and professional meetings. The Exhibitionist, published by the National Association for Museum Exhibition, conducted a mail survey in the fall of 1999 about the team approach. Two years later, the Exhibitionist devoted an issue to formalizing the exhibition process (spring, 2002), with the intent of updating the discussion of different processes and models. Several articles published in the Museum Journal of Education, 17 (3) (fall): 6-7, have presented and debated exhibition making structures. In addition to sessions at regional museum association meetings, the 2002 Annual Meeting of the Museum (AAM) devoured sessions to the experience of professionals in developing exhibitions and to the team process.

A variety of explanations have been offered for the current focus on structure and process, including resource shortages and the need for greater efficiency, responses to trends in other sectors of the economy, and the increase of occupational specialization within the museum labor force. Whatever the main reasons may be, it is clear that museums are critically examining, changing and documenting their exhibition making processes. Contrarily, Uganda national museum since inception have not embraced any change in exhibition making process which has left a lot of gaps in the current exhibitions at Uganda Museum. Therefore the researcher was compelled to improve on mineral exhibition and train curators to bring about interactive exhibition to students.

2.4 Use of Process Models in Practice

In a survey conducted in late 1999, Rounds and McIlvaney collected information about the use of the team processes from 92 museums (out of a sample of 192). Of those who responded, almost all used a team process or a variation of it. The authors acknowledged that many if not most who did not respond are probably using more traditional, linear

approaches. In a review of exhibition-making approaches, Kamien (2002) stated five key roles discussed below.

2.4.1 Principal curator

This person usually is a director or an upper level administrator who provides the overall landscape for exhibit efforts. While this person may or may not have provided the creative vision for a specific exhibit, his/her support of that vision is imperative, as final approval belongs to the client. The questions clients must answer are: How will the overall resources of the institution be deployed to support this exhibit effort? How will this exhibit support the overall goals of the institution and how, in the end, will this be measured? Does the institution have the necessary staffing, skills and experience to successfully bring the vision to completion?

2.4.2 Content specialist (curator, researcher)

It's the responsibility of curator to provide the content and assure the accuracy of that content. The questions they must answer are: What ideas are fundamental to the understanding and appreciation of the exhibit material? What are the most engaging aspects of this material? Which objects and archival materials will best support the content and be of interest to visitors. In relationship to training curators to facilitate interactive learning at Uganda National Museum, the researcher finds it very important to look content specialist of curators in order to compare with the roles curators at Uganda Museum.

2.4.3 Designer

The designer's primary task is to provide the three-dimensional frame for the exhibit's elements and the drawings/documents that will allow the exhibit to be built and installed as designed. Depending on how the team is conceived and managed, this may be a primarily logistical role, or one that helps define what content will be included and its interpretation for the visitor. The questions designers must answer are: How will the space be organized for maximum coherence and best flow through the exhibit? How will the exhibit be made most visually engaging? What props, environments, or devices might be conceived to support content and engage visitors? However, the roles of the designer

at Uganda museum has not been fully utilize as the primary task provides in the three-dimensional frame above and its not been reflected in most of the showcases, thus the researcher fills it's very important to look the designers task so that he may develop and adopt visual engagement with visitors. This therefore has compelled the researcher to develop a three dimension design layout for mineral exhibition.

2.4.4 Content interpreter (developer, interpretive planner and educator)

The utility of this role is predicated on the notion that a scholar or researcher view of the content is usually not the same as the visitor view, and must be edited and translated for the visitor to best understand and appreciate. The questions content interpreters must ask are: What will the visitors themselves be bringing to this experience? What organization and selection of material, ideas and experiences will make this exhibit content most accessible to its target audiences? What should the overall visitor experience be like?

Project manager; this is the nuts and bolts role of oversight of schedule and budget. The questions to be asked are: How should the process of creating this exhibit be organized? What processes, milestones, etc. must be put in place in order to meet the deadline and budget?

Some museums have made the shift from curator-driven to developer-driven consciously. For example,

A number of years ago the traditional mold was broken and the museum had a huge restructuring which broke the 'curator is king' model. Now, so much depends on the exhibition developer's vision and personality of which the job is being able to understand working with different people and especially the curator. Of course, if the exhibition developer is primarily a subject matter expert and views exhibitions as a communication vehicle, the results are likely to be quite similar to exhibitions that used curator led approaches.

In recent years there has been a growing interest in creating new forms of participation in museums and galleries. Substantial funding was committed to the design and development of new exhibitions and galleries like the National Museum of Kenya (NMK) to facilitate the engagement of visitors and enhance the experience of visitors and

their learning opportunities. New tools and technologies have played an important role in this regard enabling designers, curators and museum managers to develop exhibits that facilitate interactivity and enable visitors to engage in more complex forms of participation in the museums and gallery space (Schiele & Koster 2000).

In some cases, these technologies are used to provide more flexible and wide-ranging information concerning established objects and collections, in others they form part of the exhibit itself (Bradburne 2000; Ciolfi & Bannon 2002; Hall, Ciolfi, Hickey & Bannon 2002; Koleva 2001; Schulze 2001). However, it is increasingly recognized that these new forms of interactivity, whilst enhancing the individual's engagement with particular exhibits, often do so at the cost of impoverishing co-participation and collaboration.

The researcher would like to agree with the scholars, that the cost of impoverishing co-participation and collaboration with partners' in museums are very crucial because they involve close collaboration with curators, museum managers, educationalists, designers, and with museums and galleries that specialize in the arts and decorative arts as well as science centers and science museums. This has therefore involved working closely with designers, curators and artists in developing and deploying interactive exhibits and undertaking studies of their use at Uganda National Museums. In addition, curators will provide information and expertise on the collections and exhibitions to educators. Educators, in turn provide curators with pedagogical strategies to facilitate interactive teaching and learning of mineral exhibitions to visitors/students by the museum curators.

2.5 Learning in Museum

Non-Museum goer's claims that museums are a place for children to have fun, yet informed museum visitors, researchers are well aware that the fun experience often leads to learning out comes. Learning knows no boundaries, and museums can be considered as a kind of learning landscape for all visitors. If learning is viewed as process of changes in knowledge, attitude and values, then museums provides an ideal and provocative learning environment. Learning in museum happens when children connected with an interesting object or experience. The pupil's prior knowledge and personal characteristics will dictate which items and experiences have strongest appeal. When children make contact with an idea, an object or an experience in a museum, the learning and thinking spans a

long period of time and the museum event add an important layer to the on-going learning process. Learning in Uganda Museum has always been passive because curators have not been facilitated to adopt interactive learning, therefore this study seek to improve on mineral exhibition and train curators to bring about interactive learning at Uganda museum.

2.6 Visitor as Learners

Uganda National Museums present schools with learning opportunities to learn about heritage and to explore new ideas. Museums are places that encourage pupils to learn in a way that comes naturally to them, offering opportunities to actively construct meaning, respond to stimulating environment, engage in social interaction, build on what they know, ask questions, follow their interests and solve problems.

Students build knowledge and understandings about the world through personal, social and culturally mediated experiences, so museums can play an important role in promoting this kind of learning. Students come to the museum with a wide range of interest and learning preferences, so management must employ diverse strategies to create meaningful experiences and optimal conditions for interactive learning. This can be achieved through upgrading exhibitions and formal training for the museum curators to facilitate better proactive teaching and learning from the exhibitions to visitors/students.

As a master student of Vocational pedagogy, I have observed that this traditional understanding of teaching and learning through exhibitions facilitated by the museum curators with informal training creates poor expertise of museum guides where the museum guides with informal training are placed in the position of an expert guide and assumes full control of the learning and teaching process whereas the learners/visitors role is limited to listening and receiving information that are given unto them by the curators with no formal training background.

A guide with formal education background is considered a sole source of true knowledge which must be presented to learners (visitors) for him/her to learn from the exhibition. In this process a learner/visitor is a passive recipient of the information that the guide with informal background gives him. This does not allow the visitor to help the curators in

their learning from the exhibitions display as helping each other is considered cheating as observed by Olav Eikeland in (Reason & Bradbury, 2001: 145), thus it promotes unnecessary competition, selfishness and individualism among learners. This perception of teaching is synonymous to what Freire refers to as the "banking concept of education" where he considers teaching as an act of depositing where the teacher acts as a depositor of information whereas the students are the depositories (Freire, 1972: 53).

As asserted by the scholars above, the researcher agrees that teaching and learning from exhibitions that are facilitated by the museum curators don't allow proactive learning and teaching because guides act as depositors of information whereas the students are the depositories. In such a scenario, the researcher noticed that the role museum guides play in the exhibition space to facilitate teaching and learning of exhibitions to students/visitors are not adequately executed because most of the guides don't have educational background of teaching. To implement interactive teaching and learning through museum exhibitions, the researcher adopted the student centered approach of teaching and learning through formal training for the curators in order to gain knowledge in interactive teaching and learning at the Uganda museum. This can be seen from Figure 2 showing interactive engagement thinking about a master piece of sculpture in Saint Louis Art Museum.

Figure 2: **Teacher leads her class through thinking exercises in the museum.**

Photo Credit: Mike Murawski

Basing on the nature of education system in Uganda and the researcher's experience teaching was understood as the management of the learning situation by the teacher

which involves the pre-active activities of planning, sourcing, designing and preparation of the content followed by the direct interaction between the teacher and the learners that finally ends with the pro-active activities of evaluation and re-designing for further teaching. The researcher would wish to emulate this perception of teaching and learning from exhibitions by the visitors so that the museum curators can adopt this mode of teaching to allow interactive teaching and learning among the museum attendants and visitors.

As noted by Mjelde (1993: 19), learning should not be seen as anything that happens inside a student's head when he/she listens to a teacher or reads a book but should be perceived as fundamentally interactive.

2.7 Learning in line with vocational pedagogy

Learning is a holistic complex process involving cognitive, affective and social elements (Bjerknes, 2002). It is a process that involves making connections, identifying patterns, and organizing previously unrelated bits of knowledge, behavior, and action into patterned

Spady (2001: 18) looked at learning as a change in understanding and behavior that results from encountering new experiences while Lovat and Smith cited by Killen (2006) refers to learning as an enterprise of meaning making within particular contexts. These definitions of learning highlight three vital points; that learning results in change in understanding, changes in understanding are a direct result of the learners experience and their thinking about their experiences and that these changes in understanding enable learners to change their behavior.

As a master's student of vocational pedagogy, I would like to agree that pedagogical activities such as teaching and learning are complex processes achievable through different pedagogical approaches. The museum educator's work is currently shaped by accountability requirements typically expressed as visitor targets. Centralized teaching and learning initiatives are presented as 'good practice' which is in line with the roles of curators in the exhibitions space to facilitate interactive teaching and learning out of exhibitions, therefore the researcher intended to adopt this pedagogical approach to improve exhibitions and improvise formal training for curators in order to facilitate

interactive teaching and learning at the mineral exhibition section of the Uganda National Museum.

2.8 Methods of teaching and learning

The discussion and analysis of the theories and views about teaching and learning above brings us to yet another issue of methods of teaching and learning. According to the researcher, the methods as used in teaching and learning process refer to the strategies, approaches or techniques that teachers employ to enhance their students" learning. There are many methods that different teachers put to use and some of which are teacher centered or content oriented while others can be learner/student centered. It should be noted that no single method is effective all the time for all learners since teaching and learning are complex processes which are influenced by many different factors only some of which are under the teachers" control and none of which are fully understood as observed by Killen (2007).

Dagoon (2003: 72). Teachers need to use a variety of methods so as to maximize the learning achievements of the learners and this simply implies use of different ways to help students to learn. The predominant methods employed in Ugandan Vocational Education and Training Institutions, however, have been teacher-centered; lecture method for that matter, where the teachers sits or stand in front of the classroom dictating notes coupled with a few explanations and oral demonstrations which may be abstract to the learners without minding about learners understanding and the duty of the students being reduced to sitting behind fixed desks and copying/writing notes that the teacher gives them orally or written on the chalkboard.

Students are not usually involved actively in their own learning which may probably hinder their understanding of the concepts and subject matter being taught. It is important to note that teaching in this era of knowledge explosion and expansion is no longer about helping learners to accumulate knowledge that is passed onto them by the teacher rather it is about helping them to make sense of the new information no matter its source, integrating it in the existing ideas and applying their new understanding in a meaningful and relevant ways (Killen, 2007)

As explained by the above scholars and witnessed by the researcher, this method of teaching and learning technique can be adopted and deployed if curators attain formal training in guiding. The researcher at the workplace observed that students who come to learn are not usually involved actively in their own learning which may probably hinder their understanding of the concepts and subject matter being taught by the curators. The roles of the curators in the exhibition space are to facilitate interactive teaching and learning of what is in the exhibitions to students/visitors, if this mode of student centered approach is adopted through formal training of museum curators. This would enable the museum curators and students to actively involve themselves in proactive learning and teaching what is at exhibitions to students/visitors.

In the 1960s and 1970s, education theorists like Paolo Freire and Loris Malaguzzi, following in the progressive education tradition, created pedagogies that involved awakening critical consciousness and providing opportunities for self-affirmation through a co-production model where both student and teacher create the educative experience.

Kaaur (2000) as cited by Faugli argues that the pedagogy of constructivism includes learning by doing, learning through interaction, learning in rich environment, learning at high order thinking level and learning in teacher supported environment (Faugli, 2003). The researcher experience in the field relates to Kaaur's argument in the sense that learning was organized to include all forms of learning methods such as group discussion, field trips and mentorship among others. Learning by doing involves hands-on and hand-off in performance of tasks. It is the composition of thinking, feeling, acting and watching.

According to (Faugli, 2003) argument, the researcher is confident that learning that involves hands-on is very important when students visit the museum for study purposes. Learning things like craft making, excursion, pottery and demonstration of dance is within the pedagogy of constructivism which also includes learning by doing, and learning through interaction with artifacts. It's through formal training of the museum curators that will enable the curator's to adopt this mode of learning so that they are able to implement interactive teaching and learning through exhibitions to the visitors.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter elaborates the research methodology utilized in the study. Todd, describes methodology as a method or process researchers use to accomplish a task or compose a theory. Research methodology thus refers to the procedures used to make systematic observations or otherwise obtain data, evidence or information as part of the research project or study. The term methodology is used in this report to mean the approach, procedures, strategies and methods employed in a study enquiry in order to answer the research questions. These procedures presented in this chapter are as follows; research design, study population, sampling methods, data collection methods, tools and instrument used in action research study.

This study being a participatory action research study and having adopted a qualitative descriptive research design, interviews were utilized. These included conversational and open-ended interviews, dialogue and group discussions, documentary analysis and observation and participant observation as methods of data collection. To ensure effective use of these methods the researcher used a digital camera, interview guide and open ended questionnaires, reflective logs/field notes and student's evaluation notes as tools of data collection. In regard to data analysis data was transcribed and coded and present following the objectives of the study. The study population was composed of members of staff from the Uganda museum, students who visit the museum, interns at the museum and the commissioner who heads the department of Museums and Monuments.

3.1 The Research Design

According to Kerlinger (1986) cited in (Kumar, 2005) that research design is a complete plan, structure or strategy of investigation so conceived as to obtain the answers to the research questions or problems and includes what the investigator did from the time of writing the hypothesis/research questions and their operational implications to the final analysis of data. It can also be defined as a procedural plan that is adopted by the researchers to answer questions validly, objectively, accurately and economically

(Kumar, 2005). It is therefore an arrangement of conditions for collection and analysis of data in a manner that aims at combining relevance to the research purpose with the economy in the procedure as suggested by Selltiz *et al* 1962 cited in (Kumar, 2005).

In simple terms a research design is a blueprint or detailed plan for how a research is going to be brought to accomplishment including the methods of data collection and data analysis as precisely, accurately, economically as possible with the main aim of getting the answers to the research questions. Therefore the research design enabled the researcher to conceptualize an operational plan to undertake the various procedures and tasks required to complete a study and to ensure that these procedures are adequate to obtain valid, objective and accurate answers to the research questions (Kumar, 2005:84). It is thus a research plan of data collection and analysis. For purposes of this research, a qualitative descriptive research design was used that aimed at studying and learning how experiential learning and group discussion/ cooperative learning can be incorporated and used in the facilitation of the learning process of the curators so as to improve their learning outcomes especially in terms of vocational practical skills in their subjects, critical thinking skills, interpersonal or social skills that are good attributes of every good technical/vocational teacher. The researcher applied a qualitative descriptive research design in participatory action research approach because it freely allows transfer of knowledge from the researcher and the participants (Ary et al., 2010).

A descriptive research design is concerned with answering questions such as what, how, which, when and why. Therefore a descriptive research design was applied to ensure that complete description of the situation so that there are minimum biasness in the collection of data so as to reduce errors in interpreting the data collected. This justifies choice of the research design in that the data of this study basically takes the form of written descriptions of the researcher's experiences and reflections and those of the participants.

Qualitative Research Design

The researcher in this study applied the Qualitative Research Design (QRD) because it was a means of exploring and understanding individuals or groups ascribed to a social or human problem. It involved emerging questions and procedures which enabled data to be collected in the participant's setting thus creating a sense of security to the participants.

Data analysis was inductively built from particulars to general themes and the researcher made interpretations of the meaning of the data with the participants.

This research design takes account of complexity by incorporating the real-world context and can take different perspectives on board. It studies behavior in natural settings or uses people's accounts as data; usually no manipulation of variables. It focuses on reports of experience or on data which cannot be adequately expressed numerically. This research design was viable for the study because it focuses on description and interpretation and might lead to development of new concepts or theory, or to an evaluation of an organizational process. It employs a flexible, emergent but systematic research process (Hancock B. , 2009).

Participatory Action Research

A participatory action research (PAR) approach was used in this study. Participatory action research is a recognized form of experimental research that focuses on the effects of the researcher's direct actions of practice within a participatory community, with the goal of improving the performance quality of the community or an area of concern.

It is also a reflective process of progressive problem solving led by individuals working with others in teams or as a part of a 'Community of Practice' (C.o.P) to improve the way they address issues and solve problems. Reflecting upon these definitions and that of Greenwood and Levin (1998:   4-6), the research methodology of action research is a conjunction between research (inquiry), participation (collaboration) and improvement or change.

The researcher found this theory of Greenwood and Levin (1998) important because it is a tool used for assessing the quality of work in terms of originality, significance and rigor. It also addresses how action research is done and implemented.

Action research as described by Van Baren (2012) is an educational research involving collecting data regarding the current educational situation, analyzing it, developing a plan to improve it, establishing changes after a new plan has been implemented and developing conclusions regarding the improvements.

According to (Brown, Dressler, Eaton and Jacobson, 2015), action research is a systematic procedure that is flexible and can be adopted to address educational problems, therefore the study employed an action research design. The flexibility of this action research enabled the researcher to apply multiple data collection methods and tools that enabled the participants to directly participate in the research and the observed activities that were implemented.

As asserted by (Hein, 2009), action research is a means of in-service training by equipping the teachers with new skills and methods, sharpening analytical powers and heightening self-awareness. Consequently this research design was of importance to other curators who were part of the research process in order to obtain skills for problem identification and solving.

3.2 Implementation of Action Production Objective

Action research is a process of systematic inquiry that enables people to find effective solutions to real problems encountered in daily life (Ferrance, 2000; Lewin, 1938; 1946; Stringer, 2007).

By focusing on generating specific solutions to practical, localized problems, action research empowers practitioners by getting them to engage with research and the subsequent development or implementation activities (Meyer, 2000).

Action research provides the means by which professional people may increase the effectiveness of the work in which they are engaged (Mills, 2013; Lingard *et al.*, 2008; Stringer, 2008; Whitehead *et al.*, 2003)

Based on Hine, (2013). Arguments, this study took three stages of planning, observation, reflecting and acting. During the situation analysis and future workshop, the problems were realized, therefore the study started from acting and implementation stage which involved data collection and documentation, data analysis/interpretation and reflection on issues raised by the stakeholders in order to implement further changes required in the exhibitions' section of the Uganda National Museum and formal training for the museum curators who facilitate the teaching and learning of what is in the exhibitions to the visitors.

3.3 Population

Target population refers to the entire population in which the researcher is interested and requires information from. This is also the population to which the researcher intends to apply the results and conclusions of his study. This is in agreement with Billet (2001) who stressed that, engagement of stakeholders in problem solving ensures implementation of the suggested solutions. The study population of this study included staff of the Uganda National Museums, schools, interns and visitors.

3.3.1 Sample and Sample Size

Sample size determination is the act of choosing the number of observations or replicates to include in a statistical sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample.

During the situation analysis and future workshop, the researcher engaged quite a number of stakeholders from the department of Museums and Monuments, however the study in this action and implementation research was focused on the most influential stakeholders leaving a side some of the less influential ones because of the nature of their roles such as drivers and secretaries, whereas those who are influential were the top management, heads of section and curators/guides.

This study included 2 top management officers, 3 ethnographers, 2 archaeologists, 2 sites & monuments personnel, 2 researchers, 2 paleontologists, 6 people from the technical team, 6 guides, 3 educators, 8 museum attendants, 12 interns and 2 volunteers all from the Uganda National Museum (See list of stakeholder in appendix 18).

During this stage of implementation and evaluation, the researcher dealt with top management, head of sections, researchers and the technical team because of the key role they play.

(Table 2) Category of Stakeholders based their roles which is purposive.

Table 4: *Category of Stakeholders*

Category of stakeholders		Number
Influential		16
Less Influential		04
Total		20
Influential	**Roles**	**Less influential**
Administrators	Management of Uganda national Museum	• Drivers • Secretary
Heads section	Management of sections	
Museum attendant	To attend to the museum audiences	

Source: Workplace survey data, Uganda Museum July 2017

The organization chart (Figure 3) typically illustrates the relation of one official to another and shows the relationship of one sector to another at UMM. This chart is valuable in that it enabled the researcher to visualize a complete organization with her stakeholders.

This organization chart clearly designated the researcher's job description as Conservator Exhibitions Officer and in-depth it clearly spelt out responsibilities as follows; to organize, design, manage exhibitions and outdoor events at the museum, to research on exhibition themes, design and organize temporary and cultural performances, to liaise with curatorial staff on relevant topics for exhibitions, to foresee maintenance of permanent exhibits within the national and regional museums and any other duties assigned by the senior conservator exhibitions.

Organization Chart for Department of Museums and Monuments

Other Staff

1. Receptionist — 2
2. Museum Attendants — 8
3. Security — 4
4. Drivers — 3
5. Musicians — 1
6. Dancers — 3
7. Site Attendant — 8
8. Machine Attendants — 2
9. Carpenters — 2
10. Electrician — 2
11. Museum Guides — 3

Scales

1. Commissioner — U1
2. Assistant Commissioner — U1 (a)
3. Principal Conservators — U2
4. Senior Conservators — U3
5. Conservators — U4
6. Personal Secretary — U4
7. Stenographer Secretary — U5
8. Accounts Assistants — U5
9. Assistant conservators — U5/6

Figure 3: **Organization chart for the department of museums and monuments**

3.3.2 Sampling Technique

The study utilized the purposive sampling technique. The purposeful sampling means that the researcher is looking for participants who possess certain traits or qualities. In this sampling method, the researcher considers the aim of the research and selects samples accordingly (Coyne, 1997: 624). Therefore, the purposive sampling technique enabled the researcher to select the most influential stakeholders who implemented the identified interventions and evaluated the outcomes of the project.

3.4 Methods and tools for data collection

Research methods can be defined as a comprehensive set of approaches to gather evidence and analyze specific problems and thus incorporates techniques and tools: Techniques being practical ways of collecting data and for analyzing the information obtained in the research process while tools are the instruments used in the process (Mikkelsen, 2005:139). Ary *et al.* (2010) asserted that while the choice of the method in research depends on the researcher's preference of the method, the suitability of a particular method largely depends on what he/she is studying or what he/she intends to find out.

Johnson and Enwuegbuzie (2000) cited in Ary *et al.*, (2010) argued that, what is most crucial in deciding which method to use is the research question where they say that, research methods should follow research questions in a way that offers the best chance to obtain useful(and the most thorough) answers. Bell (1993: 4) also supported this where she asserted that the approach and the methods of data collection selected depend on the nature of the inquiry and the type of information required.

With the above ideas in mind and with the need to carry out a purposeful research, it was of paramount importance that the best possible data collection tools, techniques and materials so as to obtain valuable data capable of enabling the achievement of the objectives of this research were used. Data was collected that matched the intent for this study from various sources using various methods and tools which include: documentary analysis; books, journals and other written materials in both soft and hard copies and web documents via the internet, interviews included informal conversational and open ended questions, dialogue and group discussions, observations ; majorly participant observation

among others coupled with personal reflections; reflection logs and field notes to generate valuable data for this study were all used. For the purpose of this research project the researcher used the following methods and tools for data collection.

Documentary analysis

This is the method which Ary *et al*. (2010) called examining. Kumar (2005) observes that the review of literature is one of the essential tasks that a researcher does when he/she undertakes a research study so as to acquaint him or herself with the available body of knowledge within the area of study.

Documentary analysis is the method that involves deriving information by carefully studying written document, or visual information from sources called documents (Mertens, 2005).

This method helped the researcher in the initial stages of the research to establish the theoretical roots of the study, clarify ideas and develop methodology and in later stages help him/her to enhance and consolidate knowledge base and integrate findings with the existing body of knowledge (Kumar, 2005). This method was used to find out what other scholars have documented in relation to the current problem to guide the researcher's actions, research design and methodology in this study.

As already highlighted by Kumar, it was found so important to engage in literatures put down by other scholars in order to enhance understanding and repertoire of knowledge so as to have a value base from which to base arguments, submissions and reflections upon the research actions and observations that were made during this study process. Documents like the museum journal, published related documents on the internet to backup findings of this study were also used. In using this method, most of the time the researcher was interested in investigating the authenticity of the documents and the source of the document that were read in order to get the most authentic and reliable information.

Articles and books that were related to this current area of interest putting into consideration the authenticity of the source, author of such documents among others were read. This involved first of all finding out who wrote them by checking their biography,

their academic backgrounds and also checking if they wrote with some intentions of advertising or whether they were written for educational purposes. In order to avoid a lot of burden of doing all these s the books read were obtained from the Uganda National Museum library and Kyambogo University library that were felt to be of sound value and from recognized authors.

Interview

Denscombe (2003) and Patton (2002) cited in (Mikkelsen, 2005, p. 171) assert that an interview is not just an interview. Interviews are questions on experiences and behavior, on opinions and values, on feelings, on needs, knowledge and background data, they are presupposition questions and neutral questions; simulation questions etc. which may address the past, present or future.

As put forward by (Kvale & Brinkmann, 2009, p. 2), an interview is literally an interview an inter-change of views between two persons conversing about a theme of mutual interest. They maintain that a research interview is based on conversations of daily life and is a professional conversation where knowledge is constructed in the inter-action between the interviewer and the interviewee. Through conversations we get to know other people, learn about their experiences, feelings, attitudes and the world they live in.

A qualitative interview seeks to understand the world from the interviewee's point of view, to unfold the meaning of their experiences, to uncover their lived world prior to scientific explanations (Kvale & Brinkmann, 2009, p. 1). These authors assert that a research interview is nothing mysterious, it's just a conversation that has structure and purpose and thus goes beyond the spontaneous exchange of views in everyday conversations and becomes a careful questioning and listening approach with the purpose of obtaining thorough tested knowledge.

As asserted, interviewing is a way to collect data as well as to gain knowledge from individuals. Kvale (1996, p. 14).In an interview therefore a researcher asks about and listens to what interviewees themselves tell about their lived world; their dreams, fears and hopes, their views and opinions, their school and work situations, their family and social life among others in their own words. Interviews take different forms and are of

varying dimensions but for purposes of this research conversational (informal interviews) and open ended questions were used.

Informal conversational interviews

The researcher chose to use informal conversational interviews with stakeholders at workplace due to their nature of flexibility that allows questions to emerge from the immediate context, in the natural setting of the study as pointed out by Patton cited in (Mikkelsen p.171). Since this research was based in the workplace, the nature of the interactions that existed in the teaching and learning process required that questions are not preset or predetermined instead they were left to emerge from the context of the learning process as it unfolded.

The researcher used informal conversational interviews to obtain the stakeholders experiences and reflections upon the different activities which we engaged in together in workshop and alone in their group discussions as well as individually. I used answers to such questions to reflect on my actions as a lead researcher so as to plan the next course of action. I also used this method at the end of the study to capture the overall experiences, feelings and attitudes of the curators towards learner centered approaches to teaching and learning exhibitions which I will be presenting in the next chapter of this report. I also used conversational interviews during situational analysis to get ideas from the stakeholders I interacted with to find out the current state of affair regarding teaching and learning exhibitions I also particularly used this form of interview with the some administrators at the section unit to find out what plans and ideas they have for the improvement of interactive teaching and learning exhibitions to audience in the Uganda National Museum.

The use of this method was a little bit cumbersome for us to use in that it required high level of attention so as to capture all the responses and writing all the responses as the interview conversation went on was not an easy task for me. However to effectively use this method I in some instances used a voice recorder to supplement my notes.

Open ended questions

Patton (2002) cited by (Mikkelsen, 2005) describes open-ended questions as a type of interview where the exact wording and sequence of questions are determined in advance and all interviewees are asked the same basic questions. In this respect, I administered the kind of questions to the curators at Uganda Museum during situational analysis in trying to identify challenges facing exhibitions and curators at workplace. The questions used were in a completely open ended format to invite interviewees" explanations, views and perceptions rather than allowing interviewees to answer yes or no. I used open ended questions in order to be able to get various views from different stakeholders so as to be able to compare the ideas they raised. The challenge with this method is that there is little flexibility in relation to the interview to particular individuals and circumstances as suggested by Patton since the questions are predetermined by the researcher and thus the interviewee has to fit in him/herself. However I found it important for this purpose they were intended to perform as I was interested in knowing and possibly understanding stakeholder's perspectives and explanation on the challenges that were facing exhibitions and in the teaching and learning process of interactive exhibitions with the audience/students.

Focus group discussions and dialogue

Dialogue according to Bohm (1996) is a stream of meaning flowing among and through us and between us, which will make possible the flow of meaning in the whole group out of which emerge some new understanding. Thus it is a free flow of meaning that balances inquiry (asking) and advocacy (telling) in one's attempt to bring about a common understanding of a given phenomenon among the group members.

The dialogue was important method in this study especially during problem formulation, data collection and validation and report writing. I used this method due to the fact that participatory action research perspective that I employed maintains that problems are not defined by experts but should be based on dialogue (Mikkelsen p. 36-37). This method helped me to understand participants responsibilities, interests, needs, availability for the research process and plans for improvement.

In this research, dialogue with participants helped to bring participants" realities close to mine which reduced the possibilities of me becoming a threat to them as participants and to the whole museum due to my opinions and somewhat provocative questions. As encouraged by Mikkelsen action researchers need to create a dialogue with those people who are directly or indirectly affected by the study or intervention which justifies my use of this method. This required me as a researcher to remain flexible in the study design but without losing direction, sensitive to the context of the study and to adjust the approach accordingly, listening to the people's views and knowledge but without thinking that only their voice counts (Mikkelsen, 2005, p. 75).

Johnson and Johnson (1999) also maintain that using group dialogue in facilitating learners learning process in a group requires that the teacher/researcher is aware of the group dynamics and thus the success of this method in this study depended on my awareness of group dynamics and the characteristics of good dialogue as mentioned in chapter two of this report. I have throughout the process of report writing of this study been engaged in group discussions with my workmate and our mentor professor Johan J.B Matovu and Dr Kyazike Elizabeth to mention few.

We have been brainstorming on the possibilities and various ways in which the this work could be improved so that it can bring out clearly the actual learning that resulted from the experiences I encountered during the field study which may sometimes be silent within me but having great impact on the way this report would be understood. These discussions have helped me to reflect on all the experiences and to increase researchers understanding of situation as it unfolded during the field study. It is through these group discussions that this project report came to this shape.

During the discussion, I would first describe what I have prepared/written with reasons as to why I have done so and briefly give a description of what transpired on the ground. The group members together with our mentor would then ask questions on areas where the work seems unclear to them. I would then explain according to my own understanding and experiences as obtained in the field. Finally my colleagues and the mentor would give their comments and suggestions based on what they had read in the piece of work that I had sent to them through emails and also on any other issue that

could have evolved as a result of my explanation and my answers to the questions raised during the discussion. It is from such comments that I would base my further reflection upon the research process so as to improve what I had documented. The discussions have been majorly more of dialogue and brainstorming and as the norm of our learning group at the end of the discussion session I would give an oral account of my learning as a result of the interaction with the members.

In the study, Focus Group Discussions (FGD) helped me to collect information from the different categories of stakeholders in the department of Uganda National Museums, schools and visitors. According to the scholar, Focus groups provide insights into how people think and provide a deeper understanding of the phenomena being studied. (Bany Nagle N. W.) Focus groups are valuable research tools and can capture information that will help to better tell the story on the study topic.

Future workshops

Was a good tool for tackling complex problems where many, often seemingly contradicting views, have to be fitted together (Lauttamäki, 2014) Therefore Future workshop was applied by the researcher to critically analyze the area of concern that will help the stakeholders to establish the most burning issues and come up with an intervention to address it.

Observation

Observation as a means of collecting data, is the process of gathering open-ended, first-hand information by observing people and places at a research site (Creswell, 2008, p. 221). Observation is more than just looking (Cohen et al., 2011); it involves systematic looking and noting of events, behaviors, settings, people, artefacts and routines. This involves also observing the behaviors of the people being studied as they unfold due to their interaction with the environment.

Millar (2008) asserts that observation means using ears and eyes to obtain data about people, events and places. Observation as a method of data collection offers the researcher an opportunity to gather live data from naturally occurring social situations. It

allows the investigator to look at what is taking place in situation rather than relying on second hand accounts.

Cohen et al. (2011) observe that since observations allow use of immediate awareness or direct cognition as a principle mode of research, they have a potential of yielding authentic and valid data than would likely be the case with mediated or inferential methods. Because what people do may differ from what they say they do, observation provides a reality check and also enables the researcher to look afresh at everyday behavior that might otherwise be taken for granted, unexpected or go unnoticed (Cohen et al., 2011).

Seeing the place or environment where something takes place can help increase your understanding of the event, activity, or situation you are evaluating. (services, 2008).

The researcher embraced observation /checklist as an instrument and used it to exhaust all the areas he would like to explore in the in the study and observation that enabled him to triangulate on the information collected from the different stakeholders. Observation overcomes one of the key disadvantages of interviews and questionnaires, i.e. that the responses provided may not be accurate.

In this study I used this method to observe and monitor how the participants were responding to the different approaches introduced in the learning process, the nature and rate of student interactions while dealing with learning tasks in the museum gallery, the amount of collaboration and how they collaborated in their learning tasks while operating in their group discussions, the rate of their concentration on the learning tasks and commitment to their learning activities. My major purpose for using this method was to obtain empirical data from the story of the actions as it unfolded. For purposeful use of this method I employed un-structured participant observation.

Participant observation

The researcher used direct un-structured participant observation due to the fact that this research was participatory in nature that required my involvement at all times. This study took a qualitative design and since qualitative research is context bound and concerned with meaning by studying the behavior in the natural setting it was important that I

participate in the research activities and observe whatever transpired so as to be able to derive meaning out of the process of action. This kind of data collection under observation was purposely used to reinforce other methods used and as a way of validating the data gathered through the entire process.

Uwe Flick (2006) notes that the main feature of this method of data collection is that the researcher dives headlong and thus throughout this study period, I interacted with the participants so as to observe all the actions, behaviors and events as they unfolded in the natural setting. While using this method of data collection, both real time and suspended time observations were used.

Real time observation refers to where the researcher notes what is observed immediately when it is observed while suspended time observation is where the observer/researcher uses a video camera or audio recorder and looks at or listens to the data after the observation has been made (Millar, 2008).

This method was useful for enabling me to observe events and behaviors that might not be mentioned in the interviews, to gather data on sensitive and unspoken topics as supported by Kawulich (2005) cited in (Cohen et al., 2011). Schecul et al (1999) also cited by (Cohen et al., 2011) assert that this type of observation can help in guiding relationships with the participants and informants, enable the researcher to get the feel of the situation and how matters are organized in the a group or subculture or even to find out about the interactions and relationships that raise questions for further investigation.

Baker & Foy, (2008) stresses that observations help in preventing the possibility of distortion that may arise when people are asked to report their own behavior. The objective of observation to the researcher is to collect data in a "natural setting. The researcher will use observation to triangulate the information collected from the different stakeholders. Participant observation connects the researcher to the most basic of human experiences, discovering through immersion and participation the how and Whys of human behavior in a particular context. Data obtained through participant observation serve as a check against participants' subjective reporting of what they believe and do (international, 2004).

It should be noted that this method like any other method of data collection does not go without disadvantages. It is time consuming as requires the investigator to observe the events and behaviors in their natural setting which may not take place in a specified period of time. Another setback of using this method is that a researcher may assume meanings that things are not observed, a danger particularly present in cross cultural studies. We were aware of such drawbacks of this method and to minimize their effect I used various methods of data collection and communicative form of validating my observation with the stakeholders. It is my submission that observation of whatever nature is subject to selectivity of data which is influenced by the observer's values and thus the observer tends to take note of the ideas and issues that are assumed of value to him/her. From my own experiences I was most of the time choosing what to register and what to leave without even realizing it since it's sometimes hard for a single person to take note of everything that occurs in a given situation. To reduce this effect I used a digital camera and a voice recorder to link the gaps that may result between information noted down during the process of the observation and what actually happened at a particular time.

The challenge I encountered with this method is the limited time that I had with the administrators because they are always busy. However, since the method was not used in isolation, the results are enhanced by the results obtained from using other methods a term known as triangulation of methods.

Tools

The researcher took a number of photos during implementation of some activities which stakeholders were engaged in to back up my observation of the activities and interactions that were taking place so that I can always refer to them whenever need arises. This method has been helpful because it has helped me to keep memories of what transpired during the field work period live in my mind whenever I look at them. They help me to recall every vital aspect that transpired during the field study time.

3.4.1 Instrument of Data Collection

Data collection is an essential component to conducting research. According to (Kajornboon, accessed 2017), to collect data the researcher should be able to access the source from which required data is generated. It was from this foundation that Data was gathered from a number of sources including written minutes, documentation, observation, focus group interviews and evaluation meeting at Uganda Museum. The main instruments of data collection in this study were observation Check list, interview guide, flip charts and marker pens, dairies and a camera.

3.5 Procedure of Data Collection

Future Workshop

After the situation analysis, the researcher conducted future workshops concerning exhibitions and the education section at the Uganda National Museum. This process was technically guided through phases of data collections by the supervisor. The phases included preparation phase, critical phase, utopian phase and reality phases and the details of each phase are as elaborated below.

Preparation phase: In the stage, the researcher carried out the introduction and explanation of the method used, the rules and scheduled course of the workshop, organization and preparation of the room and equipment that were used at Uganda Museum.

Critical phase, this was the second phase were the researcher involved the starting point of the workshop, formulation of a general and critical question of the problem and braining storming on the problem and clustering the problems with the stakeholders. This phase was conducted in a democratic manner whereby all stakeholders' opinions were treated equally.

Utopian phase, this was an imagination of an ideal situation, which allowed the researcher together with stakeholders to turning around to the critique points from bad to goods and this was also done a transparent way whereby everyone was allowed to give his or her options.

The reality phases: We looked at what was possible and working out for the action plan meant for implementation of the best ideas together with the stakeholders. Thus the researcher developed a pair wise ranking methods which eventually led to improving mineral exhibitions and training curators to facilitate interactive learning at Uganda Museum.

Data collection was conducted by seeking permission from the commissioner of Uganda National Museum. Upon receiving permission, stakeholder meetings were convened to integrate them in the study that was aimed at improving mineral exhibitions and enhance interactive teaching and learning exhibitions at Uganda Museum. The researcher explained the procedure of data collection to the stakeholders and their role in the process. The procedure included the agreeing on the tools and how they were to be administered. In the implementation stage data was collected by interviewing students/visitors and curators during, observation and taking photos that do not disobey the stakeholders. Interviews were transcribed by the researcher and observation check lists completed. Data was later typed in Microsoft word document and stored as narrative.

More data was gathered through holding a stakeholders' evaluation workshop. Prior to the workshop office memo were put on notice board calling members to the evaluation meeting. Tools and other workshop materials were organized. A copy of data collection tool was given to the workplace supervisors for their input. Upon approval, the workshop was conducted in a democratic environment and data collected on visual charts, photography and transcribed notes.

3.5 Ethical issues in this action research

Much as this action research aimed at improving my practice, it was inevitable that the practice of others especially my stakeholders was to be affected in one way or the other since what I was doing was interlinked with what they were doing. The changes that I was trying to make in my practice could hardly be put into practice without having some side effect on others. Therefore it was important for me to seek for acceptance into the field and participants consent to participate in the research study.

The researcher assured the participants due confidentiality that their views deserved and also to protect their identities throughout this report which I believe I have kept. I tried to

make my intentions and actions explicit through dialogues with Uganda National Museum stakeholders, I tried to observe democratic values throughout the process as highlighted in chapter four. As asserted by Winter(1996) cited by (Denscombe, 2007) where he points out that when dealing with action research, the work must remain visible and open to suggestions, permission must be obtained before making observations and that the researcher must accept responsibility for maintaining confidentiality which I did, see appendix 1 for permission letter as evidence.

3.6 Data analysis

Data analysis is a process of inspecting, cleaning, transforming and modelling data with the goal of highlighting useful information, suggesting conclusions and supporting decision making. This understanding of the concept of data analysis is supported by (Ary et al., 2010) where they assert that data analysis involves reducing and organizing data, synthesizing, searching for significant patterns and discovering what is important for the study.

Data analysis has many facets and approaches encompassing diverse techniques under a variety of names in different business, science and social science domains. Mikkelsen (2005, p. 181) argues that the main aim of data analysis is to look for meanings and understanding and thus data analysis should go beyond accepting face value. She observes that there are no strict formulas for analyzing qualitative data as there are for analyzing quantitative data, however, she cautions that it should not be taken that there are no guidelines for analyzing qualitative data.

As noted by Mikkelsen it is true that there is no precise point where data collection ends and analysis begins. In my experience in the field I have found that in the process of gathering data some ideas about data analysis and interpretations would emerge and these ideas would form part of my field notes/logs. This overlap of data collection and analysis, however, improves the quality of the data collected and that of analysis as long as the researcher is careful not to allow these initial interpretations to distort additional data collection (Mikkelsen, 2005, p. 181). Since this study was qualitative in nature, I employed qualitative techniques of data analysis thus the process involved transcription

of data from the field, validation, coding and categorizing, presentation and interpretation based on my own reflection and discussion.

Transcription of data

Ary, D, Jacobs, L. and Sorensen (2010) refer to it as familiarizing and organizing of data. In this step, the researcher logically documented data gathered from group dialogues with the Museum staffs, visitors and administrators, from interviews with visiting students and the interns, and also from personal logs and field notes that is in line with the objectives of this study. This process was time consuming because it required the researcher to examine and interpret all the data gathered from the whole process while using the different methods of data collection. Therefore the researcher decided to pick only relevant data are line with the objectives of the study in order not to consume time.

Coding and categorizing

Scholar's like Mikkelsen (2005, p. 181) argues that a useful way of organizing qualitative data for analysis is coding where a researcher organizes raw data into conceptual categories and creates coding for instance X,XX,XXX, XXXX and XXXXX that were used to analyze data during the previous presentation of future workshop. The researcher also deployed pair wise matrix ranking which enabled him come up with top ranking problem to formulate problem statement of the study. Categorization of school, sexes and mineral coding were done for easy identification. The data for this study was coded for analysis following the objectives and research questions of this study. This process of coding helped me to identify relevant and appropriate information which enabled me to formulate a topic for this study but it should be noted that one of it disadvantageous is that it reduces the richness of the data gathered in the process since this condensation of data is subjected to the researcher selectivity of ideas which may leave some information out.

Presentation

The researcher presented the transcribed data under the categories X, XX, XXX, XXXX and XXXXX and also deployed pair wise matrix ranking which enabled him come up with top ranking problem to formulate the problem statement of the study. Categorization

of school, sexes, level agreement and mineral coding were done for easy identification and tables and graphs were presented for monitoring and evaluating the action taken in this study. All that was presented emerged from the raw data collected in the initial stage. Therefore the researcher presented the data that was collected in response to objectives and research questions which were related to the challenges affecting exhibition and the teaching and learning process of the curators at Uganda National Museum.

Interpretation and drawing conclusions

This interpretation of the results of the study are based on the researcher's reflections and observations of the situation that he managed to capture during the study period as it unfolded during the study process and his perception of whatever transpired in the study situation.

Mikkelsen observes that there are many challenges in the interpretation and drawing conclusions of qualitative data in a sense that there are no absolute rules to govern it except the researcher has to do the very best with his or her intellect to fairly represent the data and communicate what the data reveal given the purpose of the study. Thus it requires that the researcher be closely involved in the process from conceptualization to the presentation of the results (Mikkelsen, 2005, p. 184).

Therefore my reflections and interpretations of the results of this study are based on my experiences of the whole research process; based on what I observed, heard and did. The interpretation and discussion of the results is also enhanced by the scholarly views, theories and concepts that I read from various literature sources some of which have been documented in chapter two of this report. This idea of interpreting and theorizing based on the findings is supported by Bryman cited in (Mikkelsen, 2005) who argues that the findings of the research acquire significance in the intellectual community only when the researcher has reflected on, interpreted and theorized his or her data. It is after this interpretation and drawing of conclusions upon the results of this study that I lay down the recommendations and way forward for further learning and research.

Validity issues in this research study

Kvale & Brinkmann, 2009) asserted that validity is ordinarily used to refer to the truth, correctness and strength of a statement or knowledge claim. A valid argument is always sound, well grounded, justifiable, strong and convincing. Qualitative research has been in methodological positivist approach to social science where validity became restricted to measurements, taken as invalid due to the fact that it does not result into measurements.

However other scholars like Pervin 1984 cited in (Kvale & Brinkmann, 2009) have considered a broader concept of validity as the degree to which a method investigates what it is intended to investigate; the extent to which our observations indeed reflect the phenomena, situation or variables of the interest to us and this broad conception of validity has led to the acceptance of qualitative research as also a means of arriving to valid knowledge claims.

As argued by Cronbach 1971 cited in (Kvale & Brinkmann, 2009), to validate is to investigate and thus looks at validation as being more than just corroboration but rather as a process for developing sounder interpretations of the observations.

For the purpose of this research two forms of validation were used at Uganda National Museum i.e. communicative validity through use of action reflection cycles and triangulation of methods.

3.9.1 Communicative validity through use of action reflective cycles

To the researcher, communicative validity involves testing the validity of the knowledge claim in a conversation or dialogue. According to Mikkelsen he calls it continuous analysis and reporting (Mikkelsen, 2005, p. 97) As noted by (Kvale & Brinkmann, 2009), valid knowledge or observation is constituted or decided when conflicting knowledge claims, interpretations and action possibilities are discussed and negotiated in a conversation, through argumentations of the participants (members of the community) in a discourse; a form of argumentation where no social exertion of power takes place and the only form of power is the force of better argumentation.

Along this study I kept my personal logs of what I did, observed or heard from museum audiences, what my colleagues at workplace did and said and my reflections about them,

my interpretations of my experiences and reflections upon my observations as made during upgrading mineral showcases and formal training of museum curators which I communicated to my stakeholders on regular basis to ascertain whether they agree with my interpretations and reflections or not and whenever a disagreement would arise then a correction would be made in light of their evaluation which would therefore help me to improve what I was doing. This was to ensure that the situation of exhibitions and educators as observed by me was not misinterpreted. This is argument was supported by Mikkelsen (Mikkelsen, 2005) where she argues that continuous analysis and reporting ensures that gaps in data, surprising perspectives worth pursuing are discovered at early stages of the study.

For action research living theory requires a person to generate his or her own explanations of his or her influences on his or her own learning, the learning of others and in the social learning for social transformation, it was important that each participant in this study takes note of his or her own experiences and reflect on them so as to be aware of his or her own influences. From my experience it was evident that the technical team, educators and the curators that participated in different activities of upgrading mineral showcases and curatorial training found it unusual for them to sit and reflect on their learning which made it hard for them to write/keep logs however much they would be in position to tell what they have learnt orally and practically.

The issue of note book/Log writing being a new phenomenon to them, it was not surprising that these curators found it hard to adapt the use of log writing in assessing their own learning and teaching process as Uganda National Museum. This consequently made it hard for me to improve my logs in light of theirs. Also some intern students that were training to become curators tend to shy away when it comes to giving feedback and this seem to be attributed to the nature of the teaching that they were oriented to where they considered the curators is assumed to know everything at Uganda national Museum.

Despite the above challenges associated with this method I found it a very helpful method of validation of research work as it puts the researcher in a better position to identify data gaps and other unexpected surprises at early stages which would be used in planning of the next action. The major challenge with this method is the reliance on participants

especially the Museum curators on their " capacity to document and reflect on their own learning and give feedback which may be false at times.

Triangulation of methods

Besides using communicative validity in this study, I also adopted methodological triangulation, a concept perceived as the use of different methods to obtain views on the same object of the study. This concept is supported by Diane Millar where she suggests that it is better for action researchers not to rely on only one source of information or on one method of data collection or on one toe of data collection tool (Millar, 2008). She argues that research is stronger if the information is collected in many ways and that triangulation helps in providing more meaningful data analysis.

Michelson (Mikkelsen, 2005, pp. 96-97) identifies at least five types of triangulation which include: data triangulation, theory triangulation, investigator triangulation, discipline triangulation and methodological triangulation.

Methodological triangulation which involves „within method „triangulation; same method used on different occasions and „between methods" triangulation where different methods are used in relation to the same object of study was used.

For purpose of this study I used different methods which include unstructured participant observation, conversational interviews, discussion and dialogue, photography and document analysis and also different data collection tools which include field notes/logs, camera and audio recorder with an intention that each method or tool supplements the results obtained using the other. It should be noted however that during situational analysis, it was not possible to use various methods; the most used method was conversational interviews due to the fact that the stakeholders of Uganda museum like some audience could not afford to give me more opportunity to meet and discuss with them again because of their busy schedules of their work situations.

Martyn. D (2007) argues that triangulation involves the use of different methods to view particular action in different ways and to test whether these methods could yield similar results (Martyn, 2007). The purpose of triangulation is to find detailed and vibrant picture of the phenomenon being investigated. Therefore, in this study, some methods were

triangulated so as to validate the results. Observation, unstructured interview, mentorship, group discussion and dialogue and reflective logs were all used to examine the Validity of the data and the results (Figure 4 method of triangulation).
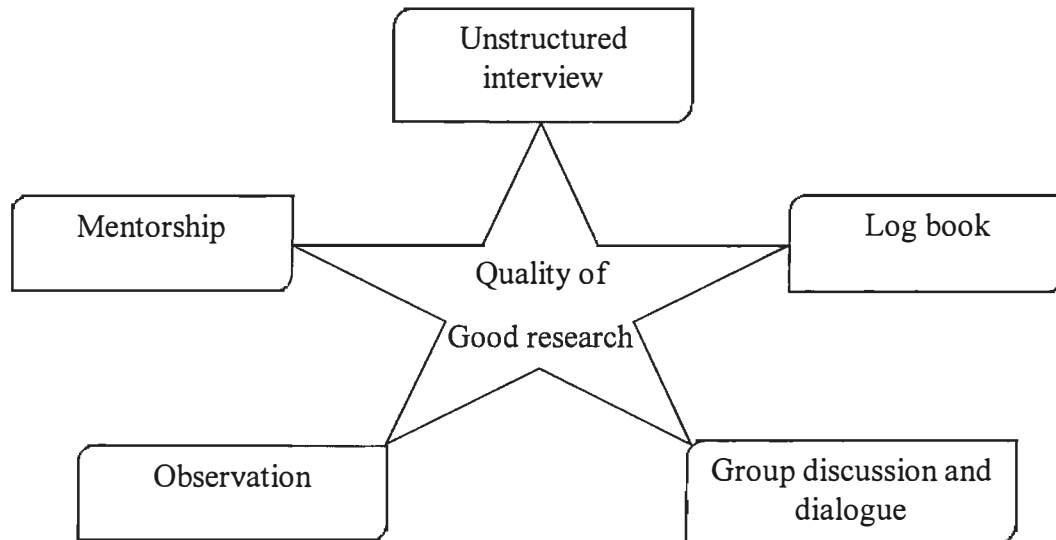
Figure 4: Method of Triangulation

Mentorship in particular was used to share the views with participants in order to test if the data they had given in other methods was matching with the results of interview during mentorship. Results of the mentorship were compared with data from observation, group discussion, logbooks, unstructured interview and participant's document analysis and there is considerable similarity in the data from these methods which in this report is regarded as Validation of the results. In triangulation of the data, observation was used as a crosscutting method to other methods employed in this research simply because every activity conducted during the data collection involved observation of participants whether in group or during mentorship session.

In my view, data triangulation using different methods is a remedy in validity of the results since it provides an opportunity to investigate the phenomenon in different ways. However, not all methods may yield the same results and thus, the results might be confusing to validate. Communicative validity helped me to avoid this trigger.

CHAPTER FOUR

INTERVENTIONS AND IMPLEMENTATION STRATEGIES FOR IMPROVEMENT OF MINERAL EXHIBITION GALLERY SECTION AND TRAINING CURATORS AT THE UGANDA MUSEUM

4.0 Introduction

In this chapter the researcher presents, interventions and implementation strategies for improvement of mineral exhibitions and, training curators at Uganda museum and the story of actions which show the situation as it unfolded, the research experiences and the learning that was acquired from the research process. The researcher presented and described data that was thought as relevant to the application and experimentation of learner centered approaches to teaching and learning of the curators and how these approaches can later influence learning in Uganda Museums. This study was carried out with the major aim of creating understanding of how learner centered approaches to teaching and learning; experiential learning and cooperative group learning, can be effectively employed and sustained as methods of teaching of vocational construction disciplines while facilitating student' learning process. The major participants in this study were the curators of the Uganda National Museum and thus the information that will be presented here will basically be related to their learning and teaching process that is interactive.

This research being qualitative in nature, data description and interpretation is based on the researcher's own reflection and perception of what was observed as a researcher and as a main participant in this study and upon what was done and what transpired during the course of the research. Data for this study included results from my own observations, students/visitors responses and reflections upon the whole process, and also incorporating views from other participants that the researcher interacted with during this study which was found very vital in the researcher's understanding of the whole situation and process of this study. The description is in a narrative form stating what was done, how it was done and why it was done the way it was done as well as the teaching and learning process that took place as a result of what was done.

This chapter presents the activities done including the process of acquiring acceptance into the field, the situational analysis, the actual implementation of the approved interventions for upgrading mineral exhibitions and training of the curators to facilitate interactive learning and teaching through exhibitions to visitors/students.

The presentation of the results of this research sequentially followed the objectives of the study as reflected in chapter one of this report which are:

- To upgrade mineral exhibitions at Uganda National Museum.

- To improvise formal training for museum curators to facilitate interactive teaching and learning through exhibitions to visitors.

- To implement the approved interventions for upgrading exhibitions galleries and training curators to facilitate interactive teaching and learning of mineral exhibitions to visitors.

- To monitor and evaluate the outcomes of the interventions for implementing upgrading mineral exhibitions and training curators to facilitate interactive teaching and learning through exhibitions to visitors.

4.1 Identifying factors affecting mineral exhibitions in the gallery and training needs for curators to facilitate interactive teaching and learning exhibitions.

The meeting was conducted in line with the implementation plan (see the implementation action plan in appendix H) to identify factors that are affecting mineral exhibitions and training needs for curators to facilitate interactive teaching and learning of mineral exhibitions. The key stakeholders which were involved in this meeting was the technical team in charge of exhibitions, heads of sections like (Ethnography, Natural history, Education, Exhibitions, Site and monuments, Archaeology and Research), Administration and Museum attendants were also inclusive. The reason why I have decided to include these key stakeholders is because of the key roles they play and their experiences in the museum.

In the dialogue we discussed and raised a number of issues that affected each mineral exhibitions and it was spear headed by the head of sections because of they are heads of department, they played a great role to identify factors that hindered mineral exhibitions

and training needs of museum curators, also expectations were brought forward especially by the museum attendants during this open discussions and which allowed everyone to contribute equally without segregation.(See issues raised and expectation in appendix F). Among the issues and expectations raised, we amicable agreed to work within our means of operations and we agreed to improve on mineral showcases in science and industry that had been damaged and abandoned during the construction oil and gas section.

We chose to upgrade mineral showcases because it's within our means of operation and the materials needed were available to meet the time fame as stated by the researcher. This decision made on mineral showcases was reached at after the researcher and all stakeholders that were involved in the meeting toured science and industry gallery and did the assessment together as a team and found out that these showcases of minerals had broken glasses, worn out labels, disorganized mineral and rotten boards which needed to be changed.

Reflecting on some of the aspects of pedagogical practice, the researcher found out it very crucial to involve stakeholders in every stage of actual implementation in a dialogue that allows them to submit in their views since they are directly involved and the reason for my suggestion was to promote a more democratic process in decision making related to action planning. It's from this discussion where the researcher discovered that the curators needed training in order for them to facilitate effective teaching and learning of interactive exhibitions of mineral showcase to visitor.

This was revealed by the education officers in the dialogue held that most of the time learning and teaching are more of passive learning where students/visitors receive information from the curators but don't receive interactive education with museum objects. As a result of that we did brainstorming on how best we make mineral showcases more interactive, thus several suggestions were raised and among them was the need for video clips concerning minerals in Uganda, human interaction with artifact where by minerals were hidden in sand so that visitors can have the opportunity to search for them and identify the mineral type. Table 5 depicts collaboration and roles played during the action study.

Table 5: *Showing collaboration and roles in the story of this action study*

Activity	Responsible Personnel	Roles
To identify factors affecting mineral exhibitions and training need for curators to facilitate interactive teaching and learning to audience	Head of sections	To technically assist in advising the team to identify factors affecting mineral exhibitions and training needs for curators.
	Administrators	To take decision on funding and advise where necessary in this research study.
	Technical Team	To technically identify factors hindering Mineral exhibitions and implement the interventions taken.
	Education Officers	To technically advice on factors affecting curators training needs and identify also factors affecting mineral exhibitions in the galleries.
	Museums Attendant	To identify factors affecting mineral exhibitions and their training needs to facilitate interactive teaching and learning of exhibitions.

Source: Workplace survey data, Uganda Museum, July 2017

4.2 Developing appropriate strategy for improving minerals exhibitions and training needs for the curators to facilitate interactive teaching and learning through exhibitions.

The researcher held a meeting with stakeholders such as the heads of sections, administrators, the technical team in charge of exhibitions and the research officers because of their important roles played in the study. In the meeting, the researcher consulted the commissioner of museums and monuments together with other heads of section on what section of the gallery should be upgraded. The decision was made to improve mineral exhibitions in science and industry exhibition section. Soon after the meeting, we all moved around the gallery and we identified mineral showcases that were out of display for a couple years because of the poor labels, disorganized artifacts, and broken glasses and damaged boards eaten up by termites.

The first step taken, was to take photographs of the damaged showcases for the purpose of documentation and evaluation of the action taken. Professionally, the researcher decided to come up with a three dimension design layout of the exhibition that illustrated the flow of exhibitions and this design layout that was shared among the stakeholders before is it was approved.

The researcher collaborated with the head of section (Science and Industry) and identified and arranged the misplaced minerals that got mixed up as a result of movement from one place to another during the installation of the oil and gas exhibition.

In the process of working closely with the head of the science and industry section the researcher observed that the previous exhibition of minerals never had any introductory panel which was a must for any exhibitions to have it, therefore we worked closely and managed to come up with an introductory panel and a map that shows occurrences of some minerals in Uganda. As the topic for this study states *"Mineral exhibition and training curators to facilitate teaching and learning at Uganda National Museum"*. This means that how will the curators facilitate interactive teaching and learning through mineral exhibitions. Reflecting on the observations made, the researcher realized that even the previous exhibitions of minerals never had any interactive engagement with

audience apart from just passive learning and teaching that are offered by the curators on duty. Kokcrharov (2015) Learning retention pyramid.
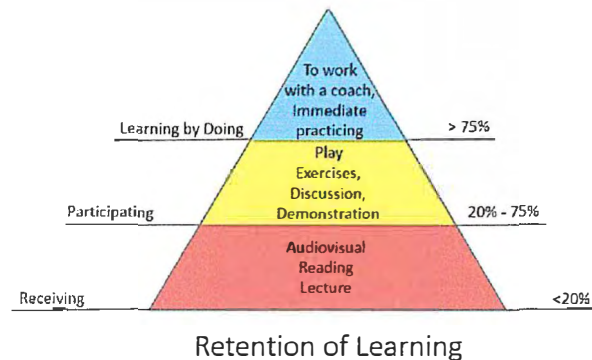
Figure 5: **Learning retention pyramid. Passive learning methods are below and active learning methods are above.**

It's from this point where the researcher observed that there is need for one to come up with an interactive exhibitions where the audiences will have the opportunity to interact with minerals hidden in a showcase with sand. This therefore prompted the researcher and the education officers to conduct a one day training of the curators whereby they were trained on how to practically engage the audiences in an interactive teaching and learning that enabled the students participate in the search for minerals hidden in the sand. The researcher often visited the commissioner office and lobbied for funds which enabled him renovate the damaged showcase, replaced the broken glass, laminated labels and printed introductory panels that were missing in the previous exhibitions.

Table 6: *Depicting collaboration and roles played in the action study.*

Activity	Responsible Personnel	Roles
To develop appropriate strategies of improving mineral exhibitions in the galleries and training need for the curators to facilitate interactive teaching and learning exhibitions to audience.	Head of sections	To technically assist in advising the team to develop appropriate ways of improving mineral exhibitions and training needs for curators to facilitate teaching and learning exhibitions to audiences.
	Administrators	To take technical decision and advise where necessary in this research study.
	Technical Team	To technically develop appropriate strategies of improving mineral exhibitions in the galleries.
	Researchers	To research on the theme of the study.

Source: Workplace survey data, Uganda Museum, July 2017

4.3 Identifying materials needed for upgrading exhibitions and training.

The technical team in charge of exhibitions that comprises the exhibition officer, carpenter, electrician, site attendant, foreman and the plumber together with the head of sections (Science and Industry), education and the administrators had a dialogue and discussed issues on how to identify the materials needed for upgrading mineral showcases and training needs for the curators to facilitate interactive teaching and learning through exhibitions to the audience. The searcher used the above category of stakeholders because there were important roles in their areas of work boundary.

After the dialogue session we all visited the science and industry section and carried out an assessment on the damaged mineral showcases that were abandoned in the section of hydroelectricity power. However, the findings that were got were broken glasses, poor labels, lack of introductory panels, disorganized minerals, worn out boards, no stands for mineral showcases, no beading to lock the glass and very dusty abandoned showcases.

This joint assessment conducted together with the commissioner prompted the technical team, heads of section and the education officer to come up with a comprehensive list of requirements needed. As a leading researcher, I decided to delegate the tasks accordingly. The carpenter, site attendant and foreman took the task of carpentry and purchased soft boards, sand paper, and wood glue, clear vanish, glass and nails.

The head of science and industry was tasked to come up with a map showing occurrence of minerals in Uganda, categorized disorganized mineral, provided photographs and developed a storyline for the introductory panel. The head of education together with the exhibitions officer were tasked to develop training needs kit that catered for the interactive learning and teaching using the exhibitions and they introduced human interaction with minerals hidden in sand and the crossword puzzle. The head of exhibitions bought materials like paint, brushes, filler, double sided tapes and masking tapes that were all used in furnishing mineral showcases whereas the commissioner availed the fund for purchasing those materials mentioned above and training materials like stationaries. This entailed collaborations and roles while identifying materials needed for upgrading and training needs for curators.

Table 7: Depicting collaborations and roles while identifying materials needed for upgrading and training needs for curators.

Activity	Responsible Personnel	Roles
To identify materials that are needed for upgrading mineral showcases and training for curators.	Head of sections/Education	To identify the appropriate materials needed together with technical team and education officers.
	Administrators	To technically assist in advising and providing funds to facilitate upgrading of mineral exhibitions and training need for curators.
	Technical Team	To technically identify the essential materials needed for improving mineral exhibitions in the galleries.

Source: Workplace survey data, Uganda Museum, July 2017

4.4 Implementing possible strategies for upgrading mineral showcase and interactive exhibitions

The researcher in the first place defined implementation as a specified set of activities designed to put into practice an activity. According to the researcher, implementation processes are purposeful and are described in sufficient detail such that independent observers can detect the presence and strength of the "specific set of activities" related to implementation. In addition, the activity or program being implemented is described in sufficient detail so that independent observers can detect its presence and strength for the case of museum audiences.

This is also based on an action plan which is a document that lists what steps must be taken in order to achieve a specific goal. Therefore to the researcher, the purpose of an action plan is to clarify what resources are required to reach the goal, formulate a timeline for when specific tasks need to be completed and determine what resources are required for implementation to take place.

The collaboration between this active implementation involved the key stakeholders like administrators (the commissioner), head of section (Science and Industry), and the technical team in charge of exhibitions at the Uganda Museum. This Active Implementation Framework helped to define what needed to be done (effective interventions), how to establish what needed to be done in practice and who would do the work to accomplish positive outcomes in typical Museum service settings (effective implementation), and where effective interventions and effective implementation will change mineral showcases in the science and industry gallery at the Uganda museum.

In a dialogue held between the researcher and the above mentioned key stakeholders, the researcher requested for the support of each stakeholder who were involved in this implementation based on their respective roles and responsibility that enabled us to have successful upgrading of the mineral showcase in the science and industry gallery. Figure 6 depicts the status of mineral showcases abandoned in section of hydroelectricity power and the second picture shows the current improved status mineral at Uganda National Museum.

Figure 6: **Exhibitions at the science and Industry section of the Uganda National**

Museum before and after implementation

Photos taken below indicates shows out label before renovation and after renovation in science industry section where mineral showcase are located at Uganda National Museum

Figure 7: **Abandoned mineral show cases with worn out labels and then after upgrading showcase with standard labels**

The pictures below illustrate organized minerals in the showcase and the table for mineral search activity introduced by the researcher in science and industry at Uganda National Museum.

Figure 8: **Organized artifacts with standard labels and table stand for mineral search**

Source: Workplace survey data, Uganda Museum, July 2017

The tasks agreed upon and roles assigned to each collaborator were as stipulated in the table 8 below. The researcher worked in a team and the table was designed based on the tasks agreed upon and responsibility at Uganda National Museum.

Table 8: *Shows the tasks agreed upon and the role assigned to each collaborator.*

Responsible Personnel	Activity/ Roles	Period
Administrator (commissioner)	Acquired funds to purchase the materials listed for upgrading mineral showcase from the head office.	2 Weeks
Head of section (Science and industry)	Developed introductory storyline for the panel, map showing mineral occurrences in Uganda, photographs, edited text labels and reorganized and identified misplaced minerals.	2 Weeks
Technical Team (Exhibitions)		
Exhibition Officer.	Painted the showcase, developed a 3 dimension design layout for the exhibition flow, formulated standard templates for labels and laminated it, designed crossword puzzle coded minerals for easy identification. (See pictures below this table)	2 Weeks
Foreman	Ferried sand from construction site and filled in the interactive showcase. (See picture for reference below this table)	1 Weeks
Site attendant	Worked with foreman and collected sand, sheaved it and sun dried it before they filled in the interactive showcase.	1 week

Carpenter	Dismantled the damaged mineral showcase, replaced the old boards with new ones, sand papered it, applied clear vanished and cut the class to replace the broken one. (See picture below this table)	2 Weeks
Electrician	Disconnected power from the showcase,	1 Week
Plumber	Worked in hand with the electrician disconnect power supply on the showcase,	1 Week
Intern student	Worked together with exhibition officer in developing sketches of design layout of 3 dimension, laminated labels and assembled it the showcase, arranged and assembled the showcase in malaria consortium section.	1 week

Source: Workplace survey data, Uganda Museum, July 2017

Photographs below illustrate activities of demolishing, refurnishing and fixing labels in the showcases by the carpenter and the researcher at Uganda National Museum.

Figure 9: **Activities during the implementation phase**

Source: Workplace survey data, Uganda Museum July 2017

4.5 Training curators

Reflecting on the situation analysis conducted at the museum, it's evidenced that there are challenges facing museum curators to facilitate interactive teaching and learning from exhibitions by the audience. It was observed that majority of the museum curators are trained on job despite the fact that they have the basics of tourism in their courses studied and it was also noticed in the registration book that the curators often offer passive learning that doesn't pass on adequate information from exhibitions for the intended purpose of interactive teaching and learning. Therefore, the researcher was compelled to come up with a practical mode of formal training to facilitate interactive teaching and learning that allows students interact freely with museum objects.

This training was conducted and facilitated by the head of section (Education Officers) whereas the lead researcher guided the curators on how to facilitate interactive teaching and learning through mineral exhibitions by the audience in relationship to pedagogical practices which emphasized audience centered learning than the curator centered approach of guiding that has been the common phenomena at the Uganda Museum.

The theme of the training was focused mainly on "Minerals in Uganda". This was at the science and industry gallery and the learning aids presented were mineral collections, maps showing mineral occurrences in Uganda, mineral sample hidden in the sand and a crossword puzzle meant for engagement of the stakeholders during the demonstration session. The activities of the training session conducted involved observation of the minerals on display, interaction with hidden samples of minerals in the sand and filling the crossword puzzle.

Reflecting on one of the methods of the vocational approach to teaching, the lead researcher suggested that for everyone to have a practical experience on this session we all needed to move out of the exhibitions hall and go to the science and industry gallery such that one of the curators can demonstrate interactive teaching and learning to all participants rather than observing and listening to the narrative part of it. At that juncture, the education officers who was the facilitator of the session requested all the participants to practically test the outcomes of the session. Therefore one of the senior guides volunteered and took the participants through the pretesting session. The first step was to

take all the participants through the introduction that involved narratives, the observation processes of analyzing and identifying different types of minerals on display, human interaction with minerals and crossword puzzle filling.

During the mineral search for hidden samples of minerals in the sand by every participants, the researcher discovered that there wasn't enough space to engage more than five people in the interactive exhibition unlike the crossword puzzle where participants would be allowed to continue moving within the gallery they filled in the puzzle. At the end of the pretesting session, the researcher and education officers agreed that the learning outcome and values of this training mode was to impart creativity, problem solving, critical thinking, hands on experience and appreciation among audience as shown in Figure 9 below.

This picture shows students getting involved in search of minerals sample hidden in the sand to be discovered by them.

Figure 10: **Students getting involved in search of minerals sample hidden in the sand to be discovered by them.**

The below pictures were taken during training session conducted at Uganda National Museum by the education officer and the researcher.

Figure 11: **Showing the researcher introducing the training mode and the facilitators (Education officer)**

Source: Workplace survey data, Uganda Museum July 2017

4.6 Learning Experiences from the pretesting interactive teaching and learning by the curators.

This relates directly to evaluation of what was discovered by both the participants and the researcher during the training and pretesting session conducted at the Uganda Museum. In reference to the objectives of this study, the researcher carried out a training and pretested it together with the participants with the intention to impart knowledge and practical skills in interactive teaching and learning that would help curators improve their practice.

Based on the pedagogical practice learnt, the researcher decided to deploy the practical mode of teaching whereby the visitors and the curators were fully engaged in the learning processes unlike passive learning where the curators pass on the teaching while the visitors are just students who receive without any analysis or input in the teaching and learning process. In the pretesting session the participants were allowed to freely interact with the samples of minerals hidden in the sand and filled in the crossword puzzle as the curators guided the whole process. The researcher and education officers realized that this learning experience entailed creativity, problem solving, critical thinking, hands on experience and appreciation   by the museum visitors which was evidenced during the pretesting session (Figure 11). Below are photos of participants who participated in the

demonstration process of searching for mineral after training secession conducted by the researcher at Uganda National Museum.
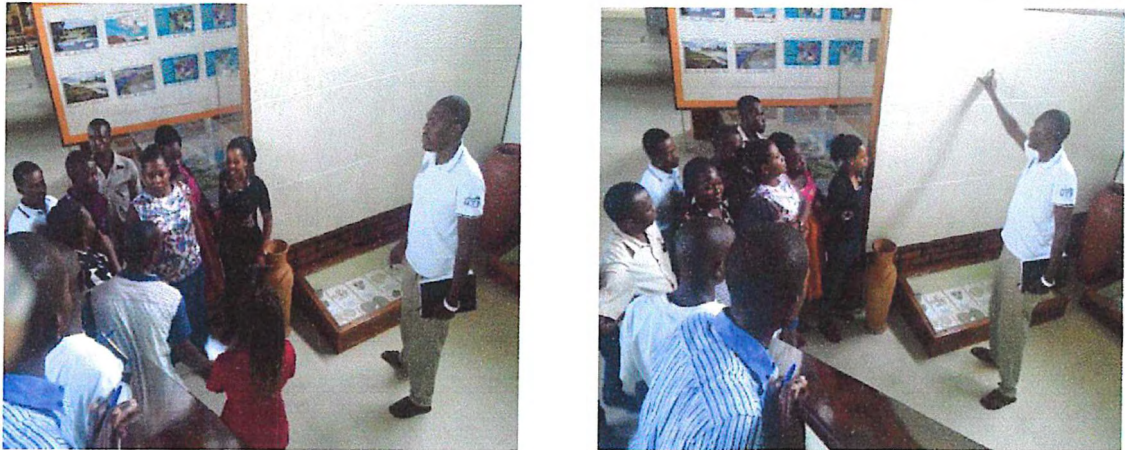
Figure 12: **Depicting pretesting session led by the senior curator at Uganda Museum and. Demonstration of introductory panel by the researcher.**

Source: Workplace survey data, Uganda Museum July 2017

One participant admitted that learning is self-interest commitment and self-discovery, and can be quicker in groups as people share ideas. Jack Ssebuyungo one of the museum guides verifies the importance of one's interest (commitment) in learning and that learning through discovery is better if students are working in groups with a curator.

4.7 Participants most important experiences

Relating to the participants' most important experiences which they shared as either individuals or groups during the training and pretesting session. The researcher paid more attention to those related to development of one's practical ability in facilitating learning processes through learning groups in order to improve his/her practice as a facilitator of exhibitions in the galleries.

During the training session organized by the researcher and the education officers in the exhibition hall at the Uganda National museum. This training was meant to impart knowledge and practical skills in the teaching and learning by the curators to the museum visitors, as the curators were taken through the pretesting session of how to practically demonstrate the way teaching and learning at the mineral exhibitions would take place. The curators acknowledged that the training was very important to them in the sense that it

enabled them experience the practical application of student centered learning rather than the passive service they have been offering to audiences.

The curators realized that the learning experiences were as a result of creativity, problem solving, critical thinking, hands on experience and appreciation among museum visitors which was evidenced during the pretesting session. The administrators also shared their experience that MVP is really a strategic course that emphasizes the participant to cause change at the workplace. This remark was made when the supervisors frequently visited the researcher to check on his progress on the action taken in science and industry gallery.

4.8 Personal Experiences from the Process

Directed Vocational Study (DVS), this course enabled the researcher develop appropriate vocational training approaches and tools for carrying out research in the researcher's areas of vocational specialization that could be directed in the following areas: VET in schools, VET in workplaces, learning at the interface between schools and workplaces and learning at work and workplace learning.

DVS enabled the researcher to use the appropriate vocational education and training strategies in one's areas of specialization and focused the research on vocational didactics (practice, theory and general knowledge in teaching and learning) as they pertain to working life and VET.

The learning outcomes at the end of this course enabled me to analyze work/production processes, activities and identify the needs of interactive teaching and learning from exhibitions at the Uganda National Museum. It also enabled me to critique, analyze and suggest changes for strategic improvements in the mineral exhibitions gallery and curatorial practice at the Uganda Museum.

This enabled the researcher to blend theory, practice and general knowledge in relation to teaching and learning using interactive exhibitions by the curators through action and reflection in the different vocational trades at the Uganda National Museum.

The study exposed the experience of the individual versus group learning approaches in the specific trades among the technical team such as the experience of learner centered

versus curator- centered learning in relation to curatorial practice at the Uganda Museum and other important issues such as assessment and evaluation of the project undertaken by the researcher.

4.9 Contradictions at Uganda National Museum

During the course of the study the researcher encountered several contradictions and complexities which involved a combination of statements, ideas, or features which are opposed to one another and a set of parts or elements that have relationships among them differentiated from the relationships with other elements outside the relational regime. The Uganda National Museum is a custodian for cultural heritage, the exhibitions available at the museum galleries provide platform for stakeholders such as schools, foreign visitors, local visitors and researchers for public study and enjoyment. However, the Uganda National museum experiences a number of contradictions and complexities that may obstruct the achievement of his main goal if they are not addressed in advance.

The human resource skill development strategies, according to the National museum and monuments policy, 2015 on human resource skill development strategies, it stipulated that the department shall support development of staff skills and reskilling in museology and exhibition designs, strengthen the skill exchange program nationally, regionally and international. However, the researcher found out that nothing has been done in regards to implementation of this policy. Consequently, this has resulted into substandard exhibitions and passive teaching and learning of exhibitions. This therefore justifies why the researcher together with the stakeholders decided to change the role of museum curators in the exhibitions space and adopted a pedagogical mode for training that would improve on their practical ability in facilitating interactive exhibitions at the Uganda National Museum.

The passive teaching and learning at the Uganda National Museum has persisted for a couple of years. This is where curatorial practice of teaching and learning at the Uganda Museum makes the museum audiences/ visitors are mainly observers while the curators/guides do dominate the teaching and learning process using exhibitions at the Uganda museum.

The Chinese philosopher Lao-tse (also called Lao-tzu) early study of the philosophy of education oscillated, forming a substructure upon which the superstructure of the modern vocational education was built. He had this philosophical assertion during his life time that 'If you tell me, I will listen. If you show me, I will see. But if you let me experience, I will learn (http://www.unevoc.unesco.org/publication).

This philosophy has been at the center stage of vocational education development of the Chinese and other nations who have applied it and to it we shall turn. Based on this theory, the researcher was compelled to introduce the interactive mode of teaching and learning using the mineral exhibitions whereby museum audiences can practically interact and engage themselves with activities of mineral search and crossword puzzle filling in the science and industry gallery.

Unstructured learning and teaching, the Uganda National Museum offers educational services to the public and this is one of the contradictions in her education system itself. The government in Uganda takes education as being of great importance to our nation and as such it is important that the researcher looked at the contradictions that were at the Uganda museum in relation to the educational services offered. The researcher realized that the Museum don't have well-structured educational programs that are in line with the National curriculum, thus teaching and learning has always been unstructured and this has been attributed to the passive learning practice that has always been facilitated by the curators. To the researcher, this has been one of the justifications as to why the researcher adopted a practical pedagogical mode of training to train curators in order to facilitate interactive teaching and learning using the mineral exhibitions for the museum visitors.

Poor attitudes towards change; is one of the biggest factors which have contradicted changes at the Uganda National museum gallery. The attitude of saying "Old is gold" has always been in the minds of some of the past and current administrators of the Uganda Museum. The researcher witnessed this negative attitude towards the changes of some of the showcases when some of the senior staff attended the Getty East Africa Program and acquired basic training in musicological practical skills that were focused on three key areas. Collection care, education and exhibition modules. This was a real training in line with pedagogical practice aimed at boosting the researcher's confidence at work which

enabled him to immediately test the new skills acquired through structured practical activities guided by the experienced British museum professionals. As a result of this program, the researcher and the exhibitions team managed to upgrade some of the showcases in the Uganda National Museum like the bark cloth, adornment, stool in Uganda, basketry and bark clothing making in Uganda. Therefore, the changes made on some of those showcases mentioned above caused a lot of loggerheads with some of the administrators who didn't like the whole idea. Likewise in this action study also, the management was also a little bit hesitant to take decision on where to relocate the displaced mineral exhibitions from the section of hydroelectricity to displace the malaria consortium section that was phased out.

Another area of contradiction was funding. Funding is one of the most complicated issues faced at the Uganda National Museum yet it's clearly stated in the standing order booklet that government shall fund any activities geared towards the development of the Uganda National Museum. Attached to the proposal of this study, a detailed work plan was drafted for the implementation of the action taken on upgrading exhibitions and training curator so that they are in position to facilitate better interactive teaching and learning using the exhibitions to the museum visitors.

This work plan was attached together to the budget and it was forwarded to the administrator to be funded but unfortunately it wasn't facilitated within the time frame allocated because the procurements are not done at the Uganda National Museum but instead it is done at the headquarter which processes takes too long which didn't favor the researcher's action plan of implementation. Thus, the researcher was facilitated by the NORHED project and the commissioner of museums and monuments at a later stage which enabled this study to be implemented beyond the stipulated time fame.

Lastly is government policy. The researcher realized that the National Museums and monument policy 2015, are well documented but their implementation is still a big question; for instance according to the National museum and monuments policy, 2015 on human resource skill development strategies, it stipulated that the department shall support development of staff skills and reskilling in museology and exhibition designs, strengthen the skills exchange program nationally, regionally and internationally but little

has been put into practice yet skills acquisition is still low at the Uganda Museum. However, during this study the researcher introduced a practical training session with museum educators that focused mainly on training curators in facilitating interactive teaching and learning of mineral exhibitions in Uganda National Museum.

4.10 Evaluation of the outcomes of intervention strategies implemented at the mineral exhibitions gallery and training of museum curators

During the evaluation stage, the researcher used participant observation which involved physical presence of the researcher at the scene or at the work place together with the participants. The curators were observed during the training, visitors participated in the group discussions in the museum galleries and during the implementation of exhibitions and training curators. In the above activities mentioned, the researcher witnessed a lot of things that took place such as practical training sessions of the curators getting involved in mineral search, crossword puzzle filling and physical demonstration of museum objects. Also the inputs and outputs observed such as demolition of outdated showcase by the carpenter, replacement of poor labels, the provision of table stand for minerals, introduction of the mineral search table and practical sessions by the curators were all the indicators observed and documented (Figure11)

The pictures below shows demolishing activity and refurbishing during implementation stage at Uganda National Museum.

Figure 13: **Demolishing process and refurnishing.**

Source: Workplace survey data, Uganda Museum July 2017

Group discussion and dialogue were also other methods used in this Action learning strategy whereby members of the team shared ideas and experiences with the purpose of

making improvement to the respective practices. This method was chosen because it encouraged sharing ideas and construction of knowledge through participation. Group discussion and dialogue is believed to be one of methods commonly used at workplaces like schools, companies and other organized institutions (Flick, 1998; Schwarz, 2005). Flick and Schwarz acknowledged that discussion in groups could help the members to plan their activities, solve disputes and promote better understanding among the members. In this study, the stakeholders agreed and used discussion and dialogue to share ideas. The intern students learnt the role of active curatorial practices through discussion and dialogue held during the training at the Uganda National Museum.

For example during the dialogue held with curators and education officers we all agreed to practically test the training outcome conducted in the exhibitions hall by engaging all people in the mineral search and crossword puzzle filling and we discovered that the training promoted among us creative thinking, self-appreciation, discovery learning and hands on experiences among others that what worked well and what didn't work out on the other side was the limited space in the mineral exhibition that didn't allow students/audiences to participate fully in the mineral search and crossword puzzle filling during peak hours and as a result of this congestion many students ended up not participating and completing the crossword puzzle filling exercise .Figure 14: Depicts students search for sample of minerals hidden in sand and crossword puzzle fillings

Figure 14: **Students scramble for mineral search and crossword puzzle fillings**

Source: Workplace survey data, Uganda Museum July 2017

In the month of July 2017, the researcher together with the stakeholder's held an evaluation workshop to evaluate the actions taken on mineral showcases and formal training of the curators to generate findings of the interventions using the methodology of data collections stated in chapter three. The process of evaluation and monitoring the results were based on what worked well and why, what didn't work out well and why? This photo was taken during evaluation workshop conducted in exhibition hall where the research took on the lead in the session as education officer facilitates.

Figure 15: **The researcher leading the session of evaluation, as the Education officer introducing the session.**

Source: Workplace survey data, Uganda Museum July 2017

The evaluation forms were also distributed by the curators who were on duty to the audiences who were only interested in learning more about minerals in Uganda, unlike some visitors who were not interested in mineral exhibitions mostly pupils. Table 6 shows the questions posed to the visitors and their responses as well as their level of agreement in terms of this key: SA (Strongly Agree), A (Agree), D (Disagree) and SD (Strongly Disagree?)

Table 9: *Showing Evaluation table for audience who participated in the study activities*

Evaluation table for audience who participated in the below activities (Student)		Response				Number
Activity	**Indicators (Learning outcomes)**	**SA**	**A**	**D**	**SD**	**25**
Interaction with minerals and crossword puzzle filling.	• Self-discovery learning	17	8	-	-	
	• Critical thinking	20	5	-	-	
	• Creativity	21	4	-	-	
	• Appreciation	15	10	-	-	
	• Hands on experience	19	6	-	-	
	• Problem solving	14	11	-	-	
	• Fun and enjoyable	10	15	-	-	

Source: Workplace survey data, Uganda Museum July 2017

Table 9 was meant for the audiences that participated in the mineral search and crossword puzzle filling activities. The researcher evaluated the action taken to generate findings using the methodology of data collection listed in chapter three. Group discussion and dialogue was also one of the methods used in this action learning strategy because it encouraged sharing ideas and construction of knowledge through participation

During the evaluation meeting held with participants the researcher posed a question to them that was; "what were the learning outcomes and values acquired during the interactive teaching and learning and crossword puzzle filling activities. The responses and level of agreement were rated in terms of these keys: SA (Strongly Agree), A

(Agree), D (Disagree) and SD (Strongly Disagree?). The total number of participants involved were 25, and the voting arrangement was done through show of hands that was recorded.

In regards to the indicators of learning outcomes listed above in the table, the analysis generally showed that majority of the participants strongly agreed (66.2%) while others agreed (33.8) whereas none of the participants disagreed.

To the researcher, the results analyzed above show that the objective of the study "to improvise formal training for museum curators to facilitate teaching and learning through exhibitions to visitors" has been achieved because the majority of the participants strongly agreed (66.2%) while 33.8% agreed whereas none of the participants disagreed strongly or disagreed which is an indicator of achievement of learning outcomes to me as a researcher at Uganda National Museum. Figure 15: Depicts stakeholder demonstrating to others how to search for minerals hidden in sand as the researcher explain to them.

Figure 16: **Depicting mineral search by the museum stakeholders during pretesting session and demonstration**

Source: Workplace survey data, Uganda Museum July 2017

The researcher designed this form to seek the general impression of mineral exhibition, this form was illustrated on a large format and pinned on a flip chat as the researcher read for them to agree or not to agree.

Table 10: *General impression of mineral exhibitions from key museum stakeholders*

General impression of mineral exhibitions from key museum stakeholders		Response				Number
Activity	**Previous indicators**	**SA**	**A**	**D**	**SD**	**31**
Designed standard labels, introductory panel, laminated labels and replaced.	• Poor label, No introduction panel and non-laminated label.	28	3	-	-	
Refurnished the showcases of minerals.	• Old and dirty showcases.	27	4	-	-	
Purchased new glass and replaced it.	• Broken glass on one of the showcase of minerals	31	-	-	-	
Reorganized the artifacts in the showcases	• Disorganized artifacts.	31	-	-	-	
Preservation and conservation.	• Abandoned and poorly maintained showcases.	24	7	-	-	
Reassembled the showcases in malaria consortium section.	• Displaced mineral showcases and abandoned in hydroelectricity section.	31	-	-	-	
Redesigned a three dimensions layout design for mineral exhibition flow.	• No three dimensions design layout for minerals.	23	8	-	-	
Preplaced the worn out soft board with new ones.	• Worn out board eaten up by termites.	31	-	-	-	

Source: Workplace survey data, Uganda Museum July 2017

Table 10 depicts the general impression of mineral exhibitions from 31 key museum stakeholders that participated in the evaluation meeting conducted and the group discussion and dialogue was also one of the suitable methods of data analysis used. The researcher listed several variables in the table 7 that were rated against their level of agreement and during the course of this group discussion and dialogue, the researcher asked the participants questions to evaluate the past and present exhibitions in order to find out their general impression about mineral exhibitions and the responses got were categorized in the response column and rated in terms of these keys listed: SA (Strongly Agree), A (Agree), D (Disagree) and SD (Strongly Disagree?).This process of evaluation was democratically done by show of hands as it was being recorded by the researcher and counted by a colleague. As per the response indicated in Table 8, the majority of the participants strongly agreed (91%) while those that agreed were 9% unlike none of them disagreed or strongly disagreed.

As for the researcher, the findings of this study in relationship to the objective of upgrading exhibitions of minerals in the science and industry gallery have been met as evidenced in the result analyzed above which shows that about (91%) of the participants strongly agreed and agreed with (9%) on the positive action taken in mineral exhibitions whereas none disagreed on the action taken by the researcher at Uganda National Museum. This to the researcher is an indication that the objective of improving exhibitions of mineral showcases has been achieved during the study conducted at the Uganda National Museum.

Table 11: *General impression of mineral exhibitions from museum audiences*

General impression of mineral exhibitions from museum audiences (Students/pupils), visitors (local and international)		Response				Number
Activity	**Previous indicators**	**SA**	**A**	**D**	**SD**	**25**
Designed standard labels, introductory panel, laminated labels and replaced.	• Poor label, No introduction panel and non-laminated label.	16	9	-	-	
Refurnished the showcases of minerals	• Old and dirty showcases.	21	4	-	-	
Purchased new glass and replaced it.	• Broken glass on one of the showcase of minerals	25	-	-	-	
Reorganized the artifacts in the showcases	• Disorganized artifacts.	23	2	-	-	
Preservation and conservation.	• Abandoned and poorly maintained showcases.	20	5	-	-	
Reassembled the showcases in malaria consortium section.	• Displaced mineral showcases and abandoned in hydroelectricity section.	24	1	-	-	
Redesigned a three dimensions layout design for mineral exhibition flow.	• No three dimensions design layout for minerals.	19	6	-	-	

Source: Workplace survey data, Uganda Museum July 2017

The researcher designed Table 11 to gather the general impression on mineral exhibitions from museum visitors that comprised mainly of students and visitors (local and international). The researcher also used Participants observation, group discussion and dialogue that involved the physical presence of the researcher in the evaluation of the meeting with 25 participants where the same question was posed to the participants that

sought their perception about the action taken on mineral exhibitions and their responses and level of agreement were rated in terms of these keys listed: SA (Strongly Agree), A (Agree), D (Disagree) and SD (Strongly Disagree).

This process of evaluation was done by show of hands as it was being recorded by the researcher and counted by one of the participants. The responses indicated in the table above depict that the majority of the participants have strongly agreed (85%) while on 15% agreed while none of them disagreed or strongly disagreed. To generalize this finding, the researcher would like affirm that majority of the participants have strongly agreed with (85%) while few (15%) agreed with the positive action taken on mineral exhibition during tours at the Uganda National Museum that is line with the objectives of the study of "upgrading exhibitions gallery at the Uganda National Museum".

Students turn up in the month of June 2017

In an attempt to find out the numbers of visitors that rolled in at the Uganda National museum in the month of June 2017, the researcher developed this table 9 in order to find out the numbers of students, school groups, and teachers that visited and participated in the mineral search and crossword puzzle filling activities. Therefore the researcher presented the transcribed data under the categories outlined in Table 12.

Table 12: Students turn up in the month of June 2017

Date	Schools	Group A-Nursery B-Primary C- Secondary D-Tertiary	Teachers		Students		Participated in			
							Mineral search		Crossword puzzle	
			Male	Female	Male	Female	Male	female	Male	Female
8/06/17	Kiringa C.D.C	B	06	03	20	14	4	4	1	6
23/06/17	Luwero s.s.s	C	02	-	16	34	8	4	4	3
24/06/17	Kitale Community school	B	03	-	21	16	4	3	4	2
28/06/17	Ebeneza P/S	A&B	02	03	44	53	9	1		3
,, ,, ,,	Little Swan P/S	A	02	05	09	10	0	0	0	0
,, ,, ,,	Mwama P/S	B	01	03	27	26	7	3	5	3
30/06/17	St Joseph P/S	B	02	01	16	36	5	1	3	4
,, ,, ,,	St Tereza P/S	B	03	02	27	25	6	3	8	3
,, ,, ,,	Hilltop S.S.S	C	03	-	23	17	3	1	6	3
,, ,, ,,	Buwambo Parent	B	08	08	32	52	6	4	10	4
,, ,, ,,	Siraid Academy	C	03	02	20	46	8	2	4	3
	11	7B,3C,1A,0D	32	27	223	329	60	26	45	34

Source: Workplace survey data, Uganda Museum July 2017

In the month of June 2017 while conducting the evaluation processes of the study undertaken, the researcher looked at the visitor's book at the Uganda National Museum and found out that 11 schools had visited the museum, the group category of the schools

that frequently visited the museum were 7 primary schools, followed by 3 secondary schools and 1 nursery school whereas none of the tertiary institutions had visited the museum in this month.

The schools that visited the museum also came with their teachers both male and female, therefore it was found out that the male teachers who visited the museum in June were more than the female teachers with 32 males whereas the 27 females. This implied that male teachers are preferred by the school administrator to manage students while on study tour.

Among the schools that visited the museum, Table 12 also presented their sexes both girls and boys. This also revealed that the numbers girls who visited the museum were 329 whereas boys were 223 in number. In comparison with the number of students who participated in the activities of mineral search and crossword puzzle at the Uganda National Museum, 64% boys participated in the minerals search and crossword puzzle activities unlike 36% girls. The analysis of the finding as indicated on the table above shows that much as the number of girls who visited the museum overwhelmed the boys, it was also evidenced by the researcher that boy's number overshadowed the girls during mineral search and crossword puzzle fillings. Looking at the total number of visitors who rolled in during the month of June 2017, the researcher found out that 611 visitors visited the museum which is a positive indication that is contrary to what was stated in the motivation of the problem of this study. *"Visitor's low turn up* "which prompted the researcher to take on action research at the Uganda Museum.

The researcher was mainly interested in the number of participants who participated in the mineral search and crossword puzzle filling activities, therefore he came up with the graphs that further elaborated the findings of this study.

Figure 16 looked at the comparison of schools and sex of the students that participated specifically in the mineral search activity at the Uganda Museum. This graph depicts the least and highest schools that participated in the mineral search activity and their sex. Therefore the researcher analyzed this data presented on the graph starting from the least column leveled zero to twelve.

Graph 10: **Schools that participated in the mineral search activity**
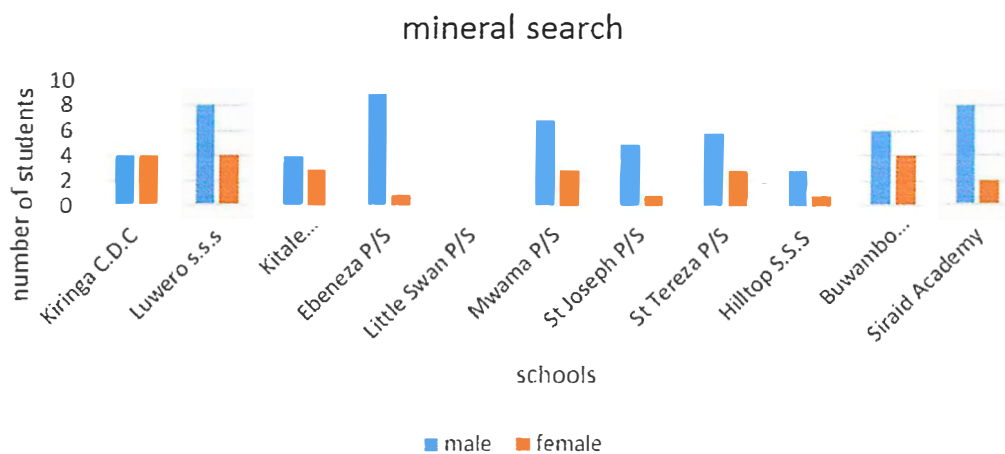
Source: Workplace survey data, Uganda Museum July 2017

Reflecting upon graph 1 the number of students that had visited the museum and participated in mineral search activity were given the scale of 0-10, in numbers against the column level of their schools and sex. According to the researchers finding in relation to the graph above, the schools that participated in mineral search activity under the column leveled 1 were: Ebenezer primary school, St Joseph primary school and Hilltop senior secondary schools with only girls whose performance were presented.

The one school that visited the museum and participated in the mineral search activity under the column leveled 2 was Siraid Academy where only girls were presented. Kitale community school, Mwama primary school and St Thereza primary school were ranked in the columns leveled 3 for participating in the mineral search activity and only girls that were presented.

Looking at the column leveled 4 in Figure 16, Karinga C.D.C had both boys and girls that participated in the mineral search activity rated, whereas Luwero Senior Secondary School had only girls that participated in the mineral search activity, Kitale community school registered only boys for mineral search while Buwambo parents registered only girls who participated in the mineral search activity from columns leveled 4 and below (Figure 16).

In column leveled 5 of graph 1 the students who participated in the mineral search activity were only boys from St Joseph primary school that were presented, whereas St Teresa primary school and Buwambo parents have registered male students who participated in the mineral search activity as indicated in level 6 and below. As for the column leveled 7, only male students from Mwama primary school participated in the mineral search activity whereas for the case of Luwero senior secondary school and Siraid Academy, only boys participated in mineral search activity and they were rated under columns leveled 8 and below.

The column leveled 9 (graph 1), shows the highest numbers of students from Ebeneza primary school who participated in the mineral search activity were only boys presented in the mineral search activity. Among all the schools that visited the Uganda museum during the month of June 2017, the graph above presented Little Swan Primary School without any leveled columns which is an indicator to the researcher that much as they visited the museum, both girls and boys didn't participate in the mineral search activity.

The analysis presented in graph 1 shows that, boys have highly interacted with mineral search activity at the highest column leveled 9 and the least column leveled 3 and above. Unlike the girls' performances in mineral search activity were below average at only the highest column of 4 and the worst was column leveled 1.

Schools where boys participated very well were:Ebeneza primary school, Luwero senior secondary school, Siraid academy, Mwama primary school, St Tereza primary school, Buwambo primary school and St Joseph primary school. Whereas the schools where girls participated below average were Kiringa C.D.C, Luwero senior secondary school, Buwambo parents, Kitale community school, Mwama primary school, St Tereza primary school, Siraid academy, Hilton senior secondary school and St Joseph primary school.

To the researcher, the findings presented in graph 1 thus show how the researcher harmonized the objective of monitoring and evaluating the outcomes of interventions for implementing this interactive teaching and learning through exhibitions by students at the Uganda National Museum which has enabled me make positive recommendations in chapter five. It is after this interpretation and drawing of conclusions upon the results of

this study that recommendations and way forward for further interactive learning and teaching using exhibitions at the Uganda National Museum has been done.

Likewise, graph 1 also looks at comparison of schools and sex of the students that participated in crossword puzzle filling in activity at the Uganda Museum. It displays the most least and highest schools that participated in the crossword puzzle filling and their sex. Therefore the researcher analyzed the data presented starting from the least column leveled zero to twelve.

Graph 2: **Schools that participated in the cross word puzzle filling in activity**
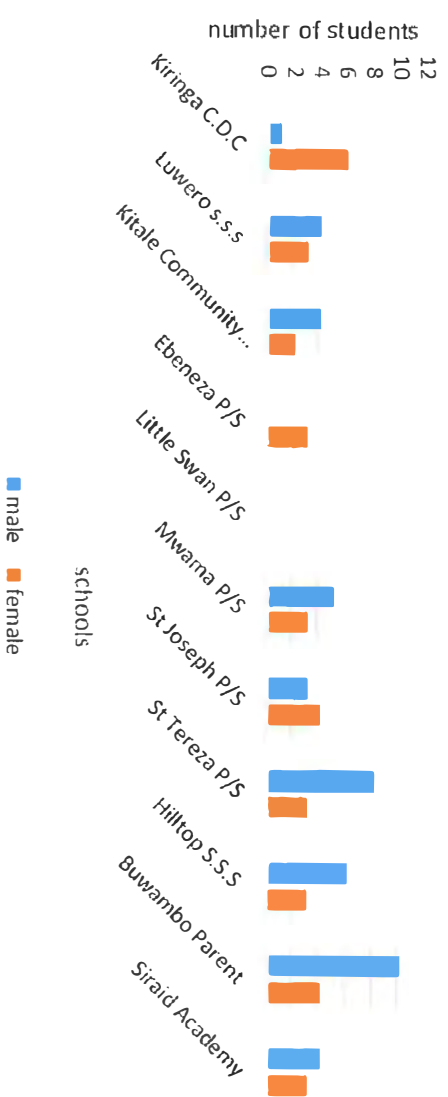
Source: Workplace survey data, Uganda Museum July 2017

Graph 2 shows how the schools that participated in the crossword puzzle filling from the column leveled 1 and below was only Kiringa C.D.C that registered only boy's performance in the crossword filling in activity. Whereas in column leveled 2 and below, only Kitale community school presented girls who participated in the crossword filling. At column leveled 3 and below, only schools like Luwero Senior Secondary, Ebeneza Primary School, Mwama Primary School, St Tereza Primary, Hilltop Senior Secondary School and Siraid Academy presented girls only in the crossword puzzle fillings unlike St Joseph primary school who only presented boys. For column leveled 4 and below, schools that presented boys in the crossword puzzle fillings were Luwero Senior Secondary School, Kitale Community School and Siraid Academy whereas St Joseph Primary School and Buwambo Parents presented girls only. The only school that presented boys in this crossword puzzle fillings at column leveled 5 was Bwama Primary

School. Whereas for the column leveled 8 and 10, schools that presented only boy in the crossword puzzle fillings were St Tereza Primary School and Buwambo Parents. The researcher also noticed that school like Ebeneza presented only girls at column leveled 3 and below unlike Little Swan Primary School that never presented any students in the crossword puzzle fillings activity at the Uganda museum.

The analysis presented on the schools that visited the museum and participated in the crossword puzzle activity are exactly what is reflected on the graph 2 above. According the researchers finding and analysis based on the above graph 2, boys have been highly presented in the crossword puzzle fillings activity at the highest column leveled 10 and the least column leveled 1 and below. However, also the girls performances were slightly above average at only the highest column leveled 6 and the least was column leveled 2 and above which is an indicator to the researcher that girl's performance in crossword puzzle filling have improved compared to mineral search activity.

To the researcher, the finding of the above graph 2 has matched the research objective of monitoring and evaluating the outcomes of interventions for implementing this interactive teaching and learning using exhibitions by students at the Uganda National Museum which has enabled me make positive recommendations in chapter five regarding the findings mentioned above.

Visitors turn up in the month of June 2017

The researcher developed this table in order to find out the numbers of local and foreign visitors, their sex, area of interest and their participations in mineral exhibitions activities in an attempt to find out the numbers of visitors that rolled in at the museum in the month of June 2017 and participated in the mineral search and crossword puzzle filling activities. Therefore, the researcher presented the raw data that are transcribed under the categories. (See appendix 19)

Table Analysis

Data analysis is a process of inspecting, cleaning, transforming and modelling data with the goal of highlighting useful information, suggesting conclusions and supporting decision making. This understanding of the concept of data analysis is supported by Ary

et al, (2010) where they assert that data analysis involves reducing and organizing data, synthesizing, searching for significant patterns and discovering what is important for the study.

Since this study was qualitative in nature, the researcher employed qualitative techniques of data analysis thus the process involved transcription of data from the field, validation, coding and categorizing, presentation and interpretation based on my own reflection and discussion.

Table 13: *Showing summary after analysis of table*

Area of Interest	National		International	
	Male	Female	Male	Female
Art/ Craft	2	0	1	2
All/ Tour/ Artefacts	54	41	79	87
History	14	6	28	24
Culture	3	0	7	2
Archeology	0	0	2	0
Total	**73**	**47**	**117**	**115**
Sub Total		**120**		**232**
Grand Total				**352**

The researcher developed the table 13 below that looked at mainly visitor's area of interest and their sex. This was intended by the researcher in order to know the area of interest of local and foreign visitors that had paid a visit to the Uganda National Museum and as well visited the mineral exhibitions. Therefore graph 3 shows areas of interest of only the international Museum visitors and their sex (male and female) during their visit at the Uganda National Museum in the month of June 2017.

Graph 3: **Areas of interest for International Museum visitors in the month of June 2017**
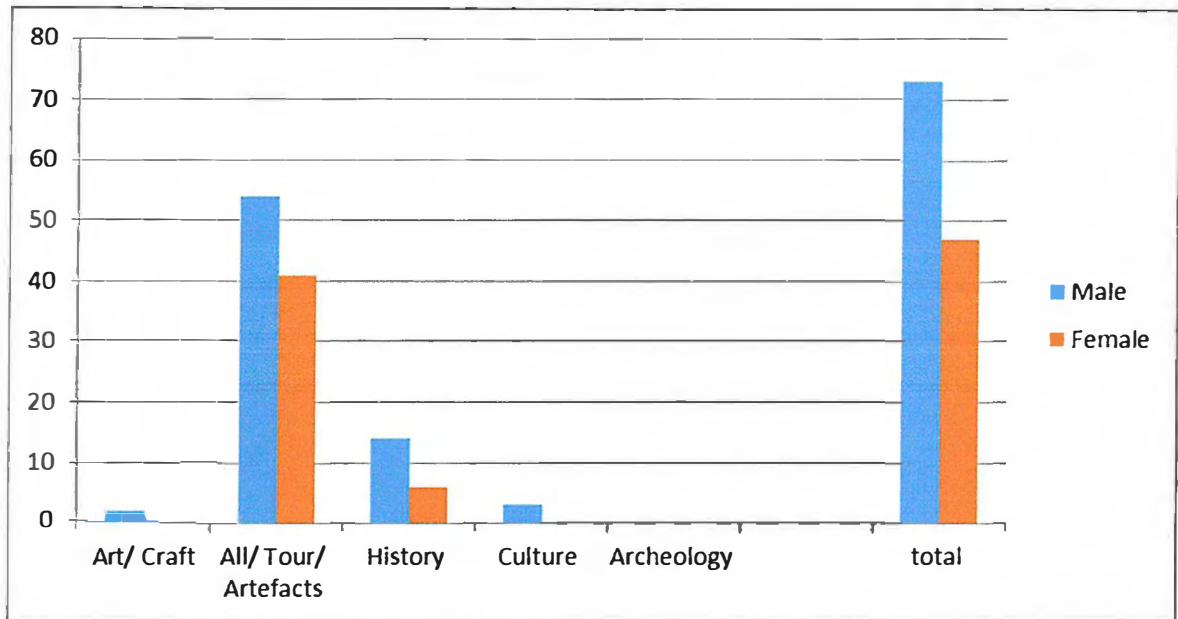
Graph 3: Depicts that the male international museum visitors were highly leveled at 55 and above whereas the female ones were leveled at 41, who showed their interest, in tours, and artifacts when they visited the Uganda National Museum in the month of June 2017. For those that showed interest in History were male visitors leveled at 14 while female visitors were leveled at 6 and below. The least number of international museum visitors registered on this graph for the area of interest was art/craft and culture where only male visitors of history were leveled 4 and whereas art/craft was leveled 4 below. Unlike female international visitors who were not interested in art/craft and history at the Uganda National Museum. Also the researcher noticed that among the international visitors who visited the Uganda National museum in the month of June 2017 and none of the male and female visitors showed interest in Archeology.

The general findings in graph 3 Reflected that male international museum visitors showed much more interest (73) compared to the female international visitors (47). For the researcher, this means the majority of the international museum visitors who visited the museum in the month of June 2017 were male visitors who explored more areas at the museum compared to the female visitors who showed low interest in exploring the Uganda Museum and the area liked was in touring all, galleries at the museum. This

implies that even the turn up number of the international male museum visitors were greater than female visitors which is a positive indicator of visitors turn up at the Uganda Museum that was contrary to what was stated in the motivation of the problem of this study. *"Visitor's low turn up* "which prompted the researcher to conduct an action research at Uganda Museum.

The researcher designed the graph below that viewed mainly visitor's area of interest and their sex. This was intended by the researcher to know the area of interest of local visitors that visited Uganda National Museum mineral exhibitions. Therefore this graph below shows areas of interest of local visitors and their sex during their visit at Uganda Museum in the month of June 2017.

Graph 4: **Areas of concern for the local visitors in the month of June 2017**
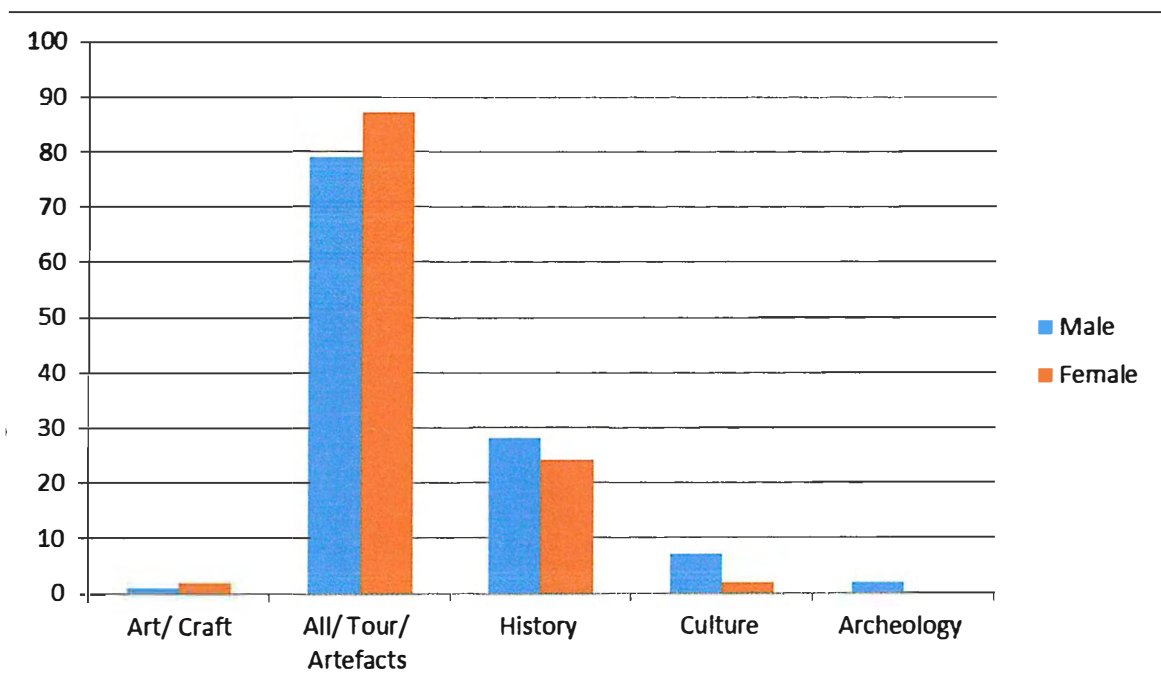
Source: Workplace survey data, Uganda Museum July 2017

As reflected on the graph above graph 4, the highest number of local visitors that visited the Uganda Museum in the month of June 2017 showed their interest in touring All the gallery which were 88 who were female whereas the male local visitors were 79 and below. The local visitors who showed interest in the history section were both male and female, with 28 males whereas 24 were female. For the visitors who were interested in

exploring culture at the Uganda Museum these were both male and female, with 7 males and 2 female visitors. As for the local visitors who showed interest in archeology at the Uganda museum only 2 male visitors unlike female visitors didn't register their area of interest. Whereas, the least local visitors who had interest of exploring art and craft were 2 who were all female and 1 male visitor and only 1 below zero.

In general, female visitation and interest is higher compared to male counterparts and the most area of interest for visitors is touring all sections. However to the researcher, this does not mean they were limited to visit only that area but they could have also visited other areas as well.

Thus graph 3 and 4 show that visitors who visited highly the museum in the month of June 2017 were 117 male international visitors whose area of interest covered all displays that are in the galleries at Uganda the Uganda National Museum. Whereas the female visitors were only 115 with their area of interest in all sections in the galleries. For the local visitors that came to the museum in June 2017 males were highly ranked with 73 interested in covering all areas in the museum, unlike the females who were only 47 that had all interest in the galleries. This means that, international visitors (232) highly turned up at the museum in the month of June 2017 than the local visitors (120) which is an indicator that shows positive turn up of visitors at the Uganda National museum.

4.11 What is working well and why?

We developed some questionnaires and forms meant for monitoring and evaluation which were distributed to the administrators, technical teams in charge of exhibitions, education officers, museum curators and the learners for completion during exhibitions of minerals in Uganda and evaluation forms on the formal training session held at the Uganda Museum.

The process of evaluation and monitoring the results were based on what worked well and why, what didn't work out well and why based on the first two objectives of this research and related to the research questions.

4.11.1 Updated Mineral exhibitions in science and industry

One of the objective of this action research was upgrading exhibitions at the Uganda National Museum, therefore the researcher and technical team in charge of exhibition implemented objective one and what worked well was the introduction of table stands for mineral showcases, mineral search table, renovations of showcases and introductory panel.

The stand for mineral showcase, was a new initiative introduced, initially the mineral showcases never had any stand were left lying on the floor and a result of that water and termites ended up attacking some of the showcases, but all those mineral showcases were replaced on top of raised tables which are functioning well and free from unnecessary movement by the cleaners and accidents.

Introduction of mineral search table in the mineral section was another innovation. This involved a kind of interactive engagement with minerals after viewing the showcases. We designed a mineral search table and had it filled up with cleaned lake sand so that visitors especially the students could have the opportunity to discover minerals hidden in the search table. This innovation has attracted a lot of visitors especially students and children and its working well but what seems not to be working well is the safety of the minerals as the curators discovered that some of the minerals have been stolen by students.

The renovations of mineral showcases, well stated among the objectives of this study involved the technical team in charge of exhibitions working on some of the damaged showcases and replacing the rotten soft board that were eaten up by termites, the broken glass, printing and laminating the new labels, refurnishing all the showcases, organizing and cleaning the artifacts and assembling the showcases as proposed in the approved design layout in the current mineral exhibitions section. Apparently, these showcases are functioning very well and many visitors are interested in them because it was out of display for many years.

The introductory panel was not in existence during the previous exhibitions of minerals. This time around we proposed and drafted a storyline for the introductory panel for the visitors to have the narrative part rather than observing only. We also proposed to come

up with video clips, photographs and a map showing mineral occurrences. In this regard a standard introductory panel and printed map showing mineral occurrences in Uganda has been designed and mounted on the partition panel which is functional and working well for visitors, but the proposal of having video clips and more photographs to aid learning and teaching mineral exhibitions didn't work out because efforts to liaise with the department of meteorology were futile since they declined to avail the researcher with those video clips and photographs.

This implementation process went on well because of the experience and expertise of the technical team, support of the administrators and head of section of science and industry where mineral exhibitions is currently located. The researcher noticed that the time frame slotted for the completion of upgrading mineral exhibitions took long than anticipated in the work plan because it was not funded fully in time and a result of this some of the things like the table stand were made later by the carpenter.

Much as the mineral showcases have been fully furnished and it's on display to be viewed, what is not working on the walls of mineral section is lack of pictorials for various minerals and video clips to illustrate mining activities in Uganda in order to enhance interactive learning and teaching out of the mineral exhibitions. These activities were later evaluated together with the stakeholders in the temporary exhibitions hall and the findings matched with the objectives of this action research.

4.11.2 Improvised formal training for museum guides to facilitate teaching and learning of exhibitions to visitors

As per objective ii, the researcher and the education officer developed the theme of the training which focused mainly on "Minerals in Uganda" located in science and industry gallery and the learning aids presented were mineral collections, maps showing mineral occurrences in Uganda, mineral sample hidden in sand and the crossword puzzle that were meant for engagement of the stakeholders during the demonstration session.

The activities of the training session conducted involved observation of the minerals on display, interaction with hidden samples of minerals in the sand and filling the crossword puzzle. However what worked well and is still working well is where everyone is involved in the training due to the benefits of the learning outcome and values that are

still being passed on because its practical oriented and they are on a daily basis imparting creativity, problem solving, critical thinking, hands on experience and appreciation to students by museum curators.

The researcher discovered that the space allocated for mineral search activity is not enough to engage more than five participants which was not working and favoring schools with large numbers of students at the Uganda Nation Museum. Though the intervention of introducing interactive use of exhibitions of minerals at the Uganda Museum didn't cater for the needs of adults it was favorable and applicable to school students because of its practical activity of discovery of hidden minerals.

To the international visitors, this intervention of mineral search and crossword puzzle fillings seemed not to work well for them but they have registered their interest in observing and reading the introductory panel introduced. The feedback from those who visited the mineral exhibitions, the intervention of interactive exhibitions of mineral wasn't a bad idea brought forward, only what it is not working well due to lack of space within the galleries. The activity of mineral search is really working very well compared to the crossword puzzle filling activity. The crossword puzzle is affected by inadequate resources for printing on a daily basis that make it problematic. On the other side as triangulated by the researcher and curators through the observation method, it was observed that adult visitors don't want to touch on the sand because their hands would get dirty and that could partially explain why they are not involved in it because solutions for the gloves and trowels were not catered for.

CHAPTER FIVE:

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.0. Overview

Chapter 5 discusses and analyzes the results from the actions taken on mineral exhibitions and the interactive teaching and learning processes presented in chapter four of this report. This discussion and analysis of the results basically depended on interpretation and description of improving mineral exhibition, teaching and learning process using the exhibitions which is based the field experiences, observation and reflection upon the situation as it unfolded in the process of research and also on the perceptions and views from the participants of this research.

In this discussion related views, theories and concepts from various scholars are integrated where considered necessary to back up analysis of the results. After discussing and analyzing the results, conclusions are made based the learning and understanding acquired through this research process and the recommendations which will reveal the way forward for this research. With the aim of improving curators practice in facilitating the teaching and learning process out of the exhibitions while using learner-centered approaches focusing on experiential learning and group learning at the Uganda National Museum, the problem statement that guided this research is: ***"Mineral exhibitions and interactive teaching and learning at Uganda Museum.***

Chapter 5 is contains the final evaluative actions and the aim of these actions is to find out whether the research has been successfully done or not. This evaluation process was based on the following five counts.

5.1 Mirror Exercise (ME)

Mirror Exercise (ME), a term created by Jack Canfield and Janet Switzer in their book: The success Principles in which they claim that individuals need to acknowledge their successes daily or when they occur by evaluating what each individual has done. This theory was introduced to the museum staff during the evaluation meeting. Surprisingly, some senior staff knew it and therefore found it relevant to share with all participants. Canfield and Switzer uphold that Mirror Exercise "gives your subconscious mind the

positive strokes it needs to pursue further achievements and it helps change any negative beliefs you have towards praise and accomplishment, which puts you in an achieving frame of mind,"(Canfield & Switzer, 2005: 200). The intention of the mirror exercise was to acknowledge one's contribution to personal development in everyday life. In the context of this study, the Mirror Exercise was used to evaluate activities and acknowledge the successes made and plan for the next actions that would avoid further failures. This method of evaluation, helped to evaluate the learning activities in the sense that museum curators were evaluating themselves prior to group discussion held in the exhibition hall while training curators. This exercise helped the museum curators to build confidence in their work and foster progress academically. The questions included: What did I do in the day, how did I do? Was it successful or not? What could be done to improve it? What were the weaknesses involve? Did I participate actively? All these questions enabled participants to evaluate the learning activities and support the process of writing the log.

Though useful, the Mirror exercise was received with mix reactions by the group members, some argued that it is kind of showing off to others that you have done this or that which is unacceptable socially. Some argued that the Mirror Exercise is the repetition of the learning log. The Mirror Exercise motivates learners than the learning log. Thus it gave stamina to the curators to move to the next level with the conviction and confidence while on duty at the Uganda National Museum.

5.2 Revisit Exercise to Validate the Results

Being aware of the discussion of Validity (see 3.9.1), this section show the actions taken to validate the results of the data collected during group discussions, mentorship, observations and unstructured interviews. This was part of the Communicative Validation exercise to test if the action results taken were consistent with the results of the last actions.

5.3 Way forward: The life of the Curatorial Learning Community at the Uganda National Museum

This section presents the way forward for the Museum curatorial learning community after completion of the research project. It provides explanation on how the heads of section should continue even after the researcher has left the Uganda National Museum to another Ministry. In the final meeting conducted for the evaluation of this project, members of Museum curatorial Learning Community agreed to carry on with the discussion and sharing of ideas that are essential for the progress in their learning as visitors/students and for their respective businesses outside school.

The group agreed to work as a team and provide advice to each other as it may be deemed necessary. In order to work as a team, the members agreed to have leadership with a chairperson and a secretary for the group whose duties would be to organize and inform members about the venue and time for the next action research proposed by any head of sections meeting.

The researcher pledged commitment to continue working with all heads of sections who may be in position to adopt action research at the workplace or world of work. Since the beginning of this action research, this cooperation has been successful and the learners/curators will continue to discuss and share their various experiences acquired from this study. The repercussion of this cooperation is that members realized their potentials to learn from each other and think it is worthy to be a member of such an action research group. In future this cooperation may result into the business community through experience sharing and it may boost the learning and academic successes for all Museum members and by so doing, they will be able to build skills necessary for management and operation of small upcoming museums in Uganda.

5.4 Are My Research Questions Answered?

The four questions (I, II, III and IV) of my research have been answered on average with their respective objectives achieved while question (III) is partially answered and the objective to some extent were achieved.

5.4.1 Research Question I

How can the existing old exhibitions galleries be improved?

Firstly, the attempt to conduct an implementation action plan of this study in chapter four was aimed at improving to mineral exhibitions in the science and industry gallery. The research questions employed in this study were created from the problem statement formulated by the stakeholders in this study. These questions were also in line with the general objectives of this study. This showed that, the teaching and learning is mainly dominated by the museum curators through the lecture method while the visitors in most cases remained as observers of learning instead of being active participants in exhibitions in the galleries.

During the study, an Action Learning strategy which promotes group discussion, mentorship and use of Action learning strategy (ALS) enabled the participants to be active in the learning processes. In this regards, the learners and researcher conducted Applied Learning Scenarios which were geared towards enabling museum audiences to own the learning processes. Group discussion and dialogue, mentorship scheme, unstructured interview, conversation among other methods were used in order to address these questions.

These methods such as mentorship, discussion and applied learning scenarios etc. were meant to incorporate new methods of teaching and learning curatorial practice and subsequently improved our ability to use a variety of methods in the learning process which was an improvement in professional practice. Not only that, the researcher has been able to work as a team member and reflect on daily practice and make accountability of what to do and how to do it as result of this study. This therefore is an indication for improvement of the researcher's own practice.

In response to objective I of upgrading exhibitions gallery at Uganda National Museum, the main issue was on how the existing old exhibitions galleries could be improved. The decision taken was to improve the mineral exhibitions whose status and conditions was doing badly as highlighted in the statement problem.

The technical team improved on the following variables that were evidenced on mineral exhibitions, like the damaged showcase, broken glass, disorganized artifacts, poor graphics and labels, poor maintenance, lack of a table stand, no map, photographs, storyline for the narrative on introductory panel and provision of a table for mineral search activities. All these variables mentioned in connection with mineral exhibitions were worked upon and it apparently worked out very well and assembled in science and industry gallery for display. To the key stakeholders and the findings of the action taken upon upgrading mineral exhibitions was very positive and all the participants involved in the evaluation process conducted, are very happy to say that objective I has been met.

My Professional Practice and curators in the Past and Present

Still this in an attempt to reflect if improvement of professional practice and attitudes has been made in comparison between the past and the present as in the table 13which is also applicable to Museum Curators.

Table 14: *Showing comparison of curatorial Practice in the Past and Present*

Past (2014-2017)	Present (2017 June and beyond).
Museum Educator/Curator of passive learning	Facilitator of interactive teaching and learning.
Museum Educator/Curator use centered approaches of learning and teaching.	Use student centered approaches of learning and teaching.
Non self-reflective Educator/Curator.	Use daily reflective practice as facilitator of interactive learning and teaching.
Believe in self- intelligence as opposed to collective intelligence.	Belief in both self and collective intelligences.
Used limited connection between education and other head sections.	Develop and use wide rage concepts of exhibition and with other heads of sections.
None Interactive exhibitions.	Interactive exhibitions.

Source: Workplace survey data, Uganda Museum July 2017

In the Past (2014-2017) museum curators mainly provided a passive education to the audience unlike in the present time (2017) June up to date where the practice has changed to facilitation of interactive teaching and learning using the mineral exhibitions. During the past (2014-2017), curators applied teacher centered approaches of learning and teaching to museum visitors but presently in (2017) they have resorted to using student centered approaches of learning and teaching for the case of mineral exhibitions.

Non self-reflective practice was noticed during the past in 2014-May 2017. But currently in 2017 June, curators use daily reflective practice to facilitate interactive learning and teaching from the mineral showcases to visitors. In the past of 2014-2017 until May, curators used to believe in self- intelligence as opposed to collective intelligence, whereas now days they believe in both self and collective intelligences of group discussion introduced by the researcher. Use of limited connection between the education section and other section heads has been noticed between2016-2017, unlike today in 2017 to date curators developed and used a wide range of concepts of exhibition and with other heads of sections. Lastly, from 2014-2017 June, there was none interactive use of exhibitions unlike today where there is interactive use of exhibitions of minerals.

Generally, attempts to reflect if we have improved our professional practice and attitudes have greatly improved because of this taken at the Uganda National Museum.

5.4.2 Research Question II

How the formal training of museum guides could be facilitated to promote interactive teaching and learning of exhibitions to visitors?

The above research question was formulated to address the second objective on how to improvise formal training for museum guides to facilitate teaching and learning out of the exhibitions to visitors. Therefore, ways of how to improvise formal education for the curators in order to facilitate interactive teaching and learning at the mineral exhibitions gallery was attended to. This was out of the our realization that the Uganda museum lacked formal education system like the Action Learning strategy which promotes group discussion, mentorship and use of action learning strategy (ALS) that enabled students to be active participants in the learning processes. In this regards, we conducted applied learning scenarios which were geared towards enabling museum audiences to own the

learning processes. Group discussion and dialogue, mentorship scheme, unstructured interview conversation among other methods were used in order to address these questions.

Use of Group Discussion in Learning Process

Group discussion and dialogue was used in this study as a method of learning to promote active participation and idea sharing among the learners. This study therefore, concludes that group discussion and dialogue under the action learning approach plays an enormous role in encouraging museum curators to participate in the learning process. It also develops cooperation between the learners/interns and curators or facilitators which in this study is seen as a relevant attribute in the learning process. Based on field experience, the learning group provided an opportunity for curators to share ideas and create their own learning through group activities and the tasks given in the group to provide challenges to learners and thus, learn from research on the particular topic. Learners/students tried to communicate in group discussion which is not the case in the lecture method where museum curators are the sole presenter of the exhibition lesson. This study therefore, concludes that the use of the group discussion as a learning strategy does not overlook the responsibility of the museum curators to teach but rather complement the learning process using exhibitions in Uganda museum. Picture below Figure 15 depicts group discussion learning.
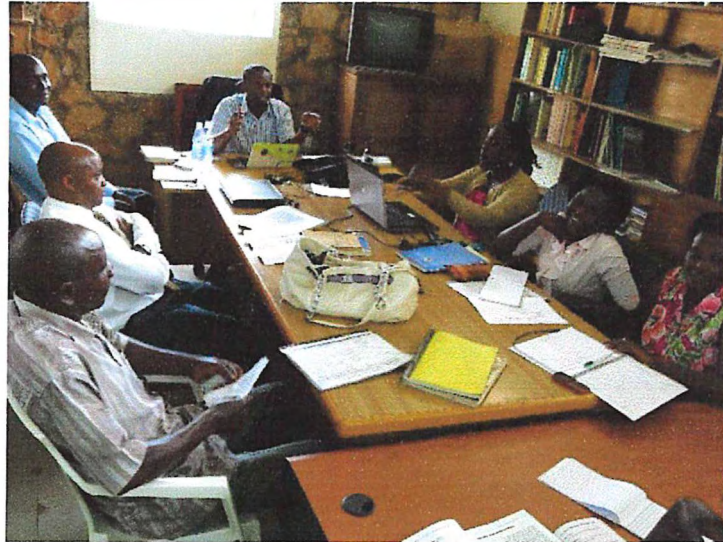
Figure 17: **Group discussion learning**

Source: Workplace Survey data, Uganda Museum July 2017

Applied Learning Scenario (ALS) adopted at Uganda Museum

This study concludes that the use of Applied Learning Scenarios adopted in museum education compels visiting student at the museum to participate in the learning process and create their own learning through practice in mineral exhibition. It engages the students to construct learning and present account of their learning to their schools. My impression of this approach is based on the opportunity that students at museum get to interact with museum objects for the purpose of construction of learning. The use of ALS in this study is seen as a move toward learner/visitors centered approach of learning and an opportunity to engage museum visitors in cooperation as a team and with Museum curators. ALS is an essential attribute in learning process because it presents opportunity for learners/visitors involved to gain skills as they practice in their schools.

To me, The use of Applied Learning Scenarios (ALS) adopted at the museum provides an understanding of how learning intended to have the interplay between Classroom and Workplace experiences could be organized and also the use of Mentorship as a way of ensuring that students/visitors actively get involve in learning and that the cooperation between learner and curator is imperative in learning process that is seen in this study as a step in organizing Action Learning activities.

5.4.3 Research Question III

How can the approved interventions be implemented?

This research question was developed to address the third objective of the study on how I will implement the approved intervention thus I looked at this based on an action plan which is a document that lists steps that must be taken in order to achieve a specific goal. To the researcher, the purpose of an action plan is to clarify what resources are required to reach the goal, formulate a timeline for when specific tasks need to be completed and determine what resources are required for implementation to take place.

Therefore the collaboration amid this active implementation involved the key stakeholders like Administrators (the commissioner), Head of section (Science and Industry), and the technical team in charge of exhibitions at Uganda Museum. This Active Implementation Frameworks was to helped define what needed to be done (effective interventions), how to establish what needed to be done in practice and who will do the work to accomplish positive outcomes in a typical Museum settings where effective interventions and effective implementation will thrive changes in mineral showcases in science and industry gallery at Uganda National museum.

In a dialogue held between the researcher and the above mention key stakeholders, I requested for the support of each stakeholders who were involved in this implementation depending on their respective roles and responsibility which enabled this successful upgrading of mineral showcase in the science and industry gallery. The approved interventions that I and the stakeholders came up with during future workshop were upgrading mineral showcase, introduction of interactive teaching and learning of mineral exhibitions were students interact with sample of minerals and crossword puzzle fillings activities. I and the technical team implemented these interventions and apparently its functioning very which has attracted several students to visit mineral exhibitions and participated in the mineral search and crossword puzzle activities, thus this is an indicator to me that the objective III of the study has been achieved.

I and education officer developed a theme of training model which emulated Applied Learning Scenarios focusing mainly on "Minerals in Uganda in science and industry gallery and the learning aids I presented were mineral collections, maps showing mineral

occurrences in Uganda, minerals sample hidden in sand and crossword puzzle that were meant for engagement of the stakeholders during the demonstration session.

The training session conducted involved observation of the minerals on display, interaction with hidden sample of minerals in the sand and filling crossword puzzle. However what worked well and is still working well was the pretest session conducted where everyone involved in the training acknowledged the benefits of the learning outcome and values and are still being passing on to students because its imparting creativity, problem solving, critical thinking, hands on experience and appreciation to students by museum curators.

Whereas, I found out that the space allocated for mineral search activity wasn't enough for more than five participants which is not working and favoring schools with large number of students and realized that my intervention of introducing interactive exhibitions of mineral at Uganda Museum didn't favor adults but again it applicable to school students only because of its practical nature of discovery hidden mineral.

To the international visitors, this intervention of mineral search and crossword puzzle fillings seem not working well for them although they have showed interest in observing and reading the introductory panel introduced. To my own observation and feedback got from those who visited the mineral exhibition, the intervention of interactive exhibitions of mineral is not a bad idea but what is not working is lack of space within the galleries. The activity of mineral search is really working very well compared to crossword puzzle filling activity which has failed later because of inadequate resources for printing crossword puzzle on daily basis.

On the other side as triangulated by the researcher through the use of observation method, I observed that adult visitors don't want to touch on the sand because their hands would get dirty and that could have been why they have not involved themselves in it, because provisions for the gloves and search trowel were not provided. Thus observation and triangulation was one of the best method used to answer the achievement this objective II and partly failures also.

5.4.4 Research Question IV

How can the outcomes going to be monitored and evaluated?

Among the objectives of this study, my motive was also to monitor and evaluate the outcomes of the interventions implemented on mineral exhibition and the training outcomes and the research question opposed was how can the outcomes going to be monitored and evaluated by me.

Therefore during monitoring and evaluation stage, I used Participants observation which is one of the methods in Qualitative studies as asserted by (Flick, 1998, 2006; Norton, 2009) that Participant Observation involves physical presence of the researcher at the scene or at the work place of the participant and my experience has been in line with the scholars" assertion.

I observed curators during training, learners in group discussion in the museum galleries and during the activities of implementations of exhibitions and training curators. In the above activities mention, I witnessed the applied learning training session of the curators getting involved in mineral search, crossword puzzle filling and physical demonstration of museum objects. Also the inputs and outputs were observed during demolition of the outdated showcase by the carpenter such, replacement of poor labels, the provision of table stand for minerals, introduction mineral search table and practical session by the curators which were the indicators observed and documented.(See figure 13 on page 95).

Group discussion and dialogue was also one of the methods applied in this action learning strategy whereby members of the team shared ideas and experiences with purpose of making improvement to respective practices. I have chosen this method because it encouraged sharing ideas and construction of knowledge through participation. Group Discussion and Dialogue is believed to be one of methods commonly used at workplaces like schools, companies and other organized institutions (Flick, 1998; Schwarz, 2005). Flick and Schwarz acknowledge that discussion in group could help the members to plan their activities, solve disputes and promote better understanding among the members. In this study, the participants and I inclusive agreed and used discussion and dialogue to share ideas related to my action study because this method gave an opportunity to participants to learn from each other and to be active rather than being passive participants for instance most of the intern students and curators have learnt the

role of active curatorial practices through discussion and dialogue held at Uganda National Museums which is partly an achievement for this objective.

For example during the dialogue held with curators and education officers we all agreed to practically test the training outcome conducted in the exhibitions hall by engaging all ourselves in the mineral search and crossword puzzle filling and we discovered that the training promoted amongst us creative thinking, self-appreciation, discovery learning and hands experiences. The other things that what worked well and what didn't work out on the other side was the limited space in the mineral exhibition that didn't allow students/audiences to participate fully in mineral search and crossword puzzle filling during peak hours and as a result of this congestion many students ended up not participating and completing the crossword puzzle fillings.

In the month of July 2017, the researcher together with the stakeholder's had an evaluation workshop to evaluate the actions taken on mineral exhibitions and formal training of the curators to generate finding on the interventions using the methodology of data collections stated in chapter three.

I also developed some questionnaires, forms for monitoring and evaluation which were distributed to the administrators, technical teams in charge of exhibitions, education officers, museum curators and the learners/interns students for completion during exhibitions of minerals and also evaluation forms on formal training session held at Uganda Museum. The process of this evaluation and monitoring the results were based on what worked well and why, what don't work out well and why? (See appendix 14 for evaluation forms).

After the implementation of mineral exhibitions in science and industry section I developed a questionnaires that sought the views of the students who participated in mineral search and crossword puzzle feeling activities and it was distributed to the audiences who had interested in learning more about minerals in Uganda, unlike those who were not interested like mostly pupils.

The questions posed to the audiences and their responses as well as their level of agreement in terms of this key: SA (Strongly Agree), A (Agree), D (Disagree) and SD (Strongly Disagree?)(Seepage 94, figure 7) revealed a very positive result that matched

the objective VI of this action research undertaken by the searcher at Uganda National Museum.

5.5 Conclusion based on my objectives.

In conclusion, the study showed that improving mineral exhibition and training curators to goes hand in hand and such must be implemented together to come up with improvement in order for museum curators facilitates interactive teaching and learning from mineral exhibitions. During the implementation, we agreed to improve on mineral showcases and train curator to acquire knowledge and skills. The study registered improvement in mineral exhibition which has attracted a lot visitors. Improvement of interactive learning by museum curators have made learning attractive for students especially who turn up for mineral search and crossword puzzle activities.

The participatory approach used during the study was of great importance during the training session with the curators which made them realize the outcomes the training conducted on interactive teaching and learning from exhibition. Through participatory methods stakeholders were able to unearth the clauses of poor exhibitions and poor skills among the Curators and identified workable objectives that resulted into improvement mineral exhibition and knowledge acquisition by the curators. Therefore I would like to say that participatory method used were the result improvement of mineral exhibition and knowledge acquired by the curators to facilitate interactive teaching and learning from mineral exhibitions at Uganda National Museum.

5.6 Recommendations

The recommendation of this study are based on the gaps that were identified during the evaluation workshop. The gaps that were seen were inadequate funding, poor attitudes towards changes of exhibitions, lack of pace to accommodate interactive lack of training and passive learning at Uganda National museum.

- The Ministry of Tourism wildlife and antiquities should ensure that enough funds are allocated to Uganda National Museum so that head of sections can address issues respectively also procurement for Museum supplies so be done at the departmental level so as to avoid bureaucracy at the headquarter.

- A positive mind toward change of showcases should be highly embraced by some of the administrators at Uganda National Museum so that changes can easily be made without any hesitation.

- For any activity that involved interaction with objects, the museum administrator should think twice about use of space. This is because one of the challenges faced during mineral search and crossword puzzle filling activities was space because it was not planned for.

- Ensure that Museum curators are trained on regular bases because they are the one who are always at the forefront disseminating information to the public.

- For learning to take place at Uganda National Museum, education section should be trained on regular bases in order to equip them practical skills and knowledge of teaching from exhibition.

These Recommendations are intended for three groups who have played significant roles in this study through their various contributions the study.

5.6.1 Recommendations to Participants (Curators and Co-facilitators)

- It is my desire to recommend to all the Museum curators and education facilitators who participated in this study to continue sharing ideas in small groups for the purpose of improving individual curatorial practices. This opportunity of idea sharing action research at workplace as I experienced in the last few months could elevate curatorial achievement of the guides and the museum education officers in their quest for museum education excellence.

- I also recommend the facilitators of exhibitions to continue working as a team and embrace team teaching and learning interactive exhibitions and self-reflective study with major aim of improving professional practice at workplace. I recommend reflective studies to participants of this study because it anchors the past with the present and enables the practitioner to plan for future.

- Use of Applied Learning Scenarios adopted by the participants could also provide confidence in building the interplay between the theory and practice which is a core value of education services at Uganda National Museum. I recommend the

use of ALS to all curators who participated in this study so as to achieve more in individual practice and always aspire for better improvement in museum curatorial practices.

- I recommend the use of mentorship scheme to facilitators (Museum educators) so as to understand the audience and their academic aspirations and develop better relationship necessary for interactive cooperation in learning and teaching process at Uganda National Museum.

5.6.2 Recommendations to Stakeholders in Education

- I recommend to museum learners, employers and Government/Institutions of learning to recognize and encourage active participation of museum audience in the learning process including development of curriculum, choice of methodology and the learning environment. This in my view is achievable with full recognition of the learners as pivotal in the learning process.

- I also recommend to the stakeholders to acknowledge the significance of the interplay between classroom and workplace experiences in promoting curatorial skill based learning needed for museum jobs and skilful performance of professional duties.

5.6.3 Recommendation to Uganda National Museum

I recommend to Uganda National Museum especially the section of education to continue adopting and provide avenue for development of Action Learning strategy and also encourage self-reflective study for museum curators who would wish to improve their professional practices.

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APPENDICES

Appendix 1: Permission Letter

KYAMBOGO UNIVERSITY

P. O. Box 1 Kyambogo, Phone: 041-285001/2 Fax: 041-220464
www.kyambogo.ac.ug
FACULTY OF VOCATIONAL STUDIES
DEPARTMENT OF ART & INDUSTRIAL DESIGN
MASTERS IN VOCATIONAL PEDAGOGY PROGRAMME
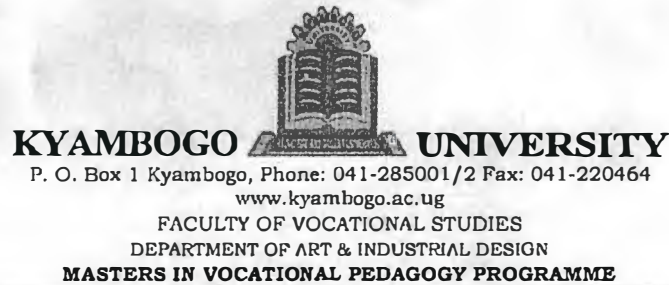
29th September, 2016

TO THE COMMISSIONER
UGANDA MUSEUMS AND MONUMENTS

RE: INTRODUCTION OF ODONG ALEX

This comes to introduce to ODONG Alex a student of Masters in Vocational Pedagogy (MVP) Programme at Kyambogo University. This student bears registration no15/U/14592/GMVP/PE and in his final year. As a requirement for graduation, this student is expected to carry out Action Research through a collaborative process with World of Work.

Any support rendered to him is highly appreciated.

Looking forward to your usual support.

Yours Sincerely,

Chris Serwaniko
Project Coordinator, NORHED MVP Program
Masters in Vocational Pedagogy Program

Appendix 2: Attendance List

Source: Workplace Data, Uganda Museum December 2016

Appendix 3: Workplace Analysis/Future workshops

ISSUES RAISED BY THE STAKEHOLDER THROUGH DISSCUSSION

- Some showcases don't have light in them.
- Some showcases have got broken glasses.
- Divergent views on changes of showcase.
- The museum have got very old exhibitions since 1950's
- Disorganized artifacts in some showcases
- Dirty showcases.
- Some objects are miss placed in showcase.
- Lack of enough information on some showcases e.g. the presidential
- Old label in some showcases
- Some showcases lack beading to seal off dust.

Continued...

- Some information/literature are hard to be interpreted to school children.
- Paleontology section has got too scientific languages to be understood by visitors.
- Poor texts in the showcases.
- Poor graphics in showcases.
- Poor hygiene of the showcases.
- Non involvement of education officers in issues of exhibitions
- Lack of clear exhibitions plan.
- Lack of logical flow of stories in the galleries.
- Inadequate communication skills

Continued...

- Difficulties in international languages
- Impaired clients are not catered for especially the deaf.
- Exhibits are sometime removed without consultation.
- Poorly maintained showcases.
- Divergent views about changing showcase.
- Inadequate curatorial practice.
- Inadequate interpretation of exhibitions terminologies.
- Inaccessibility of exhibition by people with disability.

Clustering the problem
The problem were clustered into categories of **X,XX, XXX, XXXX and XXXXX**

Category-X
- Some showcases don't have light in them
- Some showcases have got broken glasses
- Dirty showcases
- Some objects are miss placed in showcase.
- Old label in some showcases.
- Some showcases lack beading to seal off dust
- Poor texts in the showcases.
- Poor graphics in showcases
- Poor hygiene of the showcases.
- Poorly maintained showcases

Category-XX
- Divergent views on changes of showcase
- Divergent views about changing showcase.

Continued...

Category-XXX

- The museum have got very old exhibitions since 1950's.
- Disorganized artifacts in some showcases.
- Lack of enough information on some showcases e.g. the presidential.
- Lack of logical flow of stories in the galleries.
- Exhibits are sometimes removed without consultation.
- Inadequate curatorial practice

Category-XXXX

- Some information literature are hard to be adapted to school children.
- Paleontology section has not too scientific languages to be understood by visitors.
- Non involvement of education officers at times of exhibitions.
- Lack of clear exhibitions plan.
- Inadequate communication skills.
- Difficulties in intramural languages.
- Inadequate interpretation of existing terminologies.

Continued...

Category-XXXXX

- Inaccessibility of exhibition by people with disability.

FANTASY OF THE PROBLEMS CATEGORIZED INTO X,XX,XXX,XXXX AND XXXXX

1-Well maintained showcases.

2-Convergent views about changing showcases

3-Adequate curatorial practice.

4-Adequate interpretation of exhibitions terminologies.

5-Accessiblity of exhibition by people with disability.

PAIR WISE MATRIX

	1	2	3	4	5	Total Tally	Ranking
1						3	2
2	1					0	5
3	3	3				4	1
4	1	4	3			2	3
5	1	5	3	4		5	4

PAIR WISE MATRIX RESULTS

1- Adequate curatorial practice.

2-Well maintained showcases.

3- Adequate interpretation of exhibition terminologies.

4-Accessibility of exhibition by people with disability.

5-Convergent views about changing showcases.

UTOPIAN PHASE/FANTACY

Fantasys were categorized into (I) Feasible, (x) Not feasible and (LT) Long term

- Each gallery should have in charge staff.(1) x
- Train staff in curatorial practice.(1) xx
- Curators should be facilitated to research and update themselves from time to time.(x)
- Get ideas from other museums and implement them.(1) xx
- Institute supervisory committee to oversee the work of curators.(1) x
- Institute proper curatorial roles.(1) x
- Update the old exhibitions.(1) xxx
- Reorganize the artifacts.(1) xxx
- Carry out more research.(1) xxx
- Develop logical exhibition stories.(1) xxx
- Regular meetings(1)
- Motivational tips to the curators.(LT)

CATEGORIES OF SOLUTIONS INTO REALITY PHASE: X, XX AND XXX

Category-X

- Each gallery should have in-charge staff.
- Curators should be facilitated to research and update themselves from time to time.
- Institute supervisory committee to oversee the work of curators.
- Institute proper curatorial roles.

Category-XX

- Training staff in curatorial practice.
- Get ideas from other museums and implement them.

Continued...

Category-xxx

- Update the old exhibitions.
- Reorganize the artifacts.
- Carry out research.
- Develop logical exhibition stories.

REALITY PHASE
Prioritized solutions for categories **x, xx** *and* **xxx**

X-Institute advisory committee to take charge of galleries.
Xx-Retooling museum staff in curatorial practice.
Xxx- Update of exhibitions.

REALITY PHASE
Most prioritized solutions based on its achievability in term
of immediate term, short term and long term.

1-Retooling museum staff in curatorial practices.
2-Update of exhibitions.

Source: Workplace survey data, Uganda Museum December 2016

Appendix 4: Work plan 1 and II

Work plan 1

Activity	Responsible personnel	Period
Identify factors affecting exhibitions in each galleries	Head of section, administration and the technical team, guides, museum attendant education officers	1 month
Develop appropriate strategies for improving exhibition in the galleries	Head of sections, Administration, technical team and researchers.	1 month
Identify materials need for exhibition upgrading	The technical team, head of sections and administration.	1 month
Implementations of possible strategies for updating exhibitions in the galleries.	The technical team, Administration and head of sections.	2month
Monitor and evaluate the project	The technical team, administration and head of sections.	1 month

Work plan 2

Activity	Responsible personnel	Period
• Training the guides	• Senior Conservator Education Officer • Education Officer • Assistant Education officer • Exhibition Officer • All Museum Guides	• 2 day
• Identifying needs	• Education Officers	• 1 day
• Identifying training material	• Education Officers	• 1 day
• Implementing training outcome	• Museum Guides	• 1 month
• Evaluation and monitoring the project	• Exhibition officer • Education Officers	• 1 month

Budget for the research activities 2

• Refreshment during training	Office Messenger	• 2 days
Budget		200,000/=

Source: workplace survey data, Uganda Museum December 2016

Appendix 6: Budget for the Research Activities

Budget for the research activities 1

No	Item	Qty	Rate (shs)	Amount (shs)
1	Refreshment during workshops	2	200000/=	400000/=
2	Refreshment during workshops	2	200000/=	400,000/=
3	Transport	2	70000/=	140,000/=
	Stationary	1	500000/=	500,000/=
	Large format printing	1	200000/=	200,000/=
	Timber	6	150000/=	
	MDF Board	6	150000/=	
	Paint	4	45000/=	
	Glass	4	150000/=	
	Nails	4	12000/=	
	Vanish clear	2	25000/=	
	Refreshment	2	200000/=	
4	Refreshment during implementation	2	200000/=	400,000/=
5	Refreshment during monitoring and evaluation workshop	1	200000/=	200,000/=
			Grand Total	2,440,000/=

Source: workplace survey data, Uganda Museum December 2016

Appendix 7: List of attendance of implementation meeting

ACTION RESEARCH IMPLEMENTATION
MEETING: 23rd MAY 2017

No.	Names	Contacts
1.	Asiimwe Raymond	0787031243
2.	Fizhi Gibson	0773089204
3.	Mafabi Fredrick	0776369196
4.	Kimara Florence	0775197197
5.	Etuu Alvin	8119109230
6.	Mwesigzi Sarah	0772183601
7.	Kakyo Anne	0701392695
8.	Bwire Victor	
9.	Abiti Nelson	0705652649
10	Waly M M	0772056586
11	Serugyamol Nuwamanya	0784577847
		0775917986
12.	Dr. Kyazike Elizabeth	0184786976
13	Assoc Prof John Baptist Matovu	0772519534
14	Dr. Justine Nabaggala	0772579257
15.	Asiimwe Richard	0772 83 83 58
16.	Okeny Charles Kimyera	0777776552

Source: workplace survey data, Uganda Museum December 2016

Appendix 8: Minerals crossword puzzle

CROSSWORD PUZZLE FOR MINERALS IN UGANDA

V	O	L	C	A	N	I	C	A	S	H	J	A	G	T	C	O	A	Q
D	M	S	W	A	M	L	S	L	O	Z	N	M	L	R	E	L	Z	N
I	T	L	I	T	I	I	N	P	Q	K	M	A	L	I	A	B	A	T
M	K	A	T	W	R	M	E	N	J	B	S	L	A	T	E	N	K	Y
E	A	B	L	S	O	E	L	K	V	K	G	R	A	N	I	T	E	Q
N	O	R	J	C	N	S	M	B	C	E	M	E	N	T	M	U	S	I
S	L	T	B	A	O	T	C	O	P	P	E	R	O	R	E	Z	P	C
I	I	U	V	L	R	O	R	P	Y	R	I	T	E	C	U	B	E	S
O	N	P	R	S	E	N	J	D	I	A	T	O	M	I	T	E	Q	S
N	C	H	D	B	Q	E	V	E	R	M	I	C	U	L	I	T	E	A
S	S	I	L	I	C	A	S	A	N	D	P	K	N	E	B	O	K	L
T	R	A	V	E	R	T	I	N	E	V	T	E	R	R	A	Z	O	T
O	P	H	O	S	P	H	A	T	E	W	X	O	W	Z	Y	M	M	S
N	A	N	P	E	J	W	S	O	R	O	N	G	Y	P	S	U	M	K
E	Z	S	W	W	O	L	F	R	A	M	A	L	A	C	H	I	T	E

Rock Salt	Terrazo	Diamond Stone
Kaolin	Cement	Limestone
Wolfram	Travertine	
Vermiculite	Malachite	
Pyrite Cubes	Iron Ore	
Silica Sand	Slate	
Volcanic Ash	Copper ore	
Diatomite	Marble	
Phosphate	Gypsum	
Clay	Talc	
	Salt	

Source: workplace survey data, Uganda Museum December 2016

Appendix 9: Mineral coding/labeling

CODING/LABELING

Mineral	Coding/Labeling	Number
Granite	GE.01.GR	1 Pcs
Copper Ore	GE.02.CU, GE.03.CU	2 Pcs
Muscovite	GE.04.MU, GE.05.TO	2 Pcs
Gypsum	GE.05.GY	1 Pcs
Pyrite cube	GE.06.PY	1 Pcs
Iron ore	GE.07.OR	1 Pcs/More
Marble	GE.08.MA, GE.08.I MA	2 Pcs
Wolfam	GE.09.WO	1 Pcs
Talc	GE.10.TA	1 Pcs
Tin	GE.11.TI	1 Pcs
Manganese	GE.12.MAN	1 Pcs
Tourmaline	GE.13.TO	

Source: workplace survey data, Uganda Museum December 2016

Appendix 10: Exhibition design layout
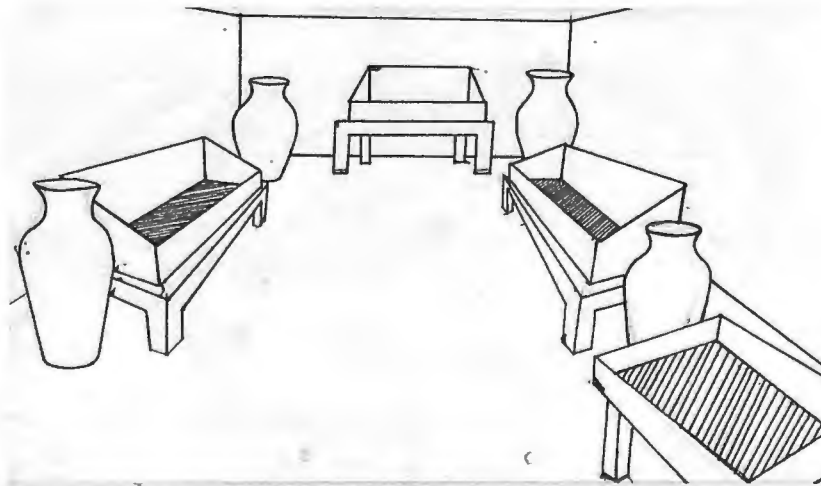
Source: workplace survey data, Uganda Museum December 2016

Appendix 11: Guiding tool for interactive teaching & learning training

A SIMPLE GUIDE TOOL FOR INTERACTIVE TEACHING AND LEARNING
EXHIBITIONS (A CASE OF MINERAL SHOWCASE)

Theme: 1 (20-30 minutes)	Mineral in Uganda	Sample Questions
Learning Aids	• Mineral collections • Maps showing mineral occurrences in Uganda. • Mineral hidden in sand. ▪ Cross word puzzle	• Name minerals found in Uganda and their usage? • Which part of Uganda do we find mineral deposits? • Can you identify one of the minerals found in Uganda? • Name any common rock-forming minerals in Uganda?
Activities:	• Audience observes minerals in display? • Audience interact with mineral hidden in sand? • Filling cross puzzle	
Learning outcomes; (Life skill and values)	• Creativity • Problem solving • Critical thinking • Hand on experience in discovering mineral. • Appreciation.	
Method I; Introduction (10-15 minutes)	• Curator introduces the lesson simple guide narratives • Curators guide the audience/ students into discussion on minerals occurrences in Uganda. • Audience/students ask some questions. •	
Method ii; Interactive exhibitions (10-15 minutes)	• Curator introduces interactive exhibitions for the search to identify minerals hidden in sans and cross puzzle filling. • Curator guide audience/students on the search to identify hidden minerals in	
	sand and cross puzzle filling. • Audience remarks and experiences on interactive learning and teaching of mineral exhibitions. • The curator concludes the lesion.	
PRETESTING		
Retesting ; Introduction (10-15 minutes)	• Curator introduces the lesson through simple guide narratives to all staff. • Curators guide the audience/ students/staff into discussion on minerals occurrences in Uganda. • Audience/students/staff ask some questions.	
Pretesting: Interactive exhibitions (10-15 minutes	• Curator introduces interactive exhibitions for the search to identify minerals hidden in sans and cross puzzle filling to all staff. • Curator guide audience/students on the search to identify hidden minerals in sand and cross puzzle filling to all staff. • Audience remarks and experiences on interactive learning and teaching of mineral exhibitions. • The curator concludes the lesion.	
END OF PRETESTING		

Source: workplace survey data, Uganda Museum December 2016

Appendix 12: Attendance list for training curators and internal memo

Source: workplace survey data, Uganda Museum December 2016

Appendix 13: Evaluation Meeting

Source: workplace survey data, Uganda Museum December 2016

Appendix 14: Training Evaluation forms for Curators

Training Evaluation Form

For Participants in Curators Trainings

Date: _____

Title _____

Location of training: _____

Trainer: _____

Instructions: Please indicate your level of agreement with the statement listed below by ticking it.

	Strongly Agree (SA)	Agree (A)	Disagree (D)	Strongly Disagree (SD)
1. The objective of the training were clearly defined by the researcher	o	o	o	o
2. Participant and interaction were encouraged by the facilitator	o	o	o	o
3. The theme covered were relevant to me	o	o	o	o
4. The content was organized and easy to follow e.g. audience interaction with minerals and crossword puzzle filling	o	o	o	o
5. The materials distributed were helpful in my work. E.g. Marking guide and minerals coding	o	o	o	o
6. The facilitator was knowledgeable about theme of training.	o	o	o	o
7. The facilitators and the researcher well prepared for the training	o	o	o	o
8. The training objectives were met.	o	o	o	o
9. The time allotted for the training was sufficient	o	o	o	o
10. Was the learning aids helpful to you while training	o	o	o	o
11. How was the learn activities useful to you in the training	o	o	o	o

What did you like most about this training?

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

What aspects of the training could be improved?

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

How do you hope to change your practice as a result of this training?

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

What additional trainings would you like to have in the future?

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

Please share other comments or expand on previous responses here:

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

Did you like the learning activities conducted in the training?

....

....

....

....

What was the learning outcomes and values to you during the training?

....

....

....

....

Do you thinking the introductory session of narratives by curators and discussion are of importance to audience?

....

....

....

....

Do you think the interactive exhibitions and crosswords puzzle filling is important?

....

....

....

....

How was the pretesting session helpful to you?

....

....

....

....

Thank you for your feedback!

Source: workplace survey data, Uganda Museum December 2016

Appendix 15: Uganda National Museum Evaluation Form of Mineral

- General Impression of mineral Exhibitions

- Administrator, technical team, Education Officer and Curators

- Museum Audience (Students/Pupils and Visitors)

UNMM Evaluation of Mineral Exhibitions
Please distribute this evaluation form to Administrators, technical team, selected
educators, curators and learners for completion during the exhibition
Please return completed forms to:
The researcher.
Thanks for your input!

Your details
Please underline or specify:
Name:
School / Institution:
Name of Exhibition:
City

Key: SA: Strongly Agree. A: Agree. D: Disagree. SD: Strongly Disagree.

Number of attendants...........

General impression of Mineral Exhibitions	Response			
	SA	A	D	SD
Activity				
Information and training received during the pre-exhibition session.				
Directions to exhibition stalls/exhibition flow & exhibition design layout.				
Programme of the exhibition (Interactive exhibitions & crossword puzzle filling)				
Time allocated for your school (mineral search & crossword puzzle filling is appropriate)				
Safety of the venue (Minerals exhibition)				

Administrators, Technical team, Education officers and Curators.

Indicators	Activity	Response			
Poor labels	Designed standard labels, introductory panel, laminated labels and replaced.	SA	A	D	SD
Poor graphics	Printed a standard map, photographs, mineral coding, and marking guides, laminated some them and replaced it.				
Dirty showcase	Refurnished the showcase and it on display for viewers				
Broken glass	Replaced the broken glass and it's on display.				
Disorganized Artifacts	Reorganized the artifacts in accordance to the labels.				
Poorly maintained	Preserved and conserved the artifacts in the showcase, we				
Worn out showcase	Replaced the worn out boards in the showcase and repainted it.				
Displaced showcase	Reassembled the showcases in malaria consortium for public view.				
Poor design of exhibitions flow	I &designed a 3 dimension layout of exhibitions flow.				

UNMM Evaluation of Mineral Exhibitions
Please distribute this evaluation form to Administrators, technical team, selected
educators, curators and learners for completion during the exhibition
Please return completed forms to:
The researcher.
Thanks for your input!

Your details
Please underline or specify:
Name:
School / Institution:
Name of Exhibition:
City:

Key: SA: Strongly Agree. A: Agree. D: Disagree. SD: Strongly Disagree.

Number of attendants.........

Museum Audience (Students/Pupils and Visitors)

Indicators	Activity	Response			
Poor labels	Designed standard labels, introductory panel, laminated labels and replaced.	SA	A	D	SD
Poor graphics	Printed a standard map, photographs, mineral coding, and marking guides, laminated some them and replaced it.				
Dirty showcase	Refurnished the showcase and it on display for viewers.				
Broken glass	Replaced the broken glass and it's on display.				
Disorganized Artifacts	Reorganized the artifacts in accordance to the labels.				
Poorly maintained	Reorganized the artifacts in accordance to the labels.				
Worn out showcases	Replaced the worn out boards in the showcase and repainted it.				
Displaced showcases	Reassembled the showcases in malaria consortium for public view.				

Source: workplace survey data, Uganda Museum December 2016

Appendix 16: General Questions

General Question

What did go on well during this action Research?

Source: workplace survey data, Uganda Museum December 2016

Appendix 17: Questionaire of Curators on duty

Curators on duty:

Note this questionnaire should be filled in by the end of gallery tour.

What did you like most about this activities of engaging with mineral search crossword puzzle filling?

What aspects of the training could be improved beside this minerals search and crossword puzzle filling?

How do you hope to change your practice as a result of this interactive engagement with mineral search and crossword puzzle filling?

Do you think the time allotted for mineral search and crossword puzzle filling is enough for you?

Did you like the learning activities of mineral search and crossword puzzle filling?

What was the learning outcomes and values to you during the minerals search and crossword puzzle filling?

Do you thinking the introductory session of narratives by curators and discussion are of importance to you?

What do you like about this interactive exhibitions of minerals compared others?

What have you achieved during this interactive exhibitions of minerals search and crossword puzzle filling?

How do you rate this interactive exhibition of minerals with other exhibitions in the galleries?

Please share other comments or expand on previous responses here:

Thank you for your feedback!

Source: workplace survey data, Uganda Museum December 2016

Appendix 18: Visitor's registry in June 2017

Source: workplace survey data, Uganda Museum December 2016

Appendix 19: Category of stakeholders

Category of stakeholders	Influential	Less Influential
Commissioner Museums and Monuments	✓	
Assistant Commissioner	✓	
Principal Conservators	✓	
Senior Conservators	✓	
Conservators	✓	
Personal Secretary		✓
Stenographer Secretary		✓
Account Assistants		✓
Assistant Conservators	✓	
Receptionist		✓
Museum Attendants	✓	
Security		✓
Drivers		✓
Musicians	✓	
Dancers	✓	
Site attendants		
Carpenters	✓	
Electricians	✓	
Museum Guides	✓	
Foreign Visitors	✓	
Local Visitors	✓	
Interns	✓	
Mentor	✓	

Source: workplace survey data, Uganda Museum December 2016

Appendix 20: Visitors turn in June 2017

Date	Group A-Ugandan B-Foreigner	Ugandan/local visitor		Foreigner/international visitors		Area of interest	Participated in	
		Male	Female	Male	Female		Mineral search	Crossword puzzle
1st/06/17	B			M		Uganda History	Nil	Nil
,,	B				F	All	Nil	Nil
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		History	,,	,,
2nd/06/17	B			M		Archeology	,,	,,
,,	B			M		Archeology	,,	,,
,,	A	M				Art	,,	,,
,,	A		F			Art	,,	,,
,,	A		F			Art	,,	,,
,,	A	M				History	,,	,,
,,	A		F			History	,,	,,
,,	A	M				History	,,	,,

,,	B			M		History	,,	,,
,,	B				F	History	,,	,,
,,	B			M		History	,,	,,
,,	B			M		All	,,	,,
3rd/06/17	B				F	All	,,	,,
,,	B			M		History	,,	,,
,,	A	M				All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				All	,,	,,
,,	A		F			History	,,	,,
,,	B				F	History	,,	,,
,,	B			M		History	,,	,,
,,	B			M		History	,,	,,
,,	A	M				History	,,	,,
,,	B			M		History	,,	,,
,,	B					History	,,	,,
,,	B			M		Culture	,,	,,
,,	B			M		History	,,	,,
,,	B			M		History	,,	,,
,,	B			M		History	,,	,,
5th/05/17	A	M				History	,,	,,
,,	A	M				History	,,	,,
,,	B				F	History	,,	,,
,,	B			M		History	,,	,,
,,	B			M		History	,,	,,
,,	A	M				History	,,	,,
,,	B			M		History	,,	,,
,,	B				F	History	,,	,,
,,	B			M		History	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		Culture	,,	,,
,,	A	M				Culture	,,	,,

Date								
6th/06/17	A	M				Culture	,,	,,
,,	A	M				Culture	,,	,,
,,	B			M		Culture	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	A		F			All	,,	,,
,,	A		F			All	,,	,,
,,	B			M		All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	A	M				All	,,	,,
,,	A		F			All	,,	,,
,,	A		F			All	,,	,,
,,	A		F			All	,,	,,
,,	B				F	Culture	,,	,,
7th/06/17	B			M		Culture	,,	,,
,,	A	M				All		
,,	A		F			All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				Artifacts	,,	,,
,,	A	M				Artifacts	,,	,,
,,	A		F			Artifacts	,,	,,
,,	A	M				Artifacts	,,	,,
,,	B			M		Artifacts	,,	,,
8th/06/17	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,

,,	B				F	All	,,	,,
,,	A				F	All	,,	,,
,,	B			M		All	,,	,,
9th/06/17	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	A	M				All	,,	,,
,,	A		F			All	,,	,,
,,	A					All	,,	,,
,,	B			M		All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	A		F			All	,,	,,
,,	B				F	All	,,	,,
,,	A		F			All	,,	,,
,,	B				F	All	,,	,,
10th/06/17	B				F	All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,

,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
12th/06/17	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	A		F			All	,,	,,
,,	A		F			All	,,	,,
,,	A		F			All	,,	,,
,,	A		F			All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	A		F			All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
13th/06/17	B			M		All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	A		F			All	,,	,,
,,	A		F			All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,

14th/06/17	A		F			Al	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				History	,,	,,
,,	A		F			History	,,	,,
15th/06/17	B			M		History	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	History	,,	,,
,,	B			M		History	,,	,,
,,	B			M		History	,,	,,
,,	B			M		History	,,	,,
,,	B				F	All	,,	,,
,,	B			M		Culture	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
15th/06/17	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	History	,,	,,
,,	B				F	All	,,	,,

,,	B			M		All	,,	,,
,,	B				F	History	,,	,,
,,	A	M				All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	A		F			All	,,	,,
16th/06/17	B			M		All	,,	,,
,,	A	M				All	,,	,,
,,	A		F			All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	A	M				History	,,	,,
,,	A	M				History	,,	,,
,,	B				F	History	,,	,,
,,	B				F	History	,,	,,
,,	A	M				History	,,	,,
,,	B				F	History	,,	,,
,,	A	M				History	,,	,,
17th/06/17	B				F	History	,,	,,
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,,	B				F	History	,,	,,
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,,	B				F	History	,,	,,
,,	A		F			History	,,	,,
,,	B			M		History	,,	,,
,,	B				F	History	,,	,,
,,	B				F	History	,,	,,
,,	B			M		History	,,	,,
,,	A	M				History	,,	,,
,,	A	M				All	,,	,,

,,	A	M				All	,,	,,
,,	A		F			All	,,	,,
,,	B			M		All	,,	
19th/06/17	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	A	M				All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	B				F	All		
,,	B				F	All	,,	,,
20th/06/17	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		History	,,	,,
,,	B				F	History	,,	,,
,,	A	M				History	,,	,,
,,	B			M		History	,,	,,
,,	B			M		History	,,	,,
,,	A		F			History	,,	,,
,,	A	M				History	,,	,,
,,	B				F	History	,,	,,
,,	B				F	History	,,	,,
,,	B				F	History	,,	,,

,,	B				F	Tour	,,	,,
,,	B				F	Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B			M		Tour	,,	,,
21st/06/17	B			M		Tour	,,	,,
,,	A		F			Tour	,,	,,
,,	B			M		Culture	,,	,,
,,	B				F	Culture	,,	,,
,,	B			M		Culture	,,	,,
,,	A	M				Tour	,,	,,
,,	A	M				Tour	,,	,,
,,	A		F			Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B				F	Tour	,,	,,
,,	B				F	Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B				F	Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	A		F			Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B				F	Tour	,,	,,
,,	B				F	Tour	,,	,,
22nd/06/17	B			M		Tour	,,	,,
,,	B				F	Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B		F			Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B				F	Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B				F	Tour	,,	,,

Date		M	F	M	F			
,,	A		F			Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B				F	Tour	,,	,,
23rd/06/17	B			M		Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	A		F			Tour	,,	,,
,,	A	M				Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	A	M				Tour	,,	,,
,,	B			M		Tour	,,	,,
,,	B				F	Tour	,,	,,
,,	B				F	History	,,	,,
,,	A	M				History	,,	,,
,,	B			M		History	,,	,,
,,	B				F	History	,,	,,
,,	B				F	Craft	,,	,,
,,	A		F			History	,,	,,
,,	A	M				History	,,	,,
,,	B			M		All	,,	,,
24th/06/17	B			M		History	,,	,,
,,	B				F	History	,,	,,
,,	B				F	History	,,	,,
,,	B			M		History	,,	,,
,,	B			M		History	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,

,,	B				F	All	,,	,,
26th/06/17	A		F			All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
27th/06/17	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	B			M		All	,,	,,
,,	B			M		Craft	,,	,,
,,	B				F	Craft	,,	,,
,,	B			M		All	,,	,,
,,	B			M		All	,,	,,
,,	B				F	All	,,	,,
28th/06/17	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	A				F	All	,,	,,
29th/06/17	A	M				All	,,	,,
,,	B				F	All	,,	,,
,,	A	M				All	,,	,,
,,	A	M				All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,
,,	B				F	All	,,	,,

Source: workplace survey data, Uganda Museum December 2016