Tools and Methods used for Knowledge retention at the Natural Resources Development College in Zambia
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Abstract—*The objectives of the study were to identify tools and methods used for knowledge retention at the Natural Resources Development College. A case study methodology was adopted; with a sample size of 86 (questionnaire respondents) and 16 (administrative interview respondents, making a total of 102. A semi-structured questionnaire was used to collect data from lecturers and interviews were held with administrative staff at the College as well as a review of existing literature. SPSS was used for statistical processing.*

The findings indicate that 46.6% of the respondents indicated that paper records were the major knowledge storage media; followed by 24.1% of the respondents who indicated flush disks; 14.7% of the respondents who indicated databases; 10.3% of the respondents who indicated lessons learned archives and the least used knowledge storage media was audio tapes which was indicated by three respondents representing 4.3%. The study concludes that knowledge tools and methods are critical to sustaining knowledge retention programmes in organisations.

Keywords: Knowledge Retention; Knowledge Retention Tools; Knowledge Retention Methods

I. INTRODUCTION

The need to manage organisational knowledge has emerged as one of the cardinal factors in the success of many organisations. In order for knowledge produced by an organisation to make a meaningful contribution to that organisation's success, that knowledge requires to be used, retained and preserved in the organisation so that it is not lost and can be used for future generations. Knowledge retention refers to all systems and activities that capture and preserve knowledge and allow it to remain in the organisational system once introduced. It includes all activities that maintain the viability of knowledge within the system (Newman and Conrad, 1999). As for Kim (2005), knowledge retention is the capture of knowledge and expertise from employees before they leave an organisation. In situations where members of staff such as lecturers decide to leave the organisation, knowledge retention ensures continuity of knowledge that will be imparted to their learners. Knowledge, expertise and skills are found in organisational employees' heads. Therefore, when such people leave, the knowledge is lost unless there are measures put in place by the organisation to capture, preserve and transfer that knowledge to a space that is secure.

Sometimes, as Kim (2000) alleges, knowledge retention is used to develop appropriate approaches for capturing the extensive knowledge of experts who are ready to retire and retaining it as organisational knowledge (Kim, 2000). In a similar vein, Shaw and Williams (2009) argue that the retention of knowledge for knowledgeable employees is a critical economic resource and a core element required to achieve significant competitive advantage of for that particular organisation. According to Walsh and Ungson (1991), the contexts of knowledge retention within an organisation include individuals, structures, organisational culture and the physical structure of the workplace. More recently, knowledge has appeared as the most strategically important resource for companies and organisations (Grant, 1996) and therefore losing it would affect organisational performance. It is in this context that organisations that fail to manage knowledge are likely to be at a disadvantage when employees with tacit knowledge move to another organisation in response to incentives, or when such employees retire or die. The need to manage organisational knowledge has emerged as one of the many challenges faced by organisation the world over. In this regard there are many knowledge retention methodologies that have been proposed and implemented by different organisations (Hussain, Lucas and Ali, 2004 and Omotayo, 2015). However, for this research and as a way of retaining College knowledge, knowledge acquisition, knowledge assessment and knowledge transfer are considered as critical components that need integration and retention in order to have a successful organisational knowledge retention programme. This is in line with a well-known retention strategy by Delong (2004).

II. STUDY CONTEXT

Natural Resources Development College (NRDC) is one of the ten colleges in Zambia under the Ministry of Agriculture and Livestock. The College campus is located on 304 hectares of land which is sixteen kilometres from the Lusaka city centre on the Great East Road. Since its inception, the College has trained thousands of graduates who are today contributing to the growth of the agricultural sector in Zambia as senior staff in government, lecturers in colleges; while others are practicing farmers (NRDC, 2007). The lack of technically trained personnel at the time of independence in 1964 was among the major constraints to the rapid growth in the economy of the Republic of Zambia. To ameliorate the situation, a number of programmes were launched at various institutions of learning during the Transitional Development Plan (TDP). The Natural Resources Development College, a product of TDP started its training programmes in the context of manpower amelioration (NRDC, 2007). NRDC was established in 1965 under the Ministry of Agriculture and Rural Development with the objective of offering a Diploma and Certificate in agriculture.

The College admitted the first group of students in March 1965 for two-year diploma courses and a one year certificate course in Home Economics. After the three initial courses, the college later developed several specialisations such as: General Agriculture, Agriculture Education, and Engineering. General Agriculture was later split into Crop Science Major, Agriculture Business Management Major and Animal Science Major. Engineering was also split into Agricultural Engineering and Water Development. The latter subsequently became Water Engineering, whilst Home

Economics became Food and Nutrition and was converted into a diploma course. A Fisheries course was also later introduced at Diploma level. The first three-year diploma courses started in 1969 (NRDC, 2007). In 1976, the College was affiliated to the University of Zambia; which then enabled the University to underwrite the College Diplomas. The institution also offers distance education and learning in conjunction with the University of Zambia, which commenced in 2007 (NRDC, 2010).

The mandate of NRDC includes the following:
- To train middle-level human resource for the agricultural and related sectors;
- To conduct research and offer consultancy services;
- To offer tailor made short courses; and
- To conduct and offer outreach services in agriculture and related fields to communities within the country (immediate surroundings and outlying areas of the country).

Its mission is to train high calibre human resources, conduct research and consultancy and undertake business ventures to promote agricultural development that will ensure food production, wealth creation and proper natural resources management responsive to the needs of the local and international communities. Furthermore, the goal of the institution is to significantly contribute to the country's Agriculture Production and related disciplines through training of high calibre human resources and conduct applied research and consultancy in agriculture and related disciplines (NRDC, 2013). Natural Resources Development College shares similar knowledge retention

concerns with other African Colleges; however, the institution has a unique situation involving staff being employed on two conditions of service. One is the Permanent and Pensionable Conditions while the other is Part Time Basis (NRDC, 2012). These conditions of services have implications on knowledge retention based on the following assertions: Permanent and pensionable staff have operational relevant institutional knowledge whilst Part time staff are assets for continuity who require integration and nurturing in college operations and after working for some time become fully knowledgeable of college operations.

III. STATEMENT OF THE PROBLEM
Knowledge retention is important to a higher institution of learning continued existence so that knowledge created today can be utilised today and tomorrow. In order for knowledge retention to be successfully retained in an organisation; it is important that the appropriate tools and methods are utilised in that organisation's knowledge retention programmes. However, the tools and methods that are used for knowledge retention at the Natural Resources Development College in Lusaka Zambia are not known and have not been reported in the literature that the researchers reviewed.

IV. OBJECTIVE OF THE STUDY
The objectives of the study were to identify tools and methods used for knowledge retention at the Natural Resources Development College (NRDC).

V. METHODOLOGY
A case study methodology was adopted for the study. The total sample size was 86

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(questionnaire respondents) and 16 (administrative interview respondents, making a total of 102. A probability sampling method called systematic random sampling was used. A serial number was given to the population. In this method every nth element was selected from a list of a population having serial numbers. In order to select respondents to be included in this study from the total population of 152 members of staff excluding those persons in administrative positions at NRDC, every 2nd person was selected. A sample of 86 was selected using the following formula: 152/2 + 10 =86; where 152 is the total population of lecturers and 10; was added to give an allowance for non-respondents. A semi-structured questionnaire were used to collect data from this sample. Sampling for the participants to be interviewed was achieved through a non-probability sampling technique called purposive sampling. A total of sixteen participants were purposively selected for interviews. These were selected on the basis of the administrative positions they held at the institution; such as Heads of Department. Interviews were conducted with administrative staff at the College. In addition a review of existing literature was done to gather more relevant data on tools and methods of knowledge retention at NRDC. Quantitative data analysis was done using the Statistical Package for the Social Sciences (SPSS) and thematically for qualitative data.

VI. FINDINGS

A. Background Information on the Respondents
A total of 86 questionnaires were distributed among staff at NRDC, out of which 70 questionnaires were completed and returned giving a response rate of 70/86= 81.4%. See Table 1. Additionally, Sixteen (16) interviews were held with people who held administrative positions at the Natural Resources Development College.

Table 1: Distribution of Respondents by Gender

Gender	Freq	%
Male	37	53
Female	33	47
Total	**70**	**100**

Out of a total number of 70 respondents, there were 53% male and 47% female respondents. In terms of age, the majority of the respondents, 38% were between 35 and 44 years old. Another 31% of the respondents were aged between 45 and 54 years old. This was followed by 29% of the respondents who were aged above 55 years old; while two 2% were between 15 and 24 years old. The findings indicate that 38% of the respondents were aged between 35 and 44 years old.

B. Highest Level of Education Attained
Out of the total number of 70 respondents, most of the respondents, 40% had a Bachelor's Degree while one (1%) of the respondents had a Postgraduate Diploma. The findings suggest that the majority of the respondents had Bachelor's Degrees. See Table 2.

Table 2: Respondents' highest academic qualification

Qualifications	Freq	%
Doctorate	2	3
Masters	18	26
Postgraduate Diploma	1	1
Bachelor's Degree	28	40
Diploma	14	20
Certificate	7	10
Total	**70**	**100**

C. Number of years worked at NRDC

Majority of the respondents (N=70, 41.4%); had worked at NRDC for five years and below while only one (1.4%) respondent had worked for 26 years and above. Table 3.

Table 3: Respondents' work experience

Work experience	Freq	%
5 years and below	29	41
6- 10 years	18	26
11- 15 years	12	17
16- 20 years	4	6
21- 25 years	6	9
26 years and above	1	1
Total	**70**	**100**

D. Specialisation Area

Respondents were asked to indicate their areas of specialisation. The responses in Table 4 show that 14% of the respondents were specialised in Animal Science and Agricultural Business Management, 13% were specialised in Basic Science and Fisheries and Agricultural Engineering, respectively, 12% of the respondents specialised in Crop Science, while the remaining 4% of the respondents either specialised in Education Extension, Food Nutrition or Water Engineering. As shown in Table 4, the majority of the respondents did not have a specific area of specialisation.

Table 4: Area of Specialisation for respondents

Area of Specialisation	Freq	%
Did not have area of specialisation	15	22
Animal Science	10	14
Agricultural Business Management	10	14
Basic Science and Fisheries	9	13
Agriculture Engineering	9	13
Crop Science	8	12
Education Extension	3	4
Water Engineering	3	4
Food Nutrition	3	4
Total	**70**	**100**

F. Tools and Methods used for Retaining Knowledge

When the respondents were asked to indicate the tools and methods used for retaining knowledge, the findings in Figure 1 show that 44.6% of the respondents indicated that the most common tool/method used to retain knowledge was documentation process, 31.4% of the respondents reported that they were using mentoring of new employees, 11.6% of the respondents reported that they were archiving the knowledge, 6.6% of the respondents reported that they were using the method of interviewing retirees and recording their experiences, 5.8% of the respondents reported that they were using the method of using retirees as consultants. The interviewees were also asked on the methods they used to capture, preserve and retain knowledge at NRDC. The responses from the interviewees were:

> *"Research and consultancy; Electronic and modules (Manuals); Documentation process; Reports writing, internet and sharing with staff; and Mentoring programme and meeting with staff".*

When the interviewees were asked to state their recommended method that should be used to retain knowledge that may be lost, they stated that:

> *"Extending of retirements age, mentoring programmes, documentation process, paper presentation on the subject and establish departmental resource centres".*
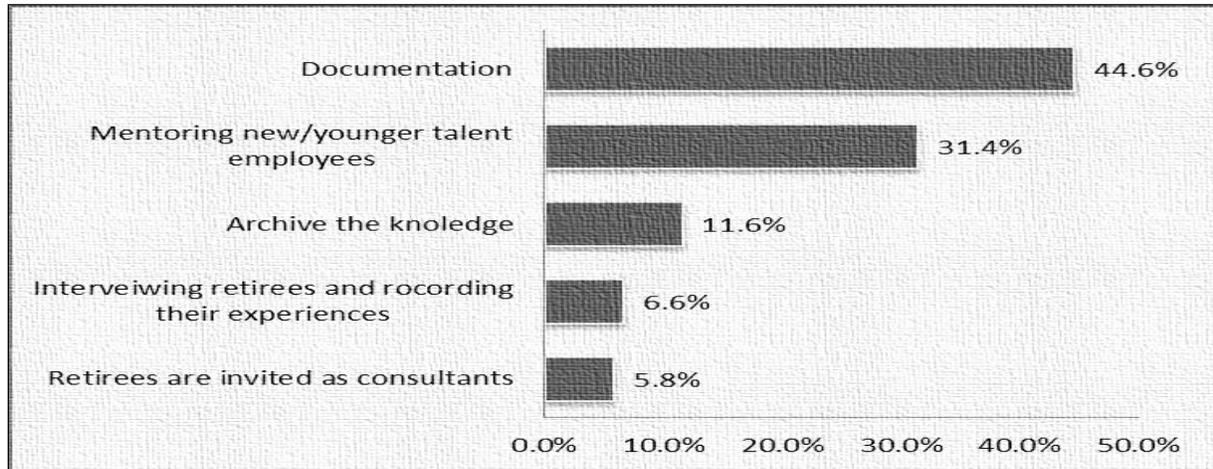
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Figure 1: Method/Way of retaining organisational knowledge

G. Knowledge Storage Media

The respondents were asked to indicate the knowledge storage media that was used to store knowledge at the College; as a way of finding out the most preferred tool/method of knowledge retention at the college. From the findings, 46.6% of the respondents indicated that paper records were the major knowledge storage media. This was followed by 24.1% of the respondents who indicated flash disks, 14.7% of the respondents who indicated databases, 10.3% of the respondents who indicated lessons learned archives and the least used knowledge storage media was audio tapes which was indicated by three respondents representing 4.3%. The findings seem to suggest that paper records were used as a major knowledge storage media at the Natural Resources Development College. See Fig. 2.
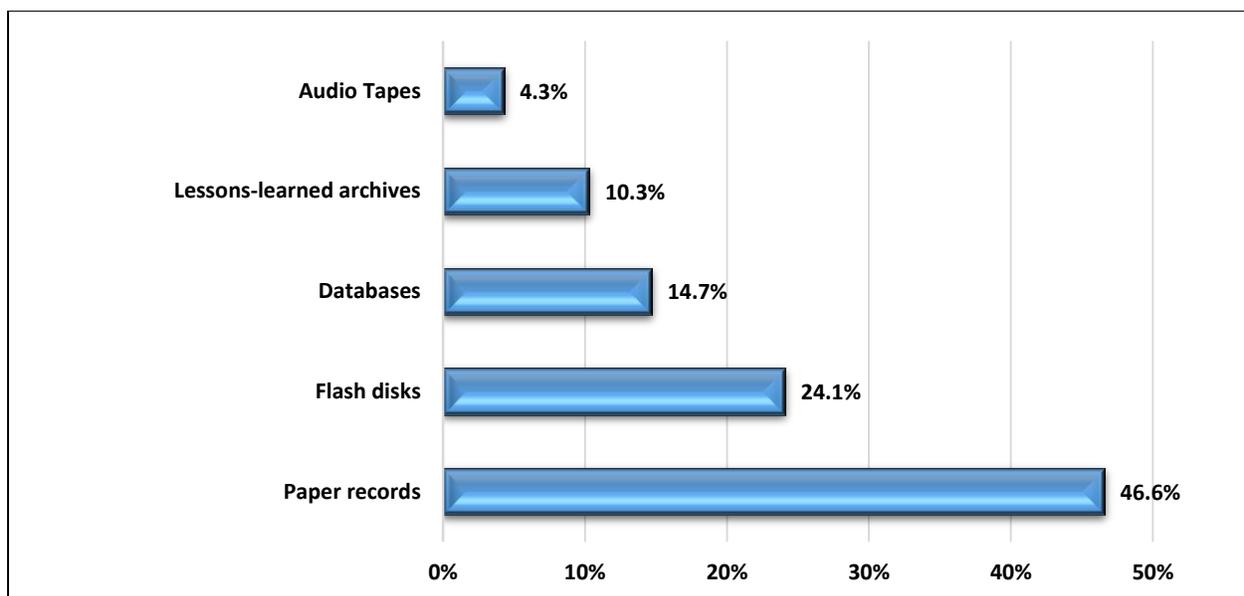
Figure 2: Knowledge Storage Media

H.Information and Communication Technologies (ICT)

When the respondents were asked to indicate the type of ICTs they had access to in their departments for carrying out their work, the findings in Figure 3 show that 20% of the respondents reported that they had access to computers, 18% of the respondents had access to intranet/electronic mail, 14% of the respondents had access to telephone/cell phone, 11% of the respondents were using websites and discussions forums,

respectively. This question was asked so as to

ascertain whether the respondents had ready access ICT facilities in the college. Information and Communication Technologies such as virtual conference rooms, twitter, blogs and knowledge directories were among those that were insignificantly used by the staff at the Natural Resources Development College. The findings of the study revealed that the computers were the most used ICTs by staff to conduct their work. See figure 3.
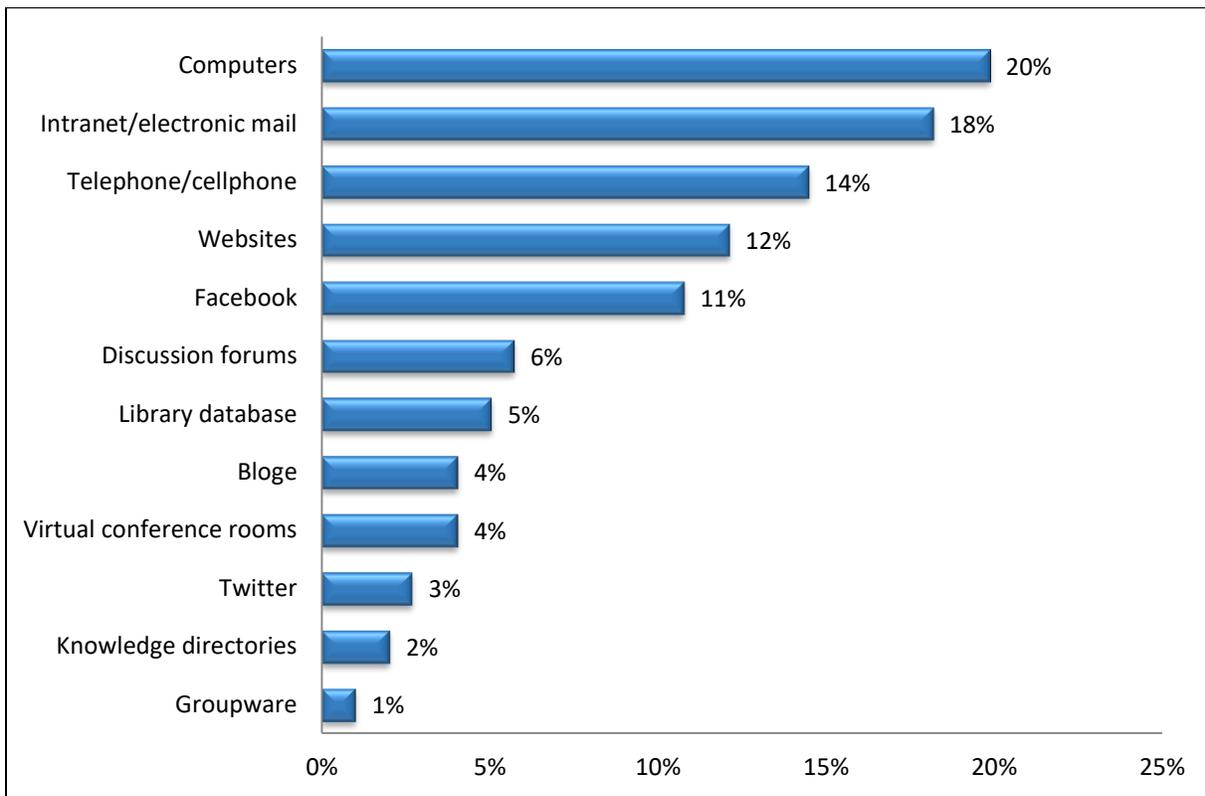

Figure 3: Information and Communication Technologies available for use at NRDC
Note: Bloge refers to Blog or Blogs

Respondents were also asked to indicate whether the Internet was freely accessible to every employee at NRDC. The majority 64.3% of the respondents answered in the

affirmative, while 35.7% of the respondents said no. When the interviewees were asked to indicate how they use ICT's to retain organisational knowledge. The responses were:

"They use computers to store necessary data, information, knowledge, notes and documents. Email for sharing notes and documents".

VII. DISCUSSION OF THE FINDINGS

When the respondents were asked to indicate the knowledge storage media that was used to store knowledge at the College, the study revealed that most of the staff were using paper records. This finding shows how widely paper records are used as tools for knowledge retention at the Natural Resources Development College. This was followed by 24% of the respondents who were using flash disks. The use of audio tapes as knowledge storage media was not so popular at NRDC. This could be attributed to the fact that paper is easier to use and cheaper compared with other storage media. However the findings also indicate that there is a danger that the college is not keeping up to date with modern tools of knowledge retention. The findings of this study on the tools and methods used for knowledge storage at the Natural Resources Development College are in line with Hernandez (2006). He pointed out that knowledge had to be captured and stored in organisations storage facilities which he identifies as databases, documents, software and embedding it in processes, products and services thus transferring the existing knowledge around in the organisation.

When the respondents were asked to indicate the type of ICTs they were using to do their daily works at NRDC, Most of the staff (respondents) reported that they were using computers, while others were using the Intranet to access electronic mail,

telephone or cell phone, websites and discussions forums, respectively. However, it was not surprising to find out that virtual conference rooms, twitter, blogs and knowledge directories were among those that were insignificantly used by the staff at the Natural Resources Development College because they were introduced recently, while the majority of the staff are made up of the older generation. In addition, the most common use of websites was browsing or search for information on topics of interest. According to Turban, Mclean and Wetherbe (2004), the use of modern information technologies is intended to help an organisation cope with turnover, downsizing by making the expertise of the organisation's human capital widely accessible; build to maintain a well-informed productive workforce, help large organisations provide a consistent level of customer service and also help organisations retain the knowledge of departing employees.

It is critical that NRDC seize this moment and takes advantage of the available modern tools of knowledge retention. The findings of the study agree with Hansen, Nohria and Tierney (1999) who pointed out that computers are used to share knowledge through person to person contacts and this is called personalisation strategy. The chief purpose of computers at some organisations is to help people communicate knowledge, not to store it. In a study conducted by Mavodza and Ngulube (2011) the majority 64% of the respondents indicated that the knowledge they needed to perform their job functions was retained in their computer or workstations. This is an indication that computers can be utilised to transfer knowledge as well as to store knowledge. Hansen, Nohria and Tierney (1999) have

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already pointed out that the rise of networked computers has made it possible to codify, store and share certain kinds of knowledge more easily and cheaply than ever before. Therefore, it can be argued that the use of technology in Higher Learning Institutions provides an avenue through which knowledge amongst workers can be shared effectively and efficiently.

With regard to the methods that were used to retain organisational knowledge, the study revealed that at the Natural Resources Development College, documentation was the most common methods that was used to retain organisational knowledge. This was followed by mentoring of new employees and archiving of the organisational knowledge. The documented explicit (codified) knowledge was the main knowledge found at NRDC. Hernandez (2006) argues that organisations need to document and retain the knowledge of their key personnel and subject matter experts, manage this intellectual capital before it simply walks out of the door resulting in organisations losing valuable intellectual capital, namely knowledge, talent, experience and expertise. Levy (2011), also reports that successful knowledge retention can be achieved through documenting, integrating knowledge back into the organisation but special care must be dedicated to retaining best practices. Similarly,

Mentoring was another common method that was used to retain organisational knowledge at NRDC. It was established that senior employees were transferring their knowledge, wisdom, specific insights and skills to their juniors such that when the experienced employees leave the organisations or die the organisation's

substantive practice, knowledge, history, stories and culture are preserved. Mentors gently transfer subtle, private skills and experiences to others as role-models thus introducing mentors to their network in an informal setting. Therefore, the impact of attrition could be reduced by making use of appropriate knowledge retention approaches to capture knowledge and information in organisations such as the Natural Resources Development College. Vellore (2015) argues that "documentation can be very useful for on boarding new employees or for training an employee to cover a specific task, but it can only go so far in transferring knowledge and skills". In order for an organisation to go far, they need to consider mentoring for he says mentoring is a tool that can be used in knowledge transfer through;

> "*Transfer knowledge from seasoned employees to newer employees; Reinforce current skills of both mentor and mentee and Establish camaraderie in the workplace*".

According to Tress (2016), mentoring in their company was used as an "element of an enterprise wide knowledge sharing initiative designed to help it stay competitive and maintain technical excellence". Mentoring is therefore an essential component of any knowledge retention programme in an organisation and for that organisation to successfully retain its knowledge, this is an aspect that needs to feature prominently in the knowledge retention programmes of that organisation. NRDC being a higher learning institution has a library. This means that the library needs to strive to keep all the institutions memory that is published and un published so that it could be consulted by all everyone.

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This role is an important one for the library as they remain the institution main keeper of their knowledge; and in this regard the library needs to makes sure that they use all the available tools and methods of knowledge retention.

VII. CONCLUSION

It has been established that there are several tools and methods that have been used for knowledge retention at the Natural Resources Development College. The identified tools and methods were: documentation processes; mentoring of new employees; archiving the knowledge; interviewing retirees and recording their experiences and inviting retirees as consultants back to the institution. In addition, research and consultancy, electronic and modules (Manuals), documentation processes, reports writing, internet and sharing with staff and mentoring programmes; and meeting with staff were also identified as ways in which the institutions knowledge could be retained. It was also recognised that all these knowledge retention strategies needed to take cognisance of modern information and communication technologies that could be utilised to retain knowledge in the organisation.

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