# ICT AND DIGITAL PRESERVATION OF HISTORICAL DATA: A STUDY OF THE AFRICAN ART AND CULTURE SECTION, DEPARTMENT OF GENERAL ART STUDIES, KNUST

**By**

**Amankwa John Opuni**
BFA (Hons.) Graphic Design

A thesis submitted to the School of Graduate Studies,
Kwame Nkrumah University of Science and Technology in partial fulfillment of the requirements for the degree of

**MASTER OF ARTS**
**(AFRICAN ART AND CULTURE)**

Faculty of Art, College of Art and Social Sciences

August, 2010

## ABSTRACT

Digital information is transforming the way we learn, the way we communicate and even the way we think. It is also changing the way that educational institutions all around the world not only work, but, more fundamentally, the very work that they do. Information and communication technologies have proved indispensable in the access and retrieval of digital information; be it in the form of research or even intellectual resource preservation. Digital preservation has over the years pushed the boundaries of preservation of valuable documents to the next level where efficiency, accessibility and longitudinal sustainability of valuable information is assured even under the harshest of conditions. The research sought to explore digital preservation strategies and policies parallel to the digitization of 35mm photographic slides belonging to the African Art and Culture Section of the Department of General Art Studies, KNUST to aid teaching and learning of art and culture. Also the research examined how useful the design and implementation of an effective functional database-driven website for the Department would be to the dissemination of information and online research activities. The researcher used qualitative research approaches comprising observations, interviews and checklists to acquire data and evaluate the results. Furthermore prototypes of the applications were developed. It was identified that the old method of keeping the Slides exposed them to rapid deterioration. It is therefore recommended that the Department embraces new and innovative digital preservation technologies and strategies, as well as ICT solutions in the preservation of 35mm slides and other research activities of the department.

## DECLARATION

I hereby declare that this submission is my own work towards the MA African Art and Culture and that to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

**AMANKWA JOHN OPUNI 20066825** ---------- ----------

Student's name & ID No. Signature Date

Certified by:

**DR. STEVE KQUOFI** ---------- ----------

(Supervisor's name) Signature Date

Certified by:

**DR. JOE ADU-AGYEM** ---------- ----------

(Head of Department's name) Signature Date

## ACKNOWLEDGEMENTS

I wish to express my profound gratitude to the almighty God through his son Jesus Christ for his Steadfast Love, Grace and Guidance in my life and through this project.

Secondly, my deepest thanks go to my Parents, Mr and Mrs Opuni Frimpong, Margaret Myres Hanse, Vivian Afrakoma Boateng, Collins Opuni Frimpong, Elton Djokoto, Seth Darkwa Kwakwa, Mr. Edward Appiah, Mr. J.W.A. Appiah, Jesbe Computers, my siblings and all my friends for their enormous contributions, prayers and support in making my two years masters programme a great success.

Finally, my deepest gratitude goes to my supervisor, Dr. Steve Kquofi, for his diligence, discipline, contributions and support even in times of extreme pressure. I say God Bless you, Sir. Finally, I wish to thank all the teaching and non-teaching staff of the Department of General Art Studies especially Nana Opoku Asare Mrs., Dr. Mariama Ross, Dr. Eric A. Asante, Dr. Mavis Enti, Dr. harry Barton Essel, and Dr. Joe Adu Agyem. God Bless you!

## TABLE OF CONTENTS

**Content** **Page**

**ABSTRACT**……ii
**DECLARATION**……..…….iv
**ACKNOWLEDGEMENTS**……..…….v
**TABLE OF CONTENTS**……..vi
**LIST OF FIGURES**…….....viii

**1.0 CHAPTER ONE: INTRODUCTION**.....1
1.1 Background to the study.....1
1.2 Statement of the Problem.....2
1.3 Research Questions.....3
1.4 Objectives.....4
1.5 Delimitation.....4
1.6 Importance of the study.....5
1.7 Research Methodology.....
1.8 Structure of the Project Report.....
1.9 Definition of Terms ….....
1.10 Abbreviations.....

**2.0 CHAPTER TWO: REVIEW OF RELATED LITERATURE**.....6
2.1 Overview.....6
2.2 Information and Communication Technology (ICT) in Data Preservation.....7
2.3 Information and Communication Technology (ICT) Literacy…….....8
2.4 Information and Communication Technology: a Necessary Tool for Academic Departments……...…….10
2.5 The Internet: Overview…….....12
2.6 The Internet and Dissemination of Information.....13
2.7 Digital Preservation Technologies.....14
2.8 Digital Preservation Developments.....16
2.9 Digital Preservation Management and Sustainability in Art.....17

2.10 Digital Preservation and ICT: the Digital Divide.....18

**3.0 CHAPTER THREE: METHODOLOGY**.....19

3.1 Overview…….....19

3.1.1 Field Methods …….....20

3.1.2 Studio Methods.....20

3.2 Research Design …….....20

3.3 Population and Sampling Method …….....21

3.4 Data Collecting Instruments …….....21

3.4.3 Descriptive Study …….....22

3.5 Sources of Data.....22

3.6 Design and Development of the Interactive Disc of Arts and Culture (IDAC) .....23

3.6.2 Design and Development of the User Interface for the IDAC ……..…29

3.8 Digitization of the Slides (SCANNING).....44

3.9 Design and Development of the Website for the Department of General Art Studies.....63

**4.0 CHAPTER FOUR:PRESENTATION AND DISCUSSION OF FINDINGS**.....73

4.1 35mm Slide Technology.....73

4.1.2 How slide projectors work …….....75

4.1.3 Slide management at the section of African art and culture section, KNUST.....77

4.1.4 Weaknesses of the slide projector system.....78

4.1.5 How slides are used at the section of African Art and Culture, KNUST …….....79

4.1.6 Benefits of Digitization of slides.....80

4.1.7 Other benefits of using digitization as a reformatting method for 35mm slides.....81

4.2 Interactive Media in Instructional Technology……..…….…..83

4.2.1 Interactive media.....83

4.2.2 Benefits of interactive media…….……84

4.2.3 Instructional media technology…….84

4.2.4 Types of Instructional Media……85

4.2.5 Benefits of Instructional technology during African art and culture lectures……85
4.2.5 Role of Interactive media in instructional technology……..……..…86

**5.0 CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS** .....88
5.1 Discussions of the overall project results…….....88
5.2 Project achievements.....88
5.3 Testing and Evaluation of the website…….....89
5.4 Testing and Evaluation – Interactive Disc of Arts and Culture - IDAC.....95
5.5 Features and application manual of the IDAC.....97
5.6 Website details and features.....101
5.7 Impact of the project.....101
5.8 Conclusions .....102
5.9 Recommendations.....103
5.10
**REFERENCES**.....108

## LIST OF FIGURES


**Page**

**Fig. 3.1** Screen shot of the AAA Logo splash screen ……....……25

**Fig. 3.1.1** Screen shot of the working area of AAA Logo….....26

**Fig. 3.1.2** Screen shot of the initial stage of the development process…….…..26

**Fig. 3.1.3** Screen shot of the finishing of the icon in AAA Logo...……...…….27

**Fig. 3.1.4** Screen shot of the exporting of the icon from AAA Logo native format to a non-native .PNG file format…….....28

**Fig. 3.1.5** Image of the finished icon……...……28

**Fig. 3.2** Screen shot of the splash screen of the software used - Adobe Photoshop CS3……31

**Fig. 3.3** Screen capture of the splash screen of the Interactive Disc of Arts and Culture -IDAC….……...32

**Fig. 3.2.1** Screen capture of the ‘new document window in Adobe Photoshop CS3 …….33

**Fig. 3.2.2** Screen capture of the ‘first stage of the Design in Adobe Photoshop CS3 …….34

**Fig. 3.2.3** Screen capture of the initial designing of the background in Adobe Photoshop CS3…….....35

**Fig. 3.2.3** Screen capture showing the beginning activity area in Adobe Photoshop CS3……35

**Fig. 3.2.4** Screen capture showing the continuing steps (1) of the activity area in Adobe Photoshop CS3…….....35

**Fig. 3.2.5** Screen capture showing the continuing steps (2) of the activity area where the IDAC icon was placed at the upper left corner of the screen……..36

**Fig. 3.4** Screen capture of the application Architecture of the Interactive Disc of Arts and Culture -IDAC……37

**Fig. 3.2.5** Screen capture showing the development steps (3) of the activity area where the info area is to the left and the category navigation to the right…….…38

**Fig. 3.2.6** Screen capture showing more details of development steps (4) of the activity area…….……38

**Fig. 3.2.7** Screen capture showing the completion of the activity area where the category images have been inserted……....40

**Fig. 3.2.8** Screen capture showing the completion of the activity area (2) where the 'credits', 'home', 'help' and 'exit' have been inserted at the top right corner of the screen……...…….41

**Fig. 3.4** Screen capture of the Color Schemer Online application……...42

**Fig. 3.2.8** Screen capture showing the completion of the whole interface with the addition of text and copyright information……...……44

**Fig. 3.8.1** Image of the scanner used for the execution of the scanning - HP Scanjet G2710 Photo Scanner L2696A……..……46

**Fig. 3.8.2** Image of the scanner; the circled area indicating the location of the Transparent material adapter- TMA…….……..49

**Fig. 3.8.5** Screen capture showing the 'scan positives, including 35mm slides using the TMA' and the 'save to file' options…….……...51

**Fig. 3.8.6** The circled area identifies the file format chsen for the digitization of the slides – '.TIFF'……..52

**Fig. 3.8.7** The enclosed area in the image above shows the selected resolution(300dpi), the number of colors and the optical scaling percentage……...52

**Fig. 3.8.8** This figure shows the option that aloows the software to save the adjastments made as a default setting for the rest of the project……..……...53

**Fig. 3.8.9** The above figure shows the priview area to left of the screen, the advanced edditing tools to the right and the 'accept' and 'new scan' at the bottom …….…….54

**Fig. 3.8.10** Screen capture showing a more detailed view of the advanced edditing tools of the scanning application ...……..55

**Fig. 3.8.11** The scanned Slide image…….……...56

**Fig. 3.8.12** Splash screen of the application software used for the Image enhancements – Adobe Photoshop CS3….……57

**Fig. 3.8.13** Enhanced image seen in the Adobe Photoshop CS3 working canvas.....58
**Fig. 3.8.14** 'Levels' window – use to adjast the intensities of the RGB- Red, Green nad Blue of the scanned image…….59
**Fig. 3.8.15** 'Hue/Saturation' window –used to adjast the raw color levels of the scanned image…….……59
**Fig. 3.8.16**' Curves' window – also used to adjast the intensities of the RGB- Red, Green nad Blue of the scanned image but this window offered more specific and detailed options of adjastments……...……60
**Fig. 3.8.17** 'Brightness/ Contrast' window –used to adjast the general luminance of the scanned image …….…….60
**Fig. 3.8.19** The scanned Slide image…….……...61
**Fig. 3.8.19** The scanned Slide image……....61
**Fig. 3.9.1** Splash screen of the application software used for the frontend development – Adobe Dreamweaver CS3……..……66
**Fig. 3.9.2** Splash screen of the application software used to edit images for the frontend development – Adobe Photoshop CS3……66
**Fig. 3.9.3** Anomated graphics to be used for the website – Adobe Photoshop CS3……..68
**Fig. 3.9.4** Layout design of the website……..68
**Fig. 3.9.5** Screen capture of the development of the frontend showing the codes and design in Adobe Dreamweaver CS3……...69
**Fig. 3.9.6** A clearer view of the site in Adobe Dreamweaver CS3…….....69
**Fig. 3.9.4.1** Splash screen of the software application used for the backend development - NetBeans IDE 6.8……...72
**Fig. 3.9.4.2** A screen capture of the codes written in the software application used for the backend development - NetBeans IDE 6.8……72
**Fig. 4.1.1** Image of the stucture and specifications of the 35mm slide……..…73
**Fig. 4.1.2** Image of slide projector……...……...75
**Fig. 4.1.3** Image of slide projector……...……...75
**Fig. 4.1.4** Image of one of the old slide projectors at the African Art and Culture section…….…76

**Fig. 4.1.5** Image of the other old slide projectors at the African Art and Culture section……..……76

**Fig. 4.1.6** Slides exposed and others in an old carousel box - African Art and Culture section…….……...77

**Fig. 4.1.7** Slides stored in a plastic container – African Art and Culture section…….78

**Fig. 5.1** A screen capture of Splash Screen - IDAC……..……97

**Fig. 5.3** A screen capture of “Home” - IDAC……..…….97

**Fig. 5.4** A screen capture of “Category Home” - IDAC……..….99

**Fig. 5.5** A screen capture of “slide view of Category” - IDAC……100

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background to the study

This study was motivated by the researcher's experience with preservative measures and use of information and communication technology (ICT) at the Department of General Arts Studies, KNUST specifically the African Art and Culture section.

Study, on ICT is not a new topic at KNUST and for that matter at the Department of General Arts Studies, but In spite of the large volumes of literature available on digital preservation as well as ICT very little has been achieved at the African Art and Culture section as far its application, practicality, approach and synchronicity with preservation are concerned. Hence this has been a subject matter of vital interest to the researcher. This study first of all examines the roles of ICT interventions in the form of a dynamic database-driven website play on the circulation of information among students and lecturers within the section and online research activities.

Secondly the roles and influences of digital preservation initiatives like digitization on the African Art and Culture section of the Department of General Art Studies, KNUST, Kumasi, in the preservation of 35mm slides and how the digitization of these slides into an interactive application can be an innovative instructional media tool in the study of Art

and Culture of Africa. This study reviews a wide range of available literature, journals and electronic resources seeking out evidence of how the integration of these interventions will reduce the marginalization of the dissemination of information, preservation and learning and teaching of African art and culture.

The primary aim of the researcher is to design and develop an effective dynamic website for the Department of General Art studies focusing more on the African Art and Culture Section and finally digitize a selected number of available 35mm photographic slides belonging to the section using modern digital preservation standards and policies into an interactive web based application and to build an objective discussion of the roles and benefits this intervention will bring to the learning and teaching experiences of students of the section.

This research was conducted by applying the qualitative research method and interviews as a technique for the collection of data from participants.

### 1.2 Statement of the problem

Many tertiary institutions all over the world are currently at a threshold in computer technology, where ICT and conversion of documents on paper and other media to digital format have been widely recognized as an effective way to access and preserve data (Smith, 1999). However, the African Art and Culture section of the Department of General Art studies, KNUST since its inception in 1973 has seen very little digital and ICT innovations.

Hundreds of 35mm old photographic slides of African Cultures and Art forms belonging to the section are in a state of deterioration. As a result of this albatross, students studying African Art and Culture at both the undergraduate and postgraduate levels learn about various African Art forms and Cultures which they may not have the opportunity of seeing in other to facilitate their understanding and appreciation of the programme.

Secondly, there is also a "Gordian knot" in the use of ICT in the African Art and Culture section which has resulted in setbacks in terms of interactions between students and lecturers. This research therefore seeks to examine and introduce digital technology in the preservation of these old 35mm photographic slides of African Cultures and Art forms, which are in are in a deplorable state into an interactive web-based application to facilitate teaching and research activities at the section.

This research also intends to design and develop a secured online environment to promote the usage of ICT in the dissemination of information in the Section of African Art and Culture, Department of General Arts Studies and the university community.

### 1.3 Research Questions

1. What kind of historical data of Art and Culture does the section of African Art and Culture have?
2. How and to what extent are historical data of Art and Culture preserved and used at the section of African Art and Culture?

3. To what extent does the Section of African Art and Culture employ ICT based knowledge in the dissemination of information?

## 1.4 Objectives

1. To examine and document preservation strategies employed in the preservation and use of slides at the African Art and Culture Section
2. To digitize selected slides of African Art and Cultures into an interactive web-based application; (IDAC) and examine its impact as an Instructional intervention initiative for the Section.
3. To discuss the roles of interactive media/Technology in the study of African Art and Culture
4. To develop a dynamic website with advanced search engine, forum and staff database for the Section as well as the Department

## 1.5 Delimitation

This research concentrates on the Department of General Arts Studies more specifically the African Art and Culture section, KNUST, Kumasi. The research also focuses on the digitization and preservation of a selected number of 35mm slides belonging to the section of African Art and Culture and development of a dynamic website for the Department of General Art Studies.

## 1.6 Importance of study

1. This research serves as a reference material for the academia, art historians and other researchers interested in the field.
2. Secondly, this project offers an effective means of preserving and managing historical and visual aids belonging to the section.
3. Further more this project serves as a teaching and learning aid for both postgraduate and undergraduate level African Art and Culture students. Lecturers within the department and from other institutions can also make use of this project as an interactive resource tool in Art.
4. Finally, this project provides a resourceful website for the Department of General Art Studies in an attempt to consolidate the flow and dissemination of information at the Section.

## 1.7 Research Methodology

Descriptive approach of Qualitative Research methodology was employed by the researcher to examine current conditions prevailing at the Section, describe the state of digital preservations and evaluate processes and concepts employed in the execution of the objectives of the study.

## 1.8 Structure of the Project Report

Chapter One basically states the problem, objective of the study, the background and the research methodology employed by the researcher in the fulfilment of the objectives of the study.

Chapter Two reviews a wide range of literature concerning Information and Communication Technologies (ICT) in data preservation and general literacy in ICT as a tool for academic departments. It also looks into modern digital preservation strategies and policies and their strengths in the tertiary educational system.

Chapter Three elaborates on the general methodology employed in the fulfilment of the objectives set for the project. The chapter further explains the descriptive and experimental methods used by the researcher as well as the instruments adopted in the collection and evaluation of data. Studio methods comprising the step by step execution of the projects are also given an in-depth description in this chapter.

Chapter Four discusses the main findings of the researcher such as conditions of preservation currently prevailing at the Section, benefits and roles of modern digital as well as ICT initiatives to Tertiary institutions, especially the Department of General Art Studies.

Chapter Five deals with the general discussion of the findings, evaluation of the projects and makes salient recommendations to the Department concerning the research and how the project could help to move the Department to the next level in the use ICT and modern Digital initiatives.

## 1.9 Definition of Terms

**Website:** A set of interconnected webpages, usually including a homepage, generally located on the same server, and prepared and maintained as a collection of information by a person, group, or organization

**Digitization:** To transform or put data into digital format.

**Interactive application:** a computer program or system interacting with a user, often in a conversational way, to obtain data or commands and to give immediate results or updated information.

**Meta tag:** an element of HTML that describes the contents of a Web page, and is placed near the beginning of the page's source code, and used by search engines to index pages by subject

**TWAIN:** Standard for linking applications and image acquisition devices. Image processing, document imaging, document image processing.

## 1.10 Abbreviations

**ANSI**: American National Standards Institute

**AIIM**: A global community for users and suppliers of enterprise content management.

**ICT**: Information and Communication Technologies

**NSF**: National Science Foundation

**JISC**: Joint Information Syste Committee

**IDAC**: Interactive Disc of Arts and Culture

**CMS**: Content management system

**GUI**: Graphical user interface

**PNG**: Portable Network Graphics

**TIFF**: Tagged Image File Format

**DPI**: Dots per inch

**TMA**: transparent material adapter

**RGB**: Red, Green, Blue

**XHTML**: extensible hypertext markup language

**CSS**: Cascading style sheets

**DHTML**: Dynamic Hypertext markup language

**PHP**: Hypertext Preprocessor

**LCD**: liquid-crystal display

**SEO**: Search Engine Optimized

**URL**: Uniform resource locator

**NOC**: Network Operations Center

# CHAPTER TWO

# REVIEW OF RELATED LITERATURE

## 2.1 Overview

The integration of Information and Communication Technologies (ICT) and Digital preservation strategies in tertiary institutions has aroused enormous research efforts to identify their cyclical benefits in terms of posterity and long term sustainability of intellectual resources. This review attempts is to identify and discuss information on Information and Communication Technologies (ICT) as a tool for academic departments. Digital preservation, strategies and rationale for digitization of art forms will also be reviewed; this will unearth the realization of the profound efficiency and significance as a result of the aggregation of these two broad areas in art.

The review also looks at historical developments and current state of research into digital preservation strategies, its introduction and sustainability, specifically in art and its immense impact on tertiary institutions. With this focus in mind, the researcher excluded some papers and studies that examine very technical aspects of digital preservation and ICT. This is to define a sufficiently narrow scope for fruitful discussions of the subject matter and to offer a set of inconclusive elements that can frame future research questions.

Finally, the general concept and materialization of interventions of digital preservation as well as ICT in educational institutions in Africa will be explored and discussed and a platform created to inform and address future directions in the use of digital preservation and Information and Communication Technologies (ICT) in Art.

## 2.2 Information and communication technology (ICT) in data preservation

"ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems, and so on … "
(http://searchciomidmarket.techtarget.com/sDefinition/0,,sid183_gci928405,00.html, 2010).

ICT can also be described as a range of equipment (hardware: personal computers, scanners and digital cameras) and computer programs (software: database programs and multimedia programs), and the telecommunications infrastructures (phones, faxes, modems, video conferencing equipment and web cameras) that allow us to access, retrieve, store, organize, manipulate, present, send material and communicate locally, nationally and globally through digital media.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) use the term ICTs, / information and communication technologies, to describe: "…the tools and the processes to access, retrieve, store, organise, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware,

software and telecommunications in the forms of personal computers, scanners, digital cameras, phones, faxes, modems, CD and DVD players and recorders, digitised video, radio and TV programmes, database programmes and multimedia programmes" (Anderson, 2005).

In sum, ICT refers to technologies which facilitate communication and sharing of information (Dunmill & Arslanagic, 2006).

It is impossible, these days to disseminate and utilize information without focusing on ICT, but researchers have also proved that there is no direct relationship between ICT investment and knowledge management and organizational performance (Jane, 2006). It is however important to recognize that as computers have become a more and more common place, and a new form of literacy it is required of people to become ICT literates.

### 2.3 Information and communication technology (ICT) literacy

ICT literacy can be described as the set of skills and knowledge required by individuals to enable meaningful use of ICT appropriate to their needs. In the context of teaching and learning, ICT literacy can be described as the ICT conceptual and functional skills to support learners and teachers to further participate in work and society in the future (http://www.rmit.edu.au/).

With the advent of ICT tools, the old inefficient methods of managing knowledge have challenged. "Technology is now available to combat corporate amnesia and facilitate

knowledge creation, capture, organization and transmission from the right people to the right people at the right time for the right job" (Arora, 2002). Technology can guarantee the accurate and timely expression and delivery of knowledge, in a more efficient way than can be done manually by people.

The Digital Horizons: Learning Through ICT: A Strategy for Schools, (2004). 'Identifies the challenge for the future is to create a learning culture that keeps pace with the changes and equips people with the relevant knowledge, skills, ideas and values they need to become lifelong learners'. The document points out that to meet this challenge various education systems must recognize the enhanced breath, richness and authenticity of learning that can be achieved through ICT,: the need for people to use ICT and information to fully participate in society and the workplace; and the importance of specialised ICT skills to economic development.

ICT literacy is the ability to appreciate the potential of ICT to support innovation in industrial, business and creative process. Learners need to gain the confidence, skills, and discrimination to adopt ICT in appropriate ways. Digital literacy is seen as a 'life skill' in the same way as literacy and numeracy. Information literacy is the ability to locate, evaluate, manipulate, manage, and communicate information from different sources. (The Digital Horizons: Learning Through ICT: A Strategy for Schools, 2004.)

As learners become increasingly information-literate, they develop skills in discrimination, interpretation, and critical analysis. ICT offers opportunities for higher-order thinking and creativity in processing, constructing, and conveying knowledge. ICT

is being used all over the world to store, manage, retrieve, disseminate and preserve indigenous knowledge. It is astounding to see how the basic ICT tools like the tape recorder can make the transfer of knowledge possible (Jain, 2006).

ICT literacy programs are critical for its proper exploitation. ICT should be well-integrated with the curriculums of education. This way ICT will not be seen as a techno-stress device. However, a lot of initiatives are being taken in this direction (Jain, 2006). The International Literacy Institute (ILI, 2002) held a meeting in the partnership with South Africa for literacy and basics education partnership aimed at championing ICT literacy in higher educational institutions in Africa.

### 2.4 Information and Communication Technology: a necessary tool for academic departments

There are now thousands of Internet 'home pages' which serve as information sources for institutions and organizations. Most universities, polytechnics and colleges of education throughout the world have established their presence on the internet, thereby making it possible for researchers to access past and current research publications (Jagboro, 2003).
ICT are major driving forces of globalised and knowledge-based societies of a new world era (Herselman, 2003). Cosgrove, Zastrutz, and Shiel (2005) further establish that ICT plays an increasingly important role in work and in social and personal life, and is now of central importance for successful and critical participation in the knowledge society and has obvious implications for education systems. They have a profound impact on teaching and learning, including dramatic effects on the way tertiary education

institutions carry out their functions of teaching, learning and research, particularly on the creation, dissemination and application of knowledge (Herselman, 2003). White (2005) notes that 'resistance to change prevails in the integration of ICT in the delivery of education and training services within our school, vocational college and university systems and institutions' he advocates a theory of Connectivism developed by Siemens (2004).

Behaviourism, cognitivism and constructivism are the three broad learning theories most often utilized in the creation of instructional environments. These theories, however, were developed in a time when learning was not impacted through technology. Over the last twenty years, technology has reorganized how we live, how we communicate, and how we learn. Learning needs and theories that describe learning principles and processes should be reflective of underlying social environments (Siemens, 2004).

The process of integrating ICT into academic departments involves a paradigm shift, where insights and new information facilitate new forms of understanding, or integration with earlier understandings, to create new perspectives and interpretations. Integration implies an embedding of ICT in the educational structures and the organization of learning (Walsh, 2009). The incorporation of Information and Communication Technologies (ICT) into the educational curriculum has been promoted as a key step in bridging the digital divide (Wims & Lawler, 2007). Using ICT in education to produce ICT-literate students and a versatile, adaptable workforce is also consistent with the human capital theory of education. Hawkins (2002), states that workers must learn how

to learn and quickly acquire new skills. Augmenting the skills of the workforce in this way has the potential to benefit the economy at large and also improve the individual student's earning and employment potential.

More specifically, there are several ways in which ICT can contribute to addressing issues in educational institutions in developing countries; some of the most pertinent of these issues include: ICTs can accelerate teacher training and the Imfundo Report (Unwin, 2004) concluded that ICT in education has most potential in pre- and in-service teacher training. Introducing ICTs can help to counter some of the negative factors endemic in many institutions in developing countries, such as student: teacher ratios, shortage of basic instructional materials and poor physical infrastructure.

Research on the Digital Education Enhancement Project in the Eastern Cape of South Africa (Leach, 2003) found that ICTs had a positive impact on student achievement. ICT can be used to make educational curriculum more interesting. Studies have verified that students enjoy learning using technology (Hepp et al., 2004; Osin, 1998). Gómez and Martinez (2001) described how using the internet in education programmes helped students in Colombia.

Distance learning can help to overcome the problems associated with geographical isolation and is invaluable for students in remote areas. Distance learning educational software also benefits from economies of scale increasing cost efficiencies. ICT serves to counteract physical distance as lecturers can maintain contact with students and friends

through telephone and the internet. ICTs can play a significant role in providing teachers and students with access to educational content and up to date resources.

The issues arising from the preceding paragraphs lead toward the conclusion that education is one of the most important elements for achieving development success. However, ICT in turn can contribute towards enhancing education (Wims and Lawler, 2007). This relationship was succinctly summarised by Kofi Annan (United Nations, 2003) when he asserted that: "While education unlocks the door to development, increasingly it is information technologies that can unlock the door to education"

**2.5 The internet: Overview**

The Internet can be conceived as a rich, multi-layered, complex, ever-changing textual environment which provides several opportunities for the academia (Jagboro, 2003). It is a mechanism for information dissemination and a medium for collaborative interaction between individuals and their computers without regard for geographic limitation of space (Leiner et al., 2000; Singh, 2002). Content created on the Internet ranges from simple e-mail messages to sophisticated 'documents' (websites) incorporating sounds, images and words.

Evans, (1996) identifies that the Internet is ‘alive', constantly in motion, theoretically borderless, potentially infinite space for the production and dissemination of information. It is arguably one of the most significant technological developments of the late 20th century. Jagboro (2003) quotes from Peters and Lankshear (1996) that while printed materials have certain fixity and finitude, texts published via the Internet have a much

more fluid character. With texts no longer housed between library or bookshop walls, it becomes impossible to 'pin down' all or even most of the available materials in given subject areas for archival and classification purposes. The Internet might thus be described as a 'sea of information', subject to the ebb and flow of various forces (political, corporate, institutional, etc.), creating an ever-shifting shoreline.

### 2.6 The internet and dissemination of information

First, and perhaps of greatest importance for many subscribers to online services, is e-mail. Computer connectivity between nations has allowed a new form of correspondence to evolve and this, though seldom noticed, has changed people's daily lives the world over. Academic departments now send information to others, more often, than ever before. While the bureaucratization of the university has contributed to an increase in 'busy work' of all kinds (including memoranda and correspondence), e-mail seems to have exacerbated the effects of this trend (Jagboro, 2003). The internet has conferred some wonderful advantages in the educational sector. It is now possible to communicate easily and rapidly with people thousands of miles away. The internet has become a seemingly indispensable part of people's lives, and correspondence by post seems tedious and slow by comparison. Yet, perhaps because e-mail, in removing previous barriers of geography and distance, reduces some of the perceived burdens of the old paper and post systems, it is used almost incessantly.

The flood of information generated by the internet is matched by a similar drowning in discourse through the myriad discussion groups and 'chat rooms' of all kinds now

available online. Some of these are outgrowths from, or affiliated with, formal publications or professional societies. Finally, the Internet is fast becoming a major site for commercial activity, educational resource and many corporate organizations now advertise their goods and services — and sometimes sell them, either as one wing of a larger operation or as their sole form of business activity — in cyberspace (Jagboro, 2003).

### 2.7 Digital preservation technologies

The term "preservation" has different meanings in different contexts: In general terms, preservation refers to a series of activities (managerial, financial, and technical) undertaken to prevent deterioration of a document or artifact and to ensure that it will continue to be usable. It may also refer to activities taken to ensure the integrity and long-term availability of information contained in rare or fragile documents or artifacts through the creation of surrogates for access purposes.

Digital preservation refers broadly to the series of managed activities necessary to ensure continued access to digital materials for as long as necessary, such as collection, description, migration and redundant storage. Digital preservation activities are undertaken by a range of preservation institutions, including libraries, archives and museums. Such institutions may operate independently or may be located within other bodies such as educational institutions, government entities or media organizations (Besek et al. 2008 p. 4). Works in digital form presents significant challenges for preservation that most analog works do not. Many analog materials remain stable for long

periods of time and require only intermittent interventions for purposes of preservation. Moreover degradation of an analog work is usually gradual enough to provide advance warning that preservation efforts are required.

Information preservation is one of the most important issues in human history, culture, education and economics, as well as the development of our civilization. While earliest information was recorded in carvings on stone, ceramic, bamboo, or wood, the development of civilization paved the way for new storage media and techniques for recording information, such as writing on silk or printing on paper. Eventually we were able to put photo-graphic images on film and music on records. A revolutionary change occurred in the information storage field with the invention of electronic storage media (Ho Lee, Slattery, Lu, Tang, & McCrary, 2002). Digital conversion/preservation of materials has advanced rapidly in the past few years. It promises to continue to expand its reach and improve its capabilities with extraordinary speed. Digitization has proven to be possible for nearly every format and medium presently held by libraries, from maps to manuscripts, and moving images to musical recordings (Smith, 1999).

Besek et al. (2008) also assess that preservation is critical in the digital context to ensure continued long term access to historically, scientifically and socially valuable materials, so that future generations will be able to benefit from works created now. Libraries, archives and other preservation institutions have been responsible for much of the preservation that has occurred in the past.

As a growing volume of materials is being created and used digitally, the long-term preservation of those materials is increasingly important. Digital preservation has received considerably more prominence in recent years, gaining the attention of entities such as national libraries, national archives, the European Commission, U.S. National Science Foundation (NSF), Deutsche Forschungsgemeinschaft (DFG - German Research Foundation), and the Joint Information Syste Committee (JISC) in the UK. It has come to be recognized as a legitimate and essential area of research and development (Lee, 2005).

While digital technologies are enabling information to be created, manipulated, disseminated, located and stored with increasing ease, preserving access to this information poses a significant challenge. Unless preservation strategies are actively employed, this information will rapidly become inaccessible. Choice of strategy will depend upon the nature of the material and what aspects are to be retained. Digital preservation strategies require some sort of copying, and the preservation of digital information is likely to require ongoing intervention. This copying could include refreshing storage media, migrating information to newer media and migrating content, migration tools and metadata to new formats. It is not clear whether preservation exceptions to current copyright legislation would allow the sort of copying needed (Lee, Slattery, Lu, Tang, & McCrary, 2002).

### 2.8 Digital preservation developments

As the transition from analogue to digital media matures many technical and cultural issues surround the subject of digital preservation. Many of the public institutions were

created in a pre-digital age. What will the impact of digital preservation be and what effect will it have on access to the material they hold (Lee, 2001)?

The evolution of data storage media and the development of the preservation technology can be described as the various media used in data storage (both digital and analog) and the techniques needed to ensure that the data on them is preserved. It also highlights the trend from analog to digital/optical storage media and indicates the transfer of data from one generation of media to the next (Lee, Slattery, Lu, Tang, & McCrary, 2002).

Currently reservation strategies in academic and research libraries are not new concepts. However, with an increasing amount of digital content, organizations have to cope with a new set of preservation issues (Baker, Keeton & Martin, 2005). Digital preservation is in its infancy worldwide and presents some difficult technological issues. Since the creation of digital media, over 200 different storage mediums have been invented ranging from magnetic tape to CD-ROM (Baker, Keeton & Martin, 2005). Each of these mediums presents a variety of their own preservation issues and also require a diverse range of technology which in many cases is no longer manufactured.

### 2.9 Digital preservation management and sustainability in art

Digital preservation deals with the long-term storage and access to digital objects. The Digital Preservation Coalition defines it as the ‘series of managed activities necessary to ensure continued access to digital materials and adds that it refers to all of the actions

required to maintain access to digital materials beyond the limits of media failure or technological change (Becker et al., 2007).

The stream of activity related to long-term institutional management and preservation of unpublished records generated by individuals and organizations has traditionally been the responsibility of the archival profession (Pescini &Toscana, 2001). In the mid-1990s, the national archives of Finland, Iceland and the UK experimented with various approaches to contracting out their digital preservation activities (Sleeman, 2004). Within the literature of the archival profession, discussions of the management and preservation of digital objects are often embedded within larger debates about changes in the profession's scope, orientation and identity (Bantin, 1998; Bearman, 1989, 1994b; Bearman & Hedstrom, 1993; Brown, 1996; Cook, 1991-92, 1994; Cox, 1994, 1995, 2000).

### 2.10 Digital preservation and ICT; the digital divide

The last decade has witnessed a rapid growth in the creation of a variety of digital sound and moving pictures formats. The prominence of the World Wide Web and growth in digital technologies has enabled users to create, download, and manipulate these born-digital files. Digital art forms are emerging from these multimedia technologies, and large scale use of digital film and music files has become a prominent feature of our cultural and intellectual life (Clifford, 2009).

Digital technology now enables large, rare film and audio collections to be digitised. The scholarly and educational community has made particular use of this new media, which is

playing an increasingly important role in learning, teaching and research. The long term preservation of moving images and sound resources however is challenging to approach, primarily due to their complex nature. Despite substantial research into digital preservation over the last few years, relatively little attention has been paid to the long-term durability and accessibility of multimedia files.

# CHAPTER THREE

# METHODOLOGY

## 3.1 Overview

In this chapter the research methodology is described in terms of design, concepts, theories, methods, population, instruments and procedures used for data collection as well as complete execution of the two Projects; Interactive Disc of Arts and Culture – (IDAC) and the website. The research design chosen enabled the researcher to achieve the purpose and objectives of the study.

The purpose of the study was to first of all digitize a selected number of photographic slides of some African cultures into an interactive web-based application (IDAC) and examine its impact on the study of arts and culture of Africa as an instructional technological asset.

Finally, it was to develop a dynamic online application (website) for the section as well as the department. The research methodology employed by the researcher is qualitative research. Experimental techniques were also employed in the execution of the intervention material (project). The methods for the collection of data and fulfillment of the research objectives were however categorized by the researcher under field and studio methods.

### 3.1.1 Field methods

The field methods comprises of the following**:**

a. Research design
b. library search
c. Sampling
d. Working procedure
e. Data collecting instruments and techniques
f. Presentation and discussion of finding

### 3.1.2 The studio methods

The studio methods were divided into two major Parts;

**I.** The design and development of the interactive application (Interactive Disc of Arts and Culture - IDAC) which comprised of :

a. Processes and steps involved in the design and development of the icon for the Interactive disc of art and culture (IDAC).
b. Designing of the application user interface
c. Digitization process for the IDAC; Scanning of Slides Finishing and exporting
d. Digital imaging (photo restoration):
e. Application source code development

**II.** Design and development of the dynamic website for the department also comprised of;

a. Frontend development:

b. Backend development (Content management system (CMS) development)

### 3.2 Research design

Descriptive study under Qualitative Research was used by the researcher to examine the slide technology systems, state of the slides storage and use at the section of African Art and Culture.

The researcher met with the lecturers and head of the Art History Section to obtain support for the study. Arrangements were made with the lecturers for the collection of data. The primary method for the collection of data was through interviews and observations.

Additionally, the field methods for the research embodies study of 35mm slide technology, Digitization of Sides, websites, interactive media, visual resources, instructional media and the section of African Art and Culture, Kwame Nkrumah University of Science and Technology, Kumasi, under-graduate, post-graduate students and lecturers of the section. The research considered data that has to do with general management, sustainability and preservations of slides in general and the section as a whole.

### 3.3 Population and Sampling method

The Target Population was lecturers and students of the Department of General Art Studies- KNUST.

The Accessible Population was the section of African Art and Culture of Department of General Art Studies, KNUST

This include Lecturers and Post Graduate Students registered for the 2008/2009 academic year totaling (20 people)

Purposive sampling was employed by the researcher in the execution of this study because the researcher has a fair knowledge about the African Art and Culture section and also selected student studying the African Art and Culture programme.

### 3.4 Data collecting instruments

i. Interviews (Unstructured )

ii. Observation (Participant Observer)

#### 3.4.1 Interviews

Unstructured Interviews were used to accumulate data about the Section's history, activities as well as individual perceptions on pertinent instructional issues affecting the section and what this intervention can bring to the section.

### 3.4.2 Observations

Observations specifically participant observations were employed by the researcher to establish facts about the set-back faced by the section as a result of the lack of modern data preservation strategies and also the lack of interactive instructional materials in the day to day activities of the students and staff of the section.

### 3.4.3 Descriptive study

Descriptive study was used by the researcher to examine the slide technology systems, state of the slides storage and usage of slide projectors at the section of African Art and Culture.

## 3.5 Sources of data

### 3.5.1 Primary sources of Data

A primary source is a document, speech, or other sort of evidence written, created or otherwise produced during the time under study. Primary sources offer an inside view of a particular event. Examples include: Original Documents, Autobiographies, diaries, e-mail, interviews, letters, minutes, news film footage, official records, photographs, raw research data, speeches, relics or artifacts (Blum, 2010). In this wise, the researcher made use of the interviews from the respondents and also the 35mm slides which were to be digitized.

### 3.5.2 Secondary sources of data

Secondary sources provide interpretation and analysis of primary sources. Secondary sources are one step removed from the original event or "horse's mouth." Examples of Secondary Sources; Britannica Online encyclopedia, textbooks (Blum, 2010). In outlining the concepts, theories and processes in design the researcher referred to some textbooks as secondary sources of information.

## 3.6.0 Design and development of the Interactive Disk of Arts and Culture (IDAC)

### 3.6.1 Design and development of icon for the application

This Section deals with the various processes that assisted the design and development of the icon for the application. Icons represent clear visual metaphor of the intention and purpose of the application for which it is designed for (Maheux, 2009). Since the birth of the graphical user interface (GUI), icons have been used to represent files and applications on computers. Even before then, symbols have been used in real life on road signs and doors to let us know what lies ahead.

#### 3.6.1.1 Planning

Based on the nature of the project and consultations with experts in the field, the researcher decided to first of all name the application as IDAC thus Interactive Disc of Arts and Culture. The next step was the designing of the icon for the application. “AAA LOGO” was the software the researcher found as appropriate for the designing of the icon.

### 3.6.1.2 Device and application software used for the design and development of the icon

Two major sets of technological interventions were employed for the designing of the icon namely, hardware devices and application software. The hardware devices employed by the researcher for the design icon included Dell INSPIRON 9300 laptop, an external Microsoft optical mouse and keyboard. The application software used for the development of the icon included; AAA Logo creator (2009)

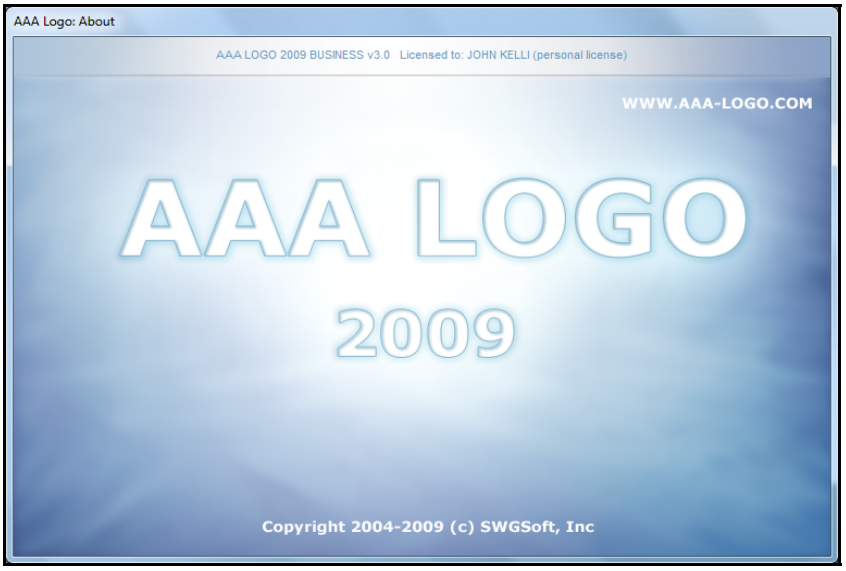


Fig. 3.1 Screen shot of the AAA Logo spash screen
*Source of image: by the researcher*

The operating system used to run the software was (Windows Vista 32 bit)

### 3.6.1.3 Step by step Development of the Icon

In designing an icon, the simpler and more laconic the icon is the better. It is preferable to keep the number of objects in a single icon to a minimum. With this in mind the designer

decided to be restricted to only three items including typography. Below is the working interface of the application (AAA Logo) for the designing of the icon.

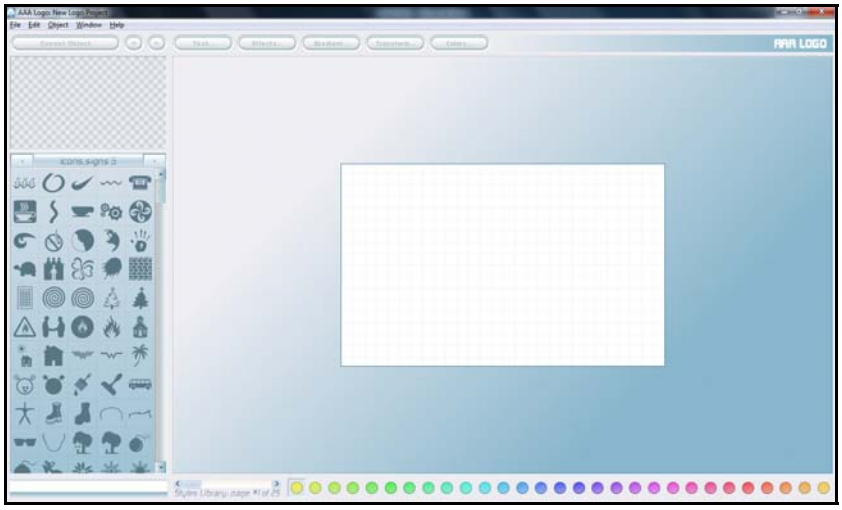

Fig. 3.1.1 Screen shot of the working area of AAA Logo
*Source of image: by the researcher*

After the application had been launched the designer made use of simple shapes and text to bring the concept to life.

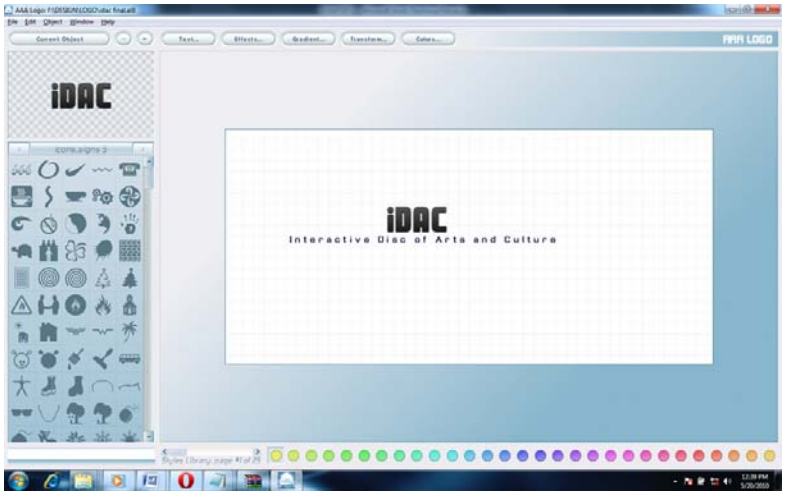


Fig. 3.1.2 Screen shot of the initial stage of the development process
*Source of image: by the researcher*

After the text had been edited and the acronym arranged , symbols and gradients were incorporated to form an arrow ontop of the “I” in other to give the design a more technical apeal. The final step of this section was the exporting of the design to am acceptable non-native file format that can be accessed by the design application which would be used to design the interface of the ‘IDAC’.

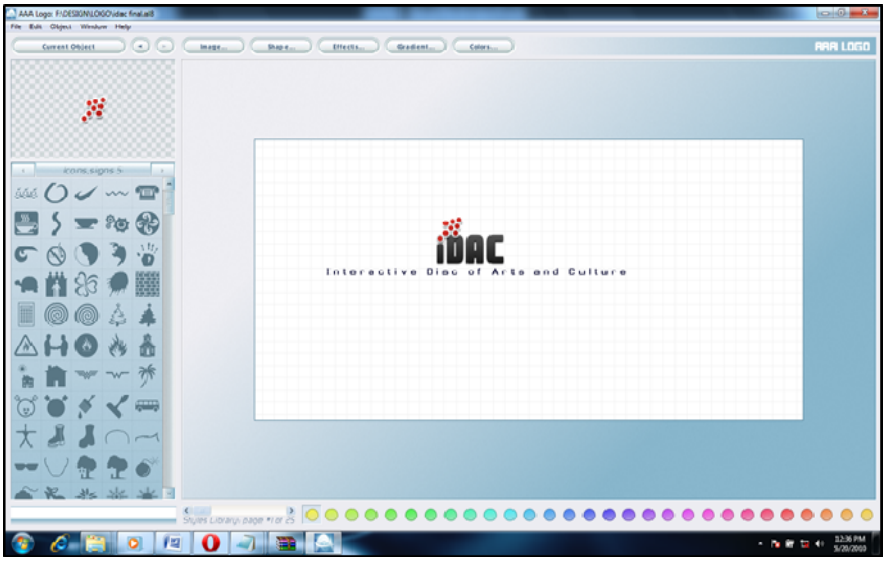


Fig. 3.1.3 Screen shot of the finishing of the icon in AAA Logo
*Source of image: by the researcher*

The designer chose to export the final AAA logo native file to 8-bit png . This decision was primarily due to the versatiliy of the ‘png’ file extension. The diagram below shows the export dialog box which was responsible for the file conversion from AAA logo to ‘png’

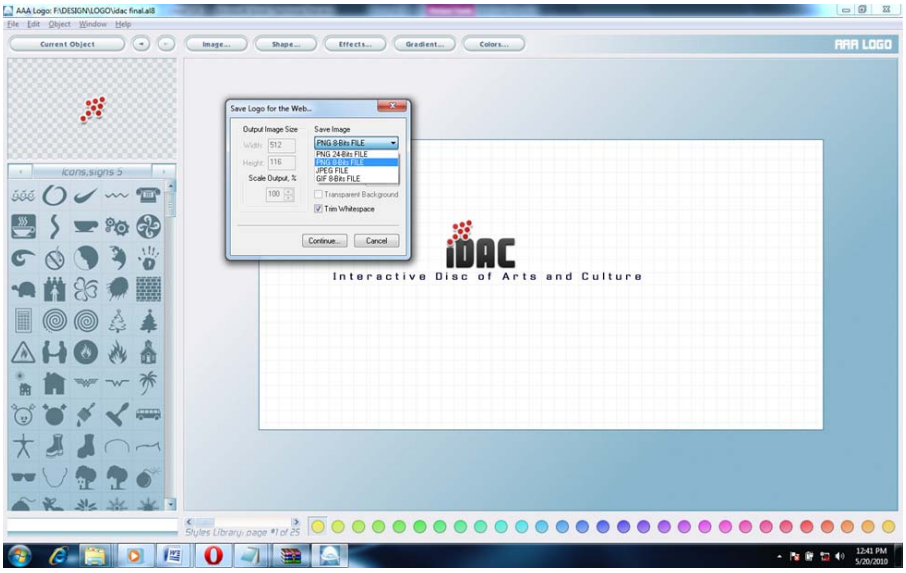


Fig. 3.1.4 Screen shot of the exporting of the icon from AAA Logo native format to a non-native .PNG file format
*Source of image: by the researcher*

Below is the final output of the icon design without the background.


Fig. 3.1.5 Image of the finished icon
*Source of image: by the researcher*

### 3.6.2 Design and development of the user interface for the IDAC

The user interface of an application will often make or break it (Ambler, 2009). Although the functionality that an application provides to users is important, the way in which it provides that functionality is just as important. An application that is difficult to

use may not be used. It won't matter how technically superior the application is or what functionality it provides, if users don't like it they simply may not use it and if they should use it, they will not enjoy using it and hence may not significantly benefiting from it.

#### 3.6.2.1 Planning

As part of planning activities made by the researcher prior to the design of the interface the following came to light. The more intuitive the user interface the easier it is to use, and the easier it is to use and the less expensive to use it. The better the user interface the easier it is to train people to use it, reducing your training costs. The better your user interface the less help people will need to use it, reducing your support costs. The better the user interface the more your users will like to use it, increasing their satisfaction with the work that you have done (Ambler, 2009). This information became the bedrock for the choice of processes and concepts employed for the designing of the user interface.

Device and application software used for the design and development of the icon: The same two major sets of technological tools were employed for the designing of the icon namely, hardware devices and application software. The hardware devices employed by the researcher for the design icon included Dell INSPIRON 9300 laptop, an external Microsoft optical mouse and keyboard. The application software employed for the design and development of the icon included AAA Logo creator (2009)

### 3.6.2.2 Concepts and development process of the interface

The designer at every step of the design process employed a series of theories collected from articles and various authorities in the design industry to come out with an excellent interface that is up to the task for which it was created

### 3.6.2.3 Interface design

The user interface of an application will often make or break it (Ambler, 2009). Although the functionality that an application provides to users is important, the way in which it provides that functionality is just as important. An application that is difficult to use may not be used. It won't matter how technically superior the application is or what functionality it provides, if users don't like it they simply may not use it and if they should use it, they will not enjoy using it hence significantly benefiting from it.

Further research conducted by the designer preceding the execution of the user interface revealed that the more intuitive the user interface the easier it is to use, and the easier it is to use and the less expensive to use it. Also, the better the user interface the easier it is to train people to use it, reducing your training costs. The better your user interface the less help people will need to use it, reducing your support costs. The better your user interface the more your users will like to use it, increasing their satisfaction with the work that you have done (Ambler, 2009). The designer at every step of the design process employed a series of theories collected from articles and various authorities in the design industry to come out with an excellent interface that is up to the task for which it was created

### 3.6.2.4 Software used for the interface design


Fig. 3.2 Screen shot of the splash screen of the software used - Adobe Photosho CS3
*Source of image: by the researcher*

### 3.6.2.5 The splash screen

The splash screen is a photo montage made by the researcher using adobe Photoshop cs3.

The icon was imported to the design stage as a non-native file extension

Dimensions of the splash; 900px /700px

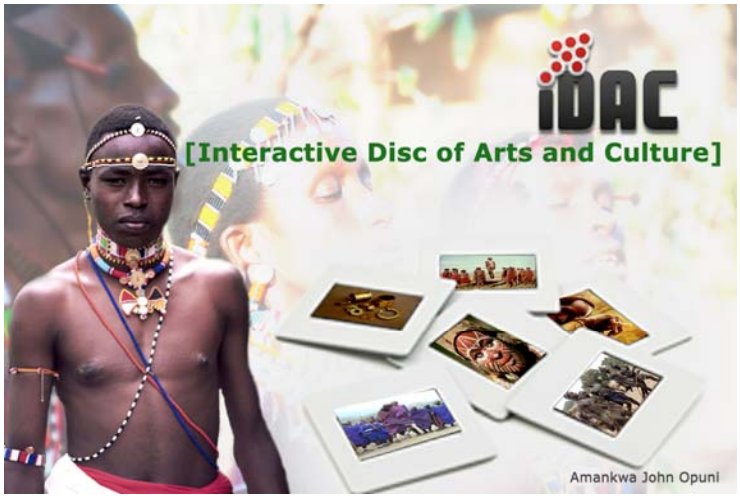


Fig. 3.3 Screen capture of the splash screen of the Interactive Disc of Arts and Culture - IDAC
*Source of image: by the researcher*

#### 3.6.2.6 Consistency in interface design

The most important thing one can possibly do is ensuring that user interface works consistently and effectively and the only way you can ensure consistency within your application is to set user interface design standards, and then stick to them. If one can click on items in one list and have something happen, then it should be possible to click on items in any other list and have the similar action.

Buttons should be placed in consistent places on all windows. The designer expressed consistency in your user interface enables your users to build an accurate mental model of the way it works, and accurate mental models lead to lower training and support costs. When developing the user interface for applications the designer will discover that your stakeholders have some unusual ideas as to how the user interface should be developed. The designer should definitely listen to these ideas but he or she also needs to make the stakeholders aware of the designer's corporate UI standards and the need to conform to them. Owing to this theory the designer came out with a series of interfaces and sampled out ideas as to which one was more appropriate at the same time conforms to his design standards.

It is imperative that users know how to work with the application that has been built for them. When an application works consistently, it means the designer only has to explain the rules once. This is a lot easier than explaining in detail exactly how to use each feature in an application step-by-step.

### 3.6.2.7 Step by step development of the interface using Adobe Photoshop CS3

The designer launched Photoshop cs3 and started a new Canvas. Size, he chose I chose 1800px×1200px and then set the Resolution to 72 dpi.

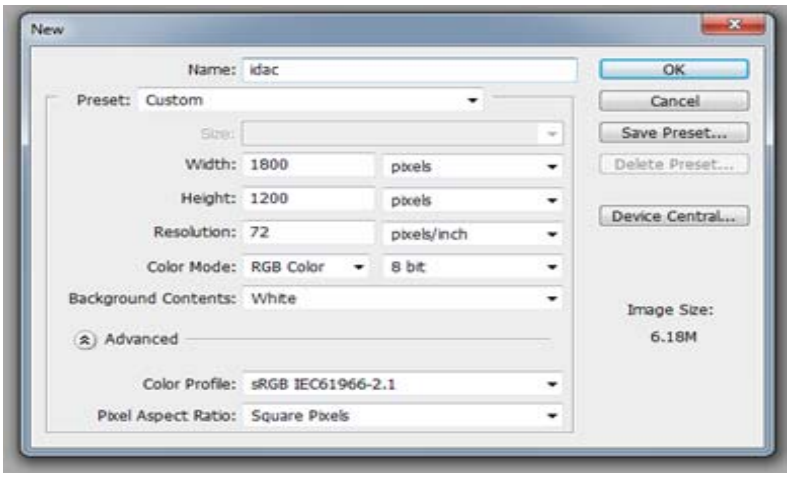


Fig. 3.2.1 Screen capture of the 'new document window in Adobe Photoshop CS3
*Source of image: by the researcher*

A new layer was created from the buttom of the layers pallete and filled with a uniform color to serve as the background layer on which the rest of the elements would be placed.

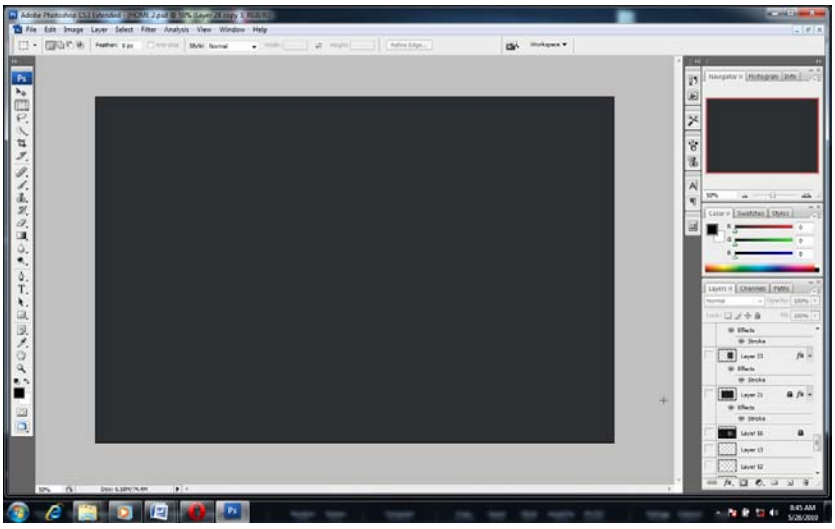

Fig. 3.2.2 Screen capture of the 'first stage of the Design in Adobe Photoshop CS3
*Source of image: by the researcher*

Using the pen tool the designer drew a curvy triangle at the left side of the canvas, gave it a gradient fill and then duplicated it with the other having a red fill.

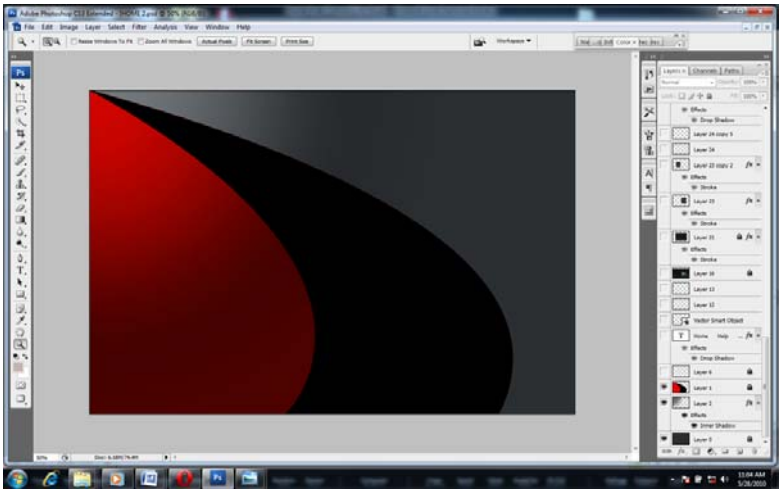

Fig. 3.2.3 Screen capture of the initial designing of the background in Adobe Photoshop CS3
*Source of image: by the researcher*

Two rectangles were drawn superimposing the backround using the maqee tool

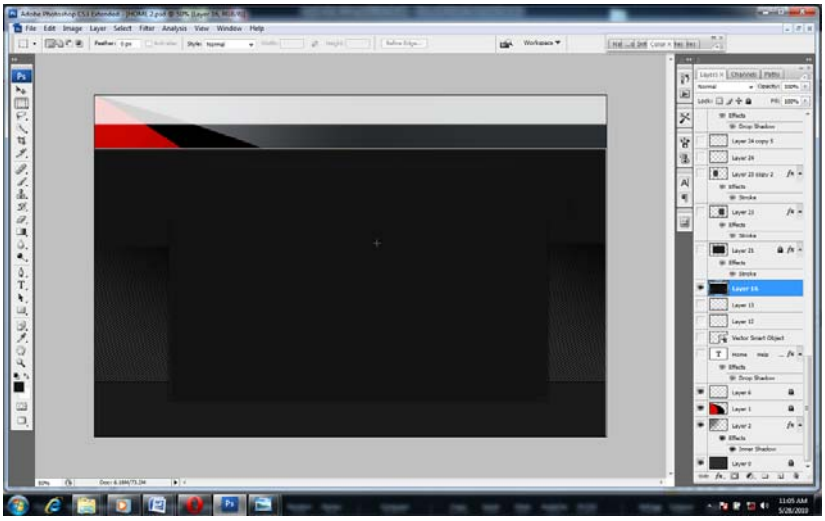

Fig. 3.2.3 Screen capture showing the beginning activity area in Adobe Photoshop CS3
*Source of image: by the researcher*

The next stage was the activity area, that was also drawn using the rectangular maqee tool. The box was given a white stroke outline to bring out the contrast which is an essential element in the design process.

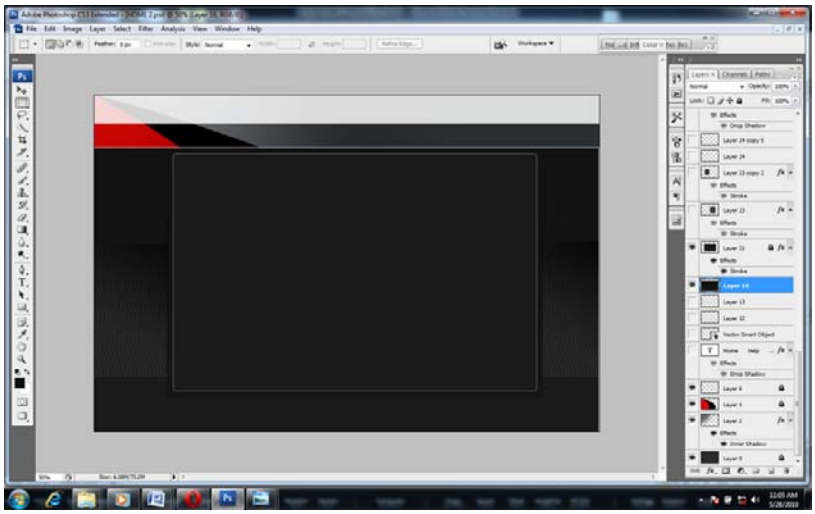

Fig. 3.2.4 Screen capture showing the continuing steps (1) of the activity area in Adobe Photoshop CS3
*Source of image: by the researcher*

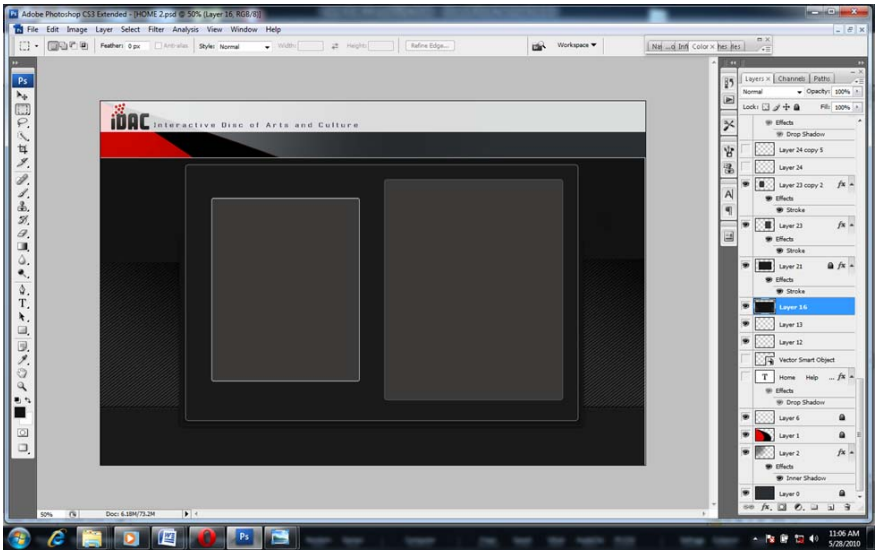


Fig. 3.2.5 Screen capture showing the continuing steps (2) of the activity area where the IDAC icon was placed at the upper left corner of the screen
*Source of image: by the researcher*

### 3.6.2.7.1 Placement of the navigational tools

**Navigation**

Navigation between major user interface items is important. If it is difficult to get from one screen to another, then users will quickly become frustrated and give up. When the flow between screens matches the flow of the work the user is trying to accomplish, then the application will make sense to users. Because different users work in different ways, the application needs to be flexible enough to support their various approaches. User interface-flow diagrams should optionally be developed to further your understanding of the flow of your user interface. For this reason the designer developed the flow chart below.

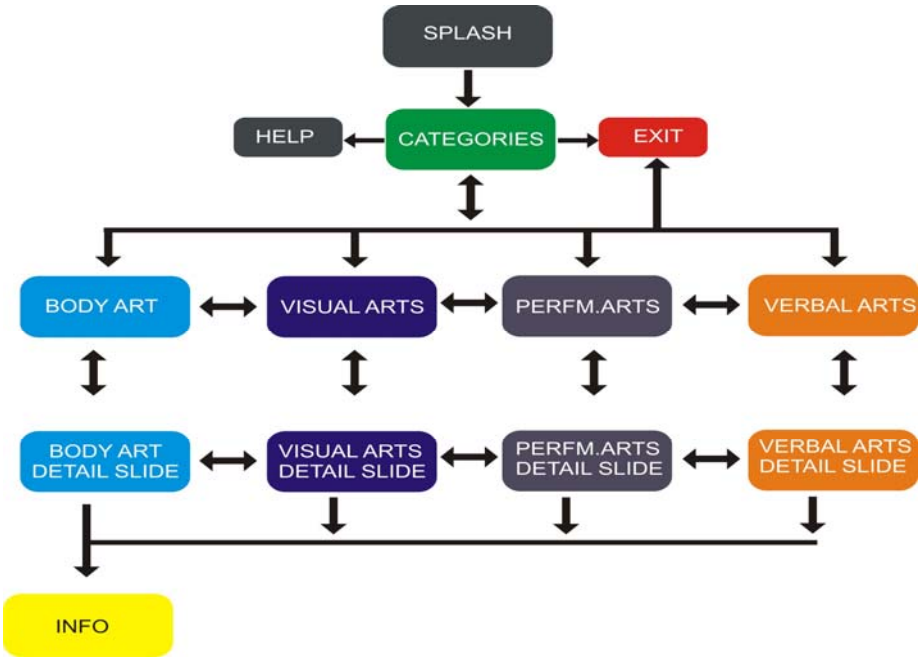


Fig. 3.4 Screen capture of the application Architecture of the Interactive Disc of Arts and Culture -IDAC

*Source of image: by the researcher*

Navigation within a screen is important. In Western societies, people read left to right and top to bottom. Because people are used to this, should you design screens that are also organized left to right and top to bottom when designing a user interface for people from this culture? You want to organize navigation between widgets on your screen in a manner users will find familiar to them.

With the same rectangular tool, white boxes were drawn to represent the category navigation which were in the form of slides.

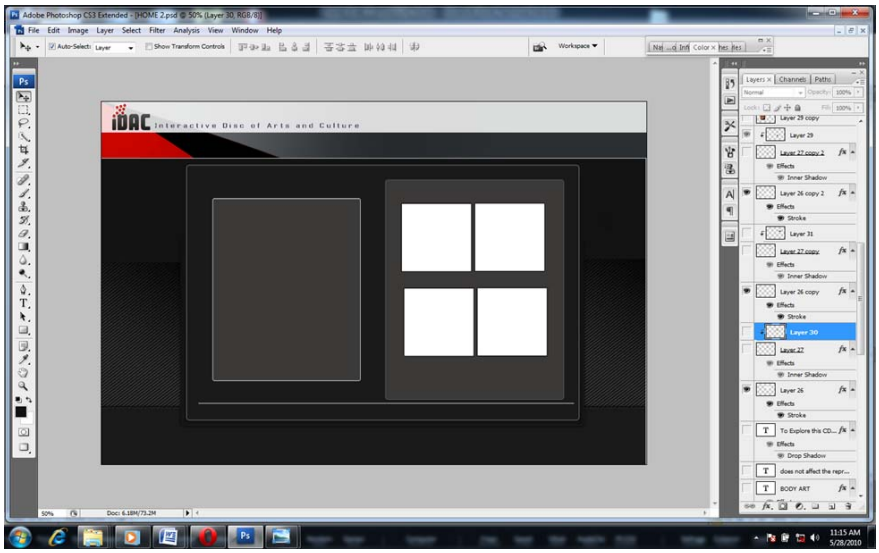


Fig. 3.2.5 Screen capture showing the development steps (3) of the activity area where the info. Area is to the left and the category navigation to the right
*Source of image: by the researcher*

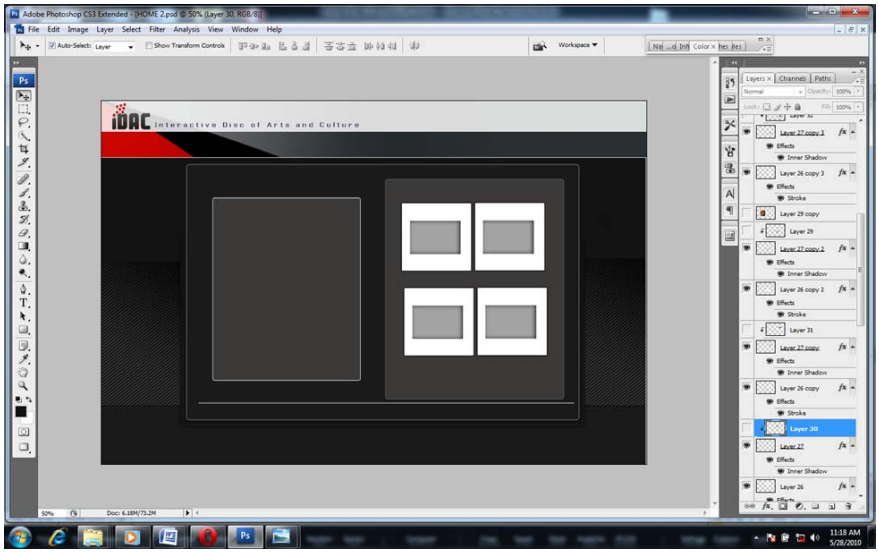


Fig. 3.2.6 Screen capture showing more details of development steps (4) of the activity area

*Source of image: by the researcher*

### 3.6.2.7.2 Layout elements

Fields are to be aligned effectively. When a screen has more than one editing field, one would want to organize the fields in a way that is both visually appealing and efficient. The best way to do so is to left-justify edit fields: in other words, the left-hand side of each edit field line up in a straight line, one over the other. The corresponding labels should be right-justified and placed immediately beside the field. This is a clean and efficient way to organize the fields on a screen.

Expect your users to make mistakes. So it is important to design the user interface to restrict certain mistakes made by your users. The design should be intuitable. In other words, if your users do not know how to use the application, they should be able to determine how to use it by making educated guesses. Even when the guesses are wrong,

the application should provide reasonable results from which your users can readily understand and ideally learn.

Avoidance of busy user interfaces. Crowded screens are difficult to understand and, hence, are difficult to use. Experimental results show that the overall density of the screen should not exceed 40 percent, whereas local density within groupings should not exceed 62 percent.

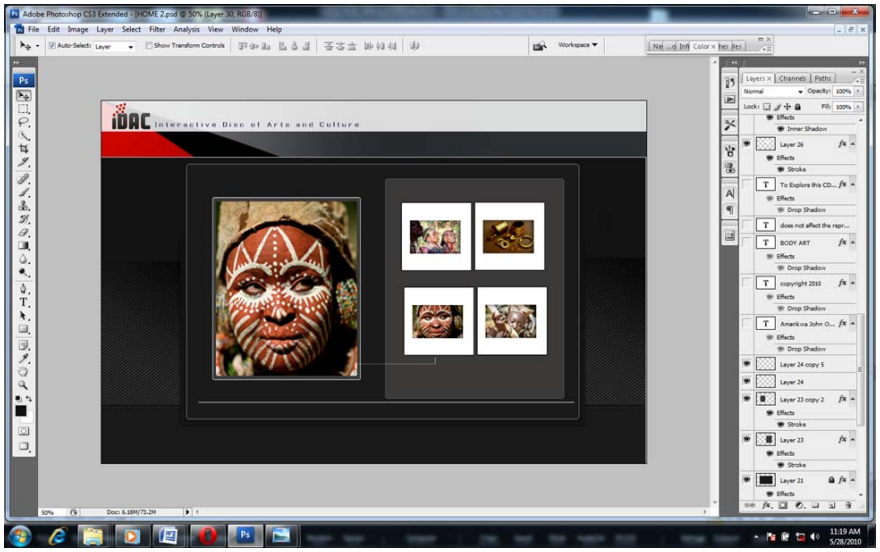


Fig. 3.2.7 Screen capture showing the completion of the activity area where the category images have been inserted
*Source of image: by the researcher*

Images to represent the categories were imported to the stage and made to occupy the right places

### 3.6.2.7.3 Identifiers

Word messages and labels effectively. The text displayed on the screens is a primary source of information for users. If text is worded poorly, then the interface will be

perceived poorly by users. Using full words and sentences, as opposed to abbreviations and codes, makes text easier to understand. Messages should be worded positively, imply that the user is in control, and provide insight into how to use the application properly.

### 3.6.2.7.4 Effective grouping

Items that are logically connected should be grouped together on the screen to communicate that they are connected, whereas items that have nothing to do with each other should be separated. The designer can use white space between collections of items to group them and/or you can put boxes around them to accomplish the same thing.

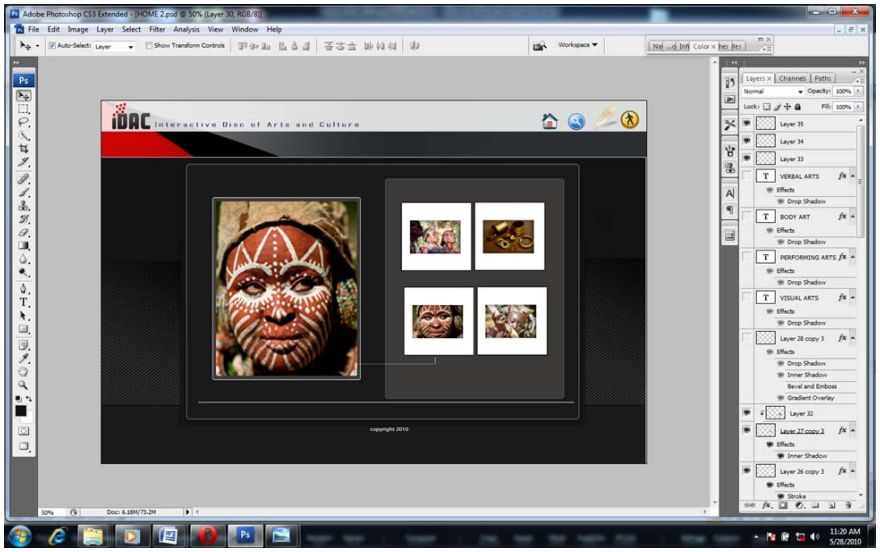


Fig. 3.2.8 Screen capture showing the completion of the activity area (2) where the 'credits', 'home', 'help' and 'exit' have been inserted at the top right corner of the screen
*Source of image: by the researcher*

### 3.6.2.7.5 Widgets

Understand the user interface (UI) widgets; the right widget for the right task. This would help to increase the consistency in the application and probably making it easier to build the application in the first place.

**3.6.2.7.6 Color scheme:** color has to be used appropriately. Color should be used sparingly in applications and, if not used, the designer must also use a secondary indicator. The problem is that some users may be color blind and if the designer is using color to highlight something on a screen, then he or she needs to do something else to make it stand out if he wants these people to notice it. The color schemer also proved useful in the section of the color scheme for the interface. Color Schemer is an excellent tool for helping one design graphic design materials, websites or interactive interfaces. Color Schemer Online helps you pick the right color options, Generates RGB/HEX color schemes, and allows you to easily explore various color schemes.

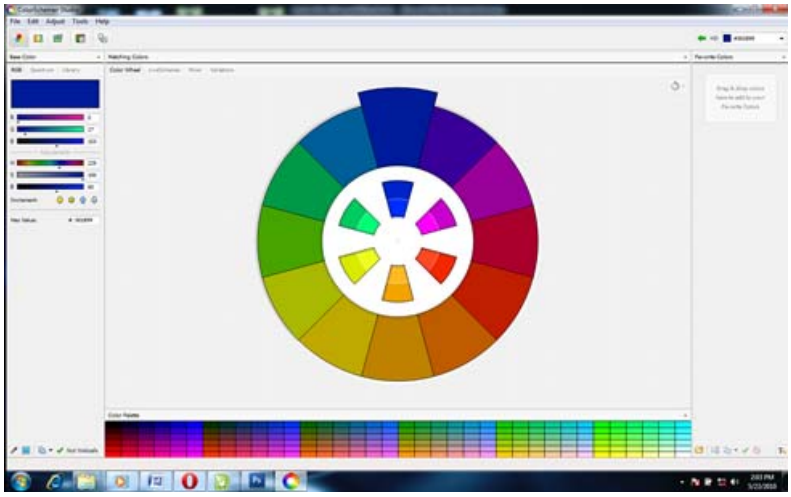

Fig. 3.4 Screen capture of the Color Schemer Online application
*Source of image: by the researcher*

Colors in the application have to be used consistently, so as to have a common look and feel throughout your application. The contrast rule has to be followed. If the designer is going to use color in designing the application at the same time (s)he has to ensure that the screens are still readable. Dark text on light backgrounds and light text on dark backgrounds are recommended. Reading blue text on a white background is easy, but reading blue text on a red background is difficult. The problem is not enough contrast exists between blue and red to make it easy to read, whereas there is a lot of contrast between blue and white.

**3.6.2.7.7 Principles adopted for the user interface design**

i. **The structure**: the design of the interface was organized purposefully, in meaningful and useful ways based on clear, consistent models that are apparent and recognizable to users, putting related things together and separating unrelated things, differentiating dissimilar things and making similar things resemble one another. The structure principle is concerned with the overall user interface architecture.

ii. **Simplicity:** The design was made simple, common tasks simple to do, communicating clearly and simply in the user's own language, and providing good shortcuts that are meaningfully related to longer procedures.

iii. **Visibility:** The design kept all needed options and materials for a given task visible without distracting the user with extraneous or redundant information.

Good designs don't overwhelm users with too many alternatives or confuse them with unneeded information.

iv. **Tolerance:** the design was made flexible and tolerant, reducing the cost of mistakes and misuse by allowing undoing and redoing, while also preventing errors wherever possible by tolerating varied inputs and sequences and by interpreting all reasonable actions.

Below is the finished interface for the home page of the application.

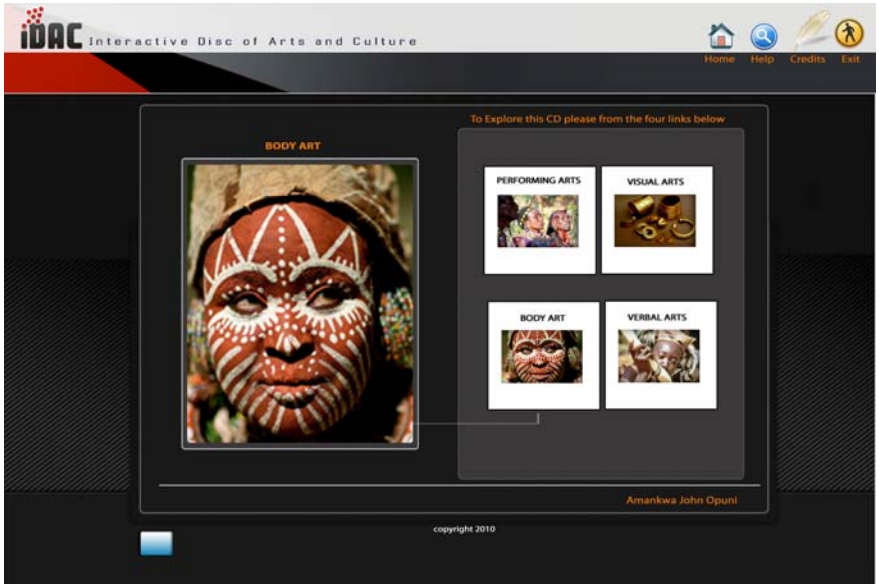


Fig. 3.2.8 Screen capture showing the completion of the whole interface with the addition of text and copyright infomation
*Source of image: by the researcher*

## 3.7 Digitization of the slides (SCANNING)

### 3.7.1 Overview

The researcher performed the scanning in accordance with ANSI and AIIM electronic imaging standards to ensure the best output. These standards include ANSI/AIIM MS44-1988 (R1993)–Recommended Practice for Quality Control of Image Scanners; ANSI/AIIM MS53-1993 Recommended Practice; File Format for Storage and Exchange of Image; Bi-Level Image File Format: Part 1; ANSI/AIIM TR19-1993– Electronic Imaging.

Display Devices (for selecting imaging devices); ANSI/AIIM TR26-1993– Resolution as it relates to Photographic and Electronic Imaging; and ANSI/AIIM TR38- 1996– Compilation of Test Targets for Document Imaging Systems. To the highest quality of images, the researcher used the most current procedures and techniques to optimize the quality of the products of the scanning process. As part of the overall digital imaging quality control process, the entire scanner and all other equipment included in the workflow underwent consistent calibration, testing, and maintenance before the commencement of the digitization process.

The scanning software has on-screen displays that enable the operator to make the image setting adjustments needed to optimize the scanner's output. As each page is scanned and displayed on a 17-inch monitor, the researcher was able to examine it for quality and completeness. At this time, the researcher can catch and rectify quality issues such as

misfed pages, poor image contrast, and incomplete images. By catching errors at this step, the post scanning section (image restoration and enhancement) is made a lot easier During the scanning phase of this project, various scanning specification standards common to the industry were observed.

### 3.7.2 Specification standards description

File Format CCITT Group IV TIFF: TIFF format is standard in document imaging and document management systems.

Resolutions: An average A4 scan produces 30 kilobytes (KB) of data at 200 ppi (pixels per inch resolution) and 50 KB of data at 300 ppi. 300 ppi is far more common than 200 ppi. Because TIFF format supports high resolutions as well as millions of colors it was more appropriate for the scanning however it will be optimized for screen display at the next stage of the project. Resolution was 300 DPI.

Image resolution refers to the spacing of pixels in an image and is measured in pixels per inch (ppi), which are commonly referred to as dots per inch or (dpi) .The higher the resolution, the more pixels in the image. Higher resolution allows for more detail and subtle color transitions in an image. A digital image that has a low resolution may look pixelated or made up of small squares with jagged edges and without smoothness. Page Orientation was Landscape so that they are readable without the need to rotate the image.

### 3.7.3 Imaging Hardware and Software

**i. Scanner**

Fig. 3.8.1 Image of the scanner used for the execution of the scanning - HP Scanjet G2710 Photo Scanner (L2696A)
*Source of image: by the researcher*

#### 3.8.3.1 HP Scanjet G2710 Photo Scanner (L2696A) Specifications:

**A. Color- / Bit-depth :**

Bit depth: 48-bit

**B. Image compression and scaling :**

Image scaling; 10 to 2400% in 1% increments

**C. Requirements & environments supported :**

Minimum system requirements; Microsoft® Windows® XP, XP x64, 2000: 500 MHz processor, 256 MB RAM, 450 MB available hard disk space, USB port, CD-ROM drive, 800 x 600 SVGA monitor, 16-bit colour, Microsoft® Windows® Internet Explorer 6; Windows Vista®, Vista x64: 800 MHz processor, 512 MB RAM, 450 MB available hard disk space, CD-ROM drive, 800 x 600 SVGA monitor, DirectX 9 capable graphics, Microsoft® Internet Explorer 7

Media; types supported; Paper (banner, inkjet, photo, plain), envelopes, labels, cards (greeting, index), 3-D objects, 35-mm slides and negatives (using transparent materials adapter), iron-on transfers

**D. Software:** HP Photosmart software for Microsoft® Windows® (Windows® 2000

**E. Features:** Easy photo, slide and negative scanning with 2400 x 4800-dpi resolution, 48-bit colour (maximum resolution may be limited by PC system factors and scan size).

HP Real Life technologies: red-eye removal, colour restore, dust/scratch removal, adaptive lighting.

Integrated transparent materials adapter (TMA) holds up to two 35 mm slides or two negative frames; scanner bed holds up to three 10 x 15 cm prints.

### 3.7.4 Workstation (COMPUTER USED)

**A. System;**

- System Manufacturer: Dell Inc.
- System Model: Inspiron 9300
- BIOS: Phoenix ROM BIOS PLUS Version 1.10 A03
- Processor: Intel(R) Pentium(R) M processor 1.86GHz, ~1.9GHz
- Memory: 2048MB RAM. Available OS Memory: 2048MB RAM
- Page File: 949MB used, 3145MB available

- Operating System: Windows 7 Ultimate 32-bit (6.1, Build 7600) (7600.win7_rtm.090713-1255)
- Language: English (Regional Setting: English)

**B. Display Devices**

- Card name: NVIDIA GeForce 6150 (Microsoft Corporation - WDDM)
- Manufacturer: NVIDIA. Chip type: GeForce Go 6800
- Display Memory: 1016 MB. Dedicated Memory: 248 MB
- Shared Memory: 767 MB
- Monitor Name: Generic PnP Monitor

**C. Disk & DVD/CD-ROM Drives**

- Drive: C:
- Free Space: 14.7 GB, Total Space: 38.1 GB, File System: NTFS
- Drive: D:
- Model: _NEC DVD+-RW ND-6500A ATA Device

### 3.7.5 The scanning process

With the right HP scanner, it's easy to scan your 35mm photo slides and negatives to create digital files and prints.

To get the clearest possible image from the scanner, the glass was cleaned beforehand with a soft, lint-free cloth that has been sprayed with a mild glass cleaner.

The lid was opened and the slides placed at the appropriate place which is located right behind the lid. That is where the transparent material adapter (TMA) is located.

Fig. 3.8.2 Image of the scanner; the circled area indicating the location of the transparent material adapter- TMA
*Source of image: by the researcher*

Fig. 3.8.3 A more close view of the slides firmly placed in the TMA image holder of the scanner
*Source of image: by the researcher*

The next stage is the launching of the application (hp solution center) on the computer. This stage was preceded by ensuring that the right drivers for the scanner have been successfully installed on the operating system. Also the USB cable linking the scanner to the computer and power input cable are fitted correctly.

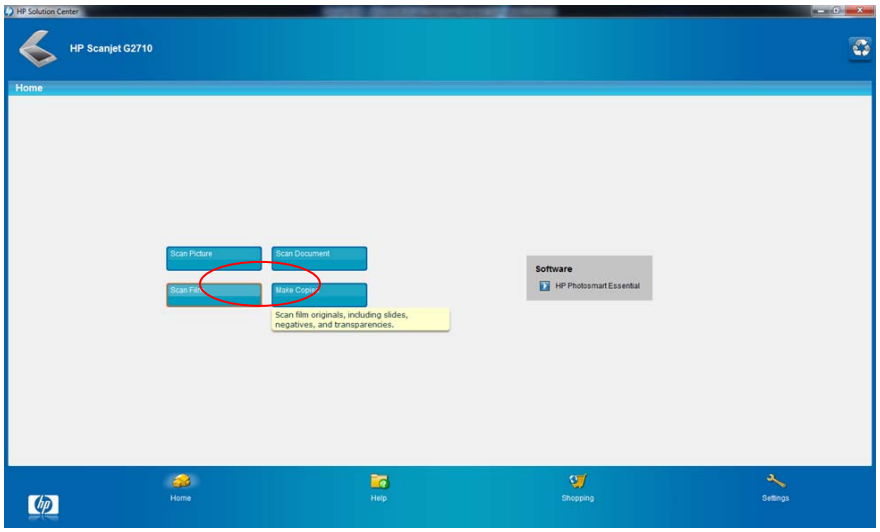


Fig. 3.8.4 Screen capture of the 'home' screen of the 'HP Solution Center' with the circled area representing the 'scan film' buttom
*Source of image: by the researcher*

The interface above shows the the various operations the scanner can perform. However for the purposes of this project the researcher chose the scan film feature which has been circled. The scan film buttom launched the settings interface of the TMA were the neccesary adjustments were made to ensure a successful scanning of the slides.

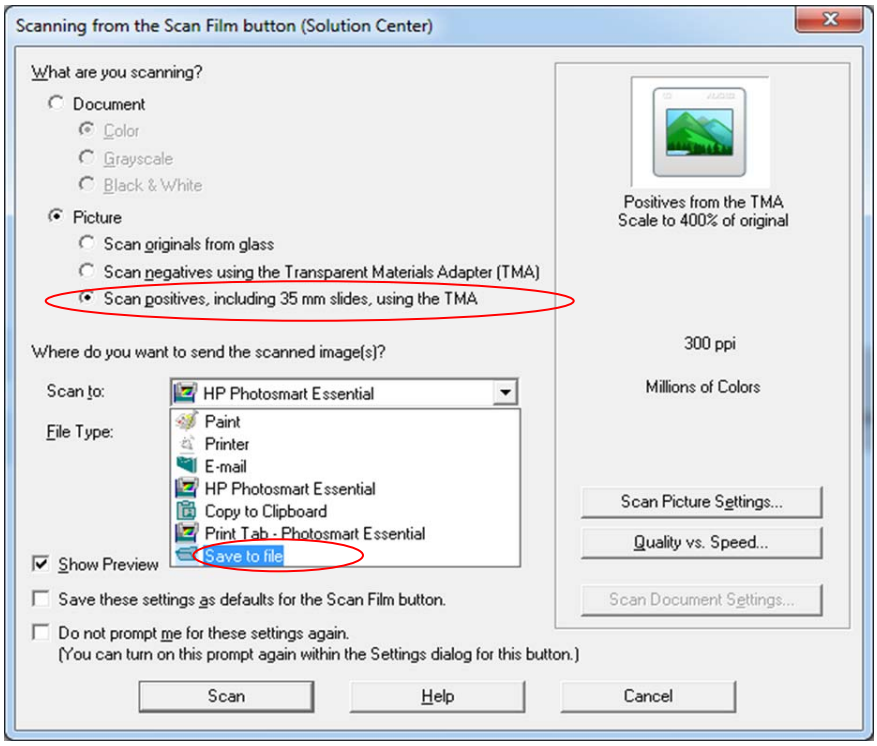


Fig. 3.8.5 Screen capture showing the 'scan possitives, including 35mm slides …, using the TMA' and the 'save to file' options
*Source of image: by the researcher*

The above diagram shows the initial sytage of the settings for the TMA. First the possitive slides feature was activated followed by the save to file where a directory was specified for the saving of the images after the scanning is complete.

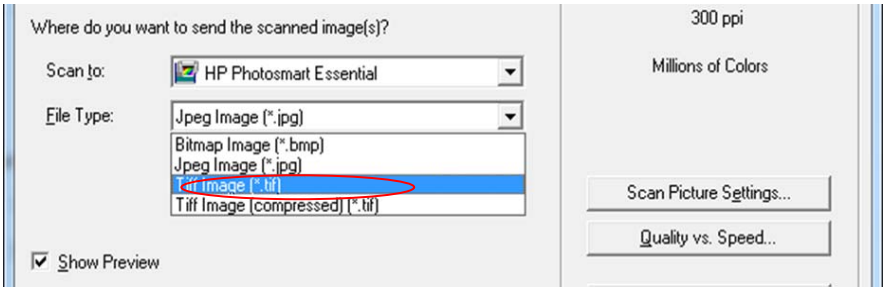


Fig. 3.8.6 The circled area identifies the file format chsen for the digitization of the slides – '.TIFF'
*Source of image: by the researcher*

Under the same interface the file format which was TIFF was selected

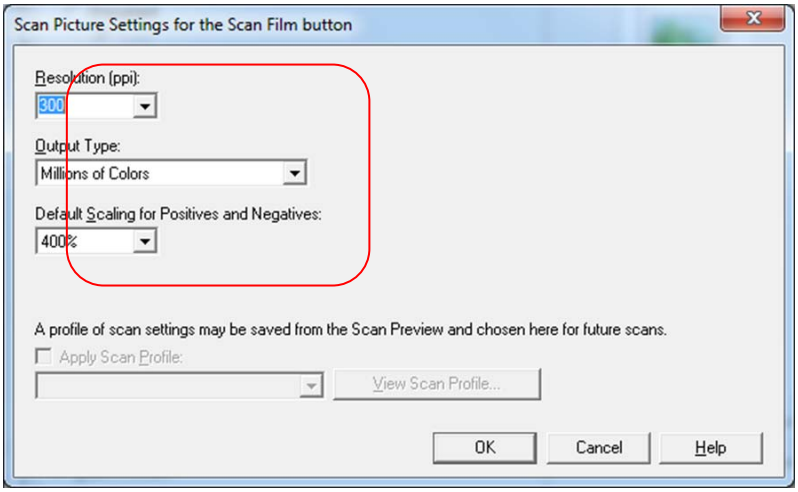


Fig. 3.8.7 The enclosed area in the image above shows the selected resolution(300dpi), the number of colors and the optical scaling percentage
*Source of image: by the researcher*

The resolution at which the image was to be scanned was set to 300dpi which was within the optical resolution range of the scanner and also a safe specification for screen display.

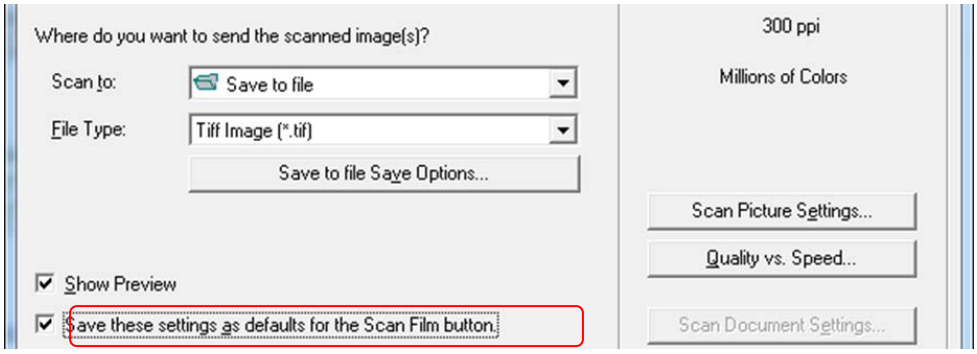


Fig. 3.8.8 This figure shows the option that alows the software to save the adjastments made as a default setting for the rest of the project
*Source of image: by the researcher*

Since a lot of slides were to be scanned it was imperative for the settings to be consistent throughout the duration of the project. For this reason the researcher checked the "Save these settings as defaults for the scan filmbuttom" which is seen in the above diagram. This allowed the researcher to concentate on the scanning process and not readjusting settings any time a scan was to be made.

After all the settings have been made and confirmed it was time for the scanning of the slides. The TWAIN interface automatically starts after the settings have been made and saved. Here the reasercher was at libertity to make manipulations and croppings to the image before hitting the scan buttom. Below is the TWAIN interface and the various features available in the utility that the researcher made use of to achive the scans

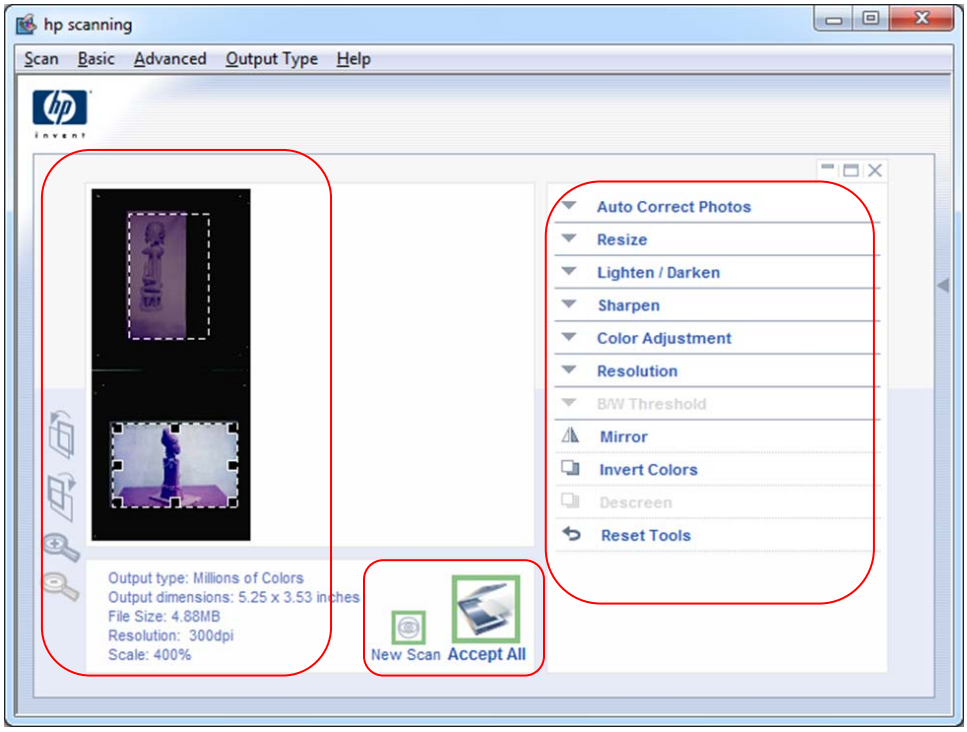


Fig. 3.8.9 The above figure shows the priview area to left of the screen, the advanced edditing tools to the right and the 'accept' and 'new scan' at the bottom
*Source of image: by the researcher*

At the left side of the screen the preview allowed the researcher to crop out unwanted parts of the slide, also check the dimensions, resolution, colors and size of the image. The left side allowed the researcher to be able to do some tweaking and enhancement to the image before the next stage of the project. They included color adjustments, brightness and contrast, scratch removal, etc. At the bottom of the interface is the "accept all" which concluded the process. After the researcher had confirmed the acceptance the scanning was done by the machine and saved in the directory that has been specified at the initial stage of the scanning process.

Below, at the outlined area is a detail of some of the features of the TWAIN interface

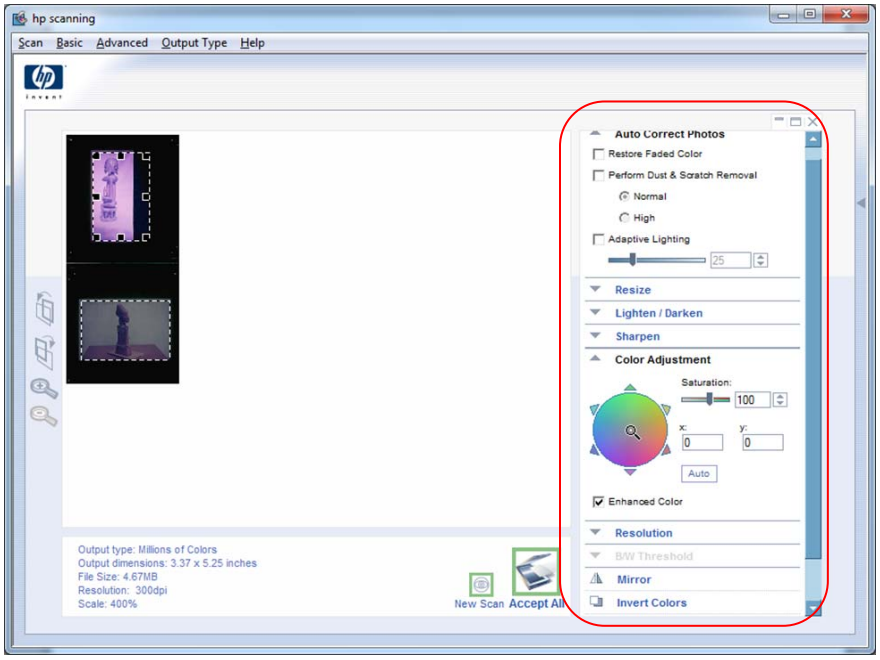


Fig. 3.8.10 Screen capture showing a more detailed view of the advanced editing tools of the scanning application
*Source of image: by the researcher*

The image after scanning is seen below. Although some adjustments were made before it was scanned it still need some enhancements, to get rid of unwanted hues and roughness. That took the researcher to the next stage of the project which is the 'Post- scanning processes'. All the processes mentioned in this report were consitent to all the slides that were scanned by the resaercher.

Fig. 3.8.11 The scanned Slide image
*Image: Yoruba fertility carving, Nigeria*
*Source: African Art and Culture Section, Department of General Art Studies, KNUST, Kumasi, Library*

### 3.7.6 Post-Scanning processing

#### 3.7.6.1 Image restoration and enhancement

The researcher processed all scanned images through an image optimizer program running on the Microsoft windows vista operating system. Image-enhancements and restorations using various imaging techniques as well as a host of selectable functions of the program, such as black border cropping, de-skewing, rotation, hues and saturations, RGB levels, scratches and tears, brightness and contrast, aspect ratios, color correction etc. were employed by the researcher to get the images to the right standard for the application.

### 3.7.6.2 Device and application software used

This stage also made use of the two major sets of technological interventions which were hardware devices and application software. The hardware devices employed included Dell INSPIRON 9300 laptop, an external Microsoft optical mouse and keyboard.

### 3.7.6.3 Application Software used for the image restoration and enhancements


Fig. 3.8.12 Splash screen of the application software used for the Image enhancements – Adobe Photoshop CS3
*Source of image: by the researcher*

The processes involved in the restoration and enhancements of the images varied from image to image due to the peculiarities of the images thus all the images did not have the same defect. Based on the defect the right process is employed. But in all the images scanned brightness and contrast, RGB levels, hues and saturations, curves, channel mixers and cropping were employed in one way or the other. The ultimate aim of this stage was to make sure that the final image is at all cost better looking and efficient than the original image.

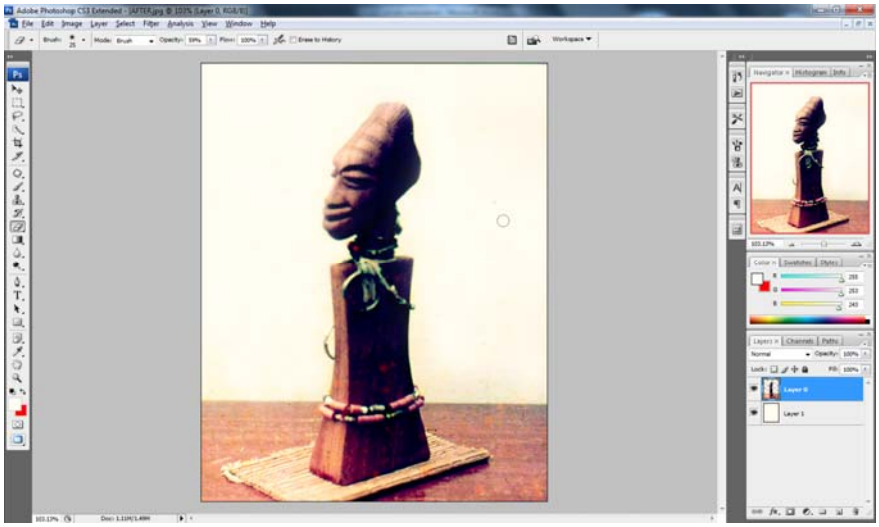

Fig. 3.8.13 Enhanced image seen in the Adobe Photoshop CS3 working canvas
*Source of image: by the researcher*

The dialog boxes below are the various constant tools used in the restoration process. Anytime the RGB levels of an image is adjusted it is also advisable to manipulate the hues and saturations due to the fact that the acid in the chemical used to develop the slide has caused a discoloration as a result of the aging and the relative humidity of the storage room or container in which the slide was stored. The researcher based on his experience as a designer has to know the right composition of the hues and saturate them to achieve a somewhat close resemblance to the real thing. After that the color channels were adjusted with reference to the RGB curves and then finally the total brightness and contrast of the composition were adjusted.

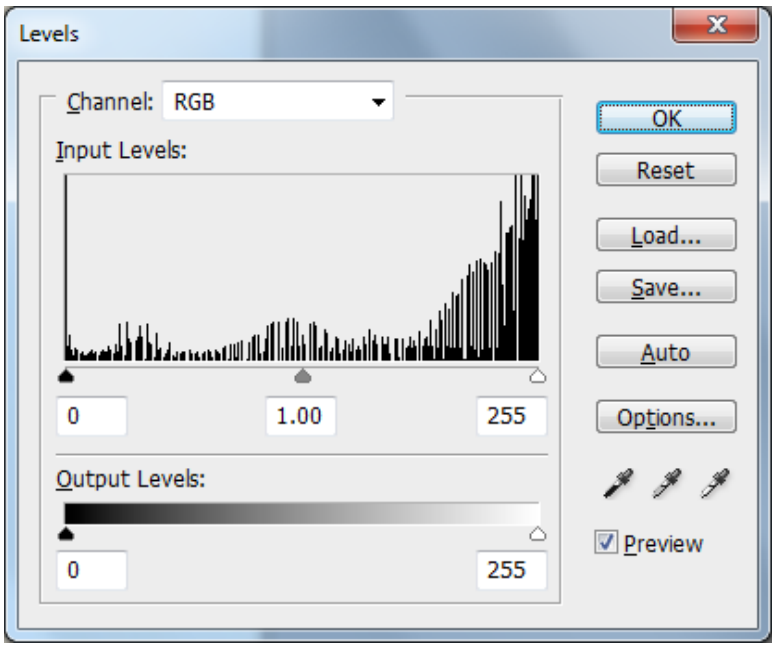


Fig. 3.8.14 'Levels' window – use to adjust the intensities of the RGB- Red, Green and Blue of the scanned image
*Source of image: by the researcher*

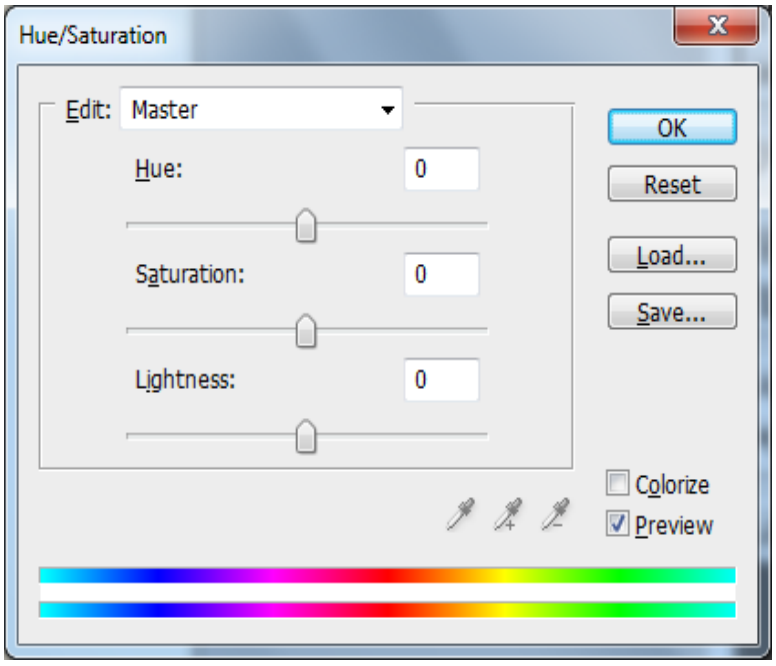


Fig. 3.8.15 ('Hue/Saturation' window – used to adjust the raw color levels of the scanned image)
*Source of image: by the researcher*

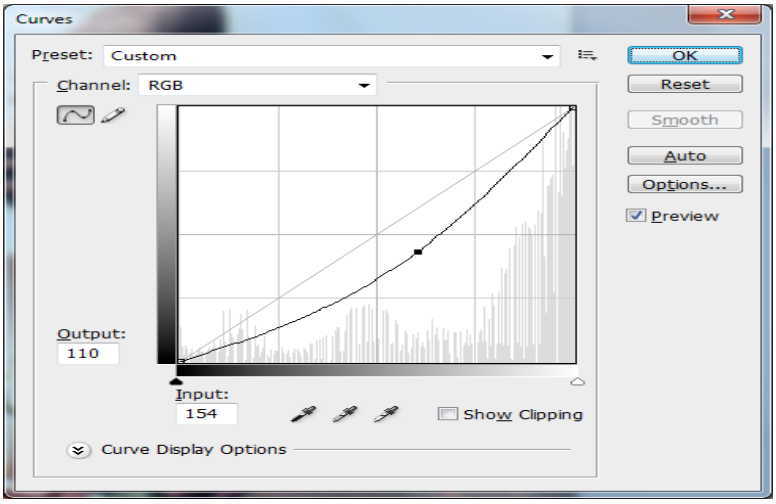


Fig. 3.8.16 'Curves' window – also used to adjast the intensities of the RGB- Red, Green and Blue of the scanned image but this window offered more specific and detailed options of adjustments
*Source of image: by the researcher*

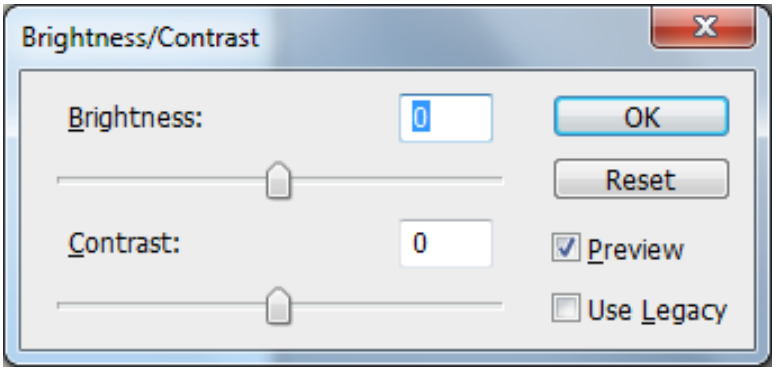


Fig. 3.8.17 'Brightness/ Contrast' window –used to adjust the general luminance of the scanned image
*Source of image: by the researcher*

"A bad picture is a bad picture" these processes cannot completely restore the original image to a perfect state however it can be efficient enough to get it close to perfect in most instances if carefully and professionally executed. Below is an example of the outcome of the restoration process to one of the scanned images.

**Before Enhancement**

Fig. 3.8.19 The scanned Slide image
*Image: Yoruba fertility carving, Nigeria*
*Source: African Art and Culture Section, Department of General Art Studies, KNUST, Kumasi, Library*

**After Enhancement**

Fig. 3.8.19 The scanned Slide image
*Image: Yoruba fertility carving, Nigeria,*
*Source: African Art and Culture Section, Department of General Art Studies, KNUST, Kumasi, Library."*

### 3.7.6.4 Finishing

### 3.7.6.5 Image inspection and quality control

Following image enhancement, the images underwent a visual quality control process by a trained and experienced digital imaging expert checking the scanned images against the original documents. Checks for the proper orientation and overall quality of the image were made also the image size in relation to the original document and confirmation that all scanned images had all the necessary parameters. Corrective re-scan actions, where possible. All images deemed of poor or marginal quality were flagged for further correction. In developing the image inspection and quality control plan, utilizes the standard ANSI/AIIM TR34-1996– Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographic Systems.

## 3.8 Design and development of the website for the Department of General Art Studies.

### 3.8.1 Overview

This section was divided into three major categories which included;

1. Planning
2. Frontend development
3. Backend development

The frontend development comprised of the site interface design and page build-up

The backend development comprised of the development of the content management system and the search engine optimization for the website.

### 3.8.2 Web design

Web design basically is the skill of creating presentations of content (usually hypertext or hypermedia) that is delivered to an end-user through the World Wide Web, by way of a Web browser or other Web-enabled software. There are about eight (8) basic different types of websites on the internet. Commercial Website; the purpose of this type of website is to sell products or services. Commercial websites are used for promoting a business or service and are among the most common type of website on the internet. The Internet address often ends with .com.

Personal Website; this type of website is to provide information about an individual or group. This type of website is run by an individual or a small group (such as a family) that contains information or any content that the individual wishes to include. The Internet address has a variety of endings. Organizational Website; the purpose of this type of website is to advocate an individual's opinion or a groups point of view. A website where persons with similar interests communicate with each other, usually by chat or message boards. The Internet address often ends with .org. Educational Website; this type of website is to provide information about an educational establishment or to present information in an educational manner. The Internet address ends in .edu. Entertainment Website; this type of website is to entertain and provide amusement. The Internet address often ends with .com. News Website; the purpose of this type of website is to provide information about current events, dedicated to dispensing news and commentary. The Internet address often ends with .com. Blog; a website that is used to log online readings or to post online diaries; may include discussion forums or chat rooms. The Internet

address has a variety of endings. Hybrid Website; many websites are a mixture of types. For example, a business web site may promote the businesses products, but may also host informative documents, such as white papers or provide news for it's visitors. In all scenarios, information is the soul of the internet and if used wisely articles and informational pieces are a good hook to bring in visitors.

There are also numerous sub-categories to the ones listed above. For example, a fan site may be a vanity site on which the administrator is paying homage to a celebrity. Another example would be a hobby site where the webmaster shares their knowledge with other like minded individuals and through forums or chat rooms creates a dialogue with them. However for the purposes of this project the researcher decided to stick to issues directly pertinent to the execution of this project as stated in the objectives of the research. As a result, the researcher did not deem it important to go into details of web development and technology as it would have been a deviation from the goal of this chapter. However a few principles and concepts as well as basic web structure information is discussed with correlation with the design and development of the website for the department.

### 3.8.2 Device used for the design and development of the website

The system or device used in the design and development of the website was consistent throughout the project.

**A. System**

- System Manufacturer: Dell Inc.
- System Model: Inspiron 9300

- BIOS: Phoenix ROM BIOS PLUS Version 1.10 A03
- Processor: Intel(R) Pentium(R) M processor 1.86GHz, ~1.9GHz
- Memory: 2048MB RAM. Available OS Memory: 2048MB RAM
- Page File: 949MB used, 3145MB available
- Operating System: Windows 7 Ultimate 32-bit (6.1, Build 7600) (7600.win7_rtm.090713-1255)
- Language: English (Regional Setting: English)

**B. Display Devices**

- Card name: NVIDIA GeForce 6150 (Microsoft Corporation - WDDM)
- Manufacturer: NVIDIA. Chip type: GeForce Go 6800
- Display Memory: 1016 MB. Dedicated Memory: 248 MB
- Shared Memory: 767 MB
- Monitor Name: Generic PnP Monitor

**C. Disk & DVD/CD-ROM Drives**

- Drive: C:
- Free Space: 14.7 GB, Total Space: 38.1 GB, File System: NTFS
- Drive: D:
- Model: _NEC DVD+-RW ND-6500A ATA Device

### 3.8.3 Application software used for the design and development of the Site interface

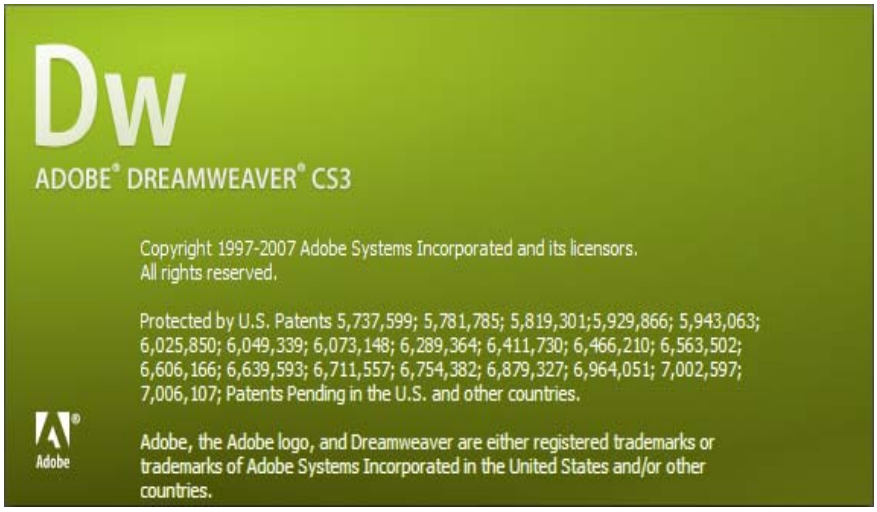


Fig. 3.9.1 Splash screen of the application software used for the frontend development – Adobe Dreamweaver CS3
*Source of image: by the researcher*


Fig. 3.9.2 Splash screen of the application software used to edit images for the frontend development – Adobe Photoshop CS3
*Source of image: by the researcher*

### 3.8.4 Step by step procedures involved in the site interface design

In designing the interface the researcher had to consider factors like accessibility of the pages that makes up the site. Web pages and sites must conform to certain accessibility principles. These accessibility principles are known as the WCAG when talking about content. Thus Semantic markup which refers to semantically organizing the web page structure and publishing web services description accordingly so that they can be recognized by other web services on different web pages. Standards for semantic Web are set by IEEE. The researcher also considered the optimization of images which is indispensible to the accessibility factors stated earlier on in the interface design.

Great effort was invested in the concept development for the layout of the page. Strategic planning and organization of the various elements and principles of design were incorporated to build the home page of the site. A web page is made up of images and extensible hypertext markup language (XHTML). However other scripts like cascading style sheets (CSS), Java scripts, Ajax, Dynamic Hypertext markup language (DHTML) also add more functions and interactivity to pages so as to achieve the purpose for which they are created.

Adobe Photoshop CS3 was used to edit and resize all the images used in the site and the compilation of the images with the scripts were made in Adobe Dreamweaver CS3

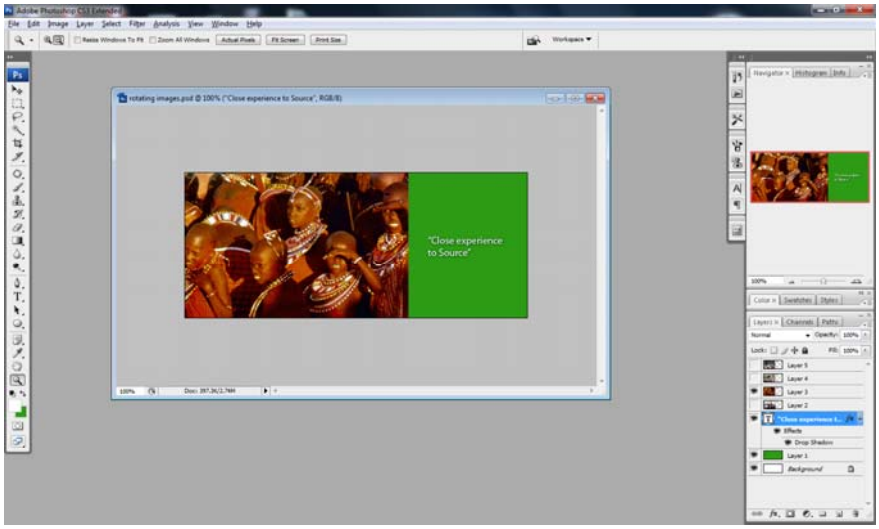


Fig. 3.9.3 Animated graphics to be used for the website – Adobe Photoshop CS3
*Source of image: by the researcher*

Before the actual design a layout was drawn to help the researcher in the scripting of the pages and also to serve as a guide for the structure and form of the site.


Fig. 3.9.4 Layout design of the website
*Source of image: by the researcher*

A new site definition was set in adobe Dreamweaver CS3 and then the code buildup commenced in building the page.

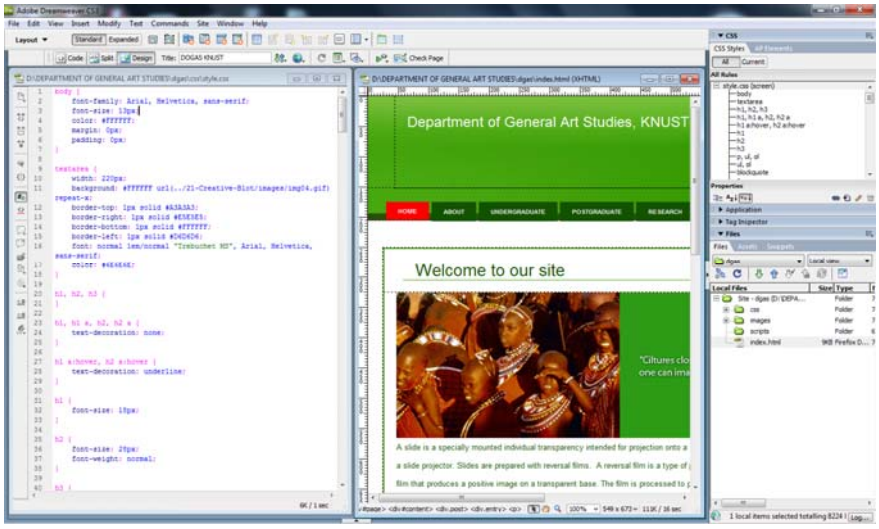


Fig. 3.9.5 Screen capture of the development of the frontend showing the codes and design in Adobe Dreamweaver CS3
*Source of image: by the researcher*

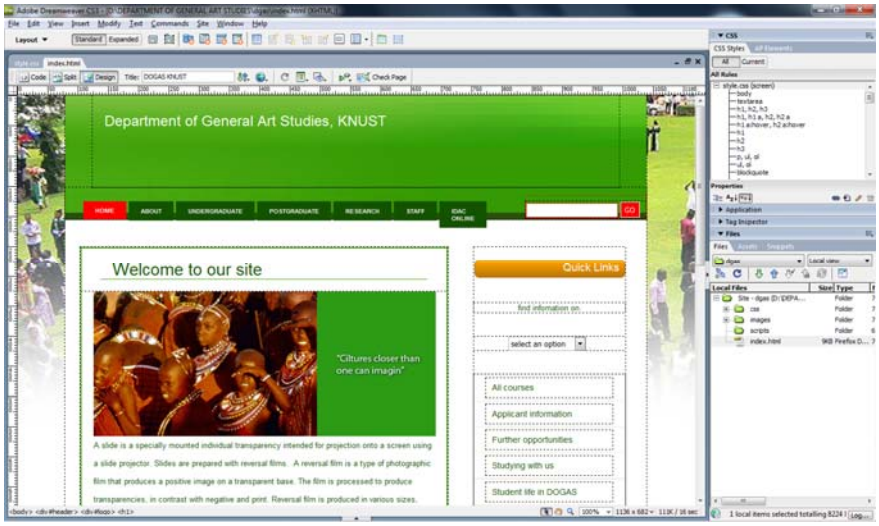


Fig. 3.9.6 A clearer view of the site in Adobe Dreamweaver CS3
*Source of image: by the researcher*

### 3.8.5 Backend development (Content management system -CMS)

The backend development of the website is an application (content management system) encapsulated by the website interface (frontend). The backend purposely resides on the server be it local (thus the designers personal computer) or remote (host/service provider).

The content management system is a database comprising of several tables (also a database) each representing a page/component of the website with features that facilitates correspondence to and from the user hence the user interacts with the database (send, receive and manipulate) through the frontend (website interface). In other words, the Content Management System allows the editor/user to interact with the site in several ways.

Additionally CMS provides a graphical user interface that allows the editor to create content, add images and multimedia files, create content schedules, and much more, such as Decentralized maintenance. Content management systems are designed with non-technical content authors in mind thus people with average knowledge of word processing can create the content directly with no HTML knowledge. One of very important features that a CMS provides is also the Configurable access restrictions; Users are assigned roles and permissions that prevent them from editing content which they are not authorized to change. It also preserves consistency of design because content is stored separate from design hence the content from all authors is presented with the same, consistent design.

Finally navigation is automatically generated and adjusted thus menus are typically generated automatically based on the database content and links will not point to non-existing pages. Support of dynamic content is seen in extensions like forums, polls, shopping applications, searching, news management are typically modules. These and many more are reasons why the content management system was a necessity for the website for the department.

In summary the backend serves as the bedrock of the interactivity of the website thus the user can conveniently do and expect a lot from the website with little or no assistance. Each area of the site can be recreated and adjusted independent of the other areas. The design layer can be completely reworked for a new user interface without the need for any adjustments to structure or content. The structure can be adjusted for additional functionality with no changes required to design and content. Content can be changed with no need to adjust the front-end design or functional structure. Finally the content management system, based on the fact that it's resident on the server means that the transfer of information to and from the website becomes very fast since the user's computer does not need to process any information. The information is processed by the server and only sent to the user's computer; as a result, the user can enjoy the communication process even if the computer's performance as well as the internet speed is not so encouraging.


Fig. 3.9.4.1 Splash screen of the software application used for the backend development - NetBeans IDE 6.8
*Source of image: by the researcher*

NetBeans IDE 6.8 was used as the code editor for the development of the content management system. A long sting PHP codes were written to build the application right from the conception of the features to the rendering and finishing of the "project" in NetBeans.

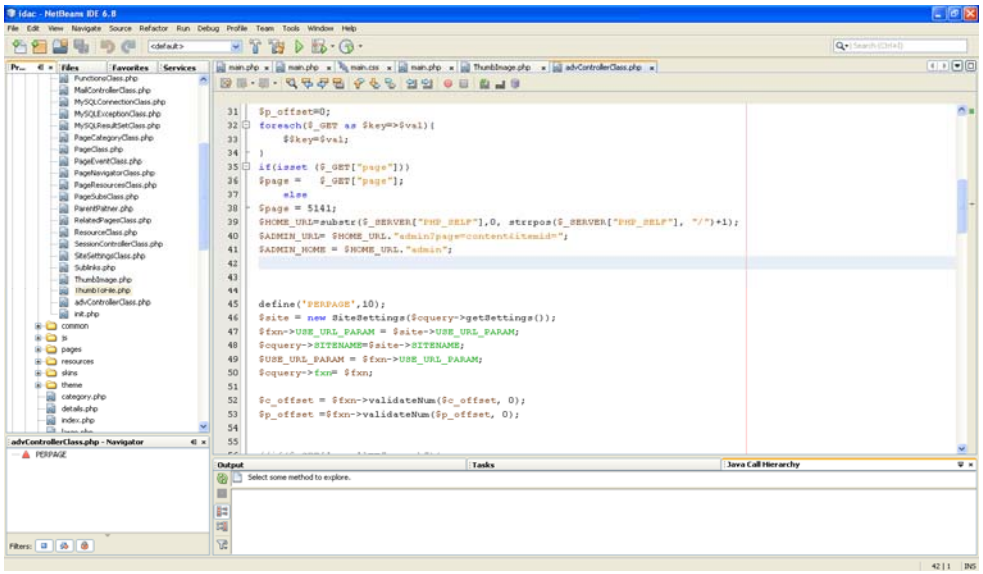

Fig. 3.9.4.2 A screen capture of the codes written in the software application used for the backend development - NetBeans IDE 6.8
*Source of image: by the researcher*

Above is the a sreenshot of the codes written for the content managemnt System. The final stages of the website involved the populating the pages of the site with the required information and the the hosting of the site for testing.

# CHAPTER FOUR

## PRESENTATION AND DISCUSSION OF FINDINGS

### 4.1 35mm Slide Technology

A slide is a specially mounted individual transparency intended for projection onto a screen using a slide projector. Slides are prepared with reversal films. A reversal film is a type of photographic film that produces a positive image on a transparent base. The film is processed to produce transparencies, in contrast with negative and print. Reversal film is produced in various sizes, from 35 mm, roll film to 8x10" sheet film.


Fig. 4.1.1 Image of the stucture and specifications of the 35mm slide
*Source of image: http://en.wikipedia.org/w/index.php?title=Reversal_film&action Retrieved 8 January 2010.*

Slides may also be described as images produced when a positive image is captured on a transparent background. The dye used to create those images is the factor that determines the severity of the reaction to light. There are two types of film: Ektachrome and Kodachrome, both manufactured by Kodak. Ektachrome slides are manufactured with

dye known to resist fading under the intense light of a projector, but develop yellow stains in dark storage areas. In contrast, Kodachrome slides retain color vibrancy in storage, but fade rapidly when exposed to a projector's light. To properly care for slides with such varying reactions, decisions must be made as to the best course of preservation (Bellis, 2009).

Slides allow the photograph to be viewed by a large audience at once. They are placed inside a cardboard or plastic shell for projection or equipment called the slide projector. A slide projector is an opto-mechanical device used to view photographic slides. It has four main elements: electric incandescent light bulb or other light source (usually fan-cooled) reflector and "condensing" lens to direct the light to the slide, holder for the slide and focusing lens.

Very little is known by researchers as the one who invented the 35mm slide system however the Magic Lantern is said to be the forerunner of the modern slide projector. In 1676, a type of Magic Lantern called the Sturm Lantern was invented and it may have been one of the first. The practice of projecting images from glass plates began centuries before the invention of photography. However, in the 1840s, Philadelphia daguerreotypists, William and Frederick Langenheim, began experimenting with The Magic Lantern as an apparatus for displaying their photographic images because of the opaque nature of the daguerreotype it disallowed its projection, the brothers looked for a medium that would create a transparent image. They employed the discoveries of the French inventor, Niepce de St. Victor, who had discovered a way to adhere a light

sensitive solution onto glass for the creation of a negative. By using that negative to print onto another sheet of glass rather than onto paper, the Langenheims were able to create a transparent positive image, suitable for projection. The brothers patented their invention in 1850 and called it a Hyalotype (hyalo is the Greek word for glass). The following year they received a medal at the Crystal Palace Exposition in London (Bellis, 2009).


Fig. 4.1.2 Rollei 66 Dual-P Multi Format Slide Projector
*Source of image: www.adorama.com/ images/large/RL66MF.JPG: Retrieved 8 January 2010.*


Fig. 4.1.3 ROYALE 250R slide projector
*Source of image: http://www.electricwords.co.uk/royale/royl250r.jpg: Retrieved 8 January 2010.*

### 4.1.2 How slide projectors work

A flat piece of heat absorbing glass is often placed in the light path between the condensing lens and the slide, to avoid damaging the latter. This glass transmits visible wavelengths but absorbs infrared. Light passes through the transparent slide and lens, and the resulting image is enlarged and projected onto a perpendicular flat screen so the audience can view its reflection. Alternatively the image maybe projected onto a translucent "rear projection" screen, often used for continuous automatic display for close viewing. This form of projection also avoids the audience interrupting the light stream by casting their shadow on the projection or by bumping into the projector.

Fig. 4.1.4 Image of one of the old slide projectors at the African Art and Culture section
*Source of image: Researcher*

Fig. 4.1.5 Image of the other old slide projectors at the African Art and Culture section
*Source of image: Researcher*

The above slide projectors are the only ones available to the Section. Unfortunately, they are out-dated and out of function.

Slide projectors were common in the 1950s to the 1970s as a form of entertainment; family members and friends would gather to view slideshows. Until about 1995, color transparency was the only photographic medium accepted for serious publishing, and was widely used in commercial and advertising photography, reportage, sports, stock, and nature photography. Digital media have gradually replaced transparency film in these applications. This was due to the so many weaknesses of the slide system and also modernization. Early color negative film had many shortcomings including high cost of film and processing and short print life. Amateurs who could afford slide film and projection equipment used it extensively until about 1970, when color print film began to displace it.

### 4.1.3 Slide management at the section of African art and culture section, KNUST

Slide collections have all the conservation concerns of a traditional photograph but with added complications.

Fig. 4.1.6 Slides exposed and others in an old carousel box – African Art and Culture Section
*Source of image: Researcher*


Fig. 4.1.7 Slides stored in a plastic container – African Art and Culture section
*Source of image: Researcher*

The slides at the department are stored in plastic carousels and cardboard boxes. Over a short term, these materials are adequate for storage, but in the archive world, the goal is

for images to last for hundreds of years. As plastic and cardboard age, they breakdown at the molecular level, this causes caustic chemicals to slowly release, a process known as off-gassing. Over time, acidic microenvironments develop, leaving collections suffocating in their own home.

### 4.1.4 Weaknesses of the slide projector system

Several manufacturers have stopped production of slide projectors. This has made it increasingly difficult in some countries to locate photo processors who will process slide film. Hence, servicing and maintenance practices of slide projectors have become if not impossible, extremely expensive for many users. Unlike traditional photos, which are viewed with the naked eye, slides are viewed with an outside light source. Once a convenient method for showing off vacation photos at the neighborhood barbecue, the design now presents issues of long-term preservation.

Each time the slide is viewed in a projector it is exposed to intense light. This causes the image to irreparably fade. Slides, unlike photographs, have no negatives from which to print another copy. Once the original image deteriorates, it is lost forever. Due to the delicate nature of photography, original images have many natural enemies. As a medium, slides generally last for 50 years, but preventing deterioration of the image is a constant battle.

In a normal environment, they can begin to fade in 10 to 20 years. Particularly, exposure to light and water (even humidity) can deteriorate an image before its time. Simply

resting an image against another object puts a photograph at risk. Think of old pictures that fade around the edges. The parts of the picture that touch the frame are absorbing the acid in the framing material, corroding the picture. This and many other factors have made this slide technology obsolete hence a need to move forward in preserving and sustaining valuable information on slides.

### 4.1.5 How slides are used at the section of African Art and Culture, KNUST

Based on the interviews with some of the lecturers of the African Art and Culture section and the researcher's own observation of the section, it came to light that it takes a lot of time for lecturers to get the right slide for lectures. This is as a result of the unavailability of slide scanners and poor cataloging of the slides. Each slide has to be taken out of the storage case and viewed in sunlight to know which category of art that particular slide falls in.

In some cases very few slides are scanned by lecturers for the purposes of a particular lecture since all the slide projectors at the section are out of order. The inability for the slide projectors to function has caused major setbacks in the use of the slides. Most students interviewed by the researcher claimed they find it very difficult to visually perceive the use of some of the art works and forms discussed during lecture sections. The slides are available but they are not accessible during lectures.

### 4.1.6 Benefits of Digitization of slides

Cultural and educational institutions serve the international community by building, protecting, preserving and ensuring continued access to diverse collections and resources. The challenges of preserving collections have been addressed in different ways over time. Institutions have used conservation to preserve the original artifact and reformatting strategies, such as microfilming and the creation of print facsimiles, to retain content, enhance access, and protect the original from excessive wear. Over the past several years, libraries and educational institutions have moved towards using digitization as an additional method for reformatting endangered and fragile paper-based materials and slides to both preserve and provide access to collections (Arthur, 2004).

Digitization is the process of converting analog information into digital format. The materials to be converted could be letters, manuscripts, books, photographs, maps, audio recordings, microforms, motion pictures, ephemera, etc.( Hurst-Wahl, 2009). Three-dimensional objects can also be digitized. The goal of digitization is improve access to the materials. To that end, most digitized materials become searchable via databases on the Internet.

A number of positive outcomes result from deploying digitization as a reformatting strategy. Digitization increases the capture capability for many types of paper-based material, 35mm slide, for which there has been no effective reformatting strategy to date (Arthur, 2004). Digitizing slides is an investment that saves space, lasts forever, and keeps information safe and full of possibilities.

Functionality, such as zooming capabilities, allows users to examine more closely fine details and produce a variety of outputs to suit different needs. Digital facsimiles better reproduce the navigational experience of 35mm slides than does the linear format of microfilm. Digitization has the potential to capture information currently recorded on many other media and may be the only method to preserve these materials. When digital facsimiles of print materials are made accessible via the World Wide Web, the widest range of users has equal access to collections from any location whether they are on- or off-site.

A virtual environment of digital files can combine content from many kinds of resources, including primary source material, and provide powerful opportunities to integrate materials seamlessly into instruction and course management systems for teaching and learning. Digitization of slides allows users to create virtual collections that will support new and creative research made possible only in a digital environment.

### 4.1.7 Other benefits of using digitization as a reformatting method for 35mm slides include

Increased accessibility; Information are accessible to everyone with Internet access from the World Wide Web thus providing equal access to a widest range of users, images can be accessed by multiple users at one time independent of their location. Images can be more readily incorporated into instructional and educational applications.

**1. Increased functionality**

Users can simultaneously compare selected digital page images of originals. Digital images can be converted to searchable text files to enable searching and analysis of content within and across works, independent of location. Digital copies can be manipulated (enlarged and contrast changed) to support some types of artifactual study. Users can have cut and paste options for ease of citation, etc. Output capability to other media can create printed facsimiles in accordance with preservation specifications to meet user needs. Can generate computer output microfilm that meets preservation specifications and generate multiple digital copies without loss of quality.

**2. Systematic and purposeful collaboration**

Once one institution has digitized a collection of slides they can easily access it and integrate into their own virtual collections, subject to relevant copyright restrictions. Digitization has more actively engaged users in the preservation of materials. While user input was always sought and considered in the workflow of microfilm reformatting for endangered and fragile materials, the advantages of digital materials have generated greater interest in reformatting as a preservation strategy

**3. Expanded scope for preservation activities**

Digitization of slides has made it easier to share digital collections so that cooperative/coordinated preservation projects or programs will be more successful than other traditional efforts. Digital reformatting has the ability to capture and display a broad array of materials with features and characteristics that are not easily reformatted using

other technologies (e.g., color items, oversize materials and other complex graphic materials). Finally, digitization can address the conversion needs of other types of media beyond film-based printed materials (e.g., audio, paper, video) and can allow collections containing a wide variety of formats to be presented and seamlessly accessed from a single interface.

## 4.2 Interactive media in instructional technology

### 4.2.1 Interactive media

Interactive media is the integration of digital media including combinations of electronic text, graphics, moving images, and sound, into a structured digital computerised environment that allows people to interact with the data for appropriate purposes. The digital environment can include the Internet, telecoms and interactive digital television (Finney, 2002).

The need to differentiate between analogue (linear) and digital (interactive) uses of media spawned other terms like New Media and Digital Media. The term ‘New media’ carries its own problems as the media associated with the original term are replaced with newer instances of the ‘new’. Obsolescence is endemic in the interactive arena. However, the term remains in use although Digital Media and Interactive Media are more stable terms and are being used increasingly. The term Interactive Media highlights the interactive connotation that is a key characteristic of the difference between the older style media and the new. The core team members for developing interactive media come from programming, media production—or asset production as it is increasingly known—and

interactive content development. The programmers decide and develop the technical structure for a project. The media production specialists concentrate on the design and development of the relevant text, audio, video, graphics and animation assets. These need to work effectively within the technical structure. The content definition determines the type and amount of information that will serve the specific purpose for developing the application. Defining the interface—exactly how the users will access the pieces of information—is often negotiated between members of the core team because it is such a key part of development.

### 4.2.2 Benefits of interactive media

As the use of new technologies is becoming part and parcel of educational endeavors, more people are getting involved in the development cycle. Interactive media considerably facilitates the learning activities at all levels as well as teaching. The input and response sequence of interactive systems allow sustained attention and maximum efficiency in educational activities that employ the use of interactive media. Interactive media is a dynamic environment that is affecting everyone from those directly involved to those who have to manage it and those who use it. it is however changing its form from fixed to mobile, limited media to rich media, limited interaction to real time interaction.

### 4.2.3 Instructional media technology

Instructional media encompasses all the materials and physical means an instructor might use to implement instruction and facilitate students' achievement of instructional

objectives. This may include traditional materials such as chalkboards, handouts, charts, slides, overheads, real objects, and videotape or film, as well newer materials and methods such as computers, DVDs, CD-ROMs, the Internet, and interactive video conferencing (Scanlan, 2003). In other words, instructional media includes any and all of the learning and instructional materials and resources which a lecturer may choose to use in order to facilitate instruction and achieve the stated instructional objectives.

### 4.2.4 Types of Instructional Media

• Real objects and models

• Printed text (books, handouts, worksheets)

• Printed visuals (pictures, photos, drawings, charts,

graphs)

• Interactive media applications

• Overhead transparencies

• Slides and filmstrips

• Audio (tape, disc, voice)

• Video and film (tape, disc)

• Television (live)

• Computer software

• The Web based applications (including websites)

### 4.2.5 Benefits of Instructional technology during African art and culture lectures

Listening to a lecture can be an abstract experience especially without the learner's physical involvement and concrete interactive examples. Instructional media help add elements of reality - for instance, including pictures or highly involved computer simulations (interactive media applications) in a lecture (http://learningforlife.fsu.edu) retrieved 4/21/2010.

Instructional Media can be very supportive in a lecture for the following situations:

**a. Gain attention;**

A picture on the LCD projector screen, as students enter the lecture hall can get the student's attention.

**b. Recall prerequisites;**

Use media to help students recall what they learned in the last lecture, so that new material can be attached to and built upon it.

**c. Present objectives to the student;**

Animated presentation projections on a large screen can be used by the lecturer to present the day's learning objectives.

**d. Support learning through examples and visual elaboration;**

One of the biggest advantages of instructional media is to bring the world into the lecture hall when it is not possible to take the student into the world.

**e. Provide feedback;**

Media can be used to provide feedback relating to a subject matter.

**f. Enhance retention and transfer;**

Pictures enhance retention. Instructional media help students visualize a lecture and transfer abstract concepts into concrete, easier to remember.

### 4.2.5 Role of Interactive media in instructional technology

Interactive media provides endless possibilities and alternatives in instructional media technology. Interactive media when consistent and aesthetically pleasing go a long way to orient the student and gain his or her attention. The interactive nature of media enables quick response and feed back to and from the student and the lecturer. Accurate visual perceptions are fostered through interactive media technology example; an interactive application like the Interactive Disc of Arts and Culture –IDAC in Instructional Media.

Interactive media has proved to be indispensible in Instructional technology in the way it brings about complete satisfaction and interaction between the objective of the lecture and the assimilation of that objective to the student.

### 4.3 Project Evaluations

The project undertook evaluations of the methodology, procedures and findings, the results of which are discussed here and the extent to which the objectives were tested and evaluated. Digital technology has become a powerful educational asset for lots of students who would not otherwise have access to them.

The old 3mm slide technology is becoming obsolete. Accessibility has become an enemy to the old preservation methods of these, thus the more one uses the slides the faster they deteriorate as a result of humidity, light and storage. This has caused very challenging maintenance and sustainability setbacks, to the user and the general efficiency of the slides as an educational instructional aid. The introduction of the Interactive Disc of Arts and Culture - IDAC moves the scope from digital preservation to digital accessibility of the slides, an interactive Instructional media material and an efficient intervention to the Section of African Art and Culture.

This paper has looked into the tremendous advantages of digitization in general as a factor for the longitudinal preservation of fragile materials of academic importance to the Section. The combination of Information and Communication Technologies (ICT) and Digital preservation strategies, in spite of the thin line that separates the two has a lot to offer the Section in terms of the dissemination of information and the packaging of information as a preservation strategy for the benefit of all.

IDAC will affect teaching and learning of African art in several ways, including raising the level of student engagement in the lecture hall, fostering vivid understanding and

promoting enthusiasm for learning. The application will also go a long way to help lecturers streamline their preparation, be more efficient in their Information and Communication Technology (ICT) integration and increase their productivity overall.

This paper brings together interactive web based applications as a form of intellectual preservation and the use of ICT as a useful tool in the dissemination of information at the Department of General Art Studies. The Section of African Art and Culture is ready to move on into the future with the interventions this project presents to the floor.

### 4.3.1 Testing and Evaluation of the website

In recent times websites are a very important platform for educational institutions and a necessity for resource acquisition, however small or large. A professionally designed website not only attracts new visitors for the institution but also ensures users visiting the website regularly. With time this allows the institution's brand to be recognized on the internet.

After the development of the website the researcher had to test it and evaluate the performance, quality and validity of the site. This is to ascertain whether the objectives for which the site was developed have been achieved and also professionalism in terms of the design concept of the site. Since the Site is an educational site, it was important to ensure the website meets quality guidelines and certain standards that users will expect from any professional educational institution.

The primary purpose of the site is to facilitate the dissemination of information in and out of the department and to showcase what goes on in the department. The evaluation was conducted by testing the site locally on an active server running on the researcher's personal computer. Note that the features offered by the local server are the same on an active remote server if the site is hosted.

The Following are some parameters the researcher employed to evaluate the website to ensure that it meets the expectations of the target audience.

a. Website load times:

b. Content:

c. Meta Tag & Title:

d. Check for Broken links:

e. Include a Search Box on your website:

f. Search Engine Optimized (SEO)

g. Overall layout and design (Appearance)

h. Internal navigation and Structure

i. Interactivity

j. Functionality

k. Site target and purpose effectiveness

l. Browser Compatibility

m. Usability

**a. Website load times (Evaluates the speed at which the website comes up entirely at different connection speeds.)**

| Connection Speed | Loading Times |
|---|---|
| 14.4K Modem | 48.32 seconds |
| 28.8K Modem | 26.16 seconds |
| 56K Modem | 15.28 seconds |
| ISDN (128K) | 8.99 seconds |
| T1 (1.44MB) | 4.44 seconds |

The website has a medium load time and should not cause a problem for most viewers. Some users on slower internet connections may find page loading slow, but this will account for a very small percentage of possible visitors.

**b. Content**

Content is one of the most important parts of the website. It is of the main reasons why people visit the website. Content is the lifeline of any website. In the light of this it was observed that there was quality of content on the website which will go a long way to attract and maintain users on the site.

**c. Meta Tag & Title**

Meta tags are not visible on the page itself but are very important for a website as it provides search engines with the necessary information about the content of the page. Each and every page has a title and supported by accurate Meta tags. This will help in getting good ranking in search engines like Google, Yahoo & MSN.

**d. Check for Broken links**

It is always important to check all the active links on the website because broken links has a very bad effect on the users and moreover it also uproots search engine rankings.

**e. Overall layout and design (Appearance)**

A site must be visually appealing, polished and professional. It must also reflect the attributes of the institution. The Site may be the first, and only, impression a potential student/researcher receives of your institution.

The general appeal of the site is very attractive and reflects an educational institution.

**f. Good use of color**

Appropriate color scheme made up tints of 3 primary colors that blending well with each other create a proper and relaxing mood or tone for the department. There is moderation in the use of color which contrasts with the content of the pages.

**g. Text that is easily read**

The most easily read combination is black text on a white background, but many other color combinations are acceptable if the contrast is within an appropriate range. The fonts used for the site are easy to read and are found on most of today's computer systems. The font size for paragraph text between 10 and 12 pixels was observed. This is good feature which promotes consistency in the Site.

**h. Meaningful graphics**

Graphics are important, as they lend visual variety and appeal to an otherwise boring page of text. The use of graphics on the site is generally impressive as it was not overused which could cause the Site to slow down.

**i. Simplicity**

Keep it simple and allow for adequate white space. Uncluttered layouts allow viewers to focus on your message. The layout used was successful since there is there is enough hierarchy and “breathing space”.

**j. Menu and Navigation Style**

The internal structure and navigation of the website is important for search engines and customers who visit the website. The website is properly woven to each page. The internal pages have a maximum of two clicks away from the home page.

The use of a side menu is a good feature and can help visitors easily find their way around.

The consistency of the side menu have given clarity and a visual appeal throughout the site

The use of buttons or dividers between the links has greatly improved the visual appeal. The choice of font on the menus makes them easier to read. On the whole navigation around the site is easy and has a sustaining experience due to the clarity, colour, consistency of element placements and fonts used.

**k. Search Box**

A search box improves the usability of your website. For an institution it is important to ensure users are able to find information with ease. The inclusion of a search box has improved the functionality of the site

**l. Interactivity**

Tools and features that involve the visitor and encourage feedback and repeat visits is seen on the site. The use of online forms for contact requests or general inquiries is very

commendable and promotes interactivity. Online forms lead the visitor in providing the required information by the website owner and make contact quick and easy. The use of a form completion response page allows the visitor to receive confirmation that their message was sent. The feedback forms can also increase visitor involvement and provide useful information.

**m. Functionality/ Cross-platform/browser compatibility**

Every component of a website should work quickly and correctly. Broken or poorly constructed components will only leave your visitors frustrated and disillusioned on the site. Across the spectrum, everything on the site works as expected, including hyperlinks, contact forms, site search, event registration, and so on.

Different browsers often have different rules for displaying content. After testing the site on the latest versions of Internet Explorer (currently, versions 6 and 7), as well as Firefox and Safari, the site checked out well.

**n. Conclusions**

A good website is an asset for any organization. A Well-organized, edited, and timely original content set in an attractive, interactive, and consistent format are some traits of great Web sites. The site for the African Art and Culture Section and the Department at large has successfully exhibited excellence in all the parameters the researcher used in the evaluation of the site. Hence the site is successful and ready for hosting on an active remote server to start serving the department.

### 4.3.2 Testing and Evaluation – Interactive Disc of Arts and Culture - IDAC

Since the IDAC is a web based application, the majority of parameters used in the evaluation of the website were consistent to the evaluation of the IDAC. However due to the specific nature of the IDAC the researcher concentrated on the following parameters which are more pertinent to the achievement of the objectives of the IDAC.

They included:

a. Content/ Application target and purpose effectiveness Overall layout and design (Appearance)

b. Overall layout and design (Appearance) / Navigation and Structure:

c. Usability / Interactivity

d. Overall recommendations and conclusions

**a. Content/ Application target and purpose effectiveness (effectiveness of the site in meeting the goals for which it was made.)**

The content of the IDAC were specific to the various categories of Art with external links which will help the user acquire more information on the selected category online. This feature comes highly recommended by the head of the Art History Section. The content on the IDAC is neatly organized with a solid consistency.

The application's goals as defined by the user: The IDAC contains all the information required to accomplish the goals and the purpose for which it was developed. The credibility of the information therein is also guaranteed.

**b. Overall layout and design (Appearance) / Prominent, logical navigation Structure**

The overall Layout and design in terms of the principles and elements of design are positively adhered to by the researcher. The use of graphics and placement of elements on the activity area is harmonizing and has an appealing effect. Text used is also clear with recommended font family and sizes. In sum the overall appearance of the IDAC is successful in all sense of the word.

Web based applications must be easy to read, navigate, and understand. The navigation structure is bold, few, effectively placed and straight to the point. There are few clicks on each page of the application which is good in helping the user find his or her way easily on the application. Hence making the use of the IDAC pleasant and resourceful to the user since the user do not have to hunt for information on the application.

**c. Usability / Interactivity**

A critical, but often overlooked component of any web based application is its degree of usability.

**d. Some key usability elements evaluated by the researcher include**

Simplicity: The best way to keep visitors glued to the application is through valuable content, good organization and attractive design. The application is simple and well organized with consistent layout; Layout is extremely important for usability. Use a consistent layout and repeat certain elements throughout application.

Screen Resolution: Screen resolution for the typical computer monitor continues to increase. Today, the average web surfer uses a resolution of 1024 x 768 pixels. The

resolution of the application (900px by 700px) makes it safe for older monitors to have a good display of the application.

### e. Conclusions

The application has a lot of interactivity with the way information is sent and received by the user. Animations on the pages also allow the user to enjoy the use of the application. Slide shows allow the user to have clear view of slides if the user has any associability issue relating to on screen display.

#### 4.3.2.1 Features and application manual of the IDAC

The first stage of the application after it has been launched is the splash screen which states the name and author of the application. It also provides a link (Enter CD) which takes the user to the home page of the application.

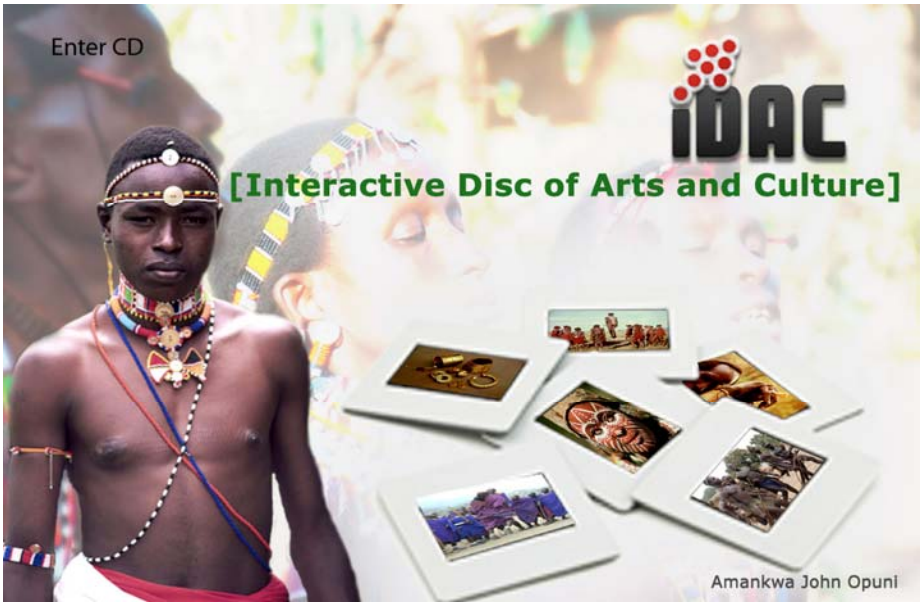


Fig. 5.1 A screen capture of Splash Screen - IDAC
*Source of image: by the researcher*

### 4.3.2.2 Introduction to the Home Interface

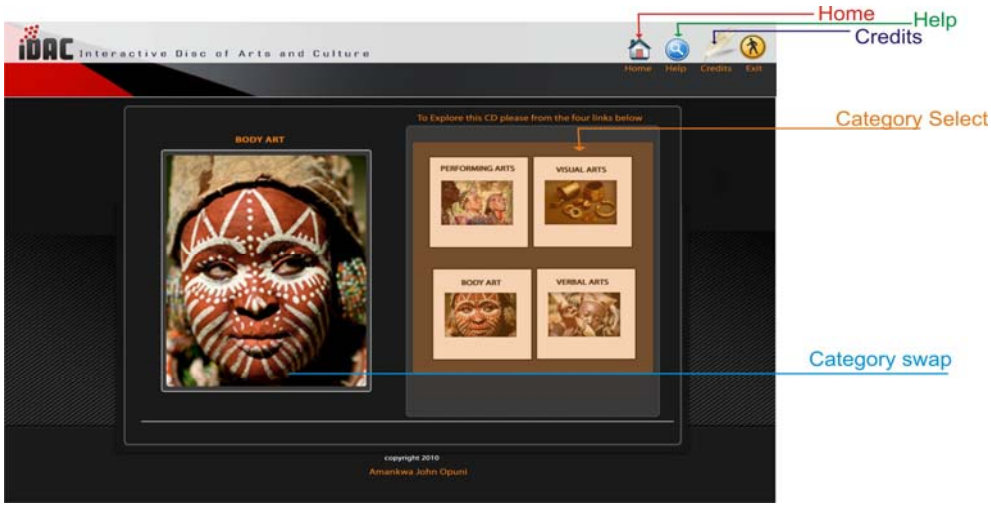


Fig. 5.3 A screen capture of "Home" - IDAC
*Source of image: by the researcher*

a. **Home:** the default startup page of the application (IDAC) where the user can begin to browse/explore the entire contents of the application.

b. **Help:** The help is intended to provide additional guidance to the use of the IDAC and also streamline the efforts of the initial application user tutorials.

c. **Credits:** Acknowledges resources and people who helped the researcher in the development of the application.

d. **Category Select:** this is the where the user selects which category of slides of interest. Whether Performing Arts, Visual Arts, Body Art and Verbal Arts.

e. After the splash screen, comes the "Category" page where the user can select which category of Art is of interest to the user.

#### 4.3.2.3 Selected Category home page screen

Below, Fig. 5.3 is the default interface of a selected category. To the left is a scroll up and down panel and by clicking on either the thumbnail images or the expanded view takes the user to the slideshow view which also carries a brief description of the image and its source.

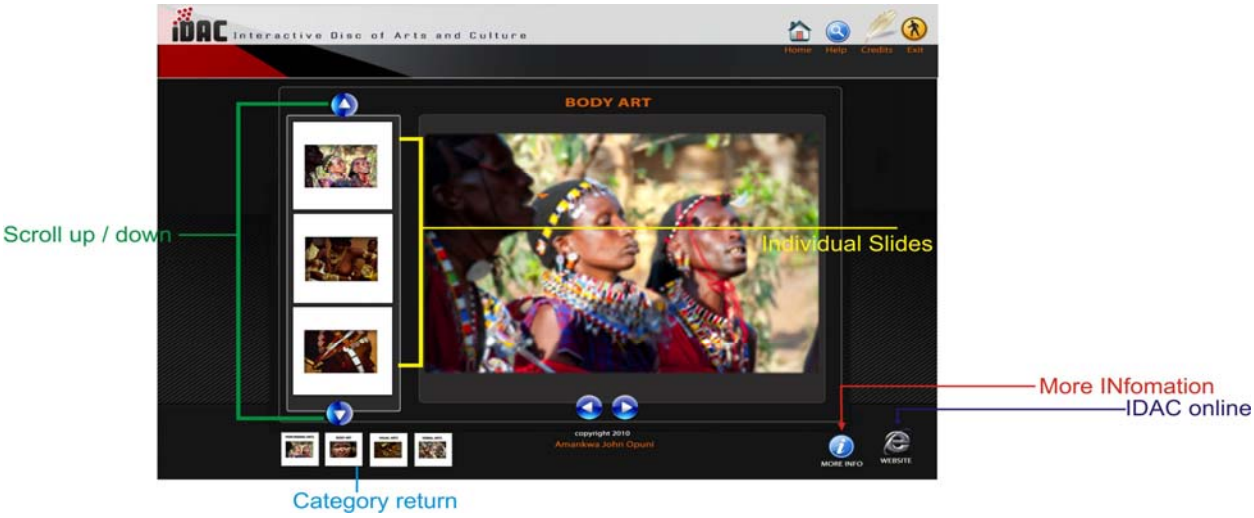


Fig. 5.4 A screen capture of "Category Home" - IDAC
*Source of image: by the researcher*

Additional features such as "More information" and "IDAC online" maximizes the interactivity of the application; more Information links the user to other useful research sites and further information can be retrieved on the various Art forms as well as the interested category.

IDAC online; send the user to the official web page of the IDAC application where available updates of the application can be downloaded onto the local host of the application.

**Slide show view –IDAC**

Fig. 5.5 A screen capture of "slide view of Category" - IDAC
*Source of image: by the researcher*

The researcher would like to acknowledge that each category of art selected is preceded by a brief documentation of what that category is and about. This feature is intended to streamline the efficiency of the application in educating the user on the subject of interest as far as the IDAC is concerned.

## 5.6 Website details and features

The website designed can be accessed online using this URL; http://www.opunimaproject.com.

Some the features the site offers include: Forum, events, calendar, online gallery, alumni response forms, feedback, requests for enquiries, research resources, lecturers, emails and

profiles, etc. All these features mentioned are interactive initiatives which are meant to make the website fully dynamic, functional and more importantly to achieve the objective for which it was developed.

### 4.4 Impact of the project

As stated above, the project captured a large amount of technical information alongside content information for IDAC as a digital resource and the website as an ICT initiative. Web application usability studies are not so encouraging in most tertiary educational institutions in Ghana. This paper therefore throws more light and serve as a streamliner for institutions interested in improving the usability and interactivity of their web based applications as well as those considering conducting web application usability research.

The IDAC and the website will be of significant use to other resource aggregators such as the KNUST repository and Site which is a reliable source of information that other applications, such as portals, can freely access through machine-to-machine protocols, to enhance information discovery and retrieval.

Once the IDAC is incorporated into Section, the data gathered will have an impact on the level of progress students will make in the programme and hopefully encourage other departments to provide similar service to their teaching staff and students. Specific lessons learned throughout the duration of the project are detailed below.

Major lessons learned which will be of use to other similar projects can be summarised as follows: It is extremely time-consuming to discover this level of detail about collection content and infrastructure without direct contact with collection owners.

Digital content provision is a fast-moving and non-static field in terms of both content and management.

# CHAPTER FIVE

# SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Conclusions

This research has identified critical lapses associated to the lack of efficient preservation strategies of slides and the marginalization of ICT initiative in higher educational institutions. Discussions of the causes of these lapses have been addressed and possible interventions to the alleviation as well as management of these lapses have been looked into. Digitization has come to stay and the way forward in the sustainability of intellectual resources is to embrace new and modern preservation strategies that facilitate the efforts of instructional media resources. The IDAC initiative has been a challenge to the researcher right from the concept development stage through to the finishing and packaging of the application. The website development has also been a handful, however the philosophy of the researcher is established in how the union of ICT and digital preservation can bring about significant progress in the way art is perceived and studied in tertiary institutions, hence specifically the scope or limitations of the researcher. The digitization of the slides alone did not address the entire sustainability issue but the packaging of the digital images into an interactive instructional material extends the possibilities of the initiative into great incentive for the study of Art of Africa. This research has been a success hence a commendable step in the way forward in educational technology.

## 5.2 Recommendations

Global trends in the application of ICTs demonstrate that the power of ICTs can transform the several interconnected functions of universities. ICT offers the potential to strengthen conventional education while rapidly transforming distance education. Despite the prevalent nature of ICT in virtually every aspect of human endeavors, they have not been widely integrated into the teaching and learning process in schools. Their integration will not only revolutionize teaching in tertiary institutions, they will engender the development of students' innate scientific inquiry mind and their critical thinking abilities.

There is the need to sensitise and encourage lecturers towards computer literacy because when this is done, the success of integration of computer education into school will be guaranteed. The tertiary education curriculum should be reviewed to reflect more practical courses in ICT for in-service lecturers as well as research students of the department and the university at large.

The researcher also strongly recommends that frequent workshops/seminar be organised specifically for the purpose of facilitating digital preservation strategies, awareness and skills in the use of ICT in lecturing which will go a long way to greatly improve their condition efficiency as lecturers.

The department needs to be well equipped with adequately functional and well-furnished computer laboratory with internet connectivity for lecturers and students to use. This will promote cyber rapport and effective research activities at the Department.

Intermediate computer literacy should be one of the pre-requisites for admitting postgraduate students into the department. This is to raise the stakes of academic activities at the department and also make the efforts of the lecturers at the department less rigorous. It will also improve upon the use of modern instructional media technologies at the department.

New lecturers must be trained to develop the needed skills in the use of ICTs and to develop positive attitude towards their use for teaching and research while old lecturers should be encouraged to have basic knowledge in computer applications

The researcher recommends that lecturers of both Sections of the department thus African Art and Culture and Art Education, be trained in digital preservation strategies and how these strategies can be incorporated into their individual curricula for the long term sustainability of art forms.

A comprehensive assessment of the research methodology programme at the Department needs to be made and ICT courses related to advanced research activities to enhance the programme. This will significantly improve the quality of research work at the Department.

In enhancing instructional competence in higher education, Special and advanced techniques are needed for the preparation of instructional materials. Interactive digital initiatives need to be encouraged at the department with qualified instructors of ICT to be employed to augment the efforts of the teaching staff. The need for assistance in the design and development of multimedia courses and the evaluation of ICT initiatives is very crucial and has to be encouraged by authorities who implement policies in the universities.

Multimedia management programmes at the elementary stage of the postgraduate programmes at the section needs to be considered in an effort to promote the use of interactive technologies at the department.

The nation's future partly depends on the quality of the output of its higher education efforts. The professionals and experts trained in our tertiary institutions in Ghana are the reflection of the quality of the systems that produced them. It is therefore imperative that the instructional systems within the tertiary level institutions should be modernized and improved in terms of infrastructure and logistics coupled with professionalism. This can best be achieved through adequate support, in terms of resources and programmes for the lecturers in their teaching and research activities. Such resources and programmes are aimed at improving the instructional sub-system required to properly equip and specialize academic departments within the institutions with the requisite resources to boost their potentials as agents of development in Ghana.

It is therefore recommended that all universities should develop appropriate steps to establish and establish special 'Open digital resource centers' which have the function of assisting students/lecturers in their academic/pedagogic functions. The objectives of such units should include the following; Art oriented computer Training of Art lecturers in higher educational institutions in skills required for effective tutoring of art and culture of Africa.

Faculties in the Faculty of Art should set up educational websites; the low usability indices coupled with vulnerabilities to being spoon-fed reveal that educational websites require varying degrees of improvements in terms of interactivity, content and functionality to bring their usability level to acceptable standards. It is recommended that the download speed also has to be improved in order to improve usability and allow access to information on these sites especially from other parts of the world.

To enhance usage of websites among the target audiences, the researcher recommends that higher institution websites need to reduce the amount of information on a page in order to minimize the need for scrolling. This is because information-packed and lengthy pages come as disadvantages for a lot of users. This is because most average users dislike scrolling, miss information when scrolling and may not notice information they need during scrolling.

Furthermore websites also have to be efficiently secured to prevent or reduce online fraud and abuse. All the recommendations stated by the researcher can be very instrumental in

the development and sustainability of excellence in tertiary institutions offered all across the nation.

Finally the researcher recommends that the Section adopts the IDAC initiative as an instructional media tool and grant all the necessary support for upgrade and development to improve upon the way art and culture is taught and appreciated at the Department of General Art Studies, as well as the entire Faculty of Art in this University.

Additionally, it is recommended that structures are put in place that allow the teaching staff and students to make maximum use of the information and communication technologies that are already provided through the Network Operations Center (NOC), KNUST. This will serve as an aggregation tool aimed at boosting reference resources for research activities.

## REFERENCES


Anderson, J. (2005) IT, e-learning and teacher development: International Education Journal, ERC2004 Special Issue, 2005, 5(5), 1-14. ISSN 1443-1475 Retrieved 6/17/2009 from http://ehlt.flinders.edu.au/education/iej/articles/v5n5/anderson/paper.pdf

Annan, K. (2001). Launching Information and Communication Technology (ICT) Task Force: Secretary General Appeals for Support from Private Sector. Retrieved 10/7/2009 from http://www.unis.unvienna.org/unis/pressrels/2001/sgsm8037.html

Arora, R. (2002). Implementing a balanced score card approach", Journal of Knowledge Management, Vol. 6 No.3, pp.240-9 Retrieved from http://www.emeraldinsight.com/journals.htm?articleid=1464867&show=pdf

Baker, M., Keeton, K. & Martin, S. (June 27 2005). Why Traditional Storage Systems Don't Help Us Save Stuff Forever Retrieved from http://digitalpreservationstrategies.blogspot.com/

Besek, J.M., et al. (2008). International study on the impact of copyright law on digital preservation. Retrieved 19 September, 2008, from http://www.digitalpreservation.gov/library/resources/pubs/docs/digital_preservation_final_report2008.pdf

Becker, C. et al (2007). Long-Term Preservation of Electronic Theses and Dissertations: A Case Study in Preservation Planning Retrieved 20/4/ 2010 from http://rcdl2007.pereslavl.ru/papers/paper_22_v2.pdf

Cosgrove, J., Zastrutzki, S., & Gerry, S. (2005). A Survey of Ict in Post-Primary Schools : The Irish Journal of Education / Iris Eireannach an Oideachais, Vol. 36, (2005), pp. 25-48 Retrieved 04/05/2009 from http://www.jstor.org/stable/30077502

Cox, M. et al. (2003). ICT and Attainment: A Review of the Research Literature. ICT in Schools Research and Evaluation UK: Department for Education and Skills and British Educational Communications and Technology Agency (Becta). Retrieved 02/03/2009, from http://www.becta.org.uk/page_documents/research/ict_attainment_summary.pdf

Clifford, L. (2009). Accessibility and Integrity of Networked Information Collections (Office of Technology Assessment, Congress of the United States, July 5, 1993; 107 pp.), p. 68.

Dunmill, M., & Arslanagic, A. (2006). Ict in arts education, a literature review: Commissioned by the New Zealand Ministry of Education Retrieved 5/12/2009 from http://artsonline.tki.org.nz/documents/ICTinArtsEducationALiteratureReview.pdf

Definition- ICT (2010) Retrieved from http://searchciomidmarket.techtarget.com/sDefinition/0,,sid183_gci928405,00.html

Jagboro, K.O. (2003, February). A study of Internet usage in Nigerian universities: A case study of Obafemi Awolowo University, Ile-Ife, Retrieved 04/05/2009 from http://portal.unesco.org/fr/ev.phpURL_ID=10297&URL_DO=DO_PRINTPAGE&URL_SECTION=201.html

Development using Information and Communication Technology (IJEDICT), 2007, Vol. 3, Issue 1, pp. 5-22. Retrieved from http://ijedict.dec.uwi.edu/include/getdoc.php?id=2194&article=241&mode=pdf

Global Information Technology Report 2004-2005, Retrieved 4/2/2010 from http://www.cosmoworlds.com/photobase/world_economic_forum/global_information_technology_report_2004-2005.htm

Hawkins, R. J. (2008, Feb 20). Ten Lessons for ICT and Education in the Developing World, Retrieved 5/22/2010 from http://www.cid.harvard.edu/archive/cr/pdf/gitrr2002_ch04.pdf

Herselman, M. (2003). Using ICT in Tertiary Education - Do We Dare To Compare? ; Proceedings of the 16th Annual NACCQ, Palmerston North New Zealand July, 2003 (eds) Mann, S. and Williamson, A. www.naccq.ac.nz retrieved 24/ 03/ 2010 from http://www.naccq.ac.nz/conferences/2003/papers/389.pdf

Hepp, P., Hinostraza, E., Laval, E. & Rehbein, L. (2004) Technology in Schools: Education, ICT and the Knowledge Society, Temuco: Instituto de Informática Educativa.

ICTs in Education (UNESCO) Retrieved from http://portal.unesco.org/education/ev.php?URL_ID=18613&URL_DO=DO_TOPIC&URL_SECTION=201

ILI (2003), Summary of 1st Meeting of University and Technology-for-Literacy/Basic Education Partnership in South Africa (UTLP-SA), UNISA, 6 December 2002. Retrieved from http://literacy.org/products/ili/webdocs/UTLPprog2003.html

Jain, P. (2006) "Empowering Africa's development using ICT in a knowledge management approach", Electronic Library, The, Vol. 24 Iss: 1, pp.51 – 67 Retrieved from http://www.emeraldinsight.com/journals.htm?articleid=1541960&show=html

Lee, K. H., Slattery, O., Lu, R., Tang, X. & McCrary, V. (2002).The State of the Art and Practice in Digital Preservation Retrieved from http://nvl.nist.gov/pub/nistpubs/jres/107/1/j71lee.pdf

Leiner, B. M., et al. (2010).A brief history of the Internet. Retrieved 5/22/2010 from http://www.isoc.org/internet/history/brief.shtml

Lee, S. (2001). Digitization: Is It Worth It? Retrieved from http://www.infotoday.com/cilmag/may01/lee.htm

Mallard, T. (2003). Digital Horizons: Learning Through ICT: A strategy for schools 2002–2004, Ministry of Education, Wellington, 2003, p. 2

Ross, S. and Gow, A. (1999) 'Digital Archaeology: Rescuing Neglected and Damaged Data Resources: a JISC/NPO Study within Electronic Libraries (eLib) Programme on the Preservation of Electronic Materials' (London: Library Information Technology Centre) Retrieved from www.ukoln.ac.uk/services/elib/papers/supporting/pdf/p2.pdf

Ross, H. (2007) briefing paper: Professional development in digital preservation: a life-long requirement. Retrieved from http://www.digitalpreservationeurope.eu/publications/professional_development.pdf

Smith, A. (1999). Why digitize. Retrieved 6/2/2010 http://www.clir.org/pubs/reports/pub80-smith/pub80.html

Walsh, K. (2009) IcT's About Learning: Summary Practitionare Enquiry Report: School leadership and the effective integration of information and communications technology: Retrieved 20/3/ 2010 from http://www1.nationalcollege.org.uk/download?id=17177&filename=enchanted-headteachers-summary.pdf

White, G. (2005). Beyond the Horseless Carriage: Harnessing the potential of ICT in education and training Retrieved 10/15/2010 from http://educationau.edu.au/sites/default/files/horseless_carriages_GW.pdf

Wims, P, & Lawler, M. (2007) Investing in ICTs in educational institutions in developing countries: An evaluation of their impact in Kenya. International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2007, Vol. 3, Issue 1, pp. 5-22. Retrieved from http://ijedict.dec.uwi.edu/include/getdoc.php?id=2194&article=241&mode=pdf

Wims, P. & Lawler, M. (2007). Investing in ICTs in educational institutions in developing countries: An evaluation of their impact in Kenya : International Journal of Education and Leach, J. (2003) "DEEP Impact: Teachers and Technology" ID21 Insights Communicating Development Research, Insights Education Issue # 1. Retrieved 10/12/2009 from http://www.id21.org/insights/insights-ed01/insights-issed01-art01.html