Teacher education library e-resources integration assessment

Alois Matorevhu*

Department of Science and Mathematics, Mutare Teachers' College, Mutare, Zimbabwe
amatorevhu@gmail.com*

* corresponding author

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ABSTRACT

Expensive technological hardware and software, prohibitively high cost of installing e-learning systems, the dedication required in terms of time and skills development, and experts required to service e-learning resources systems are some challenges developing countries face in using e-resources for teaching and learning. In the context of these challenges, this study was conducted at a library of a secondary teachers' college Y in Zimbabwe to gain insight into the nature of E-Resources Integration. Qualitative research methods involving interviews, observations, and document analysis were used to generate data. Interviewees who volunteered were pre-services teachers, teacher educators, Librarians, and ICT personnel managing the e-resources system. Through thematic analysis, data were presented as verbatim, and narratives were interpreted to unpack meaning imbued. Findings show that power outages, poor internet connectivity, lack of e-resources awareness by prospective users, competencies in using e-resources, and computers, were factors that inhibited effective e-resources use for teaching and learning. As a recommendation, libraries should design and provide e-learning resource services that motivate learners consistent with their information needs, increasing the probability of using such resources.

1. Introduction

The advent of information and communication technology has drastically changed library resources and services [1], in terms of information access and service delivery through e-resources [2], [3]. This radical change has engendered new ways information is gathered, assembled, and utilized in today's libraries [4]. Digitalization, and transformation of libraries into electronic information service systems, is a product of this radical information dissemination and use. Delivery of education as e-resources through computer networks poses new challenges for library services [5]. New information and communication technologies, together with new educational models, require librarians to evaluate development, management and delivery of library resources and services, to meet needs of both e-learners and traditional learners. Digital libraries should respond appropriately to challenges e-learners face in accessing information. Terms like virtual library, electronic library, and library without walls are used to describe digital libraries [6]. Key to meeting information needs of clients by digital libraries are e-resources, hence the necessity to gain insight about them.

Premised on electronic publishing, library information in electronic form, that is electronic resources (e-resources), can now be accessed by users [7] defines e-resources as information that can be accessed through electronic systems, and computer networks. Therefore e-resources are those systems [8], that deliver collection of information as full text (aggregated) databases, e-journals, image collections, multimedia in form of CD, tape, Internet, web technology, e-discussions, e-news, data

archives, e-mail and online chatting. Also included among e-resources are e-books, e-magazines, e-thesis, WWW, e-newspapers, e-research reports, and e-bibliographic databases [9]. Library catalogues, conference papers, government papers, monographs and research reports in electronic form, and hardware such as hard discs, flash drive, and CD ROMS are also in the e-resources group [10]. Describes e-resources as materials comprising data and / or computer program encoded for reading and manipulation by a computer using a peripheral device directly or remotely connected to the computer or through a network like internet [11]. Ability to be used directly is the common feature of e-resources.

As sources for content, teaching and learning approaches, and research, libraries are access points for teaching and learning material. Nowadays most libraries are hybrids, providing access to electronic resources through internet, while maintaining use of physical collection of documents in the library building [12]. Learners have different learning styles which can be supported by physical libraries or virtual libraries [13]. Over physical libraries, virtual libraries have advantages in that they can be open twenty-hours and seven days a week [14], [15], in addition to accessibility from a distance through online, enabling remote learners to benefit from services previously offered through traditional libraries [4]. Knowledge bases on various collections which include documents, websites, and events are hosted by libraries [16], hence they are enablers of the teaching and learning process. In addition to how information is packaged, processed, stored, and disseminated, ICT has increased the ability of libraries to reach more users. Various applications like wide-area network applications, local area networks (LANs), online information services (the Internet), online library databases, CD-ROMs, Online Public Access Catalogue (OPAC), retrieval networks, and digital online archives, are means libraries enable users to access various resources.

The International Network for the Availability of Scientific Publications (INASP) has been negotiating with international publishers on behalf of African countries for discount price, since the 1990s. Organisations like Access Global Online Research in Agriculture (AGORA), Health InterNetwork Access to Research Initiatives (HINARI), the Essential Electronic Agriculture Library (EEAL) and Programme for the Enhancement of Research Information (PERI), as well as Online Access to Research on Environment (OARE), have contributed immensely to this initiative of facilitating availability of e-resources in African universities. Most academic libraries in Africa are including intellectual works like postgraduate students' theses, journal articles, annual reports and past examinations papers on their websites to promote accessibility of intellectual knowledge through e-resources. In addition, most universities are making it obligatory that postgraduate students submit both print and electronic formats on CD-ROMs [17].

In Africa, the Consortium of Academic and Research Libraries of Ghana (CARLIGH) assist many academic institutions to subscribe to various e-resources like databases and e-journals at low cost compared to individual library subscription. This has created access to a wide range of e-resources for academic libraries to meet information needs of both local and remote users [9]. Print-based information resources in libraries are progressively giving space to information in electronic format, hence academic libraries are hybrids. In hybrid form libraries (both print and electronic based information) ensure that while enjoying advantages of electronic format, advantages of print format are not lost. To enhance e-resources usage, most academic libraries have developed information literacy programs. Information literacy is defined as an individual's ability to locate, evaluate and use information effectively. Library information literacy experts assist users to access information with less effort [18]. To enable use of e-libraries effectively, both distant and local off campus users, should be information literate. In the case of teacher preparation institutions, off campus users are either non-resident student teachers or student teachers on teaching practice, In line with this, libraries should have information literacy instruction and reference assistance for users [19].

E-resources in today's electronic environment, have caused the role of the traditional library to change consistent with demands of technology evolution. Acknowledges the invaluable benefits of e-resources in relation to complementing print-based resources [20]. Benefits include access to information that might be limited to the user because of distance or finances, and access to more current information. Therefore, technological advancement enables libraries to adopt and adapt modern trends of organizing collections and improving service delivery. In agreement, posit that ICT services provide timely information in higher learning institutions which promote academic work and increase research productivity. University libraries in this way influence teaching, learning and

research in higher educational institutions. Therefore, libraries should use up to date e-learning systems to assist learners to access reading materials.

Although 21st century academic libraries need e-resources to function properly, but e-resources availability in libraries does not automatically translate into use by learners [21], because access to the e-resources may be denied by many factors. Premised on this, strategies are being implemented globally at national and institutional levels, to promote access and usage of e-resources by improving on deficiencies like power failure, slow internet, narrow bandwidth, and lack of technicians among others (4). An overview of awareness of e-resources, infrastructure, and computer literacy, as factors which affect usage of e-resources apart from availability, is subsequently given in sections below.

Access to e-resources can occur if one is aware, implying the user has information and knowledge about the existence of them (e-resources) in the library [4]. Exposing users to information resources available in a particular library, encourage users to access and utilize them judiciously to satisfy their information needs. Although libraries may provide state of the art technologies and infrastructure, use may not be optimum if potential users lack awareness. Awareness of existence of e-resources in educational institution library by users can be achieved through library orientation activities with both students and academic staff. In addition, dissemination of information on e-resources in the library, through workshops, posters, flyers, brochures, library guide, library website, exhibitions, radio programs and word of mouth by lecturers or teachers directing students to information sites, can bring awareness to users of e-resources available in the library, if the librarian spearheads these activities. Use of Facebook, twitter, WhatsApp and blogs to interact with users about the library's resources and to answer user queries provides opportunities to extend services to cover wider users and also places the library in the world's spectrum [22]. Such promotional activities must be strategized to cover both local and remote users.

If libraries do not get e-resources and services to prospective users they deprive them (users) of benefiting from the e-resources [23]–[26]. When users do not have adequate knowledge about the existence of information resources in libraries, in most cases they are disadvantaged since they cannot access them. Among challenges faced by developing countries in facilitating awareness and use of e-resources in learning, are expensive technological hardware and software, prohibitive high cost of installing e-learning systems, dedication required in terms of time and skills development and experts required to service the e-learning resources system. It is therefore important to deal with contextual challenges in order to bring awareness to potential users about e-resources in a particular library to promote their use.

Varying factors hamper the accessibility and usage of e-resources in Africa, notwithstanding the significance of e-resources to university education. Studies [27], identify some of the access inhibiting factors as high cost of ICT equipment, and high rate of foreign exchange, power outages, poor telecommunication infrastructure, and limited expertise in the effective use of e-resources. Lack of statutory provision for accessing e-resources by institutions, technical problems, unavailability of sufficient e-resources, high purchase price and lack of legal provision [28], low internet connectivity, are some challenges faced by libraries in providing e-resources. Taking too long to view or download pages due to slow access speed of internet is the most common challenge [29]. In the context, of these challenges, academic libraries are duty bound to facilitate adaptation and adoption of e-resources into their information system, hence infrastructure enhancing e-learning resources should be an integral part of 21st century libraries.

Optimum use of e-resources requires computer literacy skills which involve the ability to use and manipulate computer systems to acquire desired information, otherwise without these skills it is impossible to benefit from e-resources. Basic computer skills are an enabler to access and use of e-resources, hence potential users should possess them. Argues that ability to use e-resources efficiently depends on basic computer skills, knowledge of what is available and how to use it. Attainment of knowledge and skills to utilize e-resources effectively by learners depends on many factors, like their disciplines, academic and financial status, interest, and training, among others [30]. Libraries should assist users in developing the requisite knowledge and skills. E-resources have potential to improve academic performances [7], but depending on how they are used in the context of the factors which inhibit their efficient use. Considering the high attrition rate of 80% in online context [31], it is crucial that educational approach to instructional design aligns e-learning with learners' needs. In this vein libraries should design and provide e-learning resource services which motivate learners consistent with their information needs, hence increasing the probability of usage of such resources. Therefore,

to gain insight about usage of e-learning resources at Teachers' College Y in Zimbabwe, the questions below guided the current study.

2. Method

Research flow teacher education library e-resources integration assessment can be seen in Fig 1. The study was conducted at a secondary teachers' college Y in Zimbabwe. Qualitative research methods involving interviews, observations, and document analysis were used to generate data. Interviewees who volunteered were pre-services teachers, teacher educators, Librarians, and ICT personnel managing e-resources system. Data were analysed through thematic analysis and presented through verbatim and narratives, which were interpreted to unpack meaning imbued in the data. The current study was guided by the theory of Diffusion of Innovations (DOIs) which explains how, why, and at what rate new ideas and technology are spread. DOIs has four main elements which influence the spread of a new idea which are the innovation itself, communication channels, time, and the social system associated with the innovation. Notwithstanding the perceived necessity of e-resources, users may not readily embrace this technology despite its availability [32].

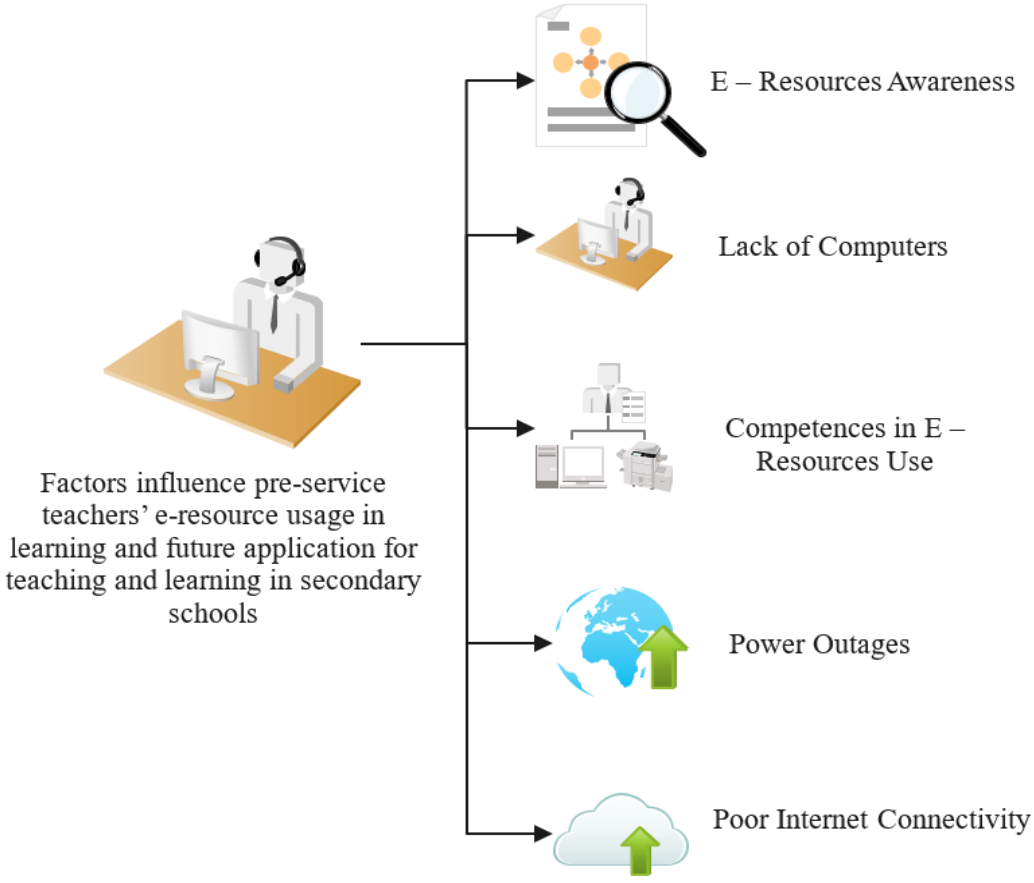

Fig. 1. Research flow teacher education library e-resources integration assessment

The DOIs theory was chosen as a framework for exploring the proliferation of electronic learning resources, their use and influence on pre-service teacher population at teachers' college Y. In the context of this study, consistent with in the framework of the DOIs theory, teacher educators, and pre - service teachers both on campus and off campus at teachers' college Y constituted the social system, and e-learning resources the innovation. The role played by electronic library (e-library) in facilitating effective e-learning in an academic institution setting, was also the focus of the study.

3. Results and Discussion

The broad categories of factors which were found to influence pre-service teachers' e-resource usage in learning and future application for teaching and learning in secondary schools are E-

Resources Awareness and Challenges in E-Resources Use consisting of lack of computers, competences in e-resources use, power outages, and poor internet connectivity as sub-categories. Presentation and analysis of findings is done under these categories.

1) E- Resources Awareness

Like any other concept, understanding what e-resources are and their relevancy to teaching and learning is important to any e-resources user or potential user, for teaching and learning. In relation to understanding of what e-resources are, pre-service teacher F described them as textbooks and journals which are accessed using internet, specifically "using the college's portal". At variance with F, pre-service teacher X professed ignorance saying, "I do not know what they are". During an explanation by the current researcher on what e-resources are pre-service teacher X interjected, "Oh yes I have used them on many occasions, it is only the term I am not familiar with, otherwise I know them". Similarly, as X, pre-service teacher Z revealed ignorance about e-learning resources saying "I not aware of what e-resources are …" but quickly acknowledged understanding them after the definition was given by the researcher. Pre-service teachers X and Z's responses show that there is need to explain the jargon that is used in relation with certain terms otherwise educators may mystify concepts which could otherwise be simple both in understanding and implementation. The principle of working from known to unknown, or old to new concepts or terms is fundamental here. This is supported by pre-service teacher X's response when asked whether the concept of e-resources was introduced and discussed during orientation as first years joining the college. The response was:

> *A lot was said about ICT and computers during orientation. We have done a course on ICT and its application as a teaching and learning tool. However, nothing was done on e-resources and their link with ICT and computers. From my point of view they are related and relevant to facilitate teaching and learning.*

After having put pre-service teacher X into context of what e-resources is, the teacher was asked to reflect on whether their use in learning was effective, the response was accompanied with an emphatic, " Yes" showing total concurrence. This corroborates the need to use simple terms and explain jargon when introducing learners (at any level) to new concepts. Responding to the need for making pre-service teachers at Teacher College Y aware of the availability and use of e-resources pre-service teacher V commented:

> *Advocating for use of e-resources in the library during orientation of first year pre-service teachers may assist in bringing awareness and increase the use of these resources. Flyers which advertise the availability and use of these e-resources by both student teachers and lecturers may help increase usage.*

Taking pre-service teacher V's response as a basis, it is suggested that flyers or brochures should include information on who to contact and where, should potential e-resources users want more information for clarification. There is need to be like in the business world, where service providers use best ways to meet information needs of clients, to improve service delivery. Success should no longer be measured solemnly by the number of libraries facilities users, but should also include the extent to which needs of clients are met. To assess success in service provision, a suggestion box in the library or the library section on Teachers' College Y website, should be provided.

Evidence from the study shows that information about the existence of e-resources at Teachers' College Y and how to use them both for personal learning and as teaching and learning tools is limited. Taking into account that some pre-service teachers come from backgrounds with less exposure to use of internet facilities, there is need to increase advocacy for use of e-resources in teaching and learning. As a solution pre-service teacher W suggested that:

> *The Librarian can be useful in educating pre-service teachers on how e-resources can be accessed through workshops at college. A Hard copy of the list of journals in the library can be made available, so that one can check to see what the library has.*

Illustrating understanding of e-resources , teacher educator J described them as "Gadgets to do with online learning, like desktops, laptops and cellphones". However, this conceptual understanding of e-resources is apparently less embracing since it does not include internet documents like e-journals and e-books. Sharing of relevant information on e-resources through platforms like workshops,

facilitated by Teachers' College Y library authorities may broaden understanding and usage of e-resources by both prospective teachers and teacher educators. This increases the likelihood that, on one hand pre-service teachers will continue applying e-resources in teaching and learning after joining the teaching profession, and on the other, teacher educators will model in pre-service teachers' classes how e-resources are used for effective lesson delivery.

2) Challenges in E-Resources Use

Challenges in E-Resources Use which are discussed subsequently, were identified as lack of computers, competences in e-resources use, power outages, and poor internet connectivity.

Lack of Computers. Computers are important hardware which should be available, since they make one able to access and use e-learning resources. Commenting on availability of computers for use by, pre-service teachers at Teachers' College Y, teacher educator U said:

> *In the Library desktops are not enough to enable all students to use e-resources. This disadvantages students who cannot afford to buy laptops or smartphones which are internet compliant. Obviously this violets principles of inclusive education.*

Also teacher educator P acknowledged the shortage of computers for pre-service teacher use lamenting that "pre-service teacher computer ratio is very high such that some do not get the chance to use them" a fact which was corroborated by pre-service teacher E that:

> *Many pre-service teachers have poor financial backgrounds so they cannot afford to buy laptops, and at the same time at college computers are not enough. This presents challenges to these pre-service teachers in terms of using e-learning resources, hence disadvantaging them, since they lag behind in developing desired competences.*

Therefore poor socio - economic backgrounds in conjunction with prohibitive high cost of laptops are factors which cause some pre-service teachers not to fully use e-learning resources to develop desired competences. In practice these pre-service teachers are left behind or excluded. To promote inclusive education consistent with education for sustainable development (ESD), strategies which are used to allow all learners to access to e-resources. This suggests the need to find ways of ensuring that all pre-service teachers at Teachers' College Y are provided equal opportunities to use e-resources for learning. Among others, inclusive strategies such as making many computers available for use by pre-service teachers, and assisting individual pre-service teachers to develop competences in using e-learning resources, will ensure that no prospective teacher will be left behind.

Competences in E-Resources Use. Deficiencies exist in using e-learning resources due to challenges in operating the computer and sifting the internet to access desired reading materials. Pre-service teachers vary in their competences to use the internet for teaching and learning. Teacher educator G noted that:

> *Many students use their cell phones to search for educational documents on internet, and they help those who are less competent or those who may not have laptops and smartphone for accessing information through the internet.*

Using the internet for learning is challenge due to various factors, which include lack of skills to: use appropriate software, apply correct commands to the computer for it to execute desired operations, and construct suitable search phrase for required content. This needs assistance from someone competent in internet based learning. Responding to the availability of such assistance, pre-service teacher Z said: "No it is not readily available". While such help could not be readily available, pre-service teacher Z showed awareness in personal deficiencies in using ICT for teaching and learning saying:

> *I need to improve my skills in application of ICT to enhance teaching and learning. The college should regularly involve student teachers in activities which improve ability of using ICT for teaching and learning. One workshop is not good enough because ICT is broad such that it cannot be covered in a single long event.*

Another pre-service teacher W commented on lack of competences to access e-resources both online and offline saying "Some lecturers talk about accessing notes on the college e-learning platform

'Dorpo' and the local area network (LAN)". On the question of teacher educators' awareness of use of e-resources for teaching and learning, pre-service teacher W emphatically responded:

> *Yes they are aware because they tell us to access notes and reading material on such platforms, but the educators do not tell us how to access the e-resources through those platforms. The advantage is for those who know how to use these platforms leaving student teachers with poor skills to struggle.*

Although teacher educators are viewed as aware of e-resources, their failure to give assistance to pre-service teachers without the full know how of using them (e-resources) is a cause for concern. Responses by pre-service teachers W and Z are an indication of exclusion of learners inconsistent with 21st century teaching and learning methodologies and ESD. A worrying aspect of this finding is that pre-service teachers may apply the same approach when teaching in schools which may adversely affect the exist competences of school graduates. However, it is important to note that not only pre-service teachers risk losing benefiting from e-resources as tools for learning, but also teacher educators because information and communication technology (ICT) is continuously developing with changes coming so fast. This calls for continuous deskilling, reskilling and up skilling, to keep abreast with new developments in e-resources for both personal learning, as well a tool for teaching and learning. In line with this teacher educator B commented:

> *ICT continuously change with new inventions so one cannot claim to know all basing on a course done a few years ago, because the knowledge might be obsolete. This implies the need to continuously learn to keep abreast with current trends in e-resources for teaching and learning.*

Asked how this can be achieved teacher educator B suggested that:

> *The college can involve teacher educators in ICT workshops regularly to learn about developments in ICT and applications in teaching and learning at various levels. This will continuously build confidence and competences in teacher educators to use e-resources for their learning and lesson delivery.*

This implies both prospective teachers and teacher educators need support from the college, so that they continuously improve in their use of e-resources for both personal learning, and in the teaching profession. Such support can be in form of workshops as suggested by teacher educator B, as well as provision of good internet services. The ultimate beneficiaries will be secondary school graduates equipped with competences relevant for joining various socio-economic sectors of any society, as a result of being taught by teachers prepared during pre-service to appropriately apply e-resources for teaching and learning. However, it is important to be cognisant of that being a pre-service teacher does not necessarily mean poor competences in ICT use specifically e-learning resources, because some prospective teachers might have good e-learning resources experience, prior to commencing the pre-service preparation programme. This suggests that through workshops and interactive class discussions, teacher educators can create platforms where pre-service teachers and teacher educators share knowledge and skills on how best to use e-learning resources to promote active learning.

Also related to continuous up skilling in use of e-resources for teaching and learning one librarian assistant indicated the need to involve them in inclusive fora dealing with e-learning resources where Teachers College Y stakeholders (library staff, teaching staff and the college administration) deliberate on issues to do with e-learning resources. Such fora like workshops, planning meetings, evaluation activities and in-service activities were suggested for use. The librarian assistant, concurring with an ICT technician said:

> *Stakeholders in the college involved in use of e-resources both directly and indirectly for learning should have opportunities to meet and share knowledge and skills on how to use e-resources for effective preparation of teachers. Such opportunities will create common understanding for stakeholders to support one another.*

Another staff member in the ICT section of Teachers' College Y supported the librarian assistant's view:

> *In the ICT section they are specialists in ICT who are able to work with various computer software, to perform various computer aided learning activities. However, members of the ICT section do not know which software and activities are most relevant to effectively prepare teachers to have best competences. It is good if through discussions with lecturers we made aware of how best we can assist on the use of e-resources for preparing teachers.*

The librarian assistant, ICT section staff member, and ICT technician's comments reflect the need for collaboration for effective use of e-resources for preparing teachers because various skills and knowledge, which a single teacher educator cannot possess are needed. Mechanisms which allow various stakeholders to share knowledge and skills should be put into place so that, instead of fragmented effort to be put, collective effort is put to effectively facilitate use of e-resources by both teacher educators and pre-service teachers.

Power Outages. Electricity is indispensible for the use of e-learning resources either offline or online. This means electricity should be readily available. Asked how e-resources are used at Teachers' College Y library, pre-service teacher V bemoaned lack of frequent use to power outages:

> *There is no electricity for most of the day, making e-resources inaccessible. In reality it makes it impossible for one to gain experience in using these resources for learning as a student teacher, as well as using them for facilitating the teaching and learning process. Also, research is adversely affected, since access to previous and most recent research articles is prevented.*

This implies that while using e-resources has advantages like easy access to information, power outages is a serious draw back which can make their use a total failure, hence a reliable source of electricity should always be available. Pre-service teacher V suggested the use of alternative sources of power like a generator:

> *There is need for alternative electricity supply like a generator. It may be useful but ways of funding fuel cost for the generator should be well planned, otherwise it will be unsustainable.*

Also pre-service teacher F lamented power outages:

> *Under normal circumstances e-learning resources can be accessed anytime anywhere, but it is not the case at this college. For instance, at some point, I wanted to access an article in a journal called J / STOR. but could not complete downloading since electricity went off during the process. Even accessing some materials offline in the library is not possible in the absence of electricity.*

In this context it is necessary as indicated by pre-service teacher V, to use alternative power sources to improve e-resources for teaching and learning at teachers' college Y.

Poor Internet Connectivity. Internet connectivity should be reliable and fast in order to offer quick services to users. If it is slow and not always available, this may frustrate users. Pre-service teacher W lamented power outages and slow internet as challenges which impeded access to e-resources saying " ..... when you go a step ahead, suddenly you go two steps backward, meaning that sometimes when internet is working, electricity may go" " ..... bundles for internet on mobile phone services are expensive .....". Corroborating challenges associated with e-resources use, while responding to the question on access to e-resources at Teachers' College Y, pre-service teacher Z's response was " Yes, using my cellphone and college internet it is cheap because the college pays for internet service provision". However, pre-service teacher Z was quick to point out that "power outage is the challenge to use e-resources through college internet". There need for Teachers' College Y to find ways of dealing with the problem of poor connectivity to improve use of e-resources by both pre-service teachers and teacher educators.

4. Conclusion

There is much will by teachers' college Y to promote e-learning resources in its library, as evidenced by devoting resources to ensure that at least internet connectivity is available. Just as the saying goes, a journey of a thousand miles starts with one step and has internet connectivity through

slow is a good beginning. However, several challenges need to be attended to if optimum use of e-resources for teaching and learning is realized at the college. For instance, more computers need to be available to cater to students who can neither afford laptops nor smartphones to access the internet. Also, support in developing competencies of both pre-service teachers and teacher educators to surf the internet should be regularly given. Attending to all the pertinent issues raised in this study will significantly improve the use of e-resources by teachers and pre-service teachers at work and in life.

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