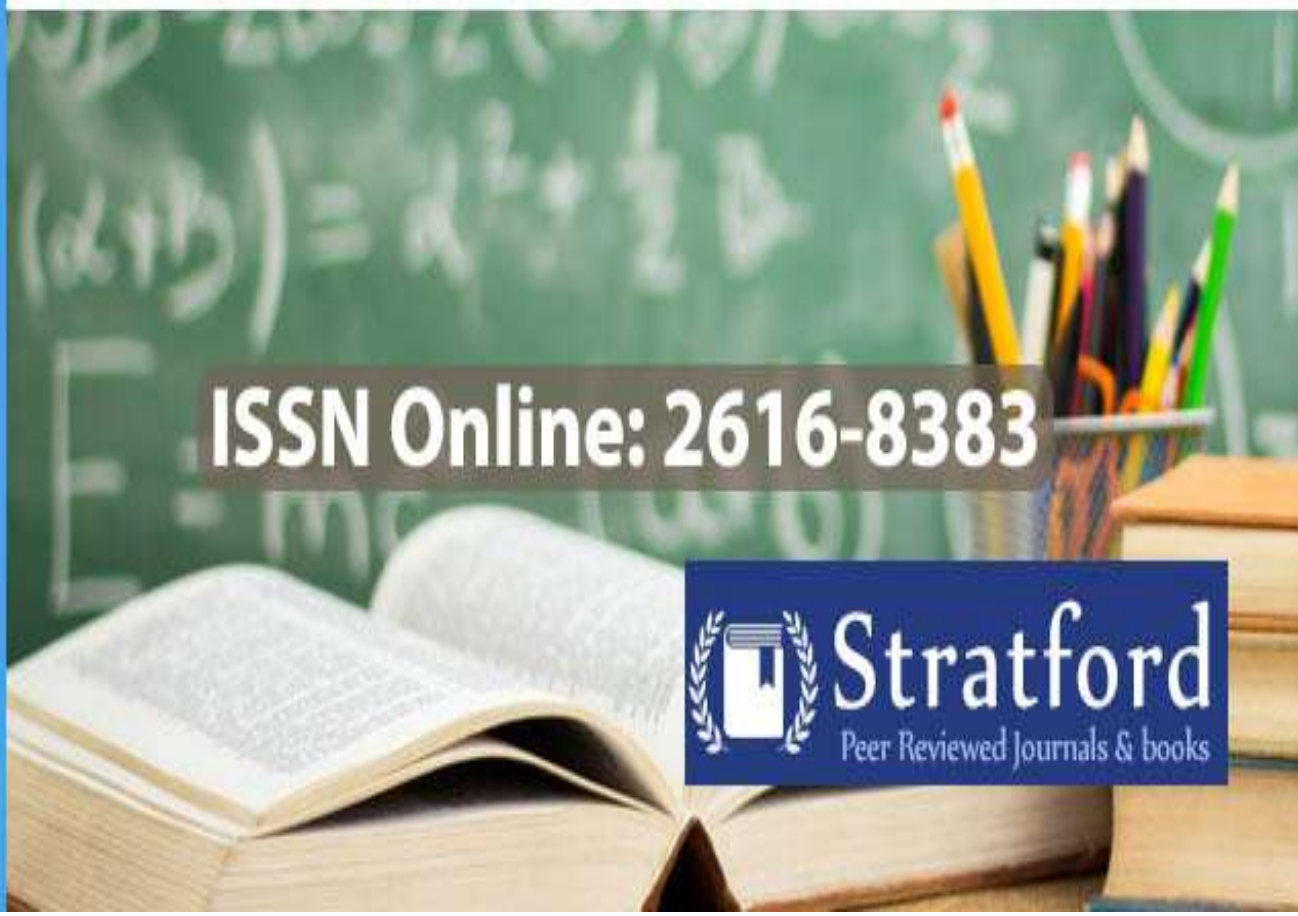
Journal of Education



Utilization of Learning Management Systems: Perspective of Physically Challenged Learners in Africa

Damas Benjamin Mahali

ISSN: 2616-8383

Stratford Peer Reviewed Journals and Book Publishing
Journal of Education
Volume 2||Issue 1||Page 53- 72||April ||2019|
Email: info@stratfordjournals.org ISSN: 2616-8383

Utilization of Learning Management Systems: Perspective of Physically Challenged Learners in Africa

Damas Benjamin Mahali

PhD Candidate, the Catholic University of Eastern Africa

Corresponding Author's email: damasmahali@gmail.com

***How to cite this article*: Mahali, D.B. (2019). Utilization of Learning Management Systems: Perspective of Physically Challenged Learners in Africa, *Journal of Education*, 2(1), 53-72.**

Abstract

The purpose of the study was to examine the Utilization of Learning Management Systems: Perspective of Physically Challenged Learners in Africa. The study was guided by three objectives which were; to establish the factors influencing the utilization of learning management systems by physically challenged learners in Africa, to determine the barriers hindering utilization of learning management systems by physically challenged learners in Africa and to provide Policy Recommendations based on the findings. The study was informed by the Diffusion of Innovation Theory and the Change Theory. Learning disabilities (LD) vary from person to person. One person with learning disabilities may not have the same as another is having, one person may have trouble with reading and writing, however, another may have the problem of understanding a concept and the other may have the problem of understanding what others are telling them. The most obvious benefit of Learning Management Systems (LMS) utilization for the physically challenged students is that they stay in their comfort zone without rushing to a campus or commuting between classes to classes. The paper used a desk study review methodology where relevant empirical literature was reviewed to identify main themes. The study findings revealed that, acknowledging accessibility in e-Learning is a key issue vouching to promote and ensure e-inclusion of students with disabilities. The study recommended that, studies evaluating utilization of LMS should employ a combination of quantitative and qualitative approaches such that each can compensate for the weakness of the other, thereby giving a detailed and credible result.

Key Words: *LMS, Physically Challenged Learners, Utilization*

1.0 Introduction

This section presents the background of the study, research problem, the objectives that guided the study and the research questions.

1.1 Background of the study

The integration of formal electronic learning management systems is a relatively new instrument in teaching and learning. As an example, the Blackboard Learning Management System was first introduced in 1995 (Casany, Alier, Mayol, Piguillem, Galanis, García-Peñalvo & Conde, 2012). An LMS is a web based software consisting of courses that contain electronic tools including a discussion board, files, grade book, electronic mail, announcements, assessments, and multimedia elements. An LMS provides access to student-centered teaching approaches, increased accessibility, assessment and evaluation features, and improved management of course content and administrative tasks (Laster, 2015; Mullinix & McCurry, 2013). Learning disabilities (LD) vary from person to person (Kumar, Ravi & Srivatsa, 2011). One person with learning disabilities may not have the same as another is having, one person may have trouble with reading and writing, however, another may have the problem of understanding a concept and the other may have the problem of understanding what others are telling them. The most obvious benefit for the physically-disabled students is that they stay in their comfort zone without rushing to a campus or commuting between classes to classes (Hawkridge, Vincent & Hales, 2018). There are integrated technologies for the students who cannot type such as voice-to-text and voice-activated programs.

According to Fletcher, Lyon, Fuchs and Barnes (2018), Children with learning disabilities can be high achievers and they can be successful, if provided with relevant help. E-learning benefits from the fast growth of technologies of information and AQ2 AQ3 AQ4 communication to empower education and to offer very sophisticated educational environments. However, e-learning environments are still far from being accessible for people with disabilities who still meet many barriers to benefit from this learning mode (Kent, 2016). The World Health Organization WHO (2018) estimates that over one billion people are living with some form of disability and facing a wide range of barriers, including access to information, education, and a lack of job opportunities and therefore, access to appropriate ICTs that support learning for students with disabilities is an international policy imperative. Furthermore, the availability of accessibility guidelines, the diversity of the e- learning platforms, and the evolution of assistive technologies do represent just a partial solution (Gutenbrunner, Tederko, Grabljevec & Nugraha, 2018).

Lebenicnik and Starcic (2018) argue that some accessibility features may exist in some e-learning environments and applications but implemented in an ad hoc way and exclusively dependent on some specific technologies or targeting only one kind of disability. In this context,

considering accessibility aspects since the design phases of the educational environment and e-learning applications should provide a rational solution. Access to information and communication for people with disabilities through modern technology is acknowledged as an important requirement (Meskhi, Ponomareva & Ugnich, 2019). People with disabilities need to use information and communication technologies as much as everyone. Within the higher education and further education, they are confronted with the use of virtual learning environments (VLE), learning management systems (LMS), web-based trainings (WBT) and other e-learning applications and educational technologies (Cinquin, Guitton & Sauzéon, 2019).

These technologies have to be accessible in order to enable people with disabilities to take part in education and the life-long learning. Some may have visual restrictions and therefore use a keyboard with Braille display or speech output systems like screen reader. Others may have physical disabilities, and use keyboard with switch access instead of mouse or keyboard, or they have cognitive and neurological disabilities, making it hard for them to concentrate, to understand complex navigation structures or to read complex text. Maboe, Eloff, Schoeman and Kayode (2018) reveals that, while there are many different disabilities that can affect the use of computers and the participation in e-learning, seven main groups of disabilities can be distinguished in order to make e-learning and educational technology accessible for all; Visual disabilities, hearing impairments, Physical disabilities, Speech disabilities, Cognitive and neurological disabilities, Multiple disabilities and Aging-related conditions.

According to Cinquin, Guitton and Sauzéon (2019), most available e-learning systems for learners with disabilities are limited to deliver accessible learning contents. However, the learners with disabilities need the whole accessible TEL environment and not only the accessible content. Providing accessible content in a non-accessible learning environment leads to a non-accessible learning experience. The e-learning environment may contain some non-accessible tools that prevent people with disabilities access to the content even though this is in an accessible format (Kent, Ellis, Pitman, McRae & Latter, 2019). Some systems may provide content during the learning process that does not meet the specific needs of each type of disability. Arkorful and Abaidoo (2015) believe that nowadays, with the increasing use of ICT in education, there are many opportunities to overcome the barriers which were encountered so far in the traditional educational systems. E-learning provides the possibility to apply an individual and inclusive approach in teaching and learning.

When applying e-learning in teaching persons with disabilities, the use of assistive technology is inevitable (Meskhi, Ponomareva & Ugnich, 2019). Assistive technology includes tools, hardware and software that serve to adapt computers and other devices so that persons with disabilities can use them. Some of the examples are screen magnifying software, Braille alphabet, special keyboards or adapters for the keyboard and the mouse. However, for all this to work, websites should also be optimized and accessible for persons with disabilities. With this in mind the Web

Accessibility Initiative (WAI) was launched to develop strategies, guidelines and resources that can make the content on the Internet more accessible to persons with disabilities.

In July 2010 the online learning management system (LMS) Blackboard from Blackboard Inc was awarded the Nonvisual Accessibility Gold Certification by the National Federation of the Blind in the United States (Disabled World, 2010). While it is laudable that this LMS, one of the most widely used in universities across the world, was acknowledged for its inclusive design, it also raises a number of uncomfortable questions. Blackboard continues to be the only LMS to have been accredited this level of certification. At a time when the possibilities of eLearning and online education are in the public spotlight through interest in the development of the massive open online course (MOOC), and at a time when enrolments in online courses are rising at a much higher rate than those in traditional face to face learning and teaching in higher education, it is disturbing to find this limited and belated approach to access for people with disabilities.

E-Learning holds many possibilities for inclusion for people with disabilities; however the online platforms utilized must provide access for all students. In many cases, for students who study fully online, university staff may not meet them until their graduation ceremony. Roberts, Crittenden and Crittenden (2011) found that the majority of these students with disabilities chose not to disclose they had a disability. While this is one of the benefits afforded by studying online, they also found that these students did not request accommodations to help with access to course material that was presented in an inaccessible format. Students with disabilities can become invisible online. This means that more care and thought needs to be put into employing universal design practice in developing online learning material. As Jaeger (2012) notes for persons with disabilities, unless technological design and implementation meaningfully focus on inclusion, the internet may become a new means of increased marginalization in society.

Twenty-seven per cent of Americans live with a disability that interferes with activities of daily living (Fox, 2011). This group of people is currently underrepresented in tertiary education (Sachs & Schreuer, 2011; Wentz, Jaeger & Lazar, 2011) although it is growing in number particularly with the increased use of eLearning serving to promote inclusion for this group of people (Fichten, Ferraro, Asuncion, Chwojka, Barile, Nguyen, Klomp & Wolforth, 2009). As Jaeger (2012) points out 'disabled' is the only minority group that people may join over the course of their life. Only fifteen per cent of people with disabilities are born with them. All people should be seen as only temporarily able-bodied. The global proportion of people with disabilities in the population is rising due to both age and environmental factors (Vincente & López, 2010). Inclusive design that facilitates access for people with disabilities helps everyone.

Given this, making eLearning accessible should be a priority for universities. This paper briefly explores the current rising rates of online learning in higher education. It examines how disability is activated differently online and the impact of this on learning and teaching through the internet and the accessibility of two of the most popular learning management systems, Blackboard and Moodle, and the different approaches, benefits and problems associated with

each system. It then explores the eLearning environment beyond the structure of a LMS to a broader digital campus that includes social networks, video hosting sites and micro blogging, where students and staff are increasingly expanding the learning and social environment in higher education. It also questions the legal and moral responsibilities of universities to make all their online activities accessible to all students, regardless of disability.

According to Fisseler and Bühler (2017), access to information and communication for people with disabilities through modern technology is acknowledged as an important requirement for social inclusion in the European Union and beyond. People with disabilities need to use information and communication technologies as much as everyone (Cooper, Ferguson & Wolff, 2016). Within the higher education and further education they are confronted with the use of virtual learning environments (VLE), learning management systems (LMS), web-based trainings (WBT) and other e-learning applications and educational technologies. Kent, Ellis, Pitman, McRae and Latter (2019) posit that, technologies have to be accessible in order to enable people with disabilities to take part in education and the live-long learning. Many options have been developed to realize human-machine interaction for people with different abilities (and disabilities). Some may have visual restrictions and therefore use a keyboard with Braille display or speech output systems like screen reader. Others may have physical disabilities, and use keyboard with switch access instead of mouse or keyboard. Or they have cognitive and neurological disabilities, making it hard for them to concentrate, to understand complex navigation structures or to read complex text.

In many cases, for students who study fully online, university staff may not meet them until their graduation ceremony. Roberts, Crittenden and Crittenden (2011) found that the majority of these students with disabilities chose not to disclose they had a disability. While this is one of the benefits afforded by studying online, they also found that these students did not request accommodations to help with access to course material that was presented in an inaccessible format. Students with disabilities can become invisible online. This means that more care and thought needs to be put into employing universal design practice in developing online learning material.

Jaeger (2015) notes for persons with disabilities, unless technological design and implementation meaningfully focus on inclusion, the internet may become a new means of increased marginalization in society. Twenty-seven per cent of Americans live with a disability that interferes with activities of daily living (Fox 2011). This group of people is currently underrepresented in tertiary education (Sachs & Schreuer, 2011; Wentz, Jaeger & Lazar, 2011) although it is growing in number particularly with the increased use of eLearning serving to promote inclusion for this group of people (Fichten, Ferraro, Asuncion, Chwojka, Barile, Nguyen, Klomp & Wolforth, 2013). As Jaeger (2012) points out 'disabled' is the only minority group that people may join over the course of their life. Only fifteen per cent of people with disabilities are born with them. All people should be seen as only temporarily able-bodied. The

global proportion of people with disabilities in the population is rising due to both age and environmental factors (Vincente & López, 2010). Inclusive design that facilitates access for people with disabilities helps everyone.

Jordan and Tseris (2018) argue that disability is located in social practice rather than an individual body. A person may have a particular impairment, but it is the impact of decisions made by society that causes it to be a disability. A person who uses a wheelchair may have specific mobility impairment, but it is the lack of wheelchair ramps on a university campus that causes disability (Ellis & Kent, 2011). However disability is activated differently online. Impairments that might encounter significant disabling environments in the analogue world, such as for a wheelchair user, may have less impact when using the internet. Other impairments such as print impairments related to vision, cognition, and manual dexterity and, increasingly, with the use of video and audio through the internet, people with hearing impairments may find different online environments can be significantly disabling.

In higher education in the United States and United Kingdom, the percentage of students with a disability is between eight and fourteen percent. This contrasts with eighteen percent in the working age population (Sachs & Schreuer, 2011). In Australia the representation of students with a disability has been reported as low as four percent (Ellis, 2011). E-Learning has great potential to help both existing students with disabilities in their studies and also facilitate a more equitable representation of this group of people in higher education. However as Seale (2013) has observed "the relationship that disabled university students have with both their technologies and institutions is poorly understood." In order for this potential to be realized the eLearning platforms need to be as accessible as possible for students with a range of different impairments. Seale and Cooper (2010) describe accessibility in this context: Broadly speaking, accessibility in relation to e-learning (e.g. virtual learning environments, digital repositories, multimedia, web portals and discussion boards) is understood as ensuring that learners are not prevented from accessing technologies or content and experience offered by technologies on the grounds of their disability.

1.2 Problem Statement

Despite the various African governments' intervention strategies on PWDs and especially the needs of learners with diverse needs, there still remains a gap on how the various concerns for such learners can best be addressed and especially through eLearning (Bell & Swart, 2018). Many PWDs have failed to access education and training through e-Learning due to various barriers ranging from environmental, technological and attitudinal factors. The current situation is that many learners with diverse needs have been left out in education and training thereby experiencing unemployment, under employment, discrimination, stigma and social exclusion. There is very little empirical research on online learning for students with learning disabilities (LD) particularly on the utilization of LMS, leaving educators with many questions but no consensus about how best to serve such students in an online environment (Kent *et al*.,2019).

Stratford Peer Reviewed Journals and Book Publishing
Journal of Education
Volume 2||Issue 1||Page 53- 72||April ||2019|
Email: info@stratfordjournals.org ISSN: 2616-8383

According to Tom, Mpekoa and Swart (2018), without accessible and barrier-free e-learning and educational technology a new digital gap will appear, hindering people with disabilities to take part in current and future developments in higher and further education. This is especially connected with the exclusion from the much demanded life-long learning. Thus assuring that current e-learning and educational technology is accessible for people with disabilities is not enough. Students with varying degrees of hearing loss face a multitude of barriers in higher education. In the researchers' opinion, there could be many reasons why these barriers exist, such as: lack of support; lack of awareness of the accommodation needs of these students; the 'invisibility' and uniqueness of their hearing loss and thus complex support needs; teaching staff ignoring calls to attend disability-related, professional development courses; attitudinal barriers of faculty members; and lack of financial and human resources. This array of factors could make it unattractive to learning institutions to admit students who are physically challenged, resulting in under-representation in higher education. This study therefore sought to establish the factors influencing Utilization of Learning Management Systems: Perspective of Physically Challenged Learners in Africa.

1.3 Specific objectives

This study was guided by the following objectives:

To establish the factors influencing the utilization of learning management systems by physically challenged learners in Africa.

To determine the barriers hindering utilization of learning management systems by physically challenged learners in Africa.

To provide Policy Recommendations based on the findings.

1.4 Research Questions

Data collection and analysis together with the conclusions drawn were informed by two research questions:

i. What are the factors influencing the utilization of learning management systems by physically challenged learners in Africa?
ii. What are the barriers hindering utilization of learning management systems by physically challenged learners in Africa?

2.0 Literature Review

This section highlighted the theoretical review and the empirical review of the related literature.

2.1Theoritical Review

This section highlighted the theories which informed the study. The theories found relevant to the study were diffusion of innovation theory and the change theory.

2.1.1 Diffusion of Innovation Theory

The diffusion of innovation theory relates to the adoption of new technologies into the teaching and learning process. As described by Rogers (1995), there are five adopter categories including innovators, early adopters, early majority, late majority, and laggards. The categories are based on the rate of adoption of an innovation and reflect the rates that faculty adopt technological innovations. Diffusion is influenced by four major factors including the innovation itself, innovation information distribution, time, and the social system adopting the innovation (Rogers, 1995). Given the recent availability of an LMS, the diffusion theory is relevant in that faculty who are innovators or early adopters of technologies may be among those who are likely to use an LMS in teaching the physically challenged learners. The social system identified in this study includes university administration. Another theory that relates to this research is the change theory (Fullan, 2001).

2.1.2 Change Theory

The change theory by Fullan (2001) is associated with technology integration. Implementation strategies affecting the rate of change indicate that, there is some evidence that projects with greater definition and more specific implementation support strategies do better at impacting student achievement. (Fullan, 2001). Fullan (2001) identified seven factors that influence the adoption of changes. Those factors include the access to innovation, orientation to a new policy, community support or pressure or apathy for the change to take place, administrative support, existence and quality of instruction and innovation that change will bring, external change agent that supports and initiates the changes; and professor advocacy. Fullan (2001) asserts that there are three stages consistent in the change theory. Stage one is the initiation of the prospective change; this stage includes an introduction to the new policy or technology.

Stage two is characterized by the implementation of changes that may include technologically enhanced software or hardware. Finally, Stage three is the institutionalization of the innovation that fosters the change. For example, the system wide availability of an LMS would serve as an institutionally available factor that would influence change. The change theory emphasizes is that once the stages are present, change will transpire. Consistent factors present in the motivation hygiene theory, the diffusion of innovations theory and the change theory are administrative policy and practices. Another prominent factor that appears in two theories is the innovation itself. These factors support the motivation factors identified by participants in this research. Namely, the innovation is a contributing factor that determines if learning institutions will adopt it into their teaching practices when attending to learners who are physically challenged.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Education
Volume 2||Issue 1||Page 53- 72||April ||2019|
Email: info@stratfordjournals.org ISSN: 2616-8383

2.2 Empirical Review

This section presents the review of the related literature.

2.2.1 Factors Influencing Utilization of Learning Management Systems by Physically Challenged Learners

Laabidi, Jemni, Ayed, Brahim and Jemaa (2014) conducted a study on learning technologies for people with disabilities. The aim of the study was to investigate how the needs of learners with disabilities are considered in the e-Learning environment, in particular, the way the learner could exploit the content as well as the way the learner could get the content. The study covered basic concepts of e-accessibility, universal design and assistive technologies, with a special focus on accessible e-learning systems. The study further presented the latest research works conducted in a research Laboratory LaTICE toward the development of an accessible online learning environment for persons with disabilities from the design and specification step to the implementation. The study findings indicated that, acknowledging accessibility in e-Learning is a key issue vouching to promote and ensure e-inclusion of students with disabilities. Furthermore, it bares the potential to eradicate barriers witnessed by students with disabilities in accessing on-line digital resources.

The study also revealed that, most available e-learning systems for learners with disabilities were limited to deliver accessible learning contents. However, the learners with disabilities needed the whole accessible TEL environment and not only the accessible content. It was argued tha providing accessible content in a non-accessible learning environment leads to a non-accessible learning experience. Further the study pointed out that accessibility has been recognized as a key design consideration for technology-enhanced training systems ensuring e-inclusion of people with disabilities in the training process and consequently preventing risks of digital exclusion. The study concluded that the presentation and control concepts were chosen taking into account their particularities for each type of disability. The study indicated that, with the introduction of meta-model, the user can avoid in particular ad hoc accessibility implementation since the model considers accessibility from an early stage of systems lifecycle and any generated system preserves the properties specified in the corresponding model and allows the preservation of these properties after any modification. Based on the study findings, it was recommended that studies to be conducted in the future should investigate the modeling transformation process from abstract models to specific models and to extend the application of the approach to other e-Learning platforms with a special focus on mobile learning.

Alamri and Tyler-Wood (2017) examined the factors affecting learners with disabilities instructor interaction in online learning. The aim of the study was to investigate the factors associated with learners with disabilities impact student outcomes in an online learning environment. The study adopted the use of electronic survey in which 40 learners with disabilities participated in online higher education coursework where they responded to an electronic survey of 20 questions. The study findings indicated that there were two factors; the

teaching and social presences and the facilitating and supporting of individual communication related to interaction among learners with disabilities and their instructors that impacted students' perceived learning achievement and class satisfaction. The results also indicated that social interaction factors, such as social presence, were correlated with less perceived learning achievement and satisfaction. This study has potential value because it found factors related to learner instructor control that may predict students with disabilities' perceived learning achievement and satisfaction.

2.2.2 Barriers Hindering Utilization of Learning Management Systems by Physically Challenged Learners

Kent (2015) conducted a study dubbed Disability and eLearning: Opportunities and Barriers. The aim of the study was to examine how disability is activated differently online and the impact of this on learning and teaching through the internet and the accessibility of two of the most popular learning management systems, Blackboard and Moodle, and the different approaches, benefits and problems associated with each system. The study findings indicated that, the reduced access to information technology experienced by people with disabilities creates an initial barrier to the use of LMS by people with physical disability. Those people with access to technology then encounter a number of problems. These include the accessibility of websites and learning management systems, the accessibility of digital audio and video content and alternatives, inflexible time limits built into online exams, the accessibility of PowerPoint presentations, and also course material in inaccessible PDF formats and the lack of access to needed adaptive technologies.

The findings were a corroboration of the findings by Van de Bunt-Kokhuis and Bolger (2009) which indicated that problems with the inaccessibility of online chat rooms, and particularly the incompatibility of screen readers with these forums for students with vision impairments with the increasing spread of the Internet holds much potential for enhancing opportunities for people with disabilities. However, scarce evidence exists to suggest that people with disabilities are, in fact, participating in these new developments. The study concluded that, eLearning is a growing area of the higher education landscape. This teaching practice holds great potential to be an avenue of inclusion for people with disabilities in that context. However, this potential is endangered by the relative inaccessibility of the online environment that is currently used both in terms of formal learning management systems and also the other social and web 2.0 tools that are used in conjunction with these systems. Access to higher education and equality of access for people with disabilities is an important moral obligation for universities.

Jemni, Laabidi and Ayed (2014) in a study on accessible e-learning for students with disabilities: from the design to the implementation indicated that, the main problem hindering utilization of LMS by physically challenged learners was the fact that, most available e-learning systems are inaccessible to people with disabilities and do not take in consideration their special needs. The study indicated that, e-learning systems are now widely adopted as they represent real

opportunities for a better quality of education for many people. However, people with disabilities are still encountering many obstacles to benefit from these systems.

A study by Sadao and Robinson (2010) revealed that, physically or cognitively inaccessible environments act as barriers to LMS usage by the physically challenged learners. For example, inaccessible transport systems or service centres prevent learners from having easy access to the services and products they need. Physical barriers include stairs or poor lighting, while cognitive barriers include texts that are not clear or symbols that are difficult to understand. Further, regardless of the cost or availability of a wheelchair, a learner will not be able to use it in an inaccessible house, road or school. Barriers are often exacerbated during natural disasters and conflicts. The study findings showed that, learners with learning disabilities indicated experiencing technical difficulties and problems caused by their own lack of knowledge about how to use e-learning. This was also true for students with mobility impairments and difficulty using their hands and/or arms, but these students also noted problems related to inaccessible course/learning management systems. Students with attention deficit and/or attention deficit hyperactivity disorder experienced technical difficulties most often as did students with health and medically related impairments. But this latter group of students also noted problems with poor use of e-learning by professors and inaccessibility of websites. Students with psychological/psychiatric disabilities also noted poor use of e-learning by professors as well as difficulty connecting to websites. The study concluded that, during the last decade there has been tremendous development and interest in e-learning on campus by physically challenged learners. The study asserted that there are many benefits of e-learning, such as the availability of online course notes, however there are also problems when it comes to utilization of eLearning by physically challenged learners. Chief among these are problems related to inaccessibility of websites and course management systems for the physically challenged learners. The study also illustrated that problem experiences differ among the physically challenged learners. The study recommended that, all postsecondary stakeholders should ensure that e-learning technologies continue to benefit rather than hamper students with all types of disabilities and that accessibility gains are maintained and built upon.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Education
Volume 2||Issue 1||Page 53- 72||April ||2019|
Email: info@stratfordjournals.org ISSN: 2616-8383

2.3 Conceptual Framework

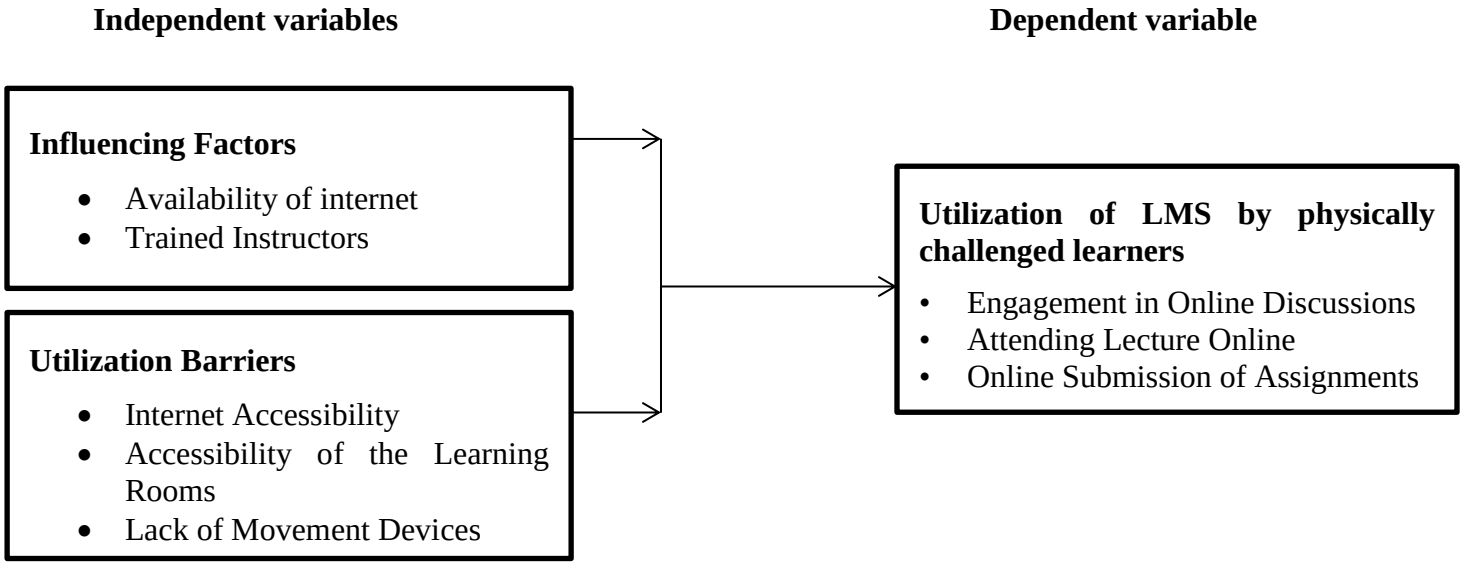


Figure 1.0 Conceptual Framework

3.0 Research Methodology

The study examined the Utilization of Learning Management Systems: Perspective of Physically Challenged Learners in Africa. The paper used a desk study review methodology where relevant empirical literature was reviewed to identify main themes. A critical review of empirical literature was conducted to examine the Utilization of Learning Management Systems: Perspective of Physically Challenged Learners in Africa.

4.0 Results and Discussion of Findings

Based on the findings of the reviewed literatures, the results indicate that acknowledging accessibility in e-Learning is a key issue vouching to promote and ensure e-inclusion of students with disabilities. Furthermore, it bares the potential to eradicate barriers witnessed by students with disabilities in accessing on-line digital resources. The reviewed literatures also found out that, most available e-learning systems for learners with disabilities were limited to deliver accessible learning contents. However, the learners with disabilities needed the whole accessible TEL environment and not only the accessible content. Based on the findings of the reviewed literature, providing accessible content in a non-accessible learning environment leads to a non-accessible learning experience. The results from the reviewed literature pointed out that accessibility has been recognized as a key design consideration for technology-enhanced training

systems ensuring e-inclusion of people with disabilities in the training process and consequently preventing risks of digital exclusion.

In addition, the results obtained from the reviewed literature indicated that, there were two factors; the teaching and social presences and the facilitating and supporting of individual communication related to interaction among learners with disabilities and their instructors that impacted students' perceived learning achievement and class satisfaction. The results also indicated that social interaction factors, such as social presence, were correlated with less perceived learning achievement and satisfaction. This study has potential value because it found factors related to learner instructor control that may predict students with disabilities' perceived learning achievement and satisfaction.

Based on the findings from the reviewed literature, the reduced access to information technology experienced by people with disabilities creates an initial barrier to the use of LMS by people with physical disability. Those people with access to technology then encounter a number of problems. These include the accessibility of websites and learning management systems, the accessibility of digital audio and video content and alternatives, inflexible time limits built into online exams, the accessibility of PowerPoint presentations, and also course material in inaccessible PDF formats and the lack of access to needed adaptive technologies. The results also indicated that, problems with the inaccessibility of online chat rooms, and particularly the incompatibility of screen readers with these forums for students with vision impairments with the increasing spread of the Internet holds much potential for enhancing opportunities for people with disabilities. Based on the results from the reviewed literature, evidence exists to suggest that people with disabilities are, in fact, participating in these new developments.

Empirical evidence demonstrates that two other factors, top management and peer support and competencies in using specialized LMS tools significantly influence physically challenged learners of LMS usage in the teaching and learning process. Top management and peer support is actually found to be the most important determinant of LMS adoption in the teaching and learning process by the physically challenged learners, even more influential than perceived usefulness. Much emphasis should therefore be put on the increasing interaction between teachers and their peers with regards to the use of LMS in the teaching and learning process. This also includes leadership showing commitment towards the value of integrating the use of LMS to facilitate and improve the learning experience of students.

Based on the empirical evidence found from the reviewed literatures, cooperating teachers and technical staffs are key determinants influencing physically challenged learners' use of technology resources such as LMS. The results show that, when using educational technology like LMS the instructor should be primarily focused on the educational value of the tools and applications used, how adequate they are in the acquisition of knowledge by the disabled learners, whether there is an interaction between learners and tools, and if there is a positive effects in using them. The results obtained from the reviewed literatures indicated that, physically or cognitively inaccessible

environments act as barriers to LMS usage by the physically challenged learners. For example, inaccessible transport systems or service centres prevent learners from having easy access to the services and products they need. Physical barriers include stairs or poor lighting, while cognitive barriers include texts that are not clear or symbols that are difficult to understand. Further, regardless of the cost or availability of a wheelchair, a learner will not be able to use it in an inaccessible house, road or school. Barriers are often exacerbated during natural disasters and conflicts. The study findings showed that, learners with learning disabilities indicated experiencing technical difficulties and problems caused by their own lack of knowledge about how to use e-learning.

Based on the reviewed literatures, Assistive technology is also critical when it comes to utilization of LMS by the physically challenged learners. Assistive technology is used by individuals with disabilities in order to perform functions that might otherwise be difficult or impossible. Assistive technology can include mobility devices such as walkers and wheelchairs, as well as hardware, software, and peripherals that assist people with disabilities in accessing computers or other information technologies. For example, people with limited hand function may use a keyboard with large keys or a special mouse to operate a computer, people who are blind may use software that reads text on the screen in a computer-generated voice, people with low vision may use software that enlarges screen content, people who are deaf may use a TTY (text telephone), or people with speech impairments may use a device that speaks out loud as they enter text via a keyboard.

5.0 Conclusion

Based on the results obtained from the reviewed literature, the study concludes that, the presentation and control concepts are chosen taking into account their particularities for each type of disability. With the introduction of meta-model, the user can avoid in particular ad hoc accessibility implementation since the model considers accessibility from an early stage of systems lifecycle and any generated system preserves the properties specified in the corresponding model and allows the preservation of these properties after any modification. The study also concludes that, perceived usefulness is an important determinant of LMS usage among learners with physical disability. Perceived usefulness of LMS is one of the major predictors for users' adoption of computer technology within the teaching and learning context involving physically challenged learners.

Based on the findings of the reviewed literatures, the study concludes that social interaction factors, such as social presence, correlates with less perceived learning achievement and satisfaction. This study has potential value because it found factors related to learner instructor control that may predict students with disabilities' perceived learning achievement and satisfaction. Based on the reviewed literature, it suffices to conclude also that, most available e-learning systems for learners with disabilities are limited to deliver accessible learning contents. However, the learners with disabilities need the whole accessible TEL environment and not only

the accessible content. Providing accessible content in a non-accessible learning environment leads to a non-accessible learning experience, the accessibility has been recognized as a key design consideration for technology-enhanced training systems ensuring e-inclusion of people with disabilities in the training process and consequently preventing risks of digital exclusion.

As per the findings of the reviewed literature, there is enough empirical evidence to conclude that; eLearning is a growing area of the higher education landscape. This teaching practice holds great potential to be an avenue of inclusion for people with disabilities in that context. However, this potential is endangered by the relative inaccessibility of the online environment that is currently used both in terms of formal learning management systems and also the other social and web tools that are used in conjunction with these systems. Access to higher education and equality of access for people with disabilities is an important moral obligation for universities. Learners with learning disabilities can be high achievers and they can be successful in using LMS, if provided relevant help. it can also be concluded based on the findings from the reviewed literature that, while there are many different disabilities that can affect the use of computers and the participation in e-learning, seven main groups of disabilities can be distinguished in order to make e-learning and educational technology accessible for all; Visual disabilities, hearing impairments, Physical disabilities, Speech disabilities, Cognitive and neurological disabilities, Multiple disabilities and Aging-related conditions.

Based on the findings from the reviewed literatures, the study concluded that during the past decades there has been tremendous development and interest in e-learning on campus by physically challenged learners. Today, there are many benefits of e-learning, such as the availability of online course notes; however there are also problems when it comes to utilization of eLearning by physically challenged learners. Chief among these are problems related to inaccessibility of websites and course management systems for the physically challenged learners. The study also illustrated that problem experiences differ among the physically challenged learners. Some accessibility features may exist in some e-learning environments and applications but implemented in an ad hoc way and exclusively dependent on some specific technologies or targeting only one kind of disability. In this context, considering accessibility aspects since the design phases of the educational environment and e-learning applications should provide a rational solution. Access to information and communication for people with disabilities through modern technology is acknowledged as an important requirement

6.0 Recommendations

Based on the findings from the reviewed literatures, the study recommends that, studies to be conducted in the future should investigate the modeling transformation process from abstract models to specific models and to extend the application of the approach to other e-Learning platforms with a special focus on mobile learning for learners who are physically challenged in Africa. The study also concludes that, future studies should test for mediating effects in the context of LMS adoption by physically challenged learners in Africa in the learning process.

The study also recommend based on the findings of the reviewed literature that, since Access to higher education and equality of access for people with disabilities is an important moral obligation for universities, the universities in Africa should provide the necessary support for the learners with physical disabilities so that they can be able to access LMS like any other learners. The study recommends further that, studies evaluating utilization of LMS should employ a combination of quantitative and qualitative approaches such that each can compensate for the weakness of the other, thereby given a detailed and credible result. As per the findings of the reviewed literatures, the study recommends that, this study be replicated in other contexts. Future studies can also examine more in depth the variables that were found to have the greatest explanatory power such as management and peer support and perceived usefulness using qualitative research methods.

7.0 References

Alamri, A., & Tyler-Wood, T. (2017). Factors Affecting Learners with Disabilities–Instructor Interaction in Online Learning. *Journal of Special Education Technology*, *32*(2), 59-69.

Al-Azawei, A., Parslow, P., & Lundqvist, K. (2017). The effect of Universal Design for Learning (UDL) application on e-learning acceptance: A structural equation model. *The International Review of Research in Open and Distributed Learning*, *18*(6).

Arkorful, V., & Abaidoo, N. (2015). The role of e-learning, advantages and disadvantages of its adoption in higher education. *International Journal of Instructional Technology and Distance Learning*, *12*(1), 29-42.

Bell, D., & Swart, E. (2018). Learning experiences of students who are hard of hearing in higher education: Case study of a South African university. *Social Inclusion*, *6*(4), 137-148.

Casany, M. J., Alier, M., Mayol, E., Piguillem, J., Galanis, N., García-Peñalvo, F. J., & Conde, M. Á. (2012). Moodbile: A framework to integrate m-learning applications with the LMS. *Journal of Research and Practice in Information Technology*, *44*(2), 129.

Cinquin, P. A., Guitton, P., & Sauzéon, H. (2019). Online e-learning and cognitive disabilities: A systematic review. *Computers & Education*, *130*, 152-167.

Cinquin, P. A., Guitton, P., & Sauzéon, H. (2019). Online e-learning and cognitive disabilities: A systematic review. *Computers & Education*, *130*, 152-167.

Cooper, M., Ferguson, R., & Wolff, A. (2016, April). What can analytics contribute to accessibility in e-learning systems and to disabled students' learning?. In *Proceedings of the Sixth International Conference on Learning Analytics & Knowledge*(pp. 99-103). ACM.

Ellis, K., & Kent, M. (2011). *Disability and new media*. Routledge.

Fichten, C. S., Ferraro, V., Asuncion, J. V., Chwojka, C., Barile, M., Nguyen, M. N., ... & Wolforth, J. (2013). Disabilities and e-learning problems and solutions: An exploratory study. *Journal of Educational Technology & Society*, *12*(4), 241-256.

Fisseler, B., & Bühler, C. (2017, September). Accessible e-learning and educational technology extending learning opportunities for people with disabilities. In *Proceedings of the International Conference of "Interactive computer aided learning" ICL2007: EPortofolio and Quality in e-Learning* (pp. 26-28).

Fletcher, J. M., Lyon, G. R., Fuchs, L. S., & Barnes, M. A. (2018). *Learning disabilities: From identification to intervention*. Guilford Publications.

Fox, S. (2011). *Americans living with disability and their technology profile*. Pew Research Center's Internet & American Life Project.

Fullan, M. (2001). The new meaning of educational change. Routledge.

Gutenbrunner, C., Tederko, P., Grabljevec, K., & Nugraha, B. (2018). Responding to the World Health Organization Global Disability Action Plan in Ukraine: developing a national disability, health and rehabilitation plan. *Journal of rehabilitation medicine*, *50*(4), 338-341.

Hawkridge, D., Vincent, T., & Hales, G. (2018). New information technology in the education of disabled children and adults. Routledge.

Jaeger, P. T. (2015). Disability, human rights, and social justice: The ongoing struggle for online accessibility and equality. *First Monday*, *20*(9).

Jemni, M., Laabidi, M., & Ayed, L. J. B. (2014). Accessible E-learning for Students with Disabilities: From the Design to the Implementation. In *The New Development of Technology Enhanced Learning* (pp. 53-74). Springer, Berlin, Heidelberg.

Jordan, K., & Tseris, E. (2018). Locating, understanding and celebrating disability: Revisiting Erikson's "stages". *Feminism & Psychology*, *28*(3), 427-444.

Kent, M. (2015). Disability and eLearning: Opportunities and barriers. *Disability Studies Quarterly*, *35*(1).

Kent, M. (2016). 14 Opportunities for eLearning, social media and disability. *Disability and Social Media: Global Perspectives*, 191.

Kent, M., Ellis, K., Pitman, T., McRae, L., & Latter, N. (2019). 3 Disability, higher education and e-learning. *Interdisciplinary Approaches to Disability: Looking Towards the Future*, *2*.

Kent, M., Ellis, K., Pitman, T., McRae, L., & Latter, N. (2019). 3 Disability, higher education and e-learning. *Interdisciplinary Approaches to Disability: Looking Towards the Future*, *2*.

Kumar, K. R. A., Ravi, S., & Srivatsa, S. K. (2011). Effective e-learning approach for Students with Learning Disabilities. *International Journal of Scientific & Engineering Research*, *2*(11), 1.

Laabidi, M., Jemni, M., Ayed, L. J. B., Brahim, H. B., & Jemaa, A. B. (2014). Learning technologies for people with disabilities. *Journal of King Saud University-Computer and Information Sciences*, *26*(1), 29-45.

Lebenicnik, M., & Starcic, A. I. (2018, August). Factors Related to the Use of Online Learning Resources: The Perception of Environmental and Contextual Barriers of Students with Special Educational Needs and Their Peers. In *International Conference on Innovative Technologies and Learning* (pp. 329-336). Springer, Cham.

Maboe, M. J., Eloff, M., Schoeman, M., & Kayode, O. (2018, July). The Experience of Students with Disabilities at an Open Distance e-Learning Institution. In *ICEL 2018 13th International Conference on e-Learning* (p. 220). Academic Conferences and publishing limited.

Meskhi, B., Ponomareva, S., & Ugnich, E. (2019). E-learning in higher inclusive education: needs, opportunities and limitations. *International Journal of Educational Management*, *33*(3), 424-437.

Mullinix, B., & McCurry, D. (2013). Balancing the learning equation: Exploring effective mixtures of technology, teaching and learning. *The Technology Source*.

Rogers, C. R. (1995). A way of being. Houghton Mifflin Harcourt.

Sadao, K. C., & Robinson, N. B. (2010). *Assistive Technology for Young Children: Creating Inclusive Learning Environments*. Brookes Publishing Company. PO Box 10624, Baltimore, MD 21285.

Tom, S. L., Mpekoa, N., & Swart, J. (2018, March). Factors that affect the provision of visually impaired learners in higher education. In *2018 Conference on Information Communications Technology and Society (ICTAS)* (pp. 1-5). IEEE.

Wentz, B., Jaeger, P. T., & Lazar, J. (2011). Retrofitting accessibility: The legal inequality of after-the-fact online access for persons with disabilities in the United States. *First Monday*, *16*(11).

World Health Organization. (2018). World health statistics 2018: monitoring health for the SDGs, sustainable development goals.