

## **Students' Attitudes and Perceptions on Technology Usage in Learning and Teaching: A Case of Distance Learning Programme at Africa Nazarene University, Kenya**

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**Abstract:** *The positive growth in access to and use of technology has caused more approaches to be developed in e-learning and is manifested in different forms. This has supplemented or replaced the traditional methods in learning, enabling engagement of learners with their learning through various web technologies alongside face-to-face delivery, and sometimes completely replacing direct face-to-face contact. However, the success of use of technology in learning depends, to a significant extent, on how the students actually use and their attitude in the learning purposes. The purpose of the study was to examine students' attitudes and perceptions about using technology in learning and teaching citing Africa Nazarene University as a case study. Data was collected from 234 IODL students. Findings from the study revealed that students' attitudes and perceptions on the use of technology in learning and teaching were diverse and were both positive and negative. While positive attitudes and perceptions of users to adopt Technology in learning and teaching can simplify their understanding and use of the technology in learning and teaching, negative attitudes would instead complicate this making adoption difficult.*

**Keywords:** *Attitudes, Perceptions, Technology, Teaching and Learning, Africa Nazarene University*

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Date of Submission: 16-10-2017

Date of acceptance: 02-11-2017

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### **I. Introduction**

The magnitude of new technologies introduced over the last ten years or so has also impacted tremendously on Open and Distance Learning practices (Weumin & Dhanarajan 2006). Bollag and Overland (2001), assert that many educational institutions are answering the challenge of increased enrolment and lack of physical space, by developing distance learning programs. The acquisition of quality higher education through technology within distance education has found remarkable levels of praise from various scholars. Moore et.al (1990) argue that through the integration of technology in distance learning, quality education has been made accessible at very low cost to people who are engaged in other activities of daily living that are likely to bar them from attending schooling on a regular basis (Bollag & Overland 2001). The increased trend towards use of distance education among conventional higher education institutions has been fuelled by two major factors: institutions are seeking to enrol non-resident learners; and the increasing need by adult learners to seek and acquire qualifications while overcoming the constraints inherent in conventional education (MoE 2006).

One of the main challenges of using technology to support distance learners is that there are very few people who have the necessary skills to teach and learn using ICT in universities. The demand for e-learning has grown tremendously but the number of tutors and lecturers trained to guide learners on ICT has failed to meet the demand requirements. More students are willing to be taught and guided through computing skills than there are teachers to guide them in acquiring the skills (Singh & Means 2000). Most of the lecturers are not comfortable with using a computer. The perception, especially by the older generation, that computers require highly skilled personnel in their operations is strong. Even if this may not be true in some cases, management also fear that their students may be in danger when they access undesired sites while using the internet. The threat of virus infection to users' computers leading to data loss has also caused fears among the users. While this may be true to some extent, appropriate training on the proper use of computers to ensure safety can help alleviate some of these fears (Martin 2011).

Availability of ICT infrastructure is the first step towards adoption and use of technology in Universities. However, a study by Hennessy (2010) revealed that there is lack of adequate facilities like hardware, software and internet limited accessibility of ICT to a large segment of the population in sub-Saharan Africa. The study also found that other factors such as transport networks, electricity, import duties, network configuration and technical faults compounded the problem.

The successful implementation of the use of technology in learning and teaching is a complex process, determined by teaching values, attitudes, curriculum needs and physical infrastructure consequently impacting on the rate of its adoption (Granger et al. 2002). A substantial body of research asserts that obstacles such as lack of electricity, computer skills, network configuration and accessibility to technological devices have a profound impact on the use of technology to support learning and teaching (Balanskat et al 2006); Becta (2004; Nchunge et al 2013). Most distance learning programs in Africa seemingly fail due to lack of technological pedagogical knowledge among both students and lecturers.

The infrastructural challenges facing developing countries in relation to the developed world such as lack of connections in the rural areas, frequent power interruptions, the high initial cost of technology for learning and teaching in universities has not in itself guaranteed the adoption and use of technology to support learning and teaching in higher learning institutions. Although students acknowledge the value of technology, various higher learning institutions including ANU found that their students are not adopting and using technology optimally for improved learning and teaching. The way in which students are taught, instructional methods used, competence of their lecturers and what they are taught directly impacts on their attitude and perception towards the use of technology in learning and teaching, thus calling for constant adjustments to and around technology (Watson 2003).

Kenya has witnessed an unprecedented expansion of distance learning programmes to cater for the great number of people determined to enhance their skills and positions in the work place while still desirous of working and supporting their families. Technology has been hailed in the context of distance education as a variable that maximizes the use of limited physical and human resources and facilities used in these accepted institutions (Ayot 2005). One of the main challenges of using technology to support distance learners is that there are very few people who have the necessary skills to teach and learn using ICT in universities. The demand for e-learning has grown tremendously but the number of tutors and lecturers trained to guide learners on ICT has failed to meet the demand requirements. More students are willing to be taught and guided through computing skills than there are teachers to guide them in acquiring the skills (Singh & Means 2000). Most of the lecturers are not comfortable with using a computer. The perception, especially by the older generation, that computers require highly skilled personnel in their operations is strong. Even if this may not be true in some cases, management also fear that their students may be in danger when they access undesired sites while using the internet. The threat of virus infection to users' computers leading to data loss has also caused fears among the users. While this may be true to some extent, appropriate training on the proper use of computers to ensure safety can help alleviate some of these fears (Martin 2011).

### **Africa Nazarene University Background**

Africa Nazarene University is essentially a contact institution which also offers distance education provision. It has a student population of over 4,000, with four departments and two schools, six campuses, offering support to distance education students. Currently, the distance student enrolment stands at 600. The IODL strives to keep abreast of developments in the rest of the world by putting more emphasis on the use of technology to support learning and teaching. There are presently over 500 personal computers on campus, but it is aimed to be increased to 1000 personal computers; creating a 1:1 ratio of computers to staff and a 1:5 ratio for students (Athoye 2013). The university also has embarked on putting up more computer laboratories, training of staff and students on using technologies for learning and teaching. To achieve this, the Institute has a Learning Management System (LMS), called the Comprehensive Academic Management System (CAMS) which they use for registration, student finance, and examinations. This allows students to check their assignment, examination and feedback results online. The institution has also established a Corporate SMS service, which allows students to communicate with the institution in obtaining fee balances, fee statements, examination results, important dates and emergency alerts. This has increased efficiency, effectiveness, and convenience in the means of communication between students and the university (Athoye 2013).

The university also has a Sage Accpac Enterprise Resource Planning (ERP) system which has seen integration of all financial data and processes in a single consolidated system. The Human Resource Management Information System (HRMIS) is used to capture staff records and staff-related processes. In the past, more focus was placed on enhancing the ICT infrastructure, hardware, and administration systems; the institution subsequently progressed on to use technology for e-learning and has recently introduced video-conferencing facilities to link its main campus to the Meru campus. This was made possible by the enhancement of the fibre-optic connection between the city of Nairobi and Meru town.

ANU has introduced e-learning using the e-Naz Moodle platform. More than 50 lecturers and facilitators have received appropriate training on the use of the e-Naz platform, while new students are provided computer literacy training, use of internet technology, and the use of the e-Naz platform. The university also regularly holds several training programmes seminars and meetings, to raise awareness of e-learning among lecturers (Athoye 2013). The institution's library catalogue is accessed through the University's Website. Other

services accessed from the Website, include information on courses, programme, fees and so on. Mobile telecommunications and land lines are used for tutorials and other related services. The learners can also e-mail their queries to administrative staff.

## **II. Literature Review**

### **Concept of Distance Learning**

Holmberg (1989) refined the definition by stating that Distance Education is a concept that covers the learning and teaching activities in the cognitive and/or psychomotor and effective domains of an individual learner. It is characterized by non-contiguous communication and can be carried out anywhere and at any time which makes it attractive to adults with professionals and social commitments (Holmberg 1989: 168). As communication technology has evolved, the possibilities for interactivity have increased. But the choices made have often involved the continued use of one-way technologies, which rule out the 'noise' that builds a vigorous and active life world (Holmberg 1989).

### **Technology in Distance Learning**

The use of technology in the distant mode gives students an opportunity to study through self-learning methods. According to Nicole (2005), "University faculty members have been among the last educators to experience the educational thrust toward technology integration". The study by Nicole (2005) responds to the need to establish the current practices of faculty members in developing nations in relation to technology use for learning and teaching following investments made to boost technology availability in the university. Factors influencing the utilization of new technologies (such as computers, the Internet and the World Wide Web) have been analysed through the lenses of several theories that have also informed similar research endeavours (Nertha et al. 2009).

Within the education sector, Internet use has been widely implemented in universities, high schools, business organisations and even the Not for Profit organisations for more than two decades with real impact in peoples' lives in their learning process. In a survey by the Pew Internet and American Life Project (2005), it was revealed that in the U.S., college students seemed generally positive about the Internet and its impact on their educational experience. The finding showed that for distance learning, projects did not enjoy much success, however. The survey also found that there appeared to be little interest among traditional college students of between 10 to 22 years old to abandon the face-to-face classrooms for online or distance learning. The study further showed that only 6% of students took online courses for college credit, and out of those 6% only half (52%) thought the online courses were worth their time, with the other half saying that they believed they learned less from the online course than they would have from a face-to-face or physical class at campus. Gauging from the above findings, it is clear that for students already enrolled in traditional college courses, online education has a long way to go before it might challenge the traditional classroom.

On study habits, the findings showed that 73% of college students were using the internet as the primary site of their information searches rather than the library. The convenience of the internet was tempting students to rely very heavily on it when searching for academic resources as compared to the physical library. The survey by the Pew Internet and American Life Project (2005) also showed that distance learning projects have not found much success because students have the option of choosing between study in classrooms and online courses. But in remote areas, where the classroom is not available for those who are interested in studying, taking online courses may be the only choice and may be better than nothing. Although the scholar argued that this preference for online courses in remote areas could make distance learning helpful to people in those areas to communicate with others and to increase their knowledge by learning via the Internet since they have no chance to study in traditional classrooms, this may not be necessarily so. One reason could be that if these people genuinely cannot afford to construct a physical classroom, then other facilities such as electricity or computers could be equally challenging to access.

In contrast to the foregoing discussion. According to Donnellan (2002), Information and Communications Technology (ICT) projects run in various parts of the world such as the UK Education Departments have shown that the use of ICT in education provides a number of learning benefits. Such benefits include improved subject learning across a wide range of curriculum areas such as English, mathematics, science, history, geography, modern languages, art, technology, IT and careers, as well as independent study and cross-curricular project work; improved motivation and attitudes to learning; development of independent learning and research skills; improved vocational training; development of network literacy (the capacity to use electronic networks to access resources, create resources and communicate with others, these can be seen as complex extensions of the traditional skills of reading, writing, speaking and listening; and social development). A paradigm shift in teaching is signified by the integration of modern ICT technology and it's true that implementing technology may be catalyzing the process but its effectiveness in use requires a paradigm shift from teaching to learning. This requires adequate training in technology and also as technical support (Rogers & Donna, 2003).

### **Studies in Adoption of Technology**

According to Volery (2000: 35), the level of adoption of e-learning is still low in various parts of the world, especially in Africa. Volery (2000) argues that the fast expansion of the internet and related technological advancements alongside limited budgets and social demands for improved access to higher education has produced a substantial incentive for universities to introduce eLearning courses. Volery (2000: 36) adds that if universities do not embrace eLearning technology that is readily available by increasing their level of adoption, they will be left behind in the pursuit of globalisation. A study by Rosen and Weil (1995) and Hadley and Sheingold (1993) found that the level of adoption by lecturers and students is highly affected by lack of teaching experience with ICT, lack of on-site support for teachers using technology, lack of help supervising children when using computers, lack of enough ICT specialist teachers to teach students computer skills, lack of computer availability, lack of time required to successfully integrate technology into the curriculum, and lack of financial support.

Other studies such as by Ribiero (2002: 23) arguing along the same line posit that if learning institutions are to utilize the potential of eLearning as a means of enhancing higher education, they must be fully aware of the critical success factors concerned with introducing online models of education. The identification of critical success factors in adoption is pivotal in increasing the level of adoption of technology among lecturers and students. A review of 150 distance education programs in Sub-Saharan Africa has concluded that traditional, paper-based means of distance learning continues to be more reliable, sustainable, and widely used than online and Web-based methods of learning (Leary & Berge 2006).

According to UNESCO (1999), 42% of the inhabitants of developed countries have telephone connections in contrast with 4.5% in developing countries, and only a mere 1.4% in sub-Saharan Africa. In addition, most single telephone connections in rural areas in developing countries are typically shared among communities, rather than owned by individual households (Mackintosh 2005). The 1998 Working Conference on Capacity Building for IT in Education in Developing Countries demonstrated the importance that developing countries' governments place on computer education (Marshall & Ruohonen 1998: 65). The conference representatives identified the need to provide computers to enable students to first develop computer skills, and second to use computers for distance learning. As an example, Botswana policies identify computer education as necessary for the people of Botswana to compete in a modern, IT-driven, global economy (Ojo & Awuah 1998: 25).

According to Laurillard (2003: 176-177), lecturers and students use technology in learning and teaching through various ways. Such ways include audiographic conference environment, audiographic task-based environment on the web, digital discussion environment, webinars, tutorial simulation programs, and interactive programs. Another study by Dela and Bandalaria (2007: 14, 17) found that Philippine educators have used combinations of radio, print, audio, and video recordings for distance education of learners scattered around the Filipino islands since 1952. Yet the country faces typical infrastructural and digital divide challenges between rural-urban populations when it comes to using computers and associated technologies for learning. However, the proliferation of mobile phones in developing countries like the Philippines may enhance the development of mobile learning (m-learning), to educate the masses.

According to Al-alak and Alnawas (2009: 203-204), for e-learning to be successful, e-learning users have to change their attitudes, belief, behaviour, perspective and habits in order to successfully adopt the use of technology. This shows the association between technology users' attitude and perception and its adoption. Brower (2002) in Al-alak and Alnawas (2009: 203-204) states that teachers' fear and unwillingness to adopt e-learning as a new way of teaching is attributed to their feeling disempowered by the approach. The argument is that in order to teach, they have to touch students and be close to them, and hence, using e-learning may dramatically change the way they teach which is mainly based on getting in contact with learners.

Dabholkar cited in (1994) Al-alak and Alnawas (2009: 203-204) hypothesized that people simultaneously have positive/negative attitudes or beliefs towards technology. A positive belief or attitude would foster individual acceptance towards technology, while a negative attitude or belief might hold them back. This is supported by Rossiter (2007) arguing that since e-learning is mainly based on the use of technology to deliver content via the internet, it has been concluded that e-learning is regarded as radical and challenging for learners, teachers and administrators, and hence, teachers may rise against the adoption the use of such systems.

Different skills which instructors have to be equipped with are also found to influence their attitude towards the adoption of e-learning system. Bonk (2000) points out that instructors should have different skills and play different roles in order to be able to adopt the use of technology in teaching effectively. First, instructors need to understand the application software and the implications of technology in order to be able to adopt such technology and enhance students' learning experience. Second, instructors need to be able to design online courses which should make studies more interesting and interactive, and hence, instructors should adopt the right tool, not just the available one. Finally, instructors have to play a social role to keep students motivated

and increase their level of learning. Such skills and roles may be perceived as obstacles which may hinder instructors from utilizing e-learning.

### III. Objective Of The Study

To examine students' attitudes and perceptions about using technology in learning and teaching in Distance learning at Africa Nazarene University.

#### RESEARCH QUESTION

What are the students' attitudes and perceptions in using technology for Learning in Distance learning at Africa Nazarene University ?

### IV. Methodology

The study adopted a mixed methods approach that encompasses the usage of both quantitative and qualitative data (Creswell 2009). To address the objective of the study on the usage of technology in learning and teaching, data was collected both qualitatively and quantitatively from 234 (39%) of 600 IODL students. After the administration of the questionnaires, the data collected was organized, collated, summarized, statistically treated and drafted in tables with the help of Statistical Package for Social Sciences (SPSS). Data was analysed descriptively and inferentially with the help of Statistical Package for Social Sciences (SPSS) computer software version 22.0. In accordance to McMillan and Schumacher (2010) and Schulze (2003), researches in the wider area of education require both quantitative and qualitative research approaches in enhancing the understanding of learning, teaching and other human phenomena

### V. Findings And Discussions

#### Students' attitudes and perceptions about using technology in learning and teaching

Regarding this objective of the study, 38 items were used to obtain the attitudes and perceptions of students on adoption of technology to support learning and teaching in a distance learning programme the findings were summarised in table 1 below.

**Table 1: Students attitudes and perceptions about using technology in learning and teaching**

| Item  |                   | Frequency | Percentage |
|---|-------------------|-----------|------------|
| <b>Using e learning would enhance my effectiveness in learning</b>    | Strongly disagree | 10        | 4.1        |
|   | Disagree          | 4         | 1.7        |
|   | Undecided         | 12        | 5.0        |
|   | Agree             | 77        | 31.8       |
|   | Strongly agree    | 135       | 55.8       |
| <b>Using e learning would improve my course performance</b>           | Strongly disagree | 13        | 5.4        |
|   | Disagree          | 7         | 2.9        |
|   | Undecided         | 11        | 4.5        |
|   | Agree             | 83        | 34.3       |
|   | Strongly agree    | 126       | 52.1       |
| <b>Using e learning would increase productivity in my course work</b> | Strongly disagree | 8         | 3.3        |
|   | Disagree          | 4         | 1.7        |
|   | Undecided         | 14        | 5.8        |
|   | Agree             | 97        | 40.1       |
|   | Strongly agree    | 101       | 41.7       |
| <b>I find e learning useful</b>                                       | Strongly disagree | 8         | 3.3        |
|   | Disagree          | 17        | 7.0        |
|   | Undecided         | 14        | 5.8        |
|   | Agree             | 75        | 31.0       |
|   | Strongly agree    | 123       | 50.8       |
| <b>I could improve my performance by using computers</b>              | Strongly disagree | 6         | 2.5        |
|   | Disagree          | 4         | 1.7        |
|   | Undecided         | 14        | 5.8        |
|   | Agree             | 67        | 27.7       |
|   | Strongly agree    | 127       | 52.5       |
| <b>I could improve my productivity by using computers</b>             | Strongly disagree | 8         | 3.3        |
|   | Disagree          | 21        | 8.7        |
|   | Undecided         | 27        | 11.2       |
|   | Agree             | 60        | 24.8       |
|   | Strongly agree    | 119       | 49.2       |
| <b>I could enhance my effectiveness by using computers</b>            | Strongly disagree | 6         | 2.5        |
|   | Disagree          | 6         | 2.5        |
|   | Undecided         | 24        | 9.9        |
|   | Agree             | 64        | 26.4       |
|   | Strongly agree    | 134       | 55.8       |
| <b>Using e learning would enhance my effectiveness in learning</b>    | Strongly disagree | 5         | 2.1        |

|   |                   |     |      |
|---|-------------------|-----|------|
|   | Disagree          | 7   | 2.9  |
|   | Undecided         | 16  | 6.6  |
|   | Agree             | 64  | 26.4 |
|   | Strongly agree    | 134 | 55.4 |
| <b>I have participated in Video Conferencing</b>                                    | Strongly disagree | 90  | 37.2 |
|   | Disagree          | 48  | 19.8 |
|   | Undecided         | 30  | 12.4 |
|   | Agree             | 38  | 15.7 |
|   | Strongly agree    | 32  | 13.2 |
| <b>I enjoy communicating using Electronic Mail (Email)</b>                          | Strongly disagree | 14  | 5.8  |
|   | Disagree          | 27  | 11.2 |
|   | Undecided         | 18  | 7.4  |
|   | Agree             | 75  | 31.0 |
|   | Strongly agree    | 105 | 43.4 |
| <b>I always use internet in learning and teaching</b>                               | Strongly disagree | 43  | 17.8 |
|   | Disagree          | 25  | 10.3 |
|   | Undecided         | 39  | 16.1 |
|   | Agree             | 55  | 22.7 |
|   | Strongly agree    | 72  | 29.8 |
| <b>I do use audio/video tapes in learning and teaching</b>                          | Strongly disagree | 62  | 25.6 |
|   | Disagree          | 44  | 18.2 |
|   | Undecided         | 30  | 12.4 |
|   | Agree             | 58  | 24.0 |
|   | Strongly agree    | 35  | 14.5 |
| <b>I have attended a course in Virtual Classroom</b>                                | Strongly disagree | 85  | 35.1 |
|   | Disagree          | 35  | 14.5 |
|   | Undecided         | 35  | 14.5 |
|   | Agree             | 54  | 22.3 |
|   | Strongly agree    | 25  | 10.3 |
| <b>I like teaching &amp; learning materials through CD-ROM &amp; WebCT</b>          | Strongly disagree | 92  | 38.0 |
|   | Disagree          | 37  | 15.3 |
|   | Undecided         | 37  | 15.3 |
|   | Agree             | 49  | 20.2 |
|   | Strongly agree    | 21  | 8.7  |
| <b>I have high level of self-confidence in using e-Naz</b>                          | Strongly disagree | 24  | 9.9  |
|   | Disagree          | 25  | 10.3 |
|   | Undecided         | 59  | 24.4 |
|   | Agree             | 67  | 27.7 |
|   | Strongly agree    | 63  | 26.0 |
| <b>I am able to skilfully use e-Naz system</b>                                      | Strongly disagree | 23  | 9.5  |
|   | Disagree          | 27  | 11.2 |
|   | Undecided         | 53  | 21.9 |
|   | Agree             | 51  | 21.1 |
|   | Strongly agree    | 85  | 35.1 |
| <b>Using e-Naz is entirely within my control</b>                                    | Strongly disagree | 18  | 4.1  |
|   | Disagree          | 50  | 12.4 |
|   | Undecided         | 64  | 27.7 |
|   | Agree             | 38  | 18.2 |
|   | Strongly agree    | 63  | 36.0 |
| <b>The e-Naz system allows easy access to information</b>                           | Strongly disagree | 10  | 4.1  |
|   | Disagree          | 30  | 12.4 |
|   | Undecided         | 67  | 27.7 |
|   | Agree             | 44  | 18.2 |
|   | Strongly agree    | 87  | 36.0 |
| <b>I am willing to participate in e-learning activities</b>                         | Strongly disagree | 6   | 2.5  |
|   | Disagree          | 14  | 5.8  |
|   | Undecided         | 14  | 5.8  |
|   | Agree             | 86  | 35.5 |
|   | Strongly agree    | 118 | 48.8 |
| <b>I am rarely disconnected during online tutorials</b>                             | Strongly disagree | 25  | 10.3 |
|   | Disagree          | 38  | 15.7 |
|   | Undecided         | 49  | 20.2 |
|   | Agree             | 71  | 29.3 |
|   | Strongly agree    | 53  | 21.9 |
| <b>I have resources, knowledge and ability to use e-Naz</b>                         | Strongly disagree | 17  | 7.0  |
|   | Disagree          | 41  | 16.9 |
|   | Undecided         | 41  | 16.9 |
|   | Agree             | 63  | 26.0 |
|   | Strongly agree    | 73  | 30.2 |
| <b>I learn more in online courses offered at e-Naz than in face to face courses</b> | Strongly disagree | 27  | 11.2 |
|   | Disagree          | 25  | 10.3 |
|   | Undecided         | 64  | 26.4 |
|   | Agree             | 75  | 31.0 |

|  |                   |     |      |
|--|-------------------|-----|------|
|  | Strongly agree    | 44  | 18.2 |
| <b>e-Naz courses require more study time than face to face courses</b>               | Strongly disagree | 14  | 5.8  |
|  | Disagree          | 54  | 22.3 |
|  | Undecided         | 48  | 19.8 |
|  | Agree             | 72  | 29.8 |
|  | Strongly agree    | 53  | 21.9 |
| <b>I find the site easy to learn</b>   | Strongly disagree | 14  | 5.8  |
|  | Disagree          | 54  | 22.3 |
|  | Undecided         | 48  | 19.8 |
|  | Agree             | 72  | 29.8 |
|  | Strongly agree    | 53  | 21.9 |
| <b>My interaction with e-Naz is clear and understandable</b>                         | Strongly disagree | 14  | 5.8  |
|  | Disagree          | 16  | 6.6  |
|  | Undecided         | 62  | 25.6 |
|  | Agree             | 51  | 21.1 |
|  | Strongly agree    | 92  | 38.0 |
| <b>I think taking courses on e-Naz is convenient</b>                                 | Strongly disagree | 9   | 3.7  |
|  | Disagree          | 15  | 6.2  |
|  | Undecided         | 53  | 21.9 |
|  | Agree             | 65  | 26.9 |
|  | Strongly agree    | 96  | 39.7 |
| <b>I think learning through e-Naz is fun</b>   | Strongly disagree | 16  | 6.6  |
|  | Disagree          | 29  | 12.0 |
|  | Undecided         | 50  | 20.7 |
|  | Agree             | 67  | 27.7 |
|  | Strongly agree    | 76  | 31.4 |
| <b>I am generally satisfied with the quality of online services offered at e-Naz</b> | Strongly disagree | 15  | 6.2  |
|  | Disagree          | 34  | 14.0 |
|  | Undecided         | 54  | 22.3 |
|  | Agree             | 67  | 27.7 |
|  | Strongly agree    | 69  | 28.5 |
| <b>I believe it will be a good idea to use e-Naz tools</b>                           | Strongly disagree | 9   | 3.7  |
|  | Disagree          | 8   | 3.3  |
|  | Undecided         | 23  | 9.5  |
|  | Agree             | 60  | 24.8 |
|  | Strongly agree    | 137 | 56.6 |
| <b>Online discussions enable students to exchange ideas and comments</b>             | Strongly disagree | 9   | 3.7  |
|  | Disagree          | 11  | 4.5  |
|  | Undecided         | 32  | 13.2 |
|  | Agree             | 76  | 31.4 |
|  | Strongly agree    | 106 | 43.8 |
| <b>I benefit from using interactive applications</b>                                 | Strongly disagree | 12  | 5.0  |
|  | Disagree          | 26  | 10.7 |
|  | Undecided         | 24  | 9.9  |
|  | Agree             | 102 | 42.1 |
|  | Strongly agree    | 72  | 29.8 |
| <b>I am able to ask questions and receive answers</b>                                | Strongly disagree | 16  | 6.6  |
|  | Disagree          | 19  | 7.9  |
|  | Undecided         | 47  | 19.4 |
|  | Agree             | 80  | 33.1 |
|  | Strongly agree    | 73  | 30.2 |
| <b>Browsing classmates work help reflect own shortcoming</b>                         | Strongly disagree | 34  | 14.0 |
|  | Disagree          | 16  | 6.6  |
|  | Undecided         | 37  | 15.3 |
|  | Agree             | 93  | 38.4 |
|  | Strongly agree    | 56  | 23.1 |
| <b>I think sharing knowledge through online discussion is time consuming</b>         | Strongly disagree | 51  | 21.1 |
|  | Disagree          | 43  | 17.8 |
|  | Undecided         | 37  | 15.3 |
|  | Agree             | 58  | 24.0 |
|  | Strongly agree    | 48  | 19.8 |
| <b>I am likely to take an online course again through e-Naz</b>                      | Strongly disagree | 14  | 5.8  |
|  | Disagree          | 9   | 3.7  |
|  | Undecided         | 36  | 14.9 |
|  | Agree             | 59  | 24.4 |
|  | Strongly agree    | 116 | 47.9 |
| <b>If available, I intend to use e-learning tools during the semester</b>            | Strongly disagree | 13  | 5.4  |
|  | Disagree          | 5   | 2.1  |
|  | Undecided         | 23  | 9.5  |
|  | Agree             | 72  | 29.8 |
|  | Strongly agree    | 117 | 48.3 |
| <b>If available, I intend to use e-learning tools as frequently as possible</b>      | Strongly disagree | 11  | 4.5  |

|   |                   |     |      |
|---|-------------------|-----|------|
|   | Disagree          | 11  | 4.5  |
|   | Undecided         | 30  | 12.4 |
|   | Agree             | 66  | 27.4 |
|   | Strongly agree    | 120 | 27.3 |
| <b>I intend to use e-learning tools whenever possible for my coursework</b> | Strongly disagree | 11  | 4.5  |
|   | Disagree          | 3   | 1.2  |
|   | Undecided         | 19  | 7.9  |
|   | Agree             | 57  | 23.6 |
|   | Strongly agree    | 148 | 61.2 |

This shows that the level of adoption of technology in Africa Nazarene University was rated as high in most items except an item on attending a course on Virtual Classrooms. The most worrying trend were numbers of students who chose the Undecided option. Although students agreed and strongly agreed with most items, they did not necessarily display the users' attitudes and perceptions on use of technology in learning and teaching in Africa Nazarene University (ANU). This is because there is a difference between the university's adoption policies which compel both the students and lecturers to cope with the requirements with no due regard to whether they have a positive attitude for it or not. Students' attitudes and perceptions about using technology in learning and teaching in ANU was measured based on the respondents' score on various items such as using E-learning would enhance my effectiveness in learning (87.6%); using E-learning would improve my course performance (86.4%); using E-learning would increase my productivity in my course work (81.8%); I find E-learning useful (81.8%); I could improve my performance by using computers (80.2%); I could increase my productivity by using computers (74%); I could enhance my effectiveness by using computers (82.2%); using E-learning would enhance my effectiveness in teaching (81.8%); I have participated in Video Conferencing (28.9%); I enjoy communicating using Electronic Mail( E-mail) (74.4%); I always use Internet in learning and teaching (52.5%); and I do use Audio/Video tapes in learning and teaching (38.5%). This table and its findings show the respondents rating of the perceived use of technology in increasing their performance through efficiency and effectiveness.

Others' responses to students' perception on technology adoption included: I have attended a course in a Virtual Classroom (32.6%); I like delivering my study and teaching materials through CD-ROM and WebCT (28.9%); I have high level of self-confidence in using the e-Naz system (53.7%); and I am able to skilfully use e-Naz system (56.2%); using e-Naz is entirely within my control (54.2%); the e-Naz system allows easy access to information (54.2%); I am willing to participate in e-learning activities (84.3%); I am rarely disconnected during online tutorial (51.2%); I have the resources, knowledge, and ability to use e-Naz (56.2); I think I learn more in online courses offered at e-Naz to face to face courses (49.2%);e-Naz courses require more study time than face to face courses (51.7%); I find the site easy to learn (59.1%); my interaction with the e-Naz is clear and understandable (66.6%); I think taking courses on e-Naz is convenient (66.6%); I think learning through e-Naz is fun (59.1%); I am generally satisfied with the quality of online courses offered through e-Naz (56.2%); I believe it will be a good idea to use eLearning tools(81.4%); online discussion enables students to exchange ideas and comments (75.2%); I benefit from using interactive applications (71.9%). These responses could be summarised as usability of the system, interactivity of the platform, and user attitude.

Regarding the same attitudes and perceptions of students, responses were also summarised and presented as: I am able to ask questions and receive answers (63.3%); browsing classmates' works helps reflect own shortcoming (61.5%); I think sharing knowledge through online discussions is time consuming (43.8%); I am likely to take an online course again through e-Naz (72.3%); if available, I intend to use e-learning tools during the semester (78.1%); if available, I intend to use e-learning tools as frequently as possible (54.7%); and if available, I intend to use e-learning tools whenever possible for my coursework (84.8%). This gives an average of 31.61%.

### **Association between technology users' attitude/ perception and adoption of technology for learning and teaching**

The association between technology users' attitude/ perception and adoption of technology for learning and teaching was tested using factor analysis and correlation.

### **Factor Analysis**

Factor analysis played a key role in identification of critical factors contributing to technology adoption especially in showing the link between technology users' attitude/ perception and adoption of technology. This study utilized Principal Component Analysis for maximum extraction of variance from the variables under study by employing the SPSS. As a prelude to understanding the interpretations of factor analysis some few terms were taken into consideration.

Eigenvalues is the measure of the level of variation in the total sample accounted for by each factor loaded. Factors with low eigenvalues have little contribution to the explanation of the variations in the variables



under study and are thus dropped in line with Kaiser's rule which states that any factor with eigenvalue below 1 should be dropped.

Factor loadings are correlation coefficients of the variables being studied. Factor loadings that are less than 0.4 are perceived and interpreted as low while those above 0.6 are treated as high.

Rotation is the process that makes the outputs easier to understand for better interpretation of the factors.

Communality is reliability of the indicator when measured by the degree of variance in a given variable as jointly explained by all the factors. Table 2 below includes all the factors that were entered into the Statistical Package for Social Sciences for analysis and their consequent reduction in line with the Confirmatory factor Analysis using the principal component analysis.

| <b>Table 2 Total Variance Explained</b> |                     |               |              |                                   |               |              |
|---|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| Component                               | Initial Eigenvalues |               |              | Rotation Sums of Squared Loadings |               |              |
|   | Total               | % of Variance | Cumulative % | Total                             | % of Variance | Cumulative % |
| 1                                       | 18.690              | 35.942        | 35.942       | 8.317                             | 15.994        | 15.994       |
| 2                                       | 5.536               | 10.646        | 46.589       | 7.144                             | 13.738        | 29.732       |
| 3                                       | 4.483               | 8.622         | 55.211       | 7.107                             | 13.668        | 43.400       |
| 4                                       | 2.808               | 5.399         | 60.610       | 4.375                             | 8.414         | 51.814       |
| 5                                       | 1.993               | 3.832         | 64.442       | 3.094                             | 5.950         | 57.764       |
| 6                                       | 1.734               | 3.335         | 67.777       | 2.768                             | 5.323         | 63.086       |
| 7                                       | 1.329               | 2.557         | 70.334       | 2.757                             | 5.302         | 68.388       |
| 8                                       | 1.183               | 2.275         | 72.608       | 1.666                             | 3.205         | 71.593       |
| 9                                       | 1.088               | 2.092         | 74.700       | 1.381                             | 2.656         | 74.249       |
| 10                                      | 1.012               | 1.947         | 76.647       | 1.247                             | 2.398         | 76.647       |
| 11                                      | .952                | 1.830         | 78.477       |                                   |               |              |
| 12                                      | .879                | 1.691         | 80.168       |                                   |               |              |
| 13                                      | .748                | 1.438         | 81.606       |                                   |               |              |
| 14                                      | .680                | 1.307         | 82.913       |                                   |               |              |
| 15                                      | .637                | 1.225         | 84.139       |                                   |               |              |
| 16                                      | .568                | 1.093         | 85.231       |                                   |               |              |
| 17                                      | .529                | 1.017         | 86.248       |                                   |               |              |
| 18                                      | .507                | .975          | 87.223       |                                   |               |              |
| 19                                      | .488                | .938          | 88.161       |                                   |               |              |
| 20                                      | .457                | .879          | 89.040       |                                   |               |              |
| 21                                      | .426                | .820          | 89.860       |                                   |               |              |
| 22                                      | .422                | .811          | 90.672       |                                   |               |              |
| 23                                      | .393                | .757          | 91.428       |                                   |               |              |
| 24                                      | .361                | .695          | 92.123       |                                   |               |              |
| 25                                      | .335                | .644          | 92.767       |                                   |               |              |
| 26                                      | .314                | .603          | 93.370       |                                   |               |              |
| 27                                      | .291                | .560          | 93.930       |                                   |               |              |
| 28                                      | .274                | .526          | 94.456       |                                   |               |              |
| 29                                      | .245                | .471          | 94.927       |                                   |               |              |
| 30                                      | .240                | .462          | 95.389       |                                   |               |              |
| 31                                      | .224                | .430          | 95.820       |                                   |               |              |
| 32                                      | .218                | .419          | 96.238       |                                   |               |              |
| 33                                      | .199                | .383          | 96.622       |                                   |               |              |
| 34                                      | .195                | .374          | 96.996       |                                   |               |              |
| 35                                      | .185                | .357          | 97.353       |                                   |               |              |
| 36                                      | .160                | .307          | 97.660       |                                   |               |              |
| 37                                      | .144                | .277          | 97.937       |                                   |               |              |
| 38                                      | .139                | .267          | 98.203       |                                   |               |              |
| 39                                      | .130                | .251          | 98.454       |                                   |               |              |
| 40                                      | .118                | .227          | 98.681       |                                   |               |              |
| 41                                      | .101                | .194          | 98.875       |                                   |               |              |
| 42                                      | .094                | .181          | 99.056       |                                   |               |              |
| 43                                      | .087                | .167          | 99.223       |                                   |               |              |
| 44                                      | .078                | .150          | 99.374       |                                   |               |              |
| 45                                      | .063                | .121          | 99.495       |                                   |               |              |
| 46                                      | .059                | .113          | 99.609       |                                   |               |              |
| 47                                      | .047                | .091          | 99.700       |                                   |               |              |
| 48                                      | .042                | .082          | 99.782       |                                   |               |              |
| 49                                      | .032                | .062          | 99.843       |                                   |               |              |
| 50                                      | .031                | .060          | 99.903       |                                   |               |              |
| 51                                      | .028                | .054          | 99.957       |                                   |               |              |
| 52                                      | .022                | .043          | 100.000      |                                   |               |              |

Extraction Method: Principal Component Analysis.

## VI. Conclusion

Table 2 shows that although there were fifty two (52) items on the relationship between technology users' attitude/ perception and adoption of technology for learning and teaching, the use of factor analysis reduced the items to ten (10) based on the fact that only factors with eigenvalues ranging from 1 and above had substantive importance. This was a high level summary of the technology users' attitude/ perception and adoption of technology for learning and teaching which was further taken through principal component analysis and varimax rotation, and the interpretation made. Table 2 displayed shows that only the reduced factors had a significant role in determining the relationship between technology users' attitude/ perception and adoption of technology for learning and teaching though with diverse interrelationships among the items. This is shown by their different loadings upon rotation of the component matrices as illustrated in Table 2. In the result for the rotated component matrix, loadings that were less than 0.5 were deleted in line with Kaiser's rule. It shows linear components (factors) before extraction and after extraction and their partial correlations as analysed through factor analysis rotation matrix through varimax method.

Table 2 indicates that the ten significant variables with highest eigenvalues were: I currently use technology in learning and teaching; I intend to use e-learning in future; I find e-learning tools interesting; I find e-Naz very interactive; I am experienced in using technology in learning and teaching; I plan to use computers during my teaching practicum and internship; I will return to e-learning often for future training; I find computers easy to use; e-Naz allows easy access of information; taking courses on e-Naz is convenient thus impacting on technology adoption. This meant that only the reduced variables afore-mentioned highly affected technology adoption in Africa Nazarene University.

## CONCLUSION

The perceptions of the students involved in the study indicate that the use of e-learning enhances their effectiveness in learning, improves their course performance, and increases their productivity in their course work. Respondents further indicated that E-learning enhanced their effectiveness in learning and teaching while others had participated in Video Conferencing, used email, internet and Audio/Video tapes in learning and teaching. Almost a third of the sample population were using CD-ROM and since they were very skilful in the use of the e-Naz system, they were confident in its use. Other strategies included their ability to answer and ask questions, reflect on their shortcomings by browsing through classmates' work and share knowledge online through discussions.

## VII. Recommendations

The study recommends the promotion of development of active IT platforms and service competence, by promotion of online teamwork though rewarding employees and students who engage in knowledge sharing in the institution's online repositories. In setting the pace by leading from the front, ANU should increase its engagement with technology in all departments in service provision and in engagement of external stakeholders on a real time basis.

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Mary Atieno Ooko Students' Attitudes and Perceptions on Technology Usage in Learning and Teaching: A Case of Distance Learning Programme at Africa Nazarene University, Kenya.” *IOSR Journal of Research & Method in Education (IOSR-JRME)* , vol. 7, no. 5, 2017, pp. 40-50.