

**EVALUATING STUDENTS' ELECTRONIC RECORDS MANAGEMENT PRACTICES  
AT JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY,  
KENYA**

**BY**

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### DECLARATION

I do hereby declare that this research thesis is my original work and has not been submitted in part or other form for examination in any other university.

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## **DEDICATION**

This work is dedicated to my wife Dorcas, our children: Jerop, Kibet, and Kimutai for their support, patience and encouragement throughout the entire course.

## ABSTRACT

The Jomo Kenyatta University of Agriculture and Technology operates a student's electronic records section which is a source of student's information as may be required on each student. The information is provided by various departments of the university including admission, students finance, catering and accommodation, examination, health services, library and other academic departments. The section is manned by system administrators at the different departmental points. These records are vital for the management of each student's academic/nonacademic affairs. However, according to anecdotal evidence, the university faces numerous challenges with respect to effectiveness and efficiency of the section. The challenges include loss of student's marks, fraud in fee payment, and loss of library books. The aim of this study was to investigate students' electronic records management practices at the university with a view to enhancing them. The objectives of the study were: to find out diversity of the electronic records that is generated on each student; to establish the policy framework that guides students' electronic records captured; to find out how the electronic records are managed from creation to disposition; to establish the challenges facing the management of electronic records; and to suggest ways in which challenges facing the student's electronic records management can be addressed. The study adopted a case study research design within a mixed methods research approach. The staff in the departments concerned with students' affairs at JKUAT constituted the population for this study. Probability sampling method was applied to select departments that took part in the study. Purposive sampling was then applied to draw the participants from the departments selected. From an aggregate population of 312 staff members, 36 members were drawn to form the final sample size for this study. This figure (36) was arrived at, through the use of Israel's (1992) sample calculation formula. The data collection method used was interview and administration of questionnaire. The data collection instruments used were interview schedules and self-administered questionnaires. The quantitative data was analyzed using simple descriptive statistics such as frequencies and percentages. Qualitative data collected were analyzed using thematic descriptions. The findings of the study showed that majority of the students' records generated were in electronic formats and ranged from academic reports, school fees reports, attendance and admission records to name but a few. At the time of the study, JKUAT did not have a policy guiding the management of students' electronic records. This meant that the management of these records was below acceptable standards as was seen through a myriad of challenges faced including but not limited to insecurity, data loss and storage inadequacies. The study therefore concluded that students' electronic records were not properly managed at JKUAT. Consequently, the study made the following recommendations: The university management should develop a students' electronic records management policy; the records managers should adhere to standard procedures as spelt out in the Records Continuum Theory; and that the staff should be retooled in order to acquire the requisite skills so as to manage the students' electronic records properly.

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## LIST OF ABBREVIATIONS AND ACRONYMS

<b>ACARM:</b>	The Association of Commonwealth Archivists and Records Managers
<b>ACCIS:</b>	Advisory Committee for the Co-ordination of Information Systems
<b>ADF:</b>	African Development Fund
<b>Arcinfo:</b>	A <i>command line based GIS system for manipulating data</i>
<b>ArcSDE:</b>	Spatial Database Engine
<b>CGSB:</b>	Canadian General Standards Board
<b>DBF:</b>	Diploma in Banking and Finance
<b>DGN:</b>	Design (file); DGN, MicroStation Design
<b>DVD:</b>	Digital versatile disc
<b>ERM:</b>	Electronic Records Management
<b>ESARBICA:</b>	Eastern and Southern Africa Regional Branch of the International Council of Archives
<b>ESRI:</b>	Environmental Systems Research Institute
<b>GeoTIFF:</b>	Geographic Tagged Image File Format,
<b>ICT:</b>	Information Communication Technology
<b>IRMT:</b>	International Records Management Trust
<b>ISO:</b>	International Organization for Standardization
<b>JISC:</b>	Joint Information Systems Committee
<b>JKUAT</b> -----	Jomo Kenyatta University of Agriculture and Technology
<b>KNADS:</b>	Kenya National Archives and Documentation Services
<b>KNLS:</b>	Kenya National Library Service

## LIST OF DEFINITION OF OPERATIONAL TERMS

**MYSQL**

**NARA** -----National Archives and Records Administration

**RM** -----Records Management

**RMS**-----Records Management Systems

**TP**-----Technical Panel

**WWW**-----World Wide Web

**Data management** – Organizing, storing, protecting, and maintaining data throughout its lifecycle. Effective data management is essential for organizations to make informed decisions, improve operational efficiency, and comply with regulations.

**Data management framework** – Establishing policies and procedures for managing university data, including defining data ownership, roles and responsibilities, and ensuring compliance with regulatory requirements.

**Electronic record**- information created, generated, transmitted or stored in digital form or analog form and also those on visual and aural media such as voicemail systems, DVDs, videotapes and cassette tapes.

**Electronic Records keeping System (ERS)**-software-based methodology used by an organization to manage all its records, regardless of format, over the entire record's lifecycle.

**Electronic Records keeping**-the use of records management principles for records maintained electronically.

**Microforms** - Any forms, either films or paper, containing micro reproductions of documents for transmission, storage, reading, and printing.

**Record**- papers, photographic, maps or other documentary materials, regardless of physical form, made or received for legal and operational purposes in connection with the transaction of business.

**Records management**- control of the creation, receipt, maintenance, use and disposition of records, including processes for capturing and maintaining evidence of and information about business activities and transactions

**Zip discs** - Type of removable disk storage capable of holding a moderate amount of computer information.

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## **CHAPTER ONE**

### **INTRODUCTION AND BACKGROUND INFORMATION**

#### **1.1 Introduction**

This chapter introduces the focus of the study and gives a context the area of study which is Jomo Kenyatta University of Agriculture and Technology. Further the chapter provides a statement of the problem, objectives of the study, research questions and assumptions of the study. The chapter also discusses the scope and limitations of the study, significance of the study, and definition of the terms.

#### **1.2 Background of the Study**

During the past decade, records management practices in most public institutions have been revolutionized (Asogwa, 2012). New information technologies from mainframes, to PCs, to local area networks and the Internet have transformed the way public institutions create, use, disseminate, and store information. Most organizations have integrated paper-based and electronic information systems thus creating a complex information management environment. This often leads to poor management and preservation of records (Touray, 2021).

Records are a valuable business asset. One of the key ways organizations are held accountable for their actions is through evidence of business transactions in the form of records. Records are ‘information created, received, and maintained as evidence, by an organization or person, in pursuance of legal obligations or in the transaction of business (ISO, 2016).



According to the Public Archives and Documentation Services Act, Cap 19 of the laws of Kenya, records also include materials in written or other forms setting out facts or events or otherwise recording information and includes papers, documents, registers, printed materials, books, maps, plans, drawings, photographs, microfilms, cinematograph films, sound recordings, electronically produced records regardless of physical form or characteristics and any copy. Electronic records management practices uniquely capture, classify and identify records to ensure that their content, structure and context of creation are fixed in time and space. These records management processes facilitate the making of complete, authentic and usable records.

The management of electronic records is a topical subject of discussion among managers worldwide. It is in this light that the US National Archives and Records Administration (NARA) Advisory Committee for the Co-ordination of Information Systems (ACCIS) (2003) established a technical panel on electronic records management (TP/ERM) whose aim was to: develop guidelines for the implementation of electronic records management policies; identify and describe standards that could facilitate effective utilization of new technologies; and facilitate coherent and integrated process between paper-based and e-records.

Management of e-records has been a subject of ongoing discussions at various fora. For example, discussions at the global forum held in Johannesburg, South Africa, 27-31 January 2003, highlighted the need for collaborative action in managing electronic records in relation to electronic government requirements. The discussion was followed by a study

of e-records management practices involving various commonwealth countries drawn from Africa, Asia, the Caribbean and the Pacific (Katuu, 2004).

The study by Nengomasha (2009) revealed that the poor culture of managing paper records had been transferred to the management of electronic records. Ngoepe and Van der Walt (2009) established poor records management in the South African public sector. IRMT (2011) established that Kenya faces many challenges with regard to records management, including lack of policies and guidelines relating to management of electronic records, inadequate records management trained personnel, inadequate financial resources, and lack of good will from senior management staff.

The same challenges face institutions of higher learning in Kenya. Chinyemba and Ngulube (2005) established that records management practices in the University of KwaZulu-Natal in South Africa was unsatisfactory. In particular, they established that the personnel charged with managing records lacked formal qualification in records management. Iwhiwhu (2005) established that Nigerian universities lacked qualified records management staff and consequently their records were managed by staff who had little or no knowledge of records management practices. A study by Nasieku et al., (2011) established that management of e-records at Moi University was unsatisfactory. In particular, records management policies were lacking, personnel were not adequately trained, while management of e-records was not well coordinated. With this background, it becomes necessary to evaluate the electronic records management practices in Kenyan universities, using the Jomo Kenyatta University of Agriculture and Technology as a case study.

### **1.3 Context of the Study Area**

Organizations including public institutions are accountable in many ways to meet legal, regulatory and fiscal requirements, undergo audits and inspections or provide explanations for what was done (Shepherd and Yeo 2003). Government institutions including universities ought to adhere to proper records management practices in order to ensure good public service delivery.

#### **1.3.1 Jomo Kenyatta University of Agriculture and Technology**

The university was established in 1981 as Jomo Kenyatta College of Agriculture and Technology (JKCAT), a middle level college, by the Government of Kenya with the assistance of the Japanese Government. Plans for the establishment of JKCAT started in 1977. In early 1978, the Kenyan president, Jomo Kenyatta, donated two hundred hectares of farmland for the establishment of the college (Kisaka & Okibo 2014).

The first group of students was admitted on 4th May 1981. President Daniel Arap Moi formally opened JKCAT on 17th March 1982. The first graduation ceremony was held in April 1984 with diploma certificates presented to graduates in agricultural engineering, food technology and horticulture. On 1st September 1988, President Daniel Arap Moi, declared JKCAT a constituent college of Kenyatta University through a legal notice, under the Kenyatta University Act (CAP 210C).

Consequently, its name was changed to Jomo Kenyatta University College of Agriculture and Technology (JKUCAT). It was finally established as a University through the JKUAT Act, 1994 and inaugurated on 7th December 1994 (Kisaka & Okibo 2014).

Currently, Jomo Kenyatta University of Agriculture and Technology has about 54,000 students in the following campuses, schools, faculties, institutes and colleges:

- a) School of Postgraduate Studies
- b) Faculty of Agriculture
- c) Faculty of Science
- d) Institute of Biotechnology Research
- e) Institute of Computer Science and Information Technology
- f) Institute of Energy and Environment Technology
- g) Institute of Tropical Medicine and Infectious Diseases
- h) School of Architecture and Building Sciences
- i) School of Human Resource Development
- j) School of Civil, Environmental and Geospatial Engineering
- k) School of Electrical, Electronic and Information Engineering
- l) School of Mechanical, Manufacturing and Materials Engineering

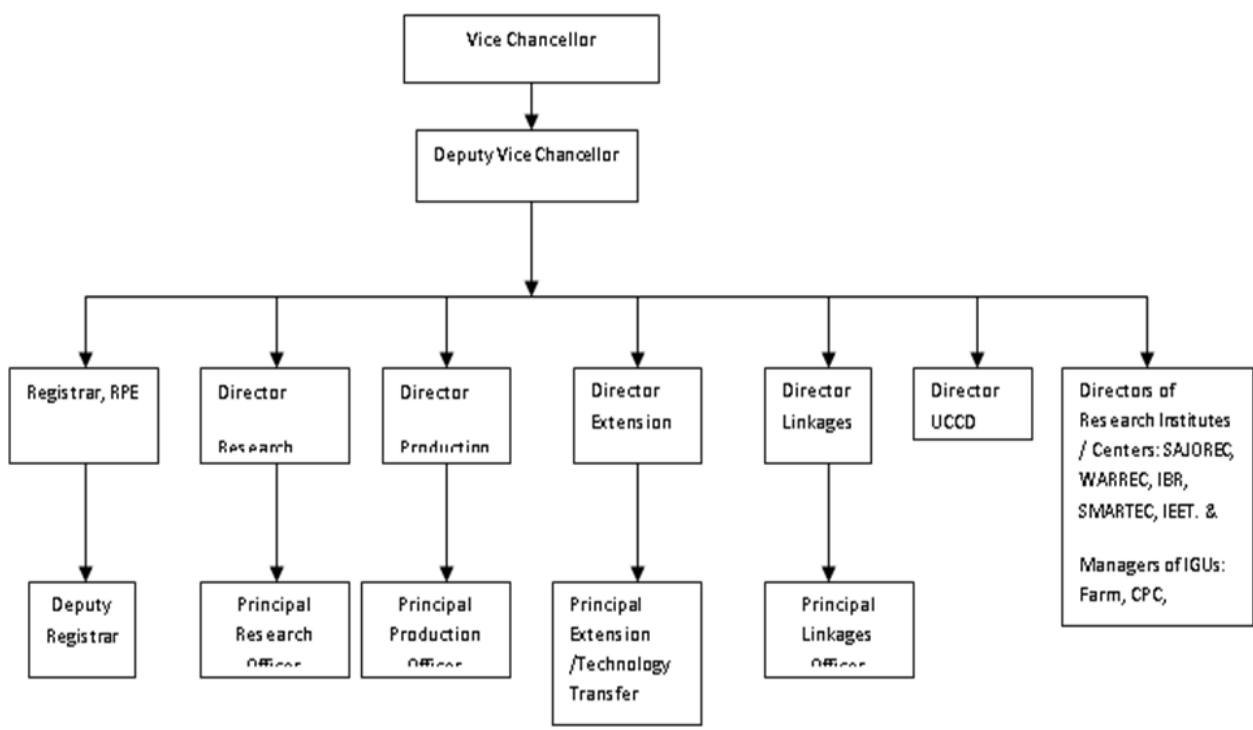
The number of students and staff and the programs and courses offered would generate a wide variety of records. It follows therefore that records representing most business transactions are generated from faculties, schools, senate, council, student affairs and administrative departments including personnel and planning. These records are maintained in various registries that are focal points with regard to records management activities in the university, and the information flows from top down and vice versa as shown in the organogram structure (fig 1.1) below:-

The objectives of the registries as outlined in the charter is to: manage records created in the course of business; provide a communication framework between the university and

students, staff, graduates and external agencies; and facilitate conservation and access to records in the university. Most records are paper-based. Besides, electronic records are generated through e-mail, Internet content, spreadsheets, databases, digitally recorded images, e-learning, and e-mail systems. This development depicts a tremendous increase in generation of e-records, a scenario that inevitably poses great concern in electronic records management practices.

**Figure 1.1 Organogram Structure**

*JKU/2/4/099*



The above organogram (Fig 1.1) is the main machinery that facilitates reporting and information flow within the university / organization which serve to equip employees (staff) with the required information needed to enable their productivity in the organization.

This is supported by Ranson, Hinings, & Greenwood (1980) in module 2 organizational structure. Every organization, including JKUAT has its aim and objectives of

establishment, which often profit maximize or benefit aid the university/societal revolution as the case of other educational institutions.

In JKUAT information flow from the top (vice chancellor) to the lower sections through respective directors/principals and vis visa as guided by the organogram.

#### **1.4 Statement of the Problem**

Jomo Kenyatta University of Agriculture and Technology (JKUAT) operates a students' electronic management system that generates all necessary information on each student. The records are generated at different service points including admission, students finance, catering and accommodation, examination, health services, library and respective academic departments. The process is controlled by system administrators at the different departmental points. Extant literature shows that proper management of organizational records is crucial for effective and efficient service delivery. With the deployment of the students' electronic records management system, it is expected that service delivery at JKUAT is quite improved. However, the University continues to face a myriad of challenges that undermine service delivery. The challenges include: missing/loss of students' marks, fraud in fee payment, and loss of library books. This is evident on Agretechnews report v48 of 2015 (corporate communication report), where academic registrar strongly emphasized that school/departmental administrators and teaching staff should record and submit students results on time to avoid students complains. It was against this background that the study sought to investigate the students' electronic records management practices in order to establish reasons for the persistent challenges. It was

hoped that the findings of the study would strengthen the students' electronic management system for enhanced service delivery at the university.

### **1.5 Aim of the study**

The aim of the study was to investigate students' electronic records management practices at the Jomo Kenyatta University of Agriculture and Technology with a view to proposing ways of enhancing the management of e-records for better service delivery at the university

### **1.6 Objectives of the Study**

The objectives of the study were:

- i. To find out the diversity of e-records generated on each student at the Jomo Kenyatta University of Agriculture and Technology;
- ii. To establish policy framework that guides how students' electronic records are managed at the Jomo Kenyatta University of Agriculture and Technology;
- iii. To examine how the captured e-records are managed from creation to disposition;
- iv. To establish challenges faced in managing students' electronic records; and
- v. To suggest strategies needed to address the challenges.

### **1.7 Research Questions**

- i. What types of e-records are generated on each student at the Jomo Kenyatta University of Agriculture and Technology and types of e-records generated?
- ii. Is there a policy framework that guides how student's electronic records are managed at the Jomo Kenyatta University of Agriculture and Technology?

- iii. How are e-records captured, managed from creation to disposal at the Jomo Kenyatta University of Agriculture and Technology?
- iv. What challenges are experienced in managing students' electronic records?
- v. What strategies could be used to address the challenges facing management of students' electronic records?

## **1.8 Significance of the Study**

The significance of any study is measured by its contribution to: research and literature; practice in the area of interest and policy formulation (Creswell, 2003).

### **1.8.1 Theoretical Significance**

The outcome of the study as per the findings and recommendations is new information that adds to the existing body of knowledge on students' electronic records management.

### **1.8.2 Practical Significance**

The study was intended to provide strategies for addressing challenges facing student's electronic records management practices at the Jomo Kenyatta University of Agriculture and Technology for purposes of improving management of electronic records. The study proffered recommendations that if implemented will improve the management of electronic records at the Jomo Kenyatta University of Agriculture and Technology and thereby enhancing service delivery to the students who are the major clients of the university.



### **1.8.3 Policy Related Significance**

The findings of the study would help policy makers develop a policy or policies which would enhance management of students' electronic records. The findings of the study established that JKUAT did not have an electronic records management policy. The study went ahead to note that for proper management of the electronic records, a policy needs to be developed. The policy makers in the university therefore would benefit from this study by realizing the need for the policy and in establishing the areas that the policy should highlight.

### **1.9 Scope of the Study**

The study majorly covered JKUAT main campus in Juja to evaluate students' electronic records management practices at the university. Despite of having satellite campuses all the respondents as guided by the bureaucratic chain of command in line with the university organogram (fig.1.1) were drawn from the main campus. This is because satellite campuses depend and rely mostly with their respective mother departments to carry out functions especially on student activities.

### **1.10 Chapter Summary**

This chapter presents the introduction and background information of the study which is deemed very important to the reader since it provides the much-needed contextual information necessary for the understanding of the area of focus. The chapter also presents the statement of the problem, the aim, objectives and scope of the study among other issues which gives a reader the thesis of the study.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter reviews what has already been done with relation to the problem being studied (Mugenda, 2003). It is based on the assumption that knowledge accumulates and that people learn from and build on what others have done (Neuman, 2006). Reviewing related literature is therefore important since the researcher gets to acquire an understanding of the topic under investigation identify related research and place the work in the context of what has already been done.

Primary and secondary sources of literature reviewed were journals, reports, dissertations, conferences papers and books. Primary sources refer to descriptions of any occurrence by an individual who actually observed or witnessed an occurrence (Mugenda, 2003). Secondary sources refer to information that was created later by someone who did not experience first-hand or participate in the events or conditions being researched.

### **2.2 Theoretical framework**

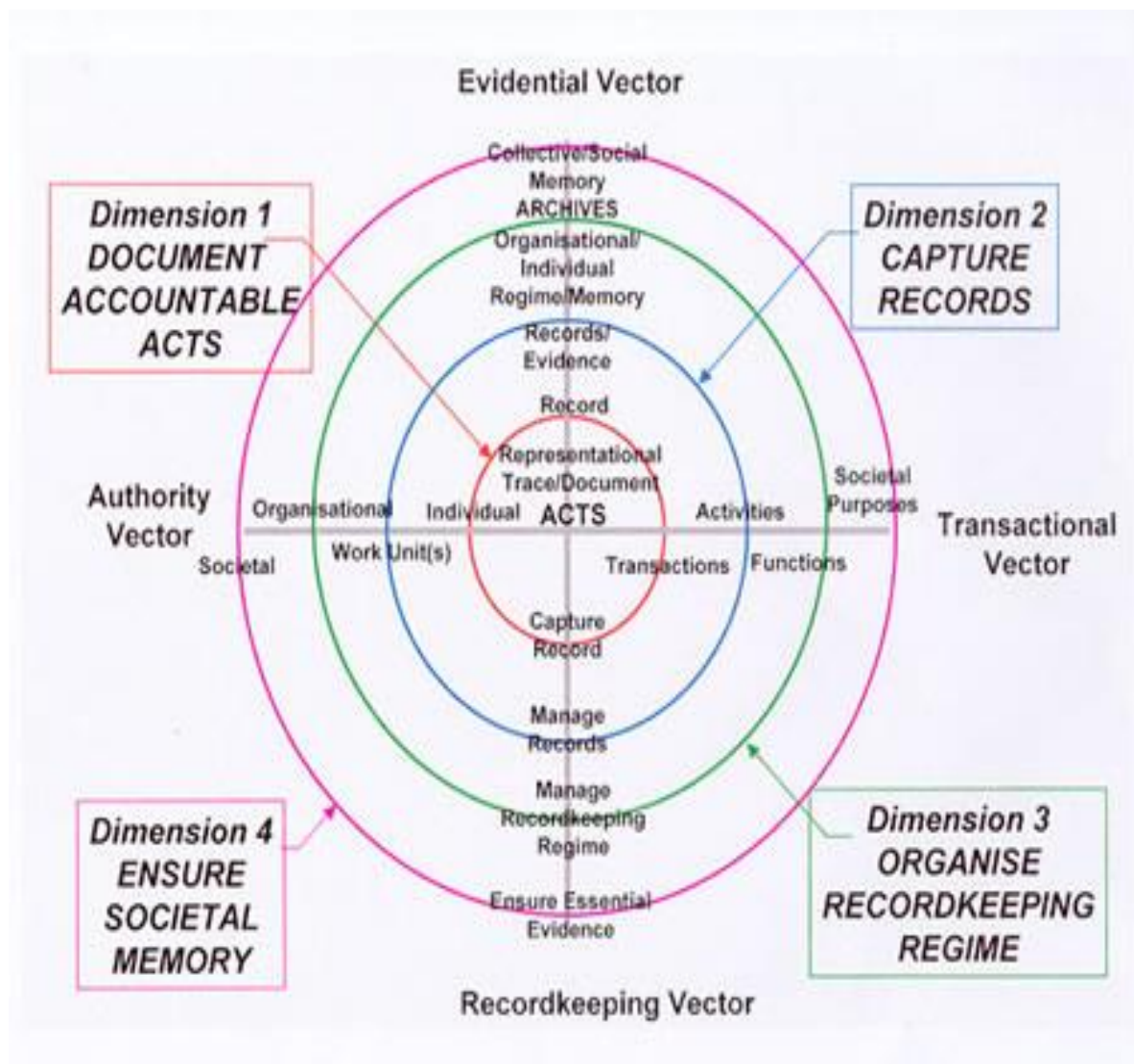
Theoretical framework is a structure that can hold or support a theory of a research study. It provides a background that supports an investigation and offers readers a justification for a particular research problem, with respect to variables intended to be measured and relationships (Mugenda and Mugenda, 2003). For this study, records continuum model was used.

### **2.2.1 Records Continuum Model (RCM)**

The Records Continuum Model was developed and adopted in Australia in 1980s (Bantin, 2002). Shepherd and Yeo (2003) stated that the Records Continuum Model was developed in response to criticism of the life-cycle models. Coetzer, (2012) stated that the separation of records management and archives administration under the life-cycle model is unsatisfactory and suggests its replacement by the Records Continuum Model with four stages namely: creation or receipt; classification; establishment of retention/ disposal; and maintenance and use. The four stages are interrelated forming a continuum in which both records officers and archivists are involved to varying degrees in the on-going management of recorded information.

According to Kemoni (2008), the Records Continuum Model has gained international acceptance as a basis for the management of records in both paper and electronic formats. The RCM has been defined in the Australian Standard for records management as a consistent and coherent regime of management processes from the time of creation of records (and even before creation in the design of recordkeeping systems) through to the preservation and use of records as archives (Flynn, 2001).

The structure of the Records Continuum Model is presented in Figure 2.2



**Figure 2.2: Records Continuum Model (Source: Upward, 2000:123)**

As presented by Frank Upward the Records Continuum Model has four dimensions: Dimension 1, Dimension 2, Dimension 3 and Dimension 4.

**Dimension 1: *Document Accountable Acts***

The whole process of RCM is defined by work activity, which is a myriad flow of individual actions, decisions, and transactions over time (Figure 2.2). Some, but certainly not all, of these acts are important enough to be worthy of documentation.

Capturing a reliable record using a recordkeeping system ensures essential evidence of such accountable acts. Thus, the document passes from Dimension One- that of general activity- into Dimension two.

**Dimension 2: *Capture records***

When a document passes from Dimension One - that of general activity - into Dimension Two, the recordkeeping system of a particular work unit transforms the data or document into a record, fixing its content, structure and context.

All of these instructions are attached to the record as metadata that will interact automatically with the recordkeeping system to achieve effective management.

**Dimension 3: *Organize recordkeeping regime***

Some accountable acts are considered important enough to warrant retaining evidence of them beyond their immediate business and regulatory use in Dimensions One and Two, to become part of the cumulative corporate memory represented by Dimension Three. The initial decision to retain is made at the time the record is captured.

However, such decisions are revisited each time the record participates in ongoing corporate business. In some cases, the initial decision is altered; some potential archives go on to become part of the corporate memory in Dimension Three; others may be judged as

of no further use and are deleted or destroyed. Thus, the third dimension is concerned with 'insider' issues to do with forming, managing and providing authorized access to the corporate memory.

**Dimension 4: *Ensure societal memory***

Dimension Four is concerned with the constitution and protection of society's collective memory in a way that crosses organizational and jurisdictional boundaries.

Ultimately, a small portion of corporate records have long term significance as documentation of the larger society, particularly those that attest to an organization's conduct of its business, the integrity of its practices and the soundness of its products and relationships with the wider community.

It has been traditional archival practice that, once records immediate business and regulatory purposes are satisfied, they are physically transferred to a central public archive for extra protection and enhanced public access. However, with the advent of electronic systems, it is increasingly common for archival materials to be managed by the originating organization, in partnership and compliance with public archival authority direction.

**2.2.3 Relevance of Continuum Model (RCM)**

The Records Continuum Model (RCM) is a theoretical framework that emphasizes the importance of managing records as a continuum, from their creation to their disposition. The RCM emphasizes that records must be managed in an integrated manner, considering the interdependence of people, processes, and systems involved in their creation, maintenance, and use (Salie, 2009).

When applied to evaluating students' electronic records management practices at Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya, the RCM can provide a useful framework for assessing the effectiveness of the university's records management practices. Specifically, the RCM can help evaluate whether the university's records management practices are aligned with the university's overall goals and objectives, and whether they adequately address the needs of students, faculty, and staff.

Moreover, the RCM can help identify gaps and areas for improvement in the university's records management practices. For example, the RCM can be used to evaluate whether the university has adequate policies, procedures, and systems in place to ensure that electronic records are created, maintained, and disposed of in accordance with legal, regulatory, and ethical requirements. It can also help identify whether students have the necessary skills and knowledge to manage their electronic records effectively, and whether the university provides adequate training and support to students in this regard. In summary, the RCM provides a useful theoretical framework for evaluating students' electronic records management practices at Jomo Kenyatta University of Agriculture and Technology, Kenya. By applying the RCM to the university's records management practices, stakeholders can gain insights into the strengths and weaknesses of the university's approach to managing electronic records, and identify opportunities for improvement (Salie, 2009).

### **2.3 Types of e-records and their formats**

A file format is usually described as either proprietary or non-proprietary. Proprietary file formats are controlled and supported by just one software developer, or can only be read by a limited number of other programs. Non-proprietary formats are supported by more than

one developer and can be accessed with different software systems. For example, RTF files can be opened in many word processing software programs. Extensible Markup Language (XML) is also becoming an increasingly popular non-proprietary format (Shepherd and Yeo, 2003).

### **2.3.1 Formats of e-records**

The three data formats are: File-based data format, directory-based data format and database connections.

**File-Based Data Format** – This type of data format includes either one file or more than one file. These files are then stored in any of the arbitrary folders. In most of the cases, it uses the single file only for example DGN. But then there are cases, which even includes at least three files. The filename extension of all these three files is different from each other. That is SHX, SHP, and DBF. All three files are important and are required here. As different tasks are performed by all these three files internally (Wilson, 2008). One uses the filename as the name of the data source. There are many layers present in it, and it is not possible to know about them just with the help of the filename. Like in shape file, there is only one data source for every shape file. And there is only one layer, which is named similarly as the name of the file. Some of the examples of file-based data format are Micro-station Design Files, Shape files, and GeoTIFF images (Davidson, 2003).

**Directory-Based Data Format** – In this type of data format, whether there is one file or there is more than one file, they are all stored in the parent folder in a particular manner. There are some cases where the requirement of an additional folder is there in the file tree in some other location so that it can be accessed easily. It is a possibility that data source is



the directory itself. There are many files present in the directory, which are represented at the available data's layers (Ryan, 2002). For example, the Polygon Data is represented by the PAL.ADF. As there is more than one file in the folder with the ADF file extension which is included in the ESRI ArcInfo Coverages. The ADF file extension includes the line string data or the arc string data. All the ADF files serve as a layer which is present in the data source inside the folder. Some of the examples of Directory-Based Data Format are US Census TIGER and ESRI ArcInfo Coverages.

Database Connections – In one respect, the database connections are quite similar to the above-mentioned data formats that are file and directory-based data format. For interpreting, for MapServer, they give geographic coordinate data (Holupirek, 2006). One needs to access the coordinates inside the MapServer, that are creating the vector datasets. The stream of coordinates that are provided by the database connections is stored temporarily in the memory. The MapServer then reads these coordinates for making the map. Coordinate Data is the most important part and most of the focus is on it only. However, one may also require tabular data and attributes. The database connection generally consists of the following information like Host that is the server's direction, Database Name, Username and Passwords, Geographic Column name, and table name or view name. A few examples of Database Connections are MySQL, ESRI, PostGIS, and ArcSDE (Kasten, 2015).

### **2.3.2 Types of e-records**

Administrative data is used to manage collections of records. Examples include the Transfer Request (TR) Number, the Record Group, the name of the person authorized to

transfer custody, among others. Descriptive data identifies and describes records. Examples include a photograph's caption, the title of a book, or the composer of a song.

Preservation data is the specialized set of information required to preserve and provide access to electronic records. Examples include the file format used to encode a file, the software necessary to view it, or an action taken to maintain it such as the results of a virus scan (Agrawal, 2004).

Technical data describes aspects of electronic records important to their proper interpretation, rendering, or playback. The type of compression used with a digital image, the audio codec contained in a digital video, or the encryption algorithm used to digitally sign an email are all examples of technical metadata (Smith, 1989). Technical metadata is frequently included as Preservation metadata as it is necessary for the maintenance of electronic records. Use Metadata includes information that describes how records can be accessed or circulated. Metadata identifying copyright status or security classification are examples of use metadata.

Data files are created in database software programs (Schaefer, 2006). Data files are divided into fields and tables that contain discrete elements of information. The software builds the relationships between these discrete elements. For example, a customer service database may contain customer name, address, and billing history fields. These fields may be organized into separate tables (e.g., one table for all student name fields). You may convert data files to a text format, but you will lose the relationships among the fields and tables. For example, if you convert the information in the customer database to text, you

may end up with ten pages of names, ten pages of addresses, and a thousand pages of billing information.

#### **2.4 Legislative and Policy Framework for Information Management**

The legislative and policy framework for data/information management plays a critical role of providing the roadmaps for the management; it becomes even more important in an electronic environment given the complexities of managing electronic records.

The University operates in a complex, data-oriented environment that requires those who are responsible for collecting, managing and disseminating data to do so in a systematic, planned and managed way. Data generated and held by the University are key assets that must be managed correctly in order to ensure that the University functions effectively. This policy outlines the data management framework that covers the roles, responsible and accountability for data collection, storage, security, maintenance, dissemination and data quality (Galala, 2013).

The fundamental step for any organization wishing to implement good Data Management procedures is to define a Data Policy (Haas, 2011). The document may have different names in different public bodies but in each it should be a set of broad, high-level principles that form the guiding framework within which Data Management can operate. This is the document that is approved at senior levels in the public body, and the senior executive who owns the policy (Data Management Champion) manages the resources for its implementation (Lorenzi, 2019).

#### **2.4.1 Policies that guide data management**

Good Data Management has become increasingly recognized in recent years and a body of legislation reflects this change in attitude. Key elements of the relevant legislation include: The Freedom of Information Act 2001 and free access to information Act of 2016 in Kenya, the Human Rights Act 1983 in Lesotho, the Data Protection Act 1984 in England and The Public Records Act 1985 in South America.

Shepherd and Yeo (2003) stated that records and archives legislation influences the development of a records management system, and would impose explicit requirements for the creation and management of records. Roper (1999) stressed that the enactment and application of comprehensive, up-to-date records and archives legislation is a critical prerequisite for the establishment of an effective, integrated system for managing records and archives throughout their life-cycle.

Existing records and archives legislation in Kenya is modelled on the British archives and records legislation. The responsibility of managing public records and archives in the Kenyan Public Service is vested in Kenya National Archives and Documentation Services (KNADS), as stipulated in the Public Archives and Documentation Service Act Cap 19 of the laws of Kenya (1965). The Act became effective on 25 January 1966. Owing to the current record keeping situation in Kenya, records and archives practitioners, educators and trainers are calling for a further review of the existing archives and records legislation so as to give record creators more responsibilities for managing their records, as opposed to the current situation, where the burden of managing public records rests with KNADS. Other researchers such as Tafor (2001), Garaba (2005) and Ngulube and Tafor (2006) established

that most archival legislations in the ESARBICA region were outdated, and they require some revision.

Previous research in Kenya established that the Public Archives and Documentation Service Act Cap 19 had certain weaknesses, and called for its revision. However, the studies did not subject Cap 19 to a strengths, weaknesses, opportunities and threats (SWOT) analysis. For example, Ombati (1996) stressed that the Public Archives and Documentation Service Act was outdated and required revision. Githaka (1996) identified the enforcement by KNADS of existing archives legislation and regulations as one of the constraints that affected the development of effective records management practices in Kenya. Kemoni (1998) established that Cap 19 had certain weaknesses, which affected the management of records in the public sector. Free Access to Information. This policy outlines the overall framework for managing data within an organization. It defines roles and responsibilities related to data stewardship, data ownership, data access, and data quality assurance. This policy categorizes data based on its sensitivity and criticality. It establishes different levels of data classification (e.g., public, internal use, confidential, highly sensitive) and determines appropriate security controls for each category. Addresses the collection, use, and disclosure of personal information. It ensures compliance with data protection laws and regulations, safeguarding individuals' privacy rights. This policy defines who can access specific data and under what circumstances. It includes rules for granting and revoking access privileges based on roles and responsibilities. This policy outlines procedures for regular data backups, offsite storage, and data recovery in case of data loss or system failures.

The management of public records in Kenya is governed by the Public Archives and Documentation Service Act, Cap 19, 1965 (Revised 2003) of the laws of Kenya. Alongside this, several rules, regulations and circulars have been issued to address effective management of records. Despite the efforts made by the Government, the state of records management in the country still remains a challenge due to lack of standardized practices and procedures. As a consequence, there is need to develop a records management policy to address the challenges.

ISO 15489: Information and Documentation - Records Management is an international standard to provide guidance on managing records in all formats or media, created or received by any public or private organization in the conduct of its activities, or any individual with a duty to create and maintain records. All the elements in the standard are to ensure that adequate records are created, captured and managed. It further determines responsibilities for the organization of records and development of records policies, procedures, systems and processes.

#### **2.4.2 Policies that Guides E-records Management**

Academic institutions such as universities have also instituted a data management policy that includes specific requirements as they pertain to the data. Data management policies are implemented in order to ensure that research data remains available and reusable over time. Currently, there is no standard framework for implementing e-records management, as these policies are applied to the specific needs of an institution rather than to a general audience overall. Programs such as JISC (formerly Joint Information Systems Committee)

and the Digital Curation Centre have taken strides to assist institutions develop a data policy framework to address these challenges.

Implementing a data sharing or management policy may require a number of steps, depending on scope of the policy being implemented. The institution issuing the policy is responsible for putting in place of the systems and procedures necessary for ensuring compliance to that policy.

Technology has eased many records management tasks and has presented some new concerns. Although paper records remain predominant in organizations, there is no doubt that record-keeping is increasingly becoming digital (Mhembere, 2019).

According to Epstein, Vigoda, & Feinstein (2007). policy seeks to facilitate standardization in the application of procedures and practices in the management of records. It takes cognizance of established laws, regulations and internationally accepted records management standards. It seeks to address the gaps and challenges that have undermined effective and efficient records management in the country. It further apportions every public service agency and its employees, responsibilities with regard to the management of records. The policy therefore lays a suitable institutional framework that would support effective management of records in the country. All public sector's policies, procedures and systems pertaining to management of records should therefore be consistent with institutional policy.

The Kenya National Archives and Documentation Service (KNADS) embarked on digitisation of selected archival materials in 2007, primarily to facilitate access to its archival holdings by the public and researchers (Mwangi 2012 & Namande 2011).

Emphasis was placed on materials that were heavily used as well as those that were physically deteriorating. At the beginning, the digitization programme was outsourced. However, KNADS decided to develop its own internal capacity for in-house implementation. The department procured scanners and computers to undertake the exercise. As of September 2012, over 13 million documents had been digitized (Mwangi, 2012). By August 2014, there was no documented clarity on the progress of the project regarding how many documents had been digitized. According to Namande (2012) and Mwangi (2012), these materials were to be made available for online ordering through KNADS' website. Users of the materials were to download them remotely after paying the stipulated fees. In addition, to ensure efficient and effective storage and access to the digitized materials, KNADS installed top-end equipment including servers and storage area networks with adequate capacity to store and process all the materials.

According to Kemone (2008), the components of a sound records management program include the presence of a records management policy, records management procedures to support records management policy and the presence of records classification systems. While Wamukoya (1996) opines that records management incorporates the policies, systems and professional and management techniques, systematically applied to the control of recorded information to enhance an organization's efficiency and effectiveness, while at the same time consolidating its evidential base.

Pitsonyane & Mnjama. (2022) states that the University has established documented and maintains an information management system that is compliant with the requirements of ISO 9001:2008 standards. In view of this, the University has: defined and managed the



process in educational design, development and delivery and determined sequence and interaction of processes. Determined criteria and methods are needed to ensure that both operations and management of these processes are effectively ensured as well as availability of resources and information necessary to support operations and monitoring of this process. It would also be necessary to ensure monitoring and analysis of these processes and conditions of acceptance at the time of delivery as well as ensure implementation of actions necessary to achieve planned results and continual improvement of these processes. The TQM Magazine (as cited in Burns & Grove, 2003) states that ISO is designed to help organisations to ensure that they meet the needs of customers and other stakeholders while also complying with statutory and regulatory requirements related to the product.

#### **2.4. 3 Policy framework for Records Management**

Shepherd and Yeo (2003:22) opine that records management policy should be endorsed by senior management and be made readily available to staff at all levels of an organization. They further assert that it should sit alongside policy on other matters where best practice is critical to the achievement of an organization's goals.

A national policy on records management should provide guidance on procedures, practices and regulations on management of records. The policy should apply to records in all formats including electronic records. It should be prepared in accordance with national laws, regulations and internationally recognized standards on records management. Kenya National Archives and Documentation Service (KNADS) should spearhead the development a national standard to guide the implementation of the policy.

Statistics Act, 2006 provides for the establishment of the Kenya National Bureau of Statistics. It provides for the collection, compilation, analysis, publication and dissemination of statistical information and co-ordination of the national statistical system. The Act provides the legal requirements for creation of records, collection, supply, disclosure and access to information. It further stipulates the offences and penalties related to the contravention of the Act.

All public officers are required to adhere to the contents of this policy as well as ensure that records they create and receive are properly captured and filed in accordance with laid down procedures. Additionally, they ensure that they do not alter, destroy, misplace or render unusable any official document, record or file that is intended to be maintained as official record.

## **2.5 Records Management**

Records management is the field responsible for efficient and systematic control of the creation, receipt, maintenance, use and disposition of records, including processes for capturing and maintaining evidence of and information about business activities and transactions (Mnjama, 2004). All organizations create and maintain information in order to operate. In order to deliver information with value, the information must be captured and managed to ensure it is authentic, reliable, dependable, full, accurate, complete, and usable (possible to locate, access, understand and utilize).

Records management requires a viable records management program in order for an organization to control both quality and quantity of the information that it creates. Complete records management practice encompasses a multitude of disciplines including

forms, reports, correspondence, directives, mail, files, copying, retention, scheduling, vital records protection, archival preservation, and ultimate disposal (Wamukoya, 2004).

Records are valuable assets that need to be managed and protected because, besides providing essential evidence of organizational activities, transactions and decisions, records also support business functions and are critical for the assessment of organizational performance. Without reliable records management, organizations cannot effectively manage their resources. Moreover, without accurate and reliable records, and effective systems to manage them, organizations cannot be held accountable for their decisions and actions (Mnjama, 2004).

Gunnlaugsdottir (2003), writing in regard to ISO 9001:2000, states that it has been his experience as a consultant in Records Management (RM) that organizations seeking to implement a certified quality system have often needed to introduce a RM programme as part of their quality system. They have discovered that their quality system cannot function without a good RM programme”. RM has admittedly been the most serious missing link in making the quality system operational. Barbara (2010) observed that many organizations enthusiastically seek ISO 9001 certification as part of their quality management initiatives, but may not have made the connection between records management and ISO certification requirements.

It is evident that records are corporate memories of organizations. Most organizations depend on recorded past accomplishment to provide a foundation for future development. Sound records management is necessary to provide background information for planning for the future, while taking advantage of the past. Thus, records serve as the “memory” of a

business. They “remember” the information needed for operating a firm, from day to day, month to month and year to year. Records are therefore, both an organizational resource and organizational asset. As a resource, records provide information, as an asset, they provide documentation (Barbara, 2010).

In order to make appropriate decisions, managers must have appropriate information. Decisions are only as good as the information on which they are based. Most of the information necessary for decision-making is based on sound records management practices (Penn, 2017). When an organization initiates legal action, for example, against another organization, records must provide the necessary documentation to win the case in court. Clear documentation (records management) of an organization’s intent and subsequent actions is a safeguard for protection from litigation consequences.

### **2.5.1 Creation of Records**

Electronic records management system uniquely captures, classify and identify records to ensure that their content, structure and context of creation are fixed in time and space. These records management processes facilitate the making of complete, authentic and usable records (Asogwa, 2013). There should be functionality to create a new record by reusing the content, structure and context of records once captured. While version/document control is beyond the scope of this document it may also provide some of this functionality (Shepherd and Yeo, 2003).

Electronic records management systems may contain aggregations of records, records that are not aggregated, or both. Records aggregations structure related electronic records and support their management and usability. They may be at more than one level, and may

have multiple relationships within separate aggregations (Duranti, 2002). Aggregations of electronic records may reflect relationships such as shared characteristics or attributes, or the existence of sequential relationships between related electronic records. The nature of the relationship between the electronic records of a particular aggregation will vary depending on factors such as their purpose and structure, and the content and format of the records themselves.

### **2.5.2 Electronic Records Management**

E-records refers to information created, generated, transmitted or stored in digital form or analog form and also those on visual and aural media such as voicemail systems, DVDs, videotapes and cassette tapes. The general guidelines of records management apply to records in any format (Duranti, 2010).

E-records, just like paper-based records are strategic and operational assets vital to the operations of an organization, therefore they need to be protected and used for the benefit of the creating agency. Like traditional paper records, e-records support the day-to-day operations of an organization's services and interaction of stakeholders. As universities services move online, e-records have become the basis of operations and hence, require a guideline in their management (Wamukoya, 2004).

Management of electronic records is a topical subject of discussion among managers worldwide. Consequently, in 2001 – 2002 the US National Archives and Records Administration (NARA) Advisory Committee for the Co-ordination of Information Systems (ACCIS) established a technical panel on Electronic Records Management (TP/REM) consisting of experts from various United Nations organizations. The objectives

of TP/REM were to: develop guidelines for the implementation of electronic records management policies, identify and describe standards that could facilitate effective utilization of new technologies, and to facilitate coherent and integrated process between paper-based and e-records (Oz, 2008). The report further identified functional requirements for electronic records management i.e., the different stages in the continuum model of electronic records as shown in Table 1.

**Table 1: Functional Requirements for Electronic Records Management**

<b>Stage</b>	<b>Example of Information Management Processes</b>
Creation & Identification	<ul style="list-style-type: none"> <li>a. Capture and store records</li> <li>b. Assign unique identifying information</li> <li>c. Provide security</li> <li>d. Support authentication, clearance and version control</li> </ul>
Appraisal	<ul style="list-style-type: none"> <li>a. Maintain appraisal criteria and authorization</li> <li>b. Apply appraisal criteria and authorization</li> </ul>
Control of Use	<ul style="list-style-type: none"> <li>a. Facilitate communication of records internally/externally</li> <li>b. Facilitate search and retrieval</li> <li>c. Provide control mechanism (e.g. tracking)</li> <li>d. Facilitate migration, conversion and portability</li> </ul>
Disposition	<ul style="list-style-type: none"> <li>a. Provide for creator/user notification prior to disposal</li> <li>b. Dispose records for which retention period has expired</li> <li>c. Maintain archival information in reusable form e.g. neutral format</li> </ul>

**Source; Patterson (2005)**

Table 1 show that the management of electronic records requires an understanding of systems that create process and store electronic records, in order to effectively manage them.

According to ISO 15489 (2001), the international records management standard recognized worldwide as establishing the baseline for excellence in records management programmes, e-records management standard that help to aid capture, classification, and management of e- records throughout their continuum model. Such a system may be paper based or may be a computer system, such as electronic records application.

### **2.5.3 Capture of Electronic Records**

According to Katuu (2004), strategies for capturing electronic records differ, depending on the opportunities presented by an agency's hardware and software environment. In paper-based systems, a document is delivered to the user, who opens it, reads it and then performs one or more of the following: copy it, file, write comments on it, forward it to someone else, give it to someone else, or dispose it off. If you create a document on paper, you generally sent it to someone else and file a copy. These same actions can be taken with an electronic record. Once the paper record has been delivered to you, it has been taken out of the delivery system. Similarly, once you have opened an electronic document and taken one or more of the above actions on it, it too should be taken out of the delivery system. This can be accomplished by saving the document in a different directory on a local network hard drive, or deleting it if it has no further value or if no further action is required (Patterson, 2005).

#### **2.5.4 Processing Electronic Records**

Directories and sub-directories to which the records are saved should be similar in structure to the filing system for paper documents, regardless of whether they were created or received. If, for instance, a record is filed relating to budgets in the administrative section of the file/cabinet designed for budget reports, an electronic copy would similarly be filed in a directory structure of one of the following: - OC: / Admin Budgets Reports (Wamukoya, 2004).

The directory structure can be used to file electronic records in the sub- directory corresponding to the year in which they were created and “non record” documents in the “cores” directory (with no year) (Zaben, 2001).

Once the electronic documents have been filed in either of the above directory structures, applying the retention period to the date of the document will determine the disposition date for each document. In this way, every record is evaluated at the time it is “filed” so that disposition of the documents through proper application of retention periods can be accomplished easily (Steffan, 2012).

#### **2.5.5 Storage of Electronic Records**

Electronic records can remain on the local area network hard drive until they can be disposed of, or until hard drive space requirements dictate it. However, electronic records which cannot be disposed off can be transferred (back up) to another media or taken for continued retention (Zaben, 2001). Records on the originating hard drive can be marked for



deletion so that space can be re-used. The directory structure facilitates deletion or movement of these records to offline storage (Coronado, 2017).

### **2.5.6 Retrieval of Electronic Records**

A list of electronic records on disks, etc can be created, and printed or maintained in a data file which can be accessed via data base management software. Use of database management software makes it easy to create, maintain, sort and use a complete list of all records including the dates of the records, located on all disks. Not only to quickly and easily identify individual documents for retrieval, but also the disks on which they reside (Gunjal, & Koganurmath, 2003).). The software is vital because it allows one to display on screen or print, a list of all budget documents in sequence by date, showing the disk on which, they reside. Even though, backup software maintains a list of all e-records located on the disk, the list is only accessible via the software and cannot be merged with the list from other disk (Vishniac, 2012).

### **2.5.7 Disposal of Electronic Records**

According to SRA (2001- 2002), database management software can be used to scan the disk directories where electronic documents are located, in addition to scanning the list of records on back up disks. Using the date of the record and file retention period the software can determine which record, if any, may be disposed of. A list of such documents can be printed, reviewed and edited when necessary to ensure that only those documents, which have no continuing value are disposed off (marked for deletion). Ultimately, the list also specifically identifies the backup disks that contain records due for disposition to

ensure this are disposed off in accordance with their approved retention period (Penn, 2017).

### **2.5.8 Security of Electronic Records**

Directory structure can be applied when securing records. Records can be moved to a similar directory structure in another part of the local area network hard drive where the directory has been marked for “read only” access (Win, 2005). This allows records to be accessible by multiple people as in a database environment simultaneously, but also protected from alteration. For this to be achieved the following crucial factors should be considered;

- i. Security against unauthorized access and hackers

**Access levels** - Users assigned access privileges, for example, read only specific file or directory.

Use of encryption – the only information that is to be accessed is decoded

Use of passwords – to be used to control access to stored records

- ii. Security against Common Mistakes

Saving – a new record should be saved on a proper medium.

- iii. Computer Viruses – appropriate antivirus programmes should be installed to counter the problem of viruses.

- iv. Power Failures – provision of backup power solutions, e.g., uninterruptible power supply (UPS), standby power supply (SPS) (Zaben, 2001).

### **2.5.9 The Care and Storage of Electronic records**

As part of a records management plan for electronic records, one need to determine where and how these records will be stored. The decision is based on the likelihood of access of those resources versus the overall cost of maintaining them. Geller (1983) provided the following recommendations for the care of storage medium: maintain temperature between 50° and 123°F, avoid disk contact with equipment that generate magnetic fields such as telephone and photocopiers, avoid writing on a label affixed, write the label before sticking on the medium, protect the medium from direct sunlight, avoid liquids and dampness, do not bend or bind with rubber bands, do not touch exposed parts, store vertically in a rigid container, avoid dropping, maintain dust free environments, always store in a special purpose made disk box (Dettinger, 2007) as further elaborated below. Storage decisions covers two aspects: content and context.

#### **a) Content**

In order to maintain record content, agencies should follow best practices in the information technology profession for data integrity. Systems should be in place to ensure that:

- i. The identity of a record's creator is verified (through the use of a password and encryption),
- ii. Data are regularly backed up, and
- iii. Data on offline media such as magnetic tape are regularly refreshed to avoid catastrophic loss of data due to medium degradation.

The simpler the record structure, the easier it is to preserve the record over time (Burns, 2003). As with the other characteristics of records, it is also best for record structure to be based on open standards. Standard Generalized Markup Language (SGML) and Xtensible Markup Language (XML) are both examples of open standards for document structure (Sprehe, Timothy, 2005).

#### **b) Context**

Sprehe (2005) points out that, if the content of a record is separated from key information about the agency and person(s) who made it, the time, place and reasons for its creation, and its relationship to other records, its value as a record is severely diminished or lost. Its contents may still be of interest, but the record will have no value as evidence unless it can be placed in context (Sprehe, Timothy, 2005).

### **2.6 Challenges Experienced in Managing Students' Electronic Records**

Challenges faced in the management of electronic records are diverse including human and physical, poor integration of legislative and policy framework, technological obsolescence among others.

#### **2.6.1 University management of electronic records in developed countries**

Challenges relating to management of electronic records are acknowledged by universities worldwide. Asogwa (2013) indicate that the problems faced in the management of electronic records in universities are diverse including; lack of e-records management policies, website management; high staff turnover; inadequate funding for human and physical resources required to establish and maintain the programmes; lack of ICT legislation and/or poor integration of e-records legislation, technological obsolescence,

fragility of storage media, ability to alter or delete information without trace and the need to preserve a lot more contextual information than the record itself (Maseh, 2016). Asogwa (2013) acknowledges that the biggest worry universities have today how to capture email records. Additionally, the Lynch (2003) acknowledges that the biggest worry universities have today is how to capture email records and the challenges of website management.

### **2.6.2 Electronic records in developing countries**

The term developing countries can sometimes be a problematic one. It is a very narrow designation, yet it encompasses a vast multitude of nations, cultures, and value systems, each of which is different from the next and the one before it.

According to UNESCO (2001), Information Communication Technology (ICT) has spread in the past few years through the Pacific region in a big way. Computers are finding their way into schools and institutions of higher learning, government and the private sector, and other organizations. In many cases, ICT has penetrated work and learning environments unplanned. Many governments and users recognize the potential of ICT and the opportunities it provides, particularly for economic and social development where distances and traditional systems have tended to hamper progress. ICT also presents opportunities for recordkeeping in developing countries (Dettinger, 2007).

Opportunities for compact storage through electronic and digital storage devices are becoming more enticing to those responsible for records as they offer an alternative to bulky paper records that need a considerable amount of space for storage (Smallwood, 2013). The increased usage of ICT has decentralized recordkeeping more and more. There is almost no need for proven manual systems as individuals are building their own empires

on their computers, creating official records as their own and managing them in their private recordkeeping system that is out of bounds to everybody else (McKemmish,2005).

The general principles of records management apply to records in any format. However, the methods used for protection, organization, indexing, retrieval and disposition vary depending on the format or medium (physical or electronic) in which the record exists (Heslop, Davis and Wilson, 2002). Therefore, the absence of policies to provide guidance to creators and users of records poses risks that also cannot be ignored. But it's not all that doom and gloom. The public sector reform programmes occurring globally now place emphasis on accountability and transparency. Agencies are therefore beginning to realize the importance of recordkeeping as tools vital for good governance.

Despite the fact that all the East and Southern African member countries have been subject to the public sector reforms demanded by the World Bank and IMF, most of their official records and archives have not changed much to enhance transparency and accountability in government (Wamukoya and Mutula, 2005).

### **2.6.3 E-Records Management at JKUAT**

JKUAT, like other higher institutions of learning in Kenya, is semi-autonomous. The university generates large volumes of physical and electronic records and documents on a daily basis. Undoubtedly, these documents and records are of great importance and as such need to be strictly preserved. Universities are legally bound to retain and preserve documents as a record of their activities and proceedings. The university creates records to support the activities it carries out. However, if these records are not managed properly, they will not provide the necessary support and information might be lost causing problems

for the institution. An efficient and effective administration ensures proper management of records. International Organization for Standardization (ISO) 15489 (2001) explained records management as the field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use and disposition of records, including the processes for capturing and maintaining evidence of an information about business activities and transactions in the form of records.

Mrwebi (2000) stated that information plays a very vital role in economic development of organizations which is essential for any corporate body to function effectively. Information is every organization's most basic and essential asset, and is common with any other business asset, recorded information requires effective management. Nakpodia (2009) stated that institutions produce increasingly large amounts of information and consequently greater volumes of records, in both paper and electronic forms. It is essential that information is captured, managed and preserved in an organized system that maintains its integrity and authenticity as well as fulfilling legal and financial requirements. According to Shepherd (2006), organizations use records to support accountability, when they need to prove that they have met their obligations or complied with the best practice or established policies.

An unmanaged record system makes the performance of duties more difficult, costs organizations all resources (e.g. time, money, etc.) and makes them vulnerable to security breaches, prosecution and embarrassment. Rule of law, management of state resources, probity, accountability, foreign relations and the protection of entitlements and rights of citizens are very critical to every good government. However, without records, all these would be meaningless (Dzandu, 2009). Important information of an organization can be

lost forever if records are not kept properly, especially when a member who is holding a key position in an organization dies, retires, resigns, travels abroad, transfer to different department, branch, or campus like JKUAT which has 14 satellite campuses. According to Duose (2009), if public officers keep their records right, the records would always be there to show the situation as it is. He added that one cannot talk about good governance, democracy and rule of law when records are not kept properly.

Elwhiwhu (2005) asserts that university records support the administrative and educational research of the institution and the objectives of the university with respect to supporting teaching, research and services in the university. To support these activities, the factors below should be considered as far as electronic records management in institutions of higher learning in Kenya is concerned.

#### **2.6.4 Advancing Technology**

Implementing robust electronic records management systems can streamline the process of collecting, organizing, and analyzing students' electronic records. These systems provide a centralized platform for storing data, ensuring data consistency, and enabling efficient access to records for evaluation purposes. Leveraging data analytics and artificial intelligence (AI) tools can help process large volumes of student records efficiently. AI algorithms can identify patterns, trends, and areas of concern in students' record-keeping practices, providing valuable insights for evaluation. Technology can facilitate automated data collection through online surveys and data extraction tools. This reduces the burden of manual data entry and ensures data accuracy and completeness. Developing mobile applications tailored for students can encourage better electronic records management. Such apps could offer features like reminders for data backup, file organization, and task



scheduling to improve students' record-keeping practices. Advancing technology can enable the implementation of stronger data security measures. Techniques like encryption, multi-factor authentication, and access controls help protect students' electronic records from unauthorized access and breaches. Implementing blockchain technology can enhance the security and immutability of students' electronic records. This could ensure the integrity of academic achievements, certifications, and credentials (Schaefer, 2006).

### **2.6.5 Training**

University of Manchester while developing an e-records management programme realized that untrained staff could jeopardize how records are obtained or manipulated, ultimately, impacting negatively on the existence and authenticity of e-records programme. Therefore, the university as an organization had to train records staff and users to ensure system accuracy and functionality. In addition, when transferring paper records to electronic formats the university took note of the time and cost associated with the conversion, hardware and software programs needed to be purchased, paper records need to be evaluated to determine what would be transferred, files needed to be converted or scanned, as well as managed and maintained ((IRMT, 2003).

However, the university had to consider outsourcing their conversion project. While electronic records are a viable and efficient solution to records management to the university, they needed to prepare themselves for issues that arise and seek services of professionals to provide the best solutions in electronic records management, while keeping in mind up-front savings and long-term cost efficiencies.

### **2.6.6 Institutional consultation**

According to Indiana University, many institutions of higher learning seem to be struggling with the same issues, albeit in their own local environments. Consequently, as universities around the world embrace the tremendous potential of ICTs, there are problems in managing documentary evidence in electronic format, for example, the electronic signature. Management of e-records poses challenges to JKUAT that needs to be addressed by providing necessary infrastructure, such as IT equipment and purchase of relevant softwares, among others.

International Records Management Trust (IRMT, 2003) stated that university authorities often have little knowledge about management of e-records. Staff are not sure as to whether electronic information they create and receive constitute official records and if so, how they should deal with them. Similarly, IT experts tend to promote the use of technology to create and share electronic information but pay little or no regard to the preservation of this information as unchangeable evidence over time (Archives) (Wamukoya, 2005).

This situation is complicated further by the fact that at policy level, senior staff and management are often unaware of requirements needed to manage electronic records over time. Furthermore, IRMT recognizes that electronic records and the systems that support them are complex and fragile. They are created and maintained using technology platforms and standards that change frequently; they are stored on media that deteriorates over time; and they are often supported by weak accountability and management framework and policies. Even among records and information managers, there is insufficient capacity and

training to articulate e-records issues and provide guidance and input to policy makers and planners (Kamatula, 2010).

In view of the dynamic nature of information technologies and the obsolescence issues associated with them, several other problems arise in the management of electronic records such as incompatibility of hardware, software, data formats and storage media; lack of metadata to provide contextual information; and lack of clearly assigned responsibilities and resources for long-term preservation (Katu, 2004).

### **2.6.7 Context and structure**

Ultimately, contextual and structural information is needed to make documents understandable and usable as electronic records. Electronic documents lack the “built in” physical characteristics of conventional records that help to establish the relationship between a record and its functional and administrative context. The information contained in a paper record is represented externally as marks on a page, and requires no further technology (beyond an individual understanding the language and notation used) to interpret it, and it will normally be collated with other paper records in a physical file or folder as a matter of course. In contrast, information within an electronic record is represented internally by an abstract machine based-code, and can only be rendered visible by a sophisticated technology, which can read and interpret that code and display it in a human readable form. Once the ability to read the code is lost, then the records become unusable, perhaps forever (Kahn and Blair, 2003). In addition, such electronic documents are often not stored in meaningful groupings, which can show their context of use; rather reliance is placed on search technologies to seek and retrieve relevant documents from a

large amorphous collection, with no indication of the links or associations between individual documents.

Increasing use of digital information and communication technology in decision making and in transactions that support organizational are often based on electronic records that, though potentially important, are difficult to identify and track, that are not consistently filed and managed, and that cannot reliably demonstrate accountability (Mulauzi, 2019).

### **2.6.8 Changing technology**

Since information in today's institutions is born, lives and dies electronically, the challenges facing universities illustrate two general propositions; it is no longer possible to plan and manage the continuum model of information without taking into account the continuum model of IT system in which the information resides. It is no longer possible to plan and manage the life of an IT system without taking into account the continuum model of the information residing in the system (Shaw & Hickok, 2000).

According to Akporhonor. (2020), information technology has revolutionized the way in which universities create, store, and manage their records. Information has moved from paper letters to email messages. Calendars, annual reports, leaflets, and other publications are now more likely to be accessed through web sites. Relational database systems have replaced transcript cards, paper forms, and case files.

With these new technologies, come questions on how universities could efficiently manage e-records generated. How they could distinguish e-mails worth saving from other messages, such as personal or routine e-mail. How they ensure that electronic records having long term administrative, legal or research value could be accessed and read in 10

or 15 years from now and how quickly documents in the computer directory could be found. Read & Ginn (2015), sums up that “Mention electronic records in a crowded room and all conversation may come to a halt”, not necessarily out of interest (or lack thereof), but more often than not out of fear of the unknown. Electronic records are perceived to be more mysterious than their analog paper counterparts Osborne (2016). The guidelines contained in this niche of cyberspace are therefore meant to dispel that myth.

### **2.6.9 Standards**

Electronic records or more accurately "technology dependent records" are those records that are not eye readable without some intervening technology (Matangira, 2016). Certainly, in 2005, the Canadian General Standards Board published a new standard Electronic Records as Documentary Evidence (CGSB-72.34-2005). This standard "specified in broad terms the policies, procedures, practices and documentation that universities needed to establish in order to ensure integrity and authenticity of electronic records in an electronic records management system (RMS)." In addition to this resource, the following guidelines would assist faculties, departments, and administrative units in establishing good business practices to manage the university's electronic information resources (Krueger, 2004). Implementing these guidelines would help to ensure that electronically stored records are easily retrievable, useable, and protected for years to come. The guidelines are:

- i. Apply records management principles to all office records, including those that are produced electronically.
- ii. Electronic records are subject to the same legal and legislative requirements as any record produced in any form or media.

- iii. Purge regularly electronic documents that are routine administrative messages, personal notes, minor redrafts, and duplicates of paper copies.
- iv. Establish an electronic classification plan in file directory. This practice allows for retention and disposition of similar types of information despite their formats.
- v. Determine retention periods and final disposition for electronic records just as for paper files. Scheduling electronic records must follow appropriate university procedures and include the university archivists' approval.
- vi. Develop naming conventions and version control for electronic documents to support quick access and easy retrieval.
- vii. Ensure that new software applications permit ready conversion of files from other systems.
- viii. Save and protect software, systems documentation, and data management tools needed to operate system.
- ix. Guard networks and computers against threats such as viruses, tampering, and unauthorized access.
- x. Plan adequate backup systems. "Refresh" data regularly by copying onto a new disc or tape.
- xi. For any questions about electronic records or records management in general, contact the records archivist (Thompson, 2017).

## **2.7 Strategies to address the challenges facing the management of student's electronic records**

a) The following strategies are provided to assist university administrators in identifying and preserving electronic records posted to departmental web sites and available through

the University of Toronto World Wide Web. The focus was to ensure long-term access to and preservation of official university administrative records and publications created and controlled by university administrators (Molai et al., 2009). Other groups or individuals creating web sites in compliance with the University of Toronto guidelines for publishing could find the following established strategies useful in preserving their own web-based information:

- i. Comply with the appropriate legal and administrative requirements for record keeping.
- ii. Ensure that electronic records are accessible, accurate, authentic, reliable, legible, and readable throughout the record continuum model.
- iii. Document policies, assign responsibilities, and develop appropriate formal mechanisms for creating and maintaining public records throughout the record continuum model.
- iv. Develop information systems that accurately reproduce the records they create and maintain.
- v. Identify and document records created by information systems.
- vi. Document authorization for the creation and modification of electronic records and, where required, ensure that only authorized persons create or modify the records.
- vii. Design and maintain information systems so that these systems can provide the official record copy for those business functions accomplished by the system.
- viii. Develop and maintain information systems that maintain accurate links to transactions supporting the records created where these links are essential to the meaning of the record.

- b) Information systems used to maintain public records shall be able to:
- i. Produce electronic records that continue to reflect their meaning throughout the records' continuum model.
  - ii. Delete electronic records created.
  - iii. Export records to other systems without loss of information.
  - iv. Output record content, structure and context.
  - v. Allow records to be masked to exclude confidential or exempt information.

c) University of Wisconsin-Stout for e-mail management, in order to minimize the possibility of litigation and to achieve compliance with Wisconsin Statute 16.61, all faculty and staff at the University of Wisconsin-Stout are made aware of the guidelines regarding e-mail. To prevent possible loss, it is advised, for paper copies or important records are retained by office of origin.

Units on campus maintaining public records exclusively in electronic format be identified and informed of the laws and regulations governing the use and retention of those records. Efforts were to be made to ensure that technologically, these records could be preserved, maintained, and retrieved (Duranti, 2002).

Documented decisions using electronic, digital format affecting divisional or college level policy was preserved. This could result in converting electronic records to printed documentation for archival retention purposes (Heslop, 2002).



The University of Wisconsin-Stout Archives housed in the University Library serve as the official public records retention unit.

d) According to Indiana University e-records guidelines, if a university is one which subscribe to the ISO 9000 series of standards for quality management, the e-records management policy directive is the place where the quality documentation and e-records issues of those standards (ISO 9004, section 17) should be addressed.

e) In Indiana University guidelines, once an e-records programme is officially approved and issued, no further authorization should be necessary for any programme activity as long as such activity falls within the range of the authority which has been delegated and stay within budgetary constraints. This is not to say, however, that the e-records management staff can operate in isolation or totally independent manner (Asogwa, 2012. In fact, for some functions, the input to management is not only desirable but it is an absolute requirement. But most e-records management programme activities such as inventories, developing referencing systems or reviewing the operation of information storage and retrieval systems, can routinely be performed without receiving management approval. A committee should be set up to tackle issues that require decisions at a management level.

According to Ghering, Caruso, & Gift (2010) Indiana University committee members should comprise of records managers, system administrators, administrators and other key figures in the hierarchy as appropriate. The committee serves two extremely important purposes. First, it provides high-level managerial expertise to the management of e-records and second, it serves as a link that ensures that the management is appraised of e-records management issues and has an opportunity to offer suggestions for future electronic records

management policies. Furthermore, if the management is involved in e-records management development process, full cooperation is much more likely at the time of implementing the programme (Wamukoya, 2005).

f) Although, electronic formats are the emerging trend, paper-based information is still widely used in universities and often considered the legal copy of record. Paper records have been known to maintain their integrity for centuries and some can contain important handwritten information that may be critical from a legal and compliance perspective, which could potentially be lost or accidentally eliminated during conversion to electronic formats. In addition, paper records have long provided individuals the convenience of use including the ability to easily view, share, or copy documents for review and ultimately track progress in a tangible format (IRMRR, 2006). Certainly, unlike electronic records, storing paper can be costly and overwhelming to administer unless properly managed with an efficient records management system. Paper systems can also be easily lost or misfiled unless an automated tracking system is implemented to identify record locations.

g) Some study presumes that the introduction of ICTs has increased proliferation of paper records. On the other hand, other schools of thought argue that electronic records systems have drastically reduced paperwork by aggregating the majority of information currently contained in paper forms into one electronic source (Laudon, 2007). Nevertheless, with electronic records solutions, data can be captured once and reused endlessly for documentation, decision support and statistical reporting. In contrast, with numerous paper forms, records are not easily portable and are not automatically corrected when there is a change in decision-making process. As a result, action officers may be forced to repeat the same information over and over again and inadvertently vital information may be left out.

In electronic records systems, records officers provide information once and can be made available throughout their lifetime. This is because, when information is computer coded, any action officer can immediately apply and understand the information, even if using a completely different language.

Therefore, this demonstrates that paper records can only be at one place at one time, meaning that action officers at different locations cannot easily access and review records. In contrast, electronic records can be accessed and viewed by action officers in different departments, faculties, locations or campuses ensuring that the most up-to-date information is always available at the point of decision-making process. Similarly, in paper records, there is no automatic means of linking or retrieving records enhancers such as alerts, education tools, literature, and knowledge databases. The electronic records systems can link records to e-coded literature references and guidelines, therefore realizing administrative simplification and evidence-based decision-making process in public universities. Ultimately, e-records have greater edge over the paper-based records but as things are now, paper records will still supplement e-records in decision-making processes in universities.

## **2.8 Strategies on Electronic Records at Jomo Kenyatta University of Agriculture & Technology (JKUAT)**

JKUAT like any other organization or government agency, needs to adopt sound electronic records management practices in order to attain its set objectives. These are the only audit tools for “good service delivery”. Good service delivery is allied to accountability that requires measurement and verification of performance that is only attained through sound

e-records management. Thus, good e-records management practice is crucial for JKUAT's success in terms of vision, mission, goals and business activities.

It is important for JKUAT management to understand the constraints associated with electronic records management and to implement the best solutions in creating an effective electronic records management program. Electronic records originate from daily transactions as different university activities are performed. As the university evaluates the utilization of paper and electronic record formats, they are finding that the benefits and challenges of each make dual/parallel systems the most appropriate approach to efficient information management.

According to IRMRR, 75 percent of all information in organizations is still maintained on paper, which suggests that universities are finding it difficult to migrate to electronic records entirely. Yet an overwhelming majority of records today are created and stored electronically (IRMRR, 2006). As technologies change and compliance guidelines emerge, universities and records professionals are faced with the problem of putting in place solid policies that are fitting for both paper and electronic records. Furthermore, as the two systems develop, university face new challenges to remain compliant and follow procedures that impact the storage, maintenance, retention and destruction of both formats. For example, most universities today have dual records systems.

These records systems are difficult to coordinate, and often are not shared between different action officers. Even when they are, action officers may not be able to easily interpret one another's decision (Choo, 1996). However, electronic records unlike paper

records provide easy integration viewpoints and facilitate shared care by using a reference terminology. The electronic records systems also provide a standard method for recording information that is easily accessible and retrievable. It brings a new level of quality and connectivity to the record. This is evident when the Cabinet Secretary for Education, Dr. Fred Matiang'i challenged the University of Nairobi (UoN) to streamline record keeping curbing the menace of missing student marks. He said this, during the 56th graduation ceremony (December 2, 2016), that learning institutions should look into their systems to ensure they offer the best and that integrity is observed in exams.

## **2.9 Chapter summary**

This chapter discussed issues concerning electronic records management as stipulated in the research objectives. It also describes the background information of JKUAT records management globally, in developing world, Kenya and at JKUAT where this study was undertaken. It also reviews past information on the area of electronic records management which is available in books, journals and the internet.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

Research methodology is a systematic process of solving a problem. It may be understood as a science of studying how research is done scientifically. It involves various steps that are generally adopted by a researcher in studying a problem along with the logic behind them. According to Shensul & LeCompte (2012), research methodology refers to strategies that researchers use to ensure that their work can be critiqued, repeated, and adapted. It covers areas such as research approach and design adopted by a researcher.

### **3.2 Research Approach**

Cresswell (2003) identified three different approaches to research: qualitative, quantitative; and mixed approach. Quantitative researches include true experiments, quasi-experiments, correlation and survey studies (Creswell, 2003). The qualitative approaches include ethnographies, grounded theory, case studies, phenomenological and narrative research. Lastly, the mixed methods approach lends itself to triangulating data sources by seeking convergence across qualitative and quantitative methods. This study adopted a mixed methods approach where both qualitative and quantitative data was collected, analyzed, presented and interpreted based on the objectives of the study. The choice of this approach was informed by the need to have a more robust and holistic view of the subject.

### **3.3 Research Design**

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.” In fact, the research design is the conceptual structure within which research is

conducted; it constitutes the blueprint for the collection, measurement and analysis of data. As such, design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data.

This study adopted a case study research design. This refers to exploring a research topic or phenomenon within its context or within a number of real-life contexts. Yin (2009:18) defined a case study as “an empirical inquiry that investigates a phenomenon in depth and within its real-world context, when the boundaries between the phenomena and context are not clearly evident”. Meanwhile, Moore, Lapan and Quartaroli, (2012) look at the case study as an investigative approach used to thoroughly describe complex phenomena such as recent events, important issues or programmes in ways to unearth new and deeper understanding of these phenomena. Moore, Lapan and Quartaroli opine that case study results offer those directly affected by the case (stakeholders) and others interested in the event or programme (audiences) extended awareness by providing rich details about highlighted aspects of the case.

Saunders *et al.* (2012) advised that the case study would be relevant if the researcher wishes to gain a rich understanding of the context of the research and the processes being enacted. Some case studies may employ quantitative approaches to collect, present and analyze data while others may employ qualitative approaches. Further still, other case studies may combine quantitative and qualitative approaches (Kumatongo, & Muzata, (2021). To substantiate this point, she says that when you read a case study, you expect to

find therein detailed data about the phenomenon that has been studied no matter what methods have been used and what theoretical position of the researcher may be.

The choice of a case study was largely informed by the need to develop a rich narrative and reveal e-records management practices at JKUAT based on an in-depth, real time and retrospective analysis which is made possible by a case study.

### **3.4 Study Population**

A study population refers to a set of entities in which all the measurements of interest to the researcher are represented. The entities may be people or things such as all records maintained in an institution. Departments concerned with the management of student electronic records at JKUAT constituted the population for this study. From the current records, JKUAT has a total of 52 departments which are concerned with student's electronic records management. In the 52 departments, the total staff members were 312 who constituted the population of the study.

### **3.5 Sampling Frame**

A list of employees in 52 departments that deal with student's electronic records and the staff members in those departments who deal with such records, constituted the sampling frame for this research. It is from this list that the final sample for this was drawn. (See appendix V)

### **3.6 Sampling Methods**

Samples can be either probability samples or non-probability samples. With probability samples each element has a known probability of being included in the sample but the non-



probability samples do not allow the researcher to determine this probability. Probability samples are those based on simple random sampling, systematic sampling, stratified sampling, cluster/area sampling whereas non probability samples are those based on convenience sampling, judgement sampling and quota sampling techniques. This study adopted both probability and non-probability sampling methods to draw the samples that took part in the study. This was in tandem with the mixed methods approach that was adopted by the study. While probability sampling was used to draw out the departments that would take part in the study, non-probability sampling was used to select the individuals that took part.

### **3.7 Sampling Techniques**

There are different sampling techniques associated with the two sampling methods. The probability sampling employs such techniques as simple random sampling, stratified random samples and cluster sampling. On the other hand non-probability sampling methods employ such techniques as judgment sampling, quota sampling and convenience sampling. To select departments that took part in the study, simple random sampling technique was applied then purposive sampling was used to draw the specific staff members that took part in the study.

### **3.8 Study Sample Size**

From an aggregate population of 312 staff members, 36 members were drawn to form the final sample for this study. This figure (36) was arrived at, through the use of Israel's (1992) sample calculation formula.

$$n = \left( \frac{\frac{P [1-P]}{A^2 + P [1-P]}}{Z^2 \quad N} \right)$$

Where:

n = sample size required

N = number of people in the population

A = Precision desired (error margin), expressed as a  
Decimal (i.e., 0.03 for 3%)

Z = the value of the standard variate at a given confidence  
Level (read from the table giving the areas under  
Normal curve) for instance, it is 1.96 for a 95%  
Confidence level.

P = Estimated Response Rate (proportion of  
respondents who may not submit their response)  
expressed as a decimal.

The sample size for this study was, thus, generated within the following values: N=312,

$$n = A=0.05, Z=95\% (1.96).$$

$$\left( \frac{\frac{0.027 [1-0.027]}{0.05^2 + 0.027[1-0.027]}}{1.96^2 \quad 312} \right) = \left( \frac{\frac{0.0263}{0.0025 + 0.0263}}{3.8416 \quad 312} \right) = 35.7 \quad n = 36$$

Subsequently, simple random sampling technique was used to determine the actual 36 staff members who took part in the study. Taking into consideration the fact that each department has six (6) members of staff who directly deal with student electronic records,

purposive sample method was used to select the six cadres of staff targeted from the six randomly selected departments provided the required sample size of 36 ( $6 \times 6 = 36$ ). By selecting the sample on basis of departments, the researcher was able to make follow ups on issues related to information flow within a particular department. After selecting six departments randomly, the researcher applied purposive sampling to select six professionals identified early within each of the six departments. Purposive sampling is a non-probability sample that is selected based on characteristics of the population and the objectives of the study. It is also non-judgmental, selective or subjective sampling (Kothari, 2003).

### **3.9 Data Collection Methods**

In order to address the research questions for the study, data was collected through questionnaire and interview methods.

The questionnaire method involved developing a document containing questions designed to solicit information appropriate for analysis that was to be completed personally by the respondent (Babbie, 2004). Pickard (2007:183) observed that “questionnaires are without doubt the single most popular data collection tools in any research involving human subjects”. They are therefore widely used and useful instruments for collecting survey information, providing structured, often numerical data to be administered without the presence of the researcher and often being comparatively straightforward to analyze (Blaxter, Hughes and Tight, 2006).

While constructing the questionnaire, Denscombe (2007) identified two types of questions: open-ended questions that leave the respondent to decide the wording of the answer, the length of the answer and the kind of matters to be raised in the answer; and closed ended questions which structures the answers by allowing only answers which fit into categories that have been established in advance by the researcher. Denscombe (2007) opined that the data gathered by the open-ended questions are more likely to reflect the full richness and complexity of the views held by the respondents. In the current study the questionnaire was used to collect data from secretaries and records clerks.

On the other hand, the interview method involved having a conversation between the researcher and the respondents in order to get qualitative, descriptive, in-depth data that is specific to the individual. Rowley, (2012) identified three categories of interviews as: structured; semi-structured and unstructured or in-depth interviews. According to Pickard (2007) the structured interview refers to a situation in which an interviewer asks each respondent a series of pre-established questions with a limited set of response categories which is often referred to as a researcher administered questionnaire.

Further, Rowley, (2012) explained that in a semi-structured interview the researcher prepares a list of themes and possibly some key questions to be covered, although their use may vary from interview to interview. Lastly the unstructured or in-depth interview, involves the use of open-ended questions that allow the interviewee to tell their own story in their own words. This study used a structured interview to collect data from hods and records managers.

### **3.10 Data Collection Instruments**

Data collection instruments are tools used to collect, measure and analyze data related to your subject, this study used interview schedules and questionnaires to collect the data.

#### **3.10.1 Interview Schedules**

The researcher used a formal interview to get data from the targeted group of staff who were directly involved with students' electronic records at JKUAT. Apart from taking note of the respondents' answers, the researcher was able to see facial expressions. The interview schedule was prepared for heads of departments and administrators so that the researcher could be able to get their views on the importance of student's electronic records (See appendix -). It was also expected to provide information on how useful the student's electronic records to them as policy makers and major users of student's electronic records.

#### **3.10.2 Questionnaires**

The current study administered questionnaires (see appendix -) to secretaries, data clerks, records managers and System administrators. The questionnaires targeted facts about organization, maintenance, storage, access, retrieval, use and disposal procedures.

### **3.11 Data Collection Procedures**

Prior to the commencement of data collection, the researcher prepared the instruments to be used in data collection, including questionnaire for secretaries, data clerks, records managers and System administrators; interview schedules were also planned for heads of departments and administrators as well as registrars, records staff and registry assistants and an observation schedule. Permission was then sought from the university management who communicated the approval to the heads of the participating departments.

Two weeks before the start day of data collection, the researcher visited the departments and booked appointments with the heads of departments and also introduced himself to the targeted respondents. On the material day, the researcher visited the departments during times earlier agreed and made field notes during the interview sessions. At the same time, the questionnaires were administered and the duration of time within which the filled questionnaires were to be picked was agreed on. On these dates, the researcher visited the respondents and picked the filled questionnaires.

### **3.12 Validity and Reliability of Data Collection Instruments**

Sound measurement must meet the tests of validity and reliability. These are the two major considerations a researcher needs to use in evaluating a measurement tool. Validity refers to the extent to which a test measures what a researcher actually wishes to measure. Reliability, on the other hand, is concerned with the accuracy and precision of a measurement procedure (Blaxter, Huyhes & Tight, 2001).

#### **3.12.1 Reliability of Data Collection Instruments**

A measuring instrument is reliable if it provides consistent results. If the quality of reliability is satisfied by an instrument, then while using it the researcher can be confident that the transient and situational factors are not interfering (Blaxter, Huyhes & Tight, 2001). This study sought to improve reliability through the following two ways:

- i. By standardizing the conditions under which the measurement took place.

It ascertained that external sources of variation such as boredom and fatigue were minimized among enumerators and respondents. In this regard, the study ensured that respondents were not induced into answering the questions during the interview when they

were not in the right frame of mind. The researcher further ensured that the interview was not too long such that they result in fatigue among respondents.

(ii) Directions for measurement will be carefully designed with no variation from group to group, and by using trained and motivated persons to conduct the research.

### *3.12.2 Validity of the Data Collection Instrument*

Validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested. In conducting this study, the two types of validity which have been identified by Kothari (2003) were taken into consideration. These are content validity and criterion-related validity.

(i) **Content validity** is the extent to which a measuring instrument provides adequate coverage of the topic under study. To achieve this form of validity, this research, ensured that the instrument contained a representative sample of the universe. Content validity was also attained by consulting experienced researchers on whether the measuring instrument meets the standards.

(ii) **Criterion-related validity** relates to the researchers ability to predict some outcome or estimate the existence of some current condition. This form of validity reflects the success of measures used for some empirical estimating purpose. The concerned criterion must possess the following qualities: freedom from bias, reliability and availability. Freedom from bias was attained by using probabilistic sampling method which gave each element in the universe an equal opportunity of being selected. Reliability was achieved by ensuring that the criterion was stable or reproducible whereas availability was attained by ensuring that the information specified by the criterion was available.

### **3.13 Ethical Considerations**

Ethical issues took into account factors such as respect, intellectualism, fabrication, plagiarism, among others (Trochim, 2006). This was achieved by conducting research within the confines of the copyright provisions such as acknowledging authors and punctuating quotations. Confidentiality was also observed by ensuring that information provided by those officers interviewed was never shared with anyone else but only utilized for the research purpose.

### **3.14 Data Presentation, Analysis and interpretation**

According to Kombo and Tromp (2006) data analysis refers to the examination of the coded data critically and making inferences. In this study, quantitative data was organized, represented, analyzed and interpreted using descriptive statistical techniques. Descriptive statistics according to Mugenda and Mugenda (2003) include the statistical procedure that produce indices and summarize data and describe the sample. Descriptive statistics that were used to summarize the data include frequencies and percentages which presented in tables and pie-charts for visual impression. Qualitative data was analyzed using thematic analysis based on the objectives of the study. Thus, the data and information obtained through the interview schedule and questionnaires was first checked for completeness then analyzed.



### **3.16 Chapter Summary**

This chapter summarized the Research Approach; Research Design; Study Population; Sampling frame; Sampling methods; Sampling Techniques; Study Sample Size; Data collection methods; Data Collection Procedure; Pretesting Data Collection Instruments; Validity and Reliability of Data Collection Instruments; Reliability of data collection instrument; Validity of the data collection instrument; Ethical Considerations; Data Presentation, Analysis and interpretation.

## CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

### 4.1 Introduction

The aim of the study was to evaluate students' electronic records management practices at Jomo Kenyatta University of Agriculture and Technology. This chapter presents findings and discusses data collected in line with the objectives of the study.

### 4.2 Response Rate

Out of the six heads of departments targeted, only four (66.6%) were available for interview, while five (83.3%) out of the six administrators were also available for interview (Table 4.1). The study elicited 100% response rate from questionnaires and an overall 75% response rate from the interviews. The respondents consisted of heads of departments, administrators, system administrators, records managers, secretaries and data clerks in the selected departments.

**Table 4.1: Response Rate**

Staff Category	No. Of Staff Targeted	Staff Interviewed	Percentage (%)
Heads of Department	6	4	11.11
Administrators	6	5	13.88
System Administrators	6	6	16.66
Records Managers	6	6	16.66
Secretaries	6	6	16.66
Data Clerks	6	6	16.66
<b>Total</b>	<b>36</b>	<b>33</b>	<b>91.63</b>

### 4.3 Diversity of e-records generated on each student

The first objective of the study sought to find out the diversity of e-records generated on each student. The respondents were therefore asked to identify the sources and formats of electronic records generated on each student. Most respondents identified the following as sources of information on students: Registration information, academic details and fees reports.

Table 4.2 presents the formats of the sources of the data generated. Nineteen out of 24 data formats were electronic, while only five were of paper formats comprising 79% and 21% respectively. Since the preferred data format is electronic, the university needs to give adequate support to management and maintenance of the e-records in order to ensure integrity and trustworthiness of the records.

**Table 4.2: Formats of data generated**

S/N	Respondents	No. of respondent	Data format	
			Electronic Number	Paper Number
1.	System administrators	6	6	0
2.	Records managers	6	6	0
3.	Secretaries	6	3	3
4.	Data clerk	6	4	2
<b>Total</b>		<b>24</b>	<b>19</b>	<b>5</b>

Further, the respondents were asked to explain how the said electronic records were generated. Their account is given in the following expressions

*“The electronic records generated include student records in the form of bio data (personal and data on family characteristics), previous educational experience, current grade, attendance, academic performance, behaviour, and achievements/faults, outcomes (e.g. promotion to next grade, repeating grade, drop-out, transfer, or graduation).*”

One of the Heads of department interviewed reported that:

Most students records fall into the following categories; admission records include all standard and supplemental application materials and supporting documentation submitted to JKUAT by students and Non-students, as well as any other information required for acceptance to any JKUAT school or program including, but not limited to, any application forms, letters of recommendation, acknowledgement forms; transcripts; letters of evaluation; screening and interview evaluations, Applicant correspondence a student's admission, registration, and academic performance.

Academic records include; an official academic record which is the official record of a student's study at JKUAT. It details all subjects studied, results, credit points, Grade Point Average (GPA) for each semester and the overall GPA for the studies. If a student has graduated, the record would also include the date the award was conferred as well as the student's official transcript and examination reports. Examination records include all types of examinations, essay tests, term papers, blue books, and other testing records documenting student mastery of the course materials. Examinations, term papers and other testing materials, at the discretion of the faculty, may be returned to the student once grades have been recorded in grade books or other media used to record grades.

Financial records; maintains a record of student account transactions, including billing, refund, and payment information, other student information include; student disciplinary records; these records can include witness statements, emails and other communications, computer records, hearing notes, outcome letters, and any appeal paperwork. Medical

records and psychological/counseling records which entails services rendered in the areas of counseling and testing as maintained by student affairs counseling services.

Effective management of current records (both paper and electronic); a reduced / eliminated level of record-keeping redundancies; reduced costs for records storage equipment and supplies; and increased usable office space through the elimination of unnecessary file storage. In addition, records management provides institutional accountability and timely access to information. Ngoepe (2014) stated that proper records management could be used to mitigate risks through compliance with legislation, minimization of information loss and provision of evidence of transactions. This is where proper management on each type of records is highly required.

#### **4.4 Policy Framework for E-records Management**

The second objective of the study sought to establish whether JKUAT had a policy to guide the management of students e-records created. In this regard, the respondents were asked to state whether there was an institutional policy that guides e-records management within the university.

Nineteen respondents said the university does not have a policy to guide management of e-records created, four said there was a policy, while only one was not sure whether or not there is an institutional policy on e-record management. To corroborate this, a question was posed during the interview with the heads of department as to whether there was an operational electronic records management policy at JKUAT. All heads of departments interviewed concurred with the rest of the respondents that there was no policy guiding the management of electronic records. One of them had this to say:

Mhhh e-records management policy? No we do not have such a policy at the moment. Maybe the records managers should develop one since I understand how important it is in ensuring proper management of records

From the responses, it would seem that the university does not have a policy to guide management of electronic records. Consequently, the management of e-records in the university is not properly guided. Nashon (2014) citing Mampe and Kalusopa (2012) stated that in order for a records management programme to succeed there should be some level of awareness of policies, regulation, procedures and standards to guide their management. ISO (2016) argues that good records management begins with establishing policies, procedures and standards before records are created. The purpose of having records management policies, procedures, standards and regulations is to provide guidance and direction on creation and management.

However, discussions with the respondents revealed that ideally, every organization requires a records management policy since the policy outlines the legal requirements for collecting, processing, and storing electronic data, including students' personal and academic information. It also defined the principles and procedures for ensuring data accuracy, confidentiality, integrity, and availability; further, Policy sets out the measures for safeguarding electronic records against unauthorized access, alteration, loss, and disclosure. It should cover physical, technical, and administrative controls, such as firewalls, encryption, access controls, and training; policy defines the rules and guidelines for using electronic devices and networks, including computers, laptops, tablets, smartphones, and the internet. It should address issues such as privacy, copyright, plagiarism, cyberbullying, and harassment. This policy should establish the time limits for

keeping electronic data, as well as the methods and procedures for destroying or deleting data that are no longer needed. It should also comply with legal and regulatory requirements for data retention and disposal. This policy outlined the conditions and procedures for accessing and sharing electronic data, including students' consent, privacy, and security. It should also address issues such as data breaches, incident reporting, and liability. This policy ensured that the policy framework for capturing students' electronic data complies with relevant laws, regulations, and standards, such as the Data Protection Act, the Cybercrimes Act, and ISO 27001. It should also include regular audits and assessments to monitor and improve the effectiveness of the policies and procedures.

#### **4.5 Management of E-records from creation to disposal**

The sections that follow presents, analyses and interprets data on the E-records management practices from creation to disposition at JKUAT.

##### **4.5.1 Creation of e-records**

In order to understand the creation of e-records, the respondents were asked give the formats of the records generated on an individual student at JKUAT. Their responses is summarized in Table 4.3

**Table 4.3 Creation of e-records**

<b>Format</b>	<b>Records Managers</b>	<b>System Administrators</b>	<b>Secretaries</b>	<b>Data Clerks</b>
Electronic	83%	100%	33%	50%
Paper	17%	0 %	67%	50%
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

All the six (100%) of the system administrators said creation of student records were in electronic formats, five (83%) of the six records managers said student records are in electronic format (Table 4.3). Two (33%) of the six secretaries said the student records are in electronic format and three (50%) of six data clerks said that the student records are in electronic format (Table 4.3). It is therefore clear that student's records at JKUAT are created in electronic formats.

Electronic records are electronically captured, classified and identified to ensure that their content, structure and context of creation are fixed in time and space. These processes facilitate the making of complete, authentic and usable records (Asogwa, 2013). There should be functionality to create a new record by reusing the content, structure and context of records once captured. While version/document control is beyond the scope of this document it may also provide some of this functionality (Shepherd and Yeo, 2003).

#### **4.5.2 Storage of e-records**

Another very important aspect of e-records management is their storage. The respondents were asked to give their views on how the records were being stored. Many organizations store their e-records on servers located within their own physical premises. These servers are managed and maintained by the organization's IT department or dedicated personnel. On-premises storage provides organizations with direct control over their data and can be tailored to meet specific security and compliance requirements. Cloud-based storage solutions have gained significant popularity in recent years. Organizations can use third-party cloud service providers like Amazon Web Services (AWS), Microsoft Azure, Google Cloud, Dropbox, or others to store their e-records. Cloud storage offers scalability,



flexibility, and accessibility from anywhere with an internet connection. devices are dedicated file storage systems connected to a network. They provide centralized storage accessible by authorized users within the organization. NAS devices are often used for collaborative file-sharing purposes and can be a cost-effective solution for smaller organizations. Their responses are summarized in Table 4.4

**Table 4.4: Preferred E-Records Storage Media**

Medium	Variety of E-Records Storage Medium						Total %
	HODS	Administrators	Records Managers	System Administrators	Secretaries	Clerks	
Compact Discs	2	2	1	1	0	2	19.4
Floppy Diskettes	1	1	0	0	1	1	11.1
Flash Discs	1	2	2	2	3	3	30.6
Hard discs	1	0	1	2	1	0	13.9
Microfilms	0	0	2	1	0	0	10
Zip Discs	1	1	0	0	1	0	10
<b>Total</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>100</b>

(Source: Researcher, 2023)

Table 4.4 shows the media preferred were: flash discs (30.6%), Compact Discs (19.4%), hard discs (13.9%) and Floppy diskettes (11.1%). The others were preferred by less than 10%, microfilm and zip discs (10%). Different professionals were in favor of specific e-information storage media because of a number of reasons such as security, capacity, durability and portability.

It is evident that flash discs and compact discs are the most preferred forms of electronic storage media, a scenario that should be supported by proper policies in terms of, among other requirements: storage equipment, staff training and funding. On the other hand, it was observed that respondents who included secretaries and administrators though they had no standardized procedures for classifying of storage media, they adopted their own. They labeled storage media based on the function, for example, postgraduate or undergraduate, staff affairs, student's affairs, etc. They then arranged them by student's registration number or staff number.

It was also observed that staff saved their records under the file name that relates to that document. For example, student's results for 2003 were saved under examination 2003 or under a specific student's registration number or year for example 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup>. However, the choice of storage medium was determined by the following: university management, security aspects, portability, durability, compact, multiple access, cost aspects, efficiency and fast access to information.

According to IRMT (1999), database management applications are used to store many different types of information that can be used to classify and catalogue records, track files,

register users, schedule records, amongst other uses. Setting up a database to allow records office staff to search for files more quickly impacts a great deal on how the office operates. This could be the reason why challenges are obvious at the university because decentralization of students' records has led to mishandling of the same records in certain departments due to inadequate management guidelines.

#### **4.5.3 Access to E-Records**

Role-based access control was commonly used to manage access to E-records. RBAC allows organizations to define access permissions based on an individual's role or job function within the organization. This ensures that users only have access to the information necessary for their specific tasks, reducing the risk of unauthorized access. Effective authentication and authorization mechanisms were essential for secure access to E-records. Multi-factor authentication (MFA) and strong password policies were commonly employed to verify the identity of users before granting access to sensitive records. Many organizations implemented audit trails and monitoring systems to track and log user activities related to E-records. These trails allowed administrators to monitor access attempts, modifications, and other actions, helping to detect and investigate any potential security breaches or unauthorized access.

The respondents were asked to state who has the right to access e-records and how access was regulated. They stated that e-records created are majorly on restricted access at the departmental level. However, only systems administrators and records managers have all the rights in managing and updating student's electronic records. It is clear, therefore that

access of student's records has been restricted to specific staff members in the different departments of the entire university.

The records of an organization can only be useful to the organization if they are accessible to the members of the organization who need to use them. This implies making sure that they are readily accessible when required. Because records are kept to provide information to support business functions, they are only useful if they can be accessed. Effective management of electronic records requires that the systems for providing access to records, whether online or offline should be adequate and reflect the needs and scope of the users.

The main reason for employing ICTs in management of records is to provide readily up-to-date information. To achieve this, all records are integrated into one database to facilitate speedy access to information. In this age of 'instant' information, there is an increasing demand for speedy access to records and the information contained in them. JKUAT must ensure that equipment or technology used in records management should remain accessible for as long as they are required.

#### **4.5.4 Security of e-records**

Records usually contain important and often confidential information. As such, security of records is extremely important. The respondents were asked to comment on the security of e-records in the university.

Table 4.5 shows that 16(67%) of the 24 staff said the data was protected by an anti-virus, while 8(33%) said that the respective staff is aware of the risk involved in lack of protective mechanism on electronic records.

**Table 4.5: Security of E-Records**

S/N	Respondents	No. of respondent	Security of e-records Availability of antivirus	Staff awareness of security of records
5.	System administrators	6	4	2
6.	Records managers	6	5	1
7.	Secretaries	6	3	3
8.	Data clerk	6	4	2
<b>Total</b>		<b>24</b>	<b>16</b>	<b>8</b>

(Source: Researcher, 2023)

It was noted that security is indeed an important aspect of management of e-records. One of the administrators explained how critical security is in an automated environment as expressed in the quote “*without a strong anti-virus and proper access rules, student's electronic records can cause a major mismanagement of university resources*”.

Securing that information can be a challenge Patti (2011) observed that some companies keep vital documents in locked storage, accessible only to authorized personnel. Policing access, maintaining access logs and assigning authority levels only add to the cost of storing the documents. Once the document is signed out, there is little the organization can

do to ensure the file remains confidential and is not shared on purpose or accidentally with anyone else in the institutions or outside of it.

#### **4.5.5 Appraisal of E-records**

The respondents were asked to indicate whether or not the records are appraised if yes, how often is it done. Out of the 24 respondents who filed the questionnaires a whopping 20 (83.3%) indicated that the e-records have never been appraised. The remaining four (16.7%) were not sure whether appraisal had been done or not.

All heads of departments and administrators said appraisal had not been done. One administrator said

*"Appraisal? No, this hasn't been done. Why should we even think about appraisal in an electronic environment? In my view, appraisal of records is important when dealing with manual records since space is always a problem but not in an automated environment".*

It is clear that appraisal of e-records has not been done due to ignorance on the part of some staff particularly untrained records managers. This state of affairs is likely to impact negatively on the management of these records.

#### **4.5.6 Disposal of E-records**

The Word disposal when applied to records management does not necessarily imply destruction. Disposal is the final stage in any records lifecycle, resulting in destruction of the records or their permanent, archival retention.

The respondents were asked to state whether e-records had been disposed of and if yes how often this is done. Those who said appraisal had never been done also said disposal had not

been done. Twenty (83.3%) said disposal of e-records has not been done. The remaining four (16.7%) were not sure whether disposal had been done or not. All nine (100%) interviewees said e-records created had not been disposed. One head of department said

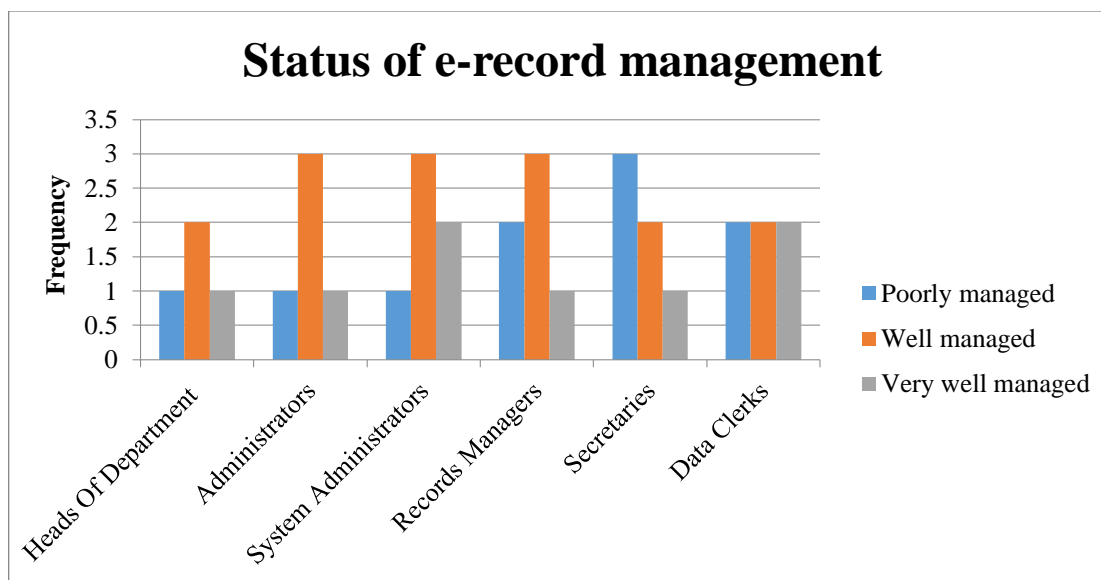
*"...well, disposal has not been done but thinking about it now, I think it is something to be considered, why should we allow data of students who have long finalized their studies continue residing in our systems?"*

It is clear that e-records are not being disposed of even when the students have finished their studies and long gone. This would mean that records that are no longer useful to the creating departments are left clogging up the systems. This is contrary to the provisions of the Records Continuum Model (RCM) that underpinned this study. The RCM observes that records should be managed in a continuum of care and that those records that are no longer active should be relegated to inactive storage irrespective of their formats. Oliverio, Pasewark and White (2006) opined that disposing of a record involves transferring it to inactive storage or destroying it. When a record is no longer needed, it should be destroyed in order to make room for current records.

#### **4.5.7 Status of E-records Management**

To sum up the objective on management of e-records, the respondents were asked to give their views on the status of e-records management.. Their aggregated response is shown on Figure 4.1





**Figure 4.1: Status of E-records management**

Three secretaries said e-records are poorly managed. Two Records managers and data clerks also indicated that the records are poorly managed, one administrator and head of department said that e-records are poorly managed. Three administrators, record managers and system administrators said the e-records were well managed. From the respondents one can conclude that e-records at JKUAT are not well managed and therefore, there is need to improve on the management of the same and trained affected staff with necessary skills and knowledge especially the secretaries and office assistants.

#### **4.6 Challenges on Management of E-Records**

One of the objectives of the study was to identify challenges that are faced at JKUAT in managing e-records. To achieve this, opinions were sought from respondents on whether or not they experienced any challenges in the management of e-records generated. The challenges are summarized in Table 4.6 and figure 4.2.

**Table 4.6: Challenges experienced in the management of e-records**

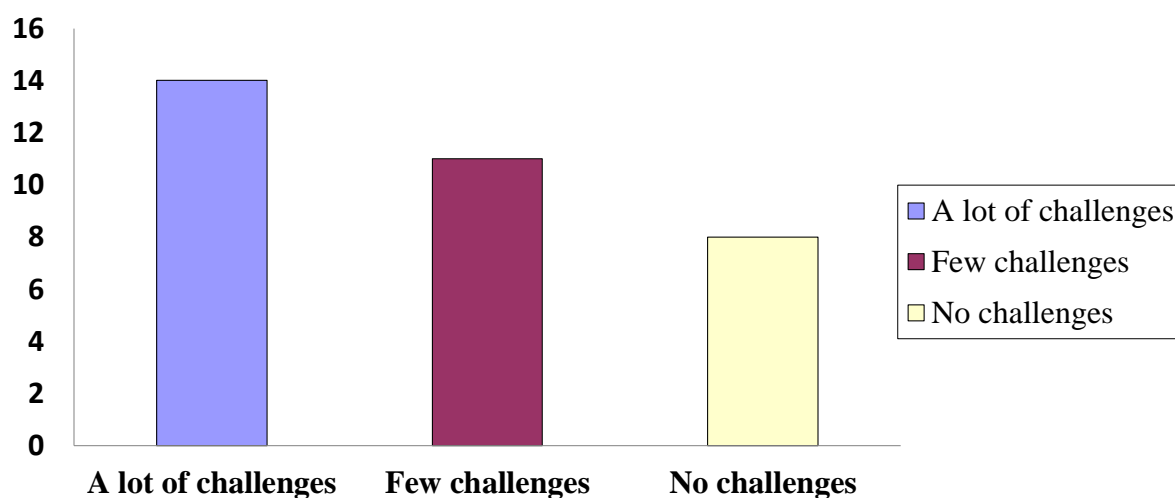
<b>Challenge</b>	<b>Frequency of Occurrence</b>
Data Integration	14
Storage Capacity	20
Data Accuracy	18
Data Security	19
Resistance to change	10
Storage medium degradation	8

The findings indicated that ensuring the security of students' electronic records is a significant challenge as there is always a risk of unauthorized access or hacking. The protection of sensitive information such as personal details, academic transcripts, and financial information requires stringent security protocols. The volume of electronic records that schools generate on a daily basis can be overwhelming, and this requires a robust and reliable storage system. Schools often face challenges related to storage capacity, which can lead to slow access to data, lost or misplaced data, and data corruption. In many cases, electronic records are not fully integrated into a school's existing IT systems. This can lead to a lack of consistency and accuracy in data, which can impact decision-making processes and lead to errors.

Errors in data entry or processing can impact the accuracy of student records, and this can have significant consequences for students' academic progress, as well as for the institution's reputation. To address these challenges, schools can adopt the following strategies: Implement strong data security measures such as access control, encryption, and regular backups to safeguard electronic records. Invest in reliable and scalable storage

solutions that can handle the volume of electronic records generated by the institution. Ensure that electronic records are fully integrated into the school's IT systems to ensure consistency and accuracy of data. Implement quality control measures to ensure the accuracy of data, such as regular audits and reviews of records. Train staff on the importance of data management and provide ongoing professional development to improve their skills in managing electronic records.

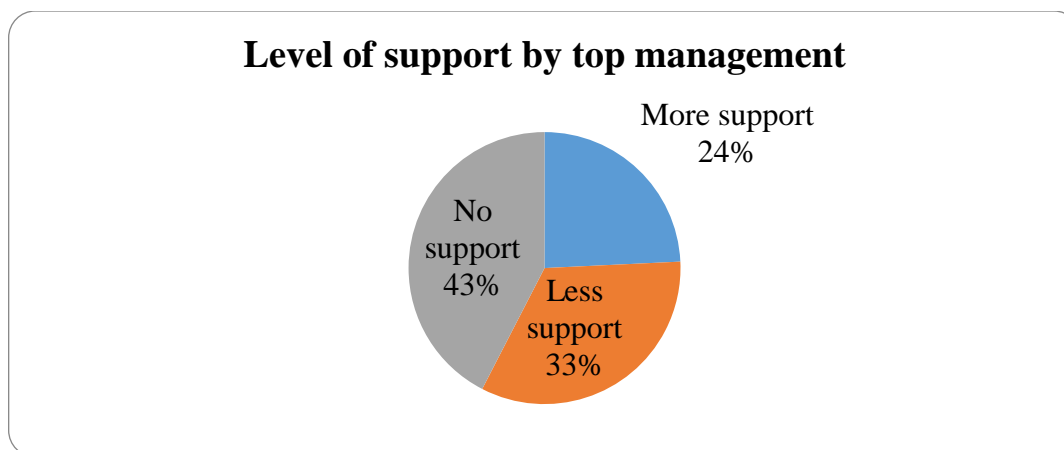
The responses from questionnaires are summarized in figure 4.2.



**Figure 4.2 Challenges on management of e- records**

Fourteen (43%) respondents said they experience a lot of challenges in managing e-records eleven (33%) experienced few challenges, and eight (24%) did not experience any challenge.

Lack of top management support was identified by a majority of the respondents. A follow-up question was asked on the level of top management support and the responses are summarized in figure 4.3.



**Figure 4.3 Level of Support by Top Management**

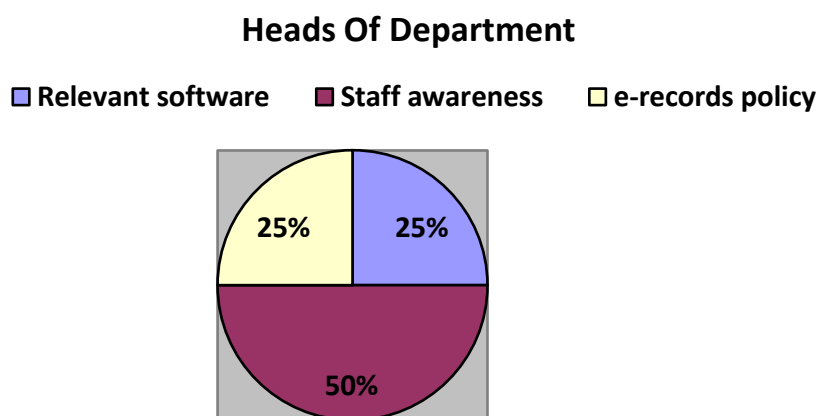
Figure 4.3 shows that JKUAT top management do not provide support to electronic records management, but three respondents said top management provides less support to e-records management programme, while 20 respondents said JKUAT top management provides no support to electronic records management programme. It is evident that JKUAT top management does not provide full support to electronic records management and, if any, it is very minimal thus resulting to poor management of students' electronic records.

All (100%) respondents said there were a myriad of challenges experienced in the management of e-records. One head of department said;

The department experienced a lot of challenges in managing e-records. First and foremost, the staff vested with the responsibility of managing these records is not well trained. Secondly, the infrastructure required for the management of these records is not adequate. Financial resources, for instance, is always insufficient, many are times that we put our requests for computers to be purchased but due to financial constraints, these machines are never bought. In fact, I sometimes think that the top management is not supportive enough to ensure that the right infrastructure is put in place.

#### 4.7 Suggested strategies to enhance management of e-records

The responses are as presented in figure 4.5. Most respondents were of the view that there is need to sensitize staff on the use of e-records. With regard to enhancing e-records management at JKUAT, 14 respondents said staff awareness is a factor, 10 said relevant software should be put in place and nine were of the opinion that a policy should be put in place. Consequently, it is clear that management challenges of e-records at JKUAT needs to be addressed by providing necessary infrastructure, such as IT equipment, formulation of policies, procurement of relevant software's and training of staff.



**Figure 4.4 Suggestion on how e-records management can be enhanced**

The study revealed that 90% of staff at JKUAT has not had any training on management of electronic records. Because of this, they continue to experience problems in managing electronic records due to inadequacy of IT skills and lack of formal training in records management. Furthermore, the existing e-records staff did not possess the necessary e-records management skills to enable them deal with e-records. There was also need for

record creators who were mostly secretaries and administrators to be trained both in IT and electronic records management since the study finding revealed that only 10% of staff handling students' e-records at the institution had some training in electronic records management. Despite the existence of various training programs within the university, the management had not taken advantage to offer training to members of staff. Training of top management would have been important because they could serve as resource persons with regard to training in electronic records management.

#### **4.8 Other mitigation measures**

Proper records management helps to support the expectation of society with regard to transparency and protection of citizen's rights. They enable governments to deliver services to citizens (e-government) and facilitate citizen participation through the provision of information and digital interaction (Shepherd, 2010).

Thus, records have to be managed as a strategic resource so as to facilitate the day to day operations of an institution. For instance, Mnjama (2004) pointed out that there are several reasons why organizations should manage records as a key resource, including: Records themselves are organizational assets because they document organizational activities and are needed for audit trails, especially in establishing who did what, why and when.

It is essential that information is captured, managed and preserved in an organized system that maintains its integrity and authenticity as well as fulfilling legal and financial requirements. According to Shepherd (2006), organizations use records to support accountability, when they need to prove that they have met their obligations or complied

with the best practice or established policies. An unmanaged record system makes the performance of duties more difficult, costs organizations all resources (e.g. time, money etc.) and makes them vulnerable to security breaches, prosecution and embarrassment.

Records management systems and procedures should facilitate compliance with university policies. Specific business functions and activities within university may be subject to specific legislation or to professional best practice or relevant ethical guidelines. Heads of institutions, schools, other units and business functions within the university have overall responsibility for the management of records generated by their activities thus ensuring that records controlled within their units are managed in a way which meet aims of the University's Records Management policies.

#### **4.9 Chapter Summary**

The chapter has discussed the findings on the data generation on students electronic management practices, a policy framework on how students' electronic data is captured, how data is managed at JKUAT and the challenges faced in managing and the strategies needed to address the challenges.

## **CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter presents a summary of research findings, draws conclusions from the findings and proffers recommendations for the study.

### **5.2 Summary of the Findings**

This part provides the summary of the findings of the study based on the research objectives,

#### **5.2.1 Diversity of e-records generated on each student**

From the findings, 79% of data formats were electronically generated, while 21% manually generated. Since the preferred data format is electronic, the university needs to give adequate support to management and maintenance of the e-records in order to ensure integrity and trustworthiness of the records/information. Different students' records generated at JKUAT include; academic reports, school fees report, attendance reports, admission reports.

According to IRMT (1999), database management applications are used to store different types of information that can be used to classify and catalogue records, track files, register users, schedule records, amongst other uses. Setting up a database to allow records office staff to search for files more quickly impacts a great deal on how the office operates. This could be the reason why challenges are obvious at the university because decentralization



of students' records has led to mishandling of the same records in certain departments due to inadequate management guidelines.

### **5.2.2 Policies that guide management of electronic records**

The study revealed that JKUAT lacks electronic records management policies which focus on ensuring compliance with relevant laws and regulations governing record-keeping, such as data protection and privacy laws (e.g., data protection act 2019), industry-specific regulations (e.g., HIPAA for healthcare), and government record-keeping standards. Organizations need to define clear retention periods for different types of electronic records. This helps avoid hoarding unnecessary data and ensures proper disposal once records are no longer needed to reduce legal and privacy risks. Strong security measures, access controls, and encryption are vital for protecting sensitive electronic records from unauthorized access, tampering, or breaches. Proper metadata and indexing are essential for efficient retrieval and searchability of electronic records, facilitating quick access to relevant information.

Standardized file naming conventions are often recommended to help employees easily identify and organize electronic records, making them more manageable in the long term. Version control mechanisms are necessary to keep track of changes made to electronic records over time. Audit trails help maintain accountability and provide a history of actions taken on records.

### **5.2.3 Management of electronic records from creation to disposal**

The finding showed that ICT is highly utilized at JKUAT, especially in regard to management of records relating to university functions and business activities such as

students' admissions, administration, finance and personnel. Most records were created or maintained electronically. However, sound electronic records management requires staff to be conversant or trained on good management practices. The finding also revealed that the most preferred e-records storage medium at JKUAT is flash discs at 30.6% because of their advantage in terms of portability, security aspects, and durability among others. Overall, the findings revealed that electronic records at JKUAT were poorly managed.

#### *5.2.3.1 Creation of e-records*

Student records at JKUAT are created in electronic formats; Electronic records are electronically captured, classified and identified to ensure that their content, structure and context of creation are fixed in time and space.

#### *5.2.3.2 Storage of E-records*

The most preferred e-records storage media were flash disks, compact disks and hard disks. Different professionals were in favor of specific e-information storage media because of reason such as security, capacity, durability and portability. However, it is evident from the findings that at JKUAT, the choice of storage medium was determined by the following: university management, security aspects, portability, durability, compact, multiple access, cost aspects, efficiency and fast access to information.

#### *5.2.3.3 Access of E-records*

E-records created are majorly on restricted access at the departmental level. Only system administrators and records managers have all the rights in managing and updating students electronic records. Access of student's records has been restricted to specific staff members in the different departments of the entire university.

#### *5.2.3.4 Security of E-records*

Security of records is extremely important, 67% of the staff indicated that data was protected by an anti-virus. Security is an important aspect of management of e-records, although securing that information can be a challenge, university need to keep vital documents in locked storage, accessible only to authorized personnel.

#### *5.2.3.5 Appraisal of e-records*

Appraisal of e-records is one of the important aspects of records management, 83.3% of the staff said that appraisal had not been done. Most of those staff only considered appraisal of records important when dealing with manual records since space is always a problem but not in automated environment.

#### *5.2.3.6 Disposal of e-records*

Disposal is the final stage in any records lifecycle, resulting in destruction of the records or their permanent, archival retention. 83.3% of the staff said that disposal of e-records has not been done, the records that are no longer useful to the creating departments are left clogging up the systems. This was in contrary to the provision of the records continuum model the underpinned the study.

#### *5.2.3.7 Status of e-records*

Most of the staff indicated that electronic records are poorly managed a situation that could be explained from the perspective of gaps identified and the number of challenges experienced.

#### **5.2.4 Challenges experienced in the management of e-records**

The study revealed very many challenges that required to be addressed if e-records were to be managed effectively. Some of these challenges included: inadequate trained staff, lack of an e-records management policy, inadequate top management support, inadequate infrastructure and storage media degradation.

#### **5.2.5 Suggestion on how e-records could be managed**

The respondents were asked to give their suggestion on how the management of e-records could be enhanced. They made several recommendations including; providing necessary infrastructure, such as IT equipment, formulation of policies, and purchase of relevant software and training of staff.

### **5.3 Conclusions**

The researcher concluded that a wide range of e-records are created that are associated with each student at JKUAT. These records include but are not limited to academic records, personal information, financial records, attendance data, research and project details, library usage, extracurricular activities, health records (if applicable), counseling and advising records, accommodation information, and digital communications. The diversity of academic e-records provided valuable insights into each student's academic journey, including courses taken, grades earned, and overall academic performance over time. The diverse e-records enable the university to offer personalized support services to students. This personalization can include academic advising, counseling, and tailored interventions based on specific needs and challenges faced by individual students. The study identified data security and privacy as critical concerns. With a wide range of e-records, it is essential

for the university to implement robust data protection measures and ensure compliance with relevant privacy regulations.

The policy framework emphasizes the importance of data governance to ensure responsible data management and protection. It sets clear guidelines for data access, data sharing, and data security measures to safeguard students' sensitive information. The policy framework outlines standardized procedures for capturing and integrating diverse e-records from different university departments and systems. This integration aims to reduce data discrepancies and create a comprehensive and accurate student profile. The framework includes provisions for data retention and disposal, specifying the duration for which certain records will be stored and the appropriate methods for securely disposing of outdated or unnecessary data. Recognizing the importance of student privacy, the policy framework incorporates provisions for obtaining informed consent from students regarding the collection, storage, and usage of their electronic records. It adheres to relevant data protection laws and regulations to safeguard students' privacy rights. The policy framework ensures that students have reasonable access to their electronic records, allowing them to review and verify the accuracy of their information. It promotes transparency in data handling practices to foster trust between the university and its students. The framework emphasizes the importance of maintaining data accuracy and quality. Regular data audits and verification processes are established to identify and rectify any inconsistencies or errors in the electronic records.

Effective records management starts with the systematic creation of records. JKUAT's implementation of standardized procedures ensures that relevant data is captured accurately

and promptly, allowing for comprehensive and reliable information. The university prioritizes secure storage and controlled access to captured records. Utilizing secure electronic databases and physical repositories ensures data integrity and confidentiality while enabling authorized personnel to retrieve information efficiently. Properly managing metadata and indexing enhances the accessibility of records. These practices provide valuable context and aid in quick retrieval, improving decision-making and response times.

One of the most significant challenges is ensuring the security and privacy of students' electronic records. With sensitive personal information and academic data stored electronically, universities must implement robust cybersecurity measures to prevent data breaches and unauthorized access. JKUAT may face difficulties in integrating diverse electronic record systems across various departments and platforms. Incompatibility issues between different systems can lead to data discrepancies and hinder the establishment of a unified record management system. The exponential growth of electronic data places a strain on storage systems and creates difficulties in managing vast amounts of information effectively. This challenge necessitates scalable and efficient data storage solutions.

Developing appropriate retention and disposal policies for electronic records can be complex, as it requires aligning with legal requirements, industry standards, and the specific needs of the university. Failure to properly manage records' lifecycle might lead to information overload or non-compliance issues. Ensuring the accuracy and quality of electronic records is essential for informed decision-making. However, inaccuracies or errors in data entry or maintenance can compromise the reliability of information, impacting academic and administrative processes.

JKUAT should invest in robust cybersecurity measures to protect electronic records from data breaches and unauthorized access. Implementing encryption, multi-factor authentication, and regular security audits can bolster data security. The university should work towards integrating and standardizing electronic record systems across departments. Adopting a unified records management system will ensure consistency, data integrity, and ease of data retrieval. To manage the increasing volume of data effectively, JKUAT should invest in scalable data storage solutions that accommodate the growing electronic records without compromising performance. Develop clear and well-defined retention and disposal policies for electronic records in accordance with legal requirements. Regularly review and update these policies to ensure compliance and efficient data lifecycle management. Implement data quality assurance processes to verify the accuracy and reliability of electronic records. Regular data audits and validation procedures will help identify and rectify data errors promptly. Conduct comprehensive training and awareness programs for staff to enhance their understanding of proper data handling, version control, and record management practices. Educate staff on data privacy and security measures to reduce human errors.

#### **5.4 Recommendations**

All the interdependent departments of the university who create and use students e-records on their daily events should be involved in development of systems and implementation of the same systems and emphasis on top management involvement. Inadequate records management practices in any organization may lead to decentralization of corruption, delayed service delivery, duplication of services, lack of accountability, poor governance and poor decision-making processes and this might lead to collapse of an institution

For efficient and robust e-records management the university must provide integrated e-service management system that guarantees efficiency and reliability of services. This is because e-records are indispensable and significantly valuable resource which dictates all activities of the university.

The university should comprehensively embrace information communication technology (ICT) to enhance quality e-records through sound and secure e-records management.

The university should develop a policy framework to ensure that JKUAT is in compliance with applicable data protection regulations, such as the Kenya Data Protection Act, 2019, and any other relevant data protection regulations. The policy framework should clearly define the purpose and scope of student data collection and ensure that data is collected only for legitimate purposes, such as academic and administrative functions.

The researcher recommends that the university through its respective department should formulate a guideline on how new students' electronic records are created, used and eventually disposed in order to have a universal format across the entire university and avoid un authorized creation or disposal of student's electronic records

The study recommended that in order for the records management staff to update and improve their skills there is need for the organizations to identify and develop programs in records management in form of short-term courses, workshops and advanced education for those without records and archives knowledge. The training should be based on Training Needs Assessment (TNA) and provided to records managers, registry staff, clerical officers, action officers and secretaries since they are the ones who mostly handle students



e-records in their respective departments during their daily work activities at JKUAT. Training Needs Assessment means conducting a training based on areas identified to be of weakness among the named staff members.

For the university to avoid audit queries by the ministry of education/government auditor general they have to provide an elaborate and clear account of activities through elaborate e-records management system and finally demonstrate an acceptable level of transparency.

The researcher also recommends that, the university to increase budgetary allocation and funding sufficient enough to sustain the university e-records management. this should be through well elaborate budget plan prepared by the authorized records manager

JKUAT should have robust security measures in place to protect electronic records from cyber-attacks and unauthorized access. This can include firewalls, data encryption, and access controls. JKUAT should establish regular data quality checks to ensure that electronic records are accurate, complete, and consistent. This can be achieved by assigning data quality roles to specific personnel, conducting data audits, and implementing data quality assurance procedures

### **5.5 Suggestion for further research**

Further research on evaluating students' electronic records management practices at Jomo Kenyatta University of Agriculture and Technology, Kenya, could delve into the following areas:

Conduct surveys or interviews with students to assess their experience and satisfaction with the university's electronic records management system. Understand their perceptions, challenges faced, and suggestions for improvement.

Investigate the relationship between students' utilization of electronic records and their academic performance. Analyze whether better access to records positively influences academic achievements and retention rates. Examine the university's compliance with data privacy and security regulations concerning electronic records management. Assess the effectiveness of measures implemented to protect students' sensitive information. Evaluate the effectiveness of training and awareness programs provided to students on using the electronic records management system.

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## APPENDICES

### Appendix I: Introduction Letter

School of Information Sciences,  
Department of Library, records and archives management,  
Moi University,  
P.O. Box 63056-00200,  
NAIROBI.

I am a postgraduate student at Moi University undertaking a Master's course in Records and Archives Management. I am carrying out a research to evaluate student's electronic records at Jomo Kenyatta University of Agriculture and Biotechnology.

This study has been influenced by the fact that most offices in public universities create and maintain electronic records but its management as not been proper and clear due to factors which are associated with ICT.

The information you provide will be used exclusively for academic purposes and shall be treated as strictly confidential.

Yours Faithfully,

Philip K. Rotich

**Appendix II: Questionnaire for officers who deal with Students Electronic Records at  
JKUAT**

**1. General information**

- i. Staff category .....
- ii. Department .....
- iii. Section .....
- iv. What is your level of competence/skills in ICT (please tick appropriately)

- Basic
- Advance
- Non

Others specify .....

.....

.....

**2. Electronic record management practices**

- i. Do you utilize Information Communication Technologies in most of your office activities? Please tick the appropriate.

Yes  No.

- ii. If yes in question 1 above elaborate which specific activities.....

.....

.....

.....

- iii. Are student's records created and maintained electronically? Tick appropriately

Yes.  No.

iv. If yes in question 3 above how do you go about managing students electronic records created?

.....  
 .....

v. In what formats do you maintain the students electronic records created? Tick appropriately

- a. E-mail
- b. Internet content
- c. Spreadsheets
- d. Drawings
- e. Databases
- f. Digitally recorded images
- g. Computer hard disk
- h. Compact discs
- i. Microforms
- j. Floppy diskettes
- k. Cassette tapes
- l. Voice mail systems
- m. Videotapes
- n. Zip discs

Others specify.....  
 .....  
 .....

vi. From your own experience how can you judge the management practice of students records in electronic format created in Jomo Kenyatta University of Agriculture and Technology? Tick Appropriately

- a. Very well managed
- b. Well managed
- c. Poorly managed
- d. Not managed

vii. What should be done to integrate electronic records management and computer based systems in the university? Tick appropriately

- a. Purchase relevant software
  - b. Staff awareness
  - c. Implementation of Electronic records management policy
- Others specify.....

.....

.....

What are the advantages of storing records electronically? Tick appropriately

- a. Efficiency and effectiveness
- b. Security of information
- c. Fast retrieval
- d. Fast access

Others specify.....

.....

.....

viii. What storage media are you likely to adopt? Tick appropriately

- a. Compact discs
- b. Microforms
- c. Floppy diskettes
- d. Cassette tapes
- e. Videotapes
- f. Zip discs
- g. Computer hard disk

Why?

Specify.....

.....

.....

ix. What do you do with web based/electronic records that are no longer required? Tick appropriately

- a. Retain them
- b. Destroy
- c. Transfer to archive

Others

specify.....  
 .....  
 .....

x. How do you ensure the security of student’s electronic records/information you maintain in your computers? Tick appropriately

- a. Antivirus
- b. Uninterruptible Power Supply
- c. Electronic records management policy
- d. Staff awareness

Others specify.....  
 .....  
 .....

**3. Challenges associated with electronic records management**

i. How does the management value the activity of electronic records management? Tick appropriately

- a) Highly valuable
- b) Less valuable
- c) Valuable
- d) No value

ii. What problems do you experience in maintaining students electronic records?  
 Tick appropriately

Obsolescence



- Security problems
- Virus problems
- Authenticity
- System compatibility
- Capture of electronic records
- Updating of electronic records
- Records overload

Others specify.....  
 .....  
 .....

- iii. In your own opinion how can these challenges be addressed? Tick appropriately
- a. Implementation of electronic records management programme
  - b. Staff training
  - c. Integration of students electronic records management with conventional computerized systems

Others specify.....  
 .....  
 .....

**4. Implementation of an electronic records management policy**

- i. Is there a policy in Jomo Kenyatta university of agriculture for the management of students electronic records?

Tick appropriately

Yes  No

ii. If yes in question 1 above, please state what the policy should address .....

.....  
 .....

What should be done in your opinion that  improve students' electronic records management in JKUAT? Tick appropriately

- a. Electronic records management policy
- b. Acquisition of hardware and software
- c. Staff training
- d. Integration of electronic records management with conventional computerized systems

.....  
 .....

iii. What should a comprehensive student's electronic records management policy address?

Tick appropriately

- a. Staff awareness
- b. Harmonization of conventional and computer based systems
- c. Acquisition of equipment
- d. Staff training
- e. Streamlining of procedures
- f. Reduce expenses
- g. Accuracy
- h. Reliability
- i. Authenticity
- j. Completeness
- k. Capture
- l. General management of e-records

Others specify.....

.....  
 .....

Thank you for your cooperation

### **Appendix III: An interview schedule for officers who deal with students electronic records at JKUAT**

This interview schedule is intended to solicit views, opinions and suggestions from the officers who deal with students electronic records at JKUAT

It aims at providing the officers who handle student's electronic records an opportunity to make contributions towards the improvement of services in their respective department and eventually the entire university. It will benefit both the staff and the students. The information obtained will be treated with CONFIDENTIALITY.

#### **1. General information**

- 1) Staff category .....
- 2) Department .....
- 3) Section .....
- 4) What is your level of competence/skills in ICT?

• Basic

• Advance

• Non

Others specify .....

.....

.....

#### **2. Electronic record management practices**

- i. Do you utilize Information Communication Technologies in most of your office activities?
- Yes No.

ii. If yes elaborate which specific activities.....  
 .....  
 .....

iii. Are students records created and maintained electronically?

Yes.

No.

iv. If yes, how do you go about managing students electronic records created?

.....  
 .....

v. In what formats do you maintain the students electronic records created?

- a. E-mail
- b. Internet content
- c. Spreadsheets
- d. Drawings
- e. Databases
- f. Digitally recorded images
- g. Computer hard disk
- h. Compact discs
- i. Microforms
- j. Floppy diskettes
- k. Cassette tapes
- l. Voice mail systems
- m. Videotapes
- n. Zip discs

Other specify .....  
 .....  
 .....

vi. From your own experience how can you judge the management practice of students records in electronic format created in Jomo Kenyatta University of Agriculture and Technology?

a. Very well managed

b. Well managed

c. Poorly managed

d. Not managed

vii. What should be done to integrate electronic records management and computer-based systems in the university?

a. Purchase relevant software

b. Staff awareness

c. Implementation of Electronic records management policy


Others specify .....

.....

.....

viii. What are the advantages of storing records electronically?

a. Efficiency and effectiveness

b. Security of information

c. Fast retrieval

d. Fast access

Others specify .....

.....

.....

ix. What storage media are you likely to adopt? Tick appropriately

- a. Compact discs
- b. Microforms
- c. Floppy diskettes
- d. Cassette tapes
- e. Videotapes
- f. Zip discs
- g. Computer hard

Why? Specify .....

.....

.....

x. What do you do with web based/electronic records that are no longer required?

- a. Retain them
- b. Destroy
- c. Transfer to archive

Others specify .....

.....

.....

xi. How do you ensure the security of student's electronic records/information you maintain in your computers?

- a. Antivirus
- b. Uninterruptible Power Supply
- c. Electronic records management
- d. Staff awareness

Others specify .....

.....

.....

**3. Challenges associated with electronic records management**

i. How does the management value the activity of electronic records management?

- a. Highly valuable
- b. Less valuable
- c. Valuable
- d. No value

ii. What problems do you experience in maintaining students electronic records?

- Obsolescence
- Security problems
- Virus problems
- Authenticity
- System compatibility
- Capture of electronic records
- Updating of electronic records
- Records overload

Others specify .....

.....

.....

iii. In your own opinion how can these challenges be addressed? Tick appropriately

- a. Implementation of electronic records management programme
- b. Staff training
- c. Integration of students electronic records management with conventional computerized systems

Others specify .....

.....

.....

iv. Implementation of an electronic records management policy

- a. Is there a policy in Jomo Kenyatta University of agriculture for the management of students' electronic records? Yes  No

b. If yes, please state what the policy should address .....

.....

.....

c. What should be done in your opinion that can improve student's electronic records management in JKUAT? Tick appropriately

- a. Electronic records management policy
- b. Acquisition of hardware and software
- c. Staff training
- d. Integration of electronic records management with conventional computerized systems

Others specify.....

.....

.....

d. What should a comprehensive student's electronic records management policy address?

- a. Staff awareness
- b. Harmonization of conventional and computer-based systems
- c. Acquisition of equipment
- d. Staff training
- e. Streamlining of procedures
- f. Reduce expenses
- g. Accuracy
- h. Reliability
- i. Authenticity
- j. Completeness
- k. Capture
- l. General management of e-records

Others specify.....

.....

Thank you for your cooperation



**Appendix IV: Interview schedule for senior administrative staff.****Part I**

Designation and /or position.....

**Part II**

- 1) What are the main functions of your office?
- 2) For how long have you worked in the department?
1. Which of the following aspects of your work cause you to use student's electronic records?
  - a. Preparing reports
  - b. Legal purposes
  - c. evaluation of students performance
  - d. Planning
  - e. Decision-making
  - f. Financial purposes
2. In what way could you say that you support the management of students electronic records use in order to improve service delivery?
3. Please highlight some of the problems you encounter when you need student electronic record.
4. Do you think that effective records keeping can contribute towards better provision of service delivery?
5. In what ways do you think the introduction of ICT has contributed towards management of students electronic records?
6. Please suggest ways in which management of students electronic records can be improved to make it more effective and efficient in provision of services.

Thank you for your cooperation. Your help is much appreciated.

**THANK YOU**

**Appendix V: JKUAT Departments**

1. Social science/humanities,
2. School of human resource development,
3. Dean of students,
4. Finance,
5. Academic,
6. Land resource and animal science,
7. Electrical engineering,
8. Dean faculty of agriculture,
9. College of engineering,
10. Dean faculty of science,
11. Continues education programme,
12. Alternative degree program,
13. Library,
14. Sports and games,
15. Halls of residence,
16. Pure and applied math's,
17. Statistics and actuarial science,
18. Food science,
19. Civil engineering,
20. Landscape architecture,
21. Faculty of architecture & building science,
22. Research production & extension,
23. Board of post graduate studies,
24. Information and communication technology,
25. School of mechanical engineering,
26. Electrical and electronic engineering,
27. Zoology,
28. Physics,

29. Botany,
30. Biochemistry,
31. Institute for biotechnology research,
32. BEED,
33. Construction management,
34. E-learning,
35. INTROMID,
36. Computer science & IT,
37. Telecom & information engineering,
38. Horticulture,
39. Commerce and economic studies,
40. Medical laboratory science,
41. Mechanical Engineering,
42. Mechatronic Engineering,
43. Chemistry,
45. Computing,
46. Farm,
47. Procurement,
48. Hospital,
49. Bookshop,
50. Food technology center,
51. Engineering workshop,
52. Medical microbiology.

## Appendix VII: Pretest Checklist

## Pretest Checklist for the Questionnaire

a) Does the questionnaire have any typographic errors?

Yes  No

b) If yes please indicate them in the questionnaire

a) Are there any misspelt words in the questionnaire?

Yes  No

b) If yes please indicate them in the questionnaire

a) Are the questions relevant to the respondent?

Yes  No

b) If no, please provide suggestions

---

a) Does the questionnaire contain direct questions?

Yes  No

b) If yes provide suggestions below

---



---

6. (a) Are the questions presented in a systematic and logical manner?

Yes  No

(b) If yes provide suggestions below

---



---

1. (a) Are the questions easily understood?

---

### Appendix VI: Research Permit

99

#### Appendix VI: Research Permit



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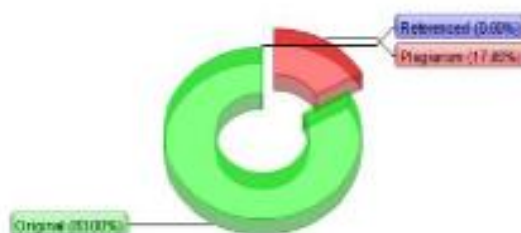
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