E-Learning in Nursing Education in Rwanda: Benefits and Challenges. An Exploration of Participants' Perceptives

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Abstract: *E-learning is a commonplace in nursing and healthcare professional education, and generally the importance of Information and Communication Technology (ICT) and the Internet in tertiary education is recognized. The entry visa for e-learning is a computer and an Internet connection [1]. The aim of this paper is to analyse the utilisation of e-learning in selected nursing campus in Rwanda. A convergence parallel mixed method was use as recommended by Creswell[2]. For quantitative survey, a total of 275 participants responded to the questionnaires, and for qualitative approach, a total number of 40 participants were purposively selected. Quantitative data was analysed using SPSS 23, and for qualitative data, thematic analysis was used. The finding from this study indicated that participants were ready and eager to embrace e-learning in nursing education due to a number of benefits they reported such e-learning being a student centred approach, being a blended learning method, and fast track for the production of nursing workforce taking into consideration the history of Rwanda. However it was found that a number of challenges were hindering a proper implementation such as: resource constraints, insufficient teachers and students training in ICT, language barrier, lack of policies regarding e-learning, resistance to change, issues related to Moodle accessibility.*

Keywords: *blended learning, distance learning, e-learning in nursing, ICT in education in Rwanda, web-based learning.*

I. Introduction

E-Learning has become a worldwide phenomenon in the new technological economy, crossing oceans and reaching to remote villages. The entry visa for e-learning is a computer and an Internet connection [1]. Integration of ICT competency into a nursing curriculum is important to ensure success throughout the education and career of contemporary nursing students. As enrolment in nursing programs increases, the diverse population of students from many different cultural and socioeconomic backgrounds presents a challenge for faculty in addressing unique learning needs [3]. Since 2000, the growth in e-learning, a blended approach that combines online and face to-face training, has exploded [1]. E-learning is a commonplace in nursing and healthcare professional education[4], and generally the importance of Information and Communication Technology (ICT) and the Internet in tertiary education is recognized [5-7]. As a result, in nursing education both teachers [6], and nursing students [8] are being expected to incorporate and use digital technologies to facilitate learning in undergraduate nursing curricula.

Following the transformation of higher education, and introducing e-learning in nursing schools there is no evidence on how nursing students and nursing educators are using e-learning platform, therefore there was a need for a comprehensive study to explore the utilization of e-learning system platform in Rwandan nursing and midwifery education, and to contribute to its better usage. This study explored the areas knowledge and perceptions of participants on the utilisation of e-learning platform in order to identify the areas that could be improved, in order to enhance student preparation, nurse educators' facilitation of the students via e-learning platform, thus increasing the quality of nursing education, by developing nursing students into autonomous, competent and effective professionals who can provide safe and relevant nursing care. This paper is responding to two research questions that were covered by this study were: (1) how is e-learning platform currently used the selected nursing campuses in Rwanda? (2) What are factors hindering the use of e-learning platform in the selected nursing campuses in Rwanda?

II. Literature Review

The term e-learning comprises a lot more than online learning, virtual learning, distributed learning, networked or web-based learning. As the letter "e" in e-learning stands for the word "electronic", e-learning would incorporate all educational activities that are carried out by individuals or groups working online or offline,

and synchronously or asynchronously via networked or standalone computers and other electronic devices [9]. Integration of informatics competency into a nursing curriculum is important to ensure success throughout the education and career of contemporary nursing students. As enrolment in nursing programs increases, the diverse population of students from many different cultural and socioeconomic backgrounds presents a challenge for faculty in addressing unique learning needs [3]. Edwards and O'Connor [3] further argue that competency in informatics will allow the beginning nursing students to navigate the on-line teaching software used by colleges. With rigorous expectations in nursing programs, students may feel overwhelmed with assignments, organization, and time management. Frustration may build when students struggle with basic informatics competency, often leaving them unable to navigate instructional websites or work with necessary on-line learning content.

Schools of nursing across the globe are charged with providing students with the best possible learning opportunities in the healing arts [10]. Traditionally, these opportunities have taken the form of nursing theory delivered through a variety of classroom teaching techniques, laboratory experiences in which students practice clinical skills and clinical environments in which students care for the patients. These teaching and learning are well rooted in nursing education and provide a framework for successful preparation of clinician who are able to care for the patient across environments [10].Given how nursing education includes theoretical and clinical learning in addition to standards and regulations, and how each becomes more complex in the online setting, those outside of the online nursing education field are quite likely to find solutions to their own challenges within the nursing literature. Nursing education has, therefore, made and will continue to make valuable contributions to adult, continuing, and professional education in the twenty-first century [11]. The use of technology in education requires a change in the educator's method of teaching [12], and the literature reveals the importance of the facilitation for teaching and learning in higher education [13-16]; particularly, the facilitation of online learning and teaching [14, 17, 18]. Although e-learning is popular; a lot of challenges have been noted including: lack of resources, inadequate computer literacy, lack of quality e-content, difficulties to facilitate learners online and language barrier [19-21]. The is also lack of relevant ICT standards and lack of a firm framework to encourage students [5, 22, 23], and lower levels of students and nurse educators to use ICT equipment [24, 25]. The literature further demonstrates that there is also a mismatching between technologies and the context, culture and work practices, inadequate behaviour of people, resistance to changes, lack of awareness and negative attitudes towards ICTs, lack of administrative and technical end-user support, lack of systemic approach to implementation and lack of follow-up [26-29].

Research Context

Rwanda is a country of a thousand hills, located in Sub-Saharan Central Africa in the Great Lakes region [30]. The population for 2014 is estimated at 12.2 million, and increased from 11.8 million in 2013 [31]. The capital of Rwanda is Kigali. The Rwanda's economy is growing steadily due to community-driven initiatives that are responding to the needs of the population [32]. Statistics for 2011 reported approximately 700 physicians, 8000 nurses, and 300 midwives providing care for over 11 million people [33]. Rwanda falls below the minimum level of the World Health Organization's recommended health care providers per 1,000 people [34]. The Ministry of Health (MoH) is responsible for the health care system in Rwanda and is committed to improve and provide quality health resources for the population [32].Historically, there were three levels of training for nurses and midwives in Rwanda A2, A1, and A0. A2 level nurses and midwives are trained at secondary school level while A1 nurses and midwives have an advanced certificate following three years of tertiary education. A0 nurses and midwives possess a bachelor's degree. The MoH decided in 2006 decided that training and deploying A2 level nurses and midwives should stop as their skills were deemed insufficient to provide quality patient care. The minimum requirement for a Rwandan nurse is thus now A1. Despite this, many health facilities continue to use a large number of A2 nurses due to the lack of A1 nurses [35: 12-13]. Until 2012 more than 90% of the nurses have the lowest level of nursing training available (equivalent to secondary-school qualifications, or A2 level) A1 nurses represent less than 10% of the total pool of nurses. A2 nurses are relatively evenly spread throughout the country, though there are still disparities between districts, with a number of under-served districts in the South, West and Northern Provinces. On average there is about 1 nurse for a population of 1,500[35: 12-13].

Starting e-learning in nursing schools became as a solution to the rapid upgrading of thousands of nurses from A2 to A1 which required a very different approach. There were existing health workers who were required to upgrade their skills rapidly, and schools were expected to make this possible without a significant increase in faculty. The strategy proposed here reflected that unique situation, emphasizing the training of existing educators and introducing innovative programs, such as e-learning, to allow for the continuing education of practicing professionals [36: 151]. According to Rwanda Human Resource for Health Program [36] the e-learning program for nurses and midwives is a strong example of the Government of Rwanda's approach to facilitating skill upgrades in health workers in a manner that will maximize recruitment and retention of trainees. The e-learning program is designed to adapt to the learning needs of nurses and midwives who are

already working, but who are in need of further training. The curriculum design is catered to these stipulations, making the program attractive to these targeted candidates and making it highly likely that they will successfully graduate. The implementation of e-learning platform which started in 2012 in Rwandan nursing and midwifery schools has brought positive impact to nursing education. However some challenges have been reported associated with the use of ICT equipment by students and teachers and language barrier [37]. Recently there are many changes that took place in the Rwandan tertiary education where MPs have endorsed a bill that seeks to have some 10 universities in the country merged to form one institution of higher learning [38]. The Bill allows the university to develop high education quality and innovative teaching and research for addressing the problems of the population, the students, the nation, the region and globally[38]. The Law N° 71/2013 of 10/09/2013which is a law establishing the University of Rwanda (UR) and determining its mission, powers, organization and functioning came into effects the day of its publication [39]. These changes have also affected public nursing and midwifery schools. The provincial nursing and midwifery school programs have recently come under the administrative umbrella of the University of Rwanda, and College of Medicine and Health sciences.

III. Methodology

Research Design

A convergence mixed method model also known as concurrent triangulation design was used, where quantitative and qualitative data were collected simultaneous as recommended by Creswell [40]from the participants from the selected nursing school' campuses in Rwanda, in order to explore the knowledge and the perceptions of nursing students, nurse educators, ICT managers and Campus managers on the utilization of e-learning platform from the selected nursing school campus (Fig.1). As part of four phased action research project, this paper presents the results from the first cycle which was aimed at exploring the current use of e-learning platform.
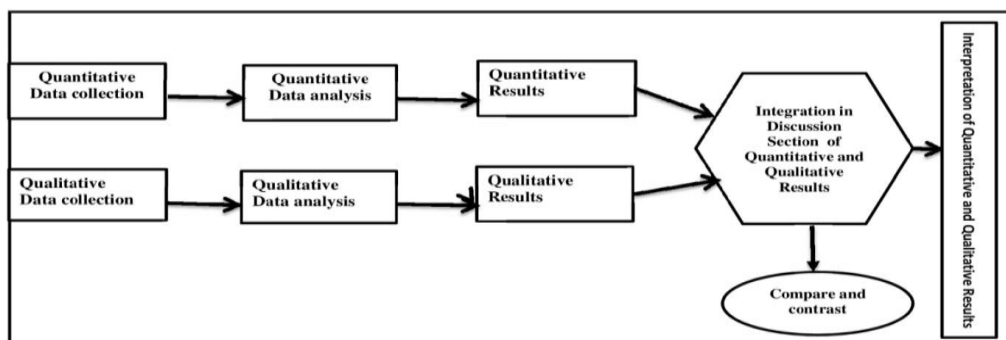

Figure 1: adapted from convergence model of Mixed Method adapted from Creswell [41].

Population

Three campuses for the selected Nursing School participated in this study. The sampling technique was stratified for each of 3 campus, then simple random sampling. Participants included nursing students, nurse educators, ICT managers and campus managers. For quantitative survey, a total of 275 participants responded to the questionnaires (227 nursing students, 44 nurse educators, two ICT managers and two campus managers). The overall response rate from the three campuses was 90.4% for nursing students, 57.1% for nurse educators, 75% for ICT managers and 75% for campus managers. And the qualitative approach a total number of 40 participants was purposively selected. The criteria for inclusion in the study were that participants were nurse educators, ICT managers and Campus managers for at least 6 months involved after being assigned that post in the particular campus, for students 2nd and 3rd year students were only included. Data were collected in 2015.

Data collection and analysis

Before the data collection process, we met as a research team and discussed how we were going to conduct the process, they participated throughout the study. For the quantitative survey, structured questionnaires were distributed to the participants, after purpose of the study was explained and getting their consent form signed. In depth interviews were conducted after purposefully selecting the participants, explaining to them the purpose of the study and getting their consent form signed. The average duration of the interview was 20 minutes. One focus discussion that took place, were conducted by a senior nurse educator manager, and an expert in e-learning, the researcher playing the role of the facilitator. The average of the FGD was 40 minutes. All in depth were audio-recoded with participants' permission, however with the FGD; the facilitator had to write important information as one of the participants said there should not any recording. To ensure consistence of the

information gathered the facilitator (researcher) presented immediately after the sessions to the group the key findings, and they agreed the key point written were correct.

The quantitative data analysis was done once all questionnaires were gathered, and SPSS 23 was used. For qualitative data, the analysis was done concurrently with data collection process which allowed modification of data collected, and the process. Using continuous comparisons data were analysed thematically. We listened to audio-records several times and transcribed them into word documents, and then we read transcripts line by line, coded the data, cluttered codes into themes, then into categories. To ensure trustworthiness, audio-records, transcripts were kept as an audit trail. During data collection, the accuracy of data was checked on the spot at the end of each session through verification and during analysis; transcripts were verified through member checks. Three individuals conducted the analysis (researcher, one researcher experienced in qualitative methods, and the supervisor of this this study) verified the themes and categories. An online forum discussion was organized where the researcher presented preliminary findings for their comments and corrections to ensure that their views has been accurately captured and reflected. For these who responded it was constructive as new data emerged.

Ethical consideration
Since this study was part of a PhD research project, ethical clearance was acquired from the University of KwaZulu-Natal Research Ethics Committee with protocol HSS/1294/014D. Further clearance (No1637/12.00/2015 and Permission (No1636/12.00/2015) to conduct the study was obtained from the Rwandan Ministry of Education, and the permission was also obtained from the selected school at University of Rwanda (UR) where the study was conducted. Individual participants gave informed consent to participate in this study and their ethical rights were respected. All data collection devices and transcripts were privy to the research team only and no names were used to identify participants, and only codes were used. It was made clear to the participants that they did not have to respond to any question they felt uncomfortable with and that they were free to withdraw from the study at any time.

IV.   Presentation of the Main Findings
The participants in quantitative survey consisted of four categories and a structured research instrument was used for (Nursing students, nurse educators, ICT managers, campus managers) from the three selected campuses. To reiterate the sampling method was stratified for each of 3 campus, then simple random sampling. A total of 275 participants responded to the questionnaires (227 nursing students, 44 nurse educators, two ICT managers and two campus managers. And for qualitative data 40 participants were purposively selected from 3 selected campuses of the selected school in Rwanda. The research questions that were answered by this study were: (1) how is e-learning platform currently benefit the selected nursing school? (2)What are factors hindering the use of e-learning platform in the selected school?

Socio-demographic characteristics of the participants for quantitative phase
Data set one/ Nursing students: Of 227 participants the minimum age were 28 years old, and the maximum age was 50 years old of the 227 nursing students. The mean age was 36.09 years; the standard deviation (SD) was 4.434). The majority 64.3%(n=146) were females and 35.7%(n=81) were male. All of them were enrolled in nursing program for advanced diploma.

Data set two/ Nursing educators: Of 44 participants the minimum age were 27 years, and the maximum age was 57. The mean age was 34.59 and the standard deviation (S.D) was 7.215. The majority were females, 68.2%(n=30 and males were 31.8(n=14). Regarding the highest qualification of the participants, it was found that, 54.5%(n=24) had a bachelor's degree; 22.7%(n=10) had an honour's degree; 18.2%(n=8) had an advanced diploma; and 4.5%(n=2) had a master's degree, and the majority 70.5%(n=31) did not have a qualification in nursing education and only 29.5%(n=13) reported to have a qualification in nursing education. The minimum number of working years' experience was 2 years and the maximum number of working years' experience was 15 years. The mean age was 4.91 and the standard deviation (S.D) was 3.139.

Data Set Three/ ICT managers: Of two ICT managers, who participated in this study, one was between 30-34 years old and another ICT manager was between 35-40years old. Both of them were males. Their highest degree was bachelor's and had a qualification in ICT or computer science. Their working experience ranged 1-5 years and 6-10 years respectively.

Data set Four/Campus managers: Of two campus managers who participated in this study one was between 30-40 years old, and between 40-50 for another campus manager. One was a male and another one was a female. One had a Masters' degree as a highest qualification while another one had a bachelor's degree. Both of

them had qualification in nursing education. Regarding their working experience, one had been a campus a manager in less than 3 years while the other had an experience of 21 and more years as a campus manager.

Socio-demographic characteristics of participants for qualitative phase

These who participated in in depth interviews were 37. Twenty nurse educators, 17 nursing students. Out of 20 teacher participants 11 were females and 9 were males, the majority was aged between 25-35 (n=16) and from 36 to 45 were four. In students participants group eight were females, and nine were males, and those who were between 25-35 were 10 and from 36-45 were seven. All the three participants in FGD all were aged between 36 and 45, and one was a male and two were females.

Benefits of e-learning according to the participants from quantitative data

The findings from this study revealed that that the majority of the nursing students use technology in their daily activities. The majority of nursing students, 90.7%(n=206) reported that internet was very important in their lives, and, 71.4%(n=162) said they had a good ability and 26%(n=59) said that they had very good ability to use internet. It was also found that among nurse educators, the majority reported to use computer and/or internet to prepare and to teach lessons in the last 12 months; 97.7%(n=43) in preparing lesson and 97.7%(n=43) in class teaching in front of / with the students. Of 44 nurse educators, 52.3%(n=23) reported to use internet in more than 75% of all lessons, 22.7%(n=10) reported between 71-50%; and 18.2%(n=8). And further all campus managers who participated in this study, 100% use computers for school management related tasks (budgeting, planning, timetabling, etc); searching for information; making presentations; communicating online with teachers (email, web site announcements, etc.), and communicating by emails with educational authorities (at local, regional, or central level). The students' participants also reported to use the use of ICT tools for various reasons such as getting to learning resources, following the course anytime without necessarily being at school, searching for information about diseases even when they are in their clinical placements. Another aspect reported by the students' participants is being able to save their documents and keep them for a long period. The rich information provided by the participants revealed that is a necessity to use ICT tools in e-learning.

The findings from this study revealed that the majority of the nurse educators had a positive opinion regarding the positive impact of using ICT on students' learning. Out of 44 nurse educators, 56.8%(n=25) reported that somewhat that students understand more easily what they learn; 52.3%(n=23) reported a lot that students feel more autonomous in their learning (they can repeat exercises if needed, explore in more detail topics that they are interested in, etc.), and 31.8%(n=14) reported somewhat positive impact of on using ICT on student learning; 47.7%(n=21) reported a lot that ICT improves the class climate (students more engaged, less disturbing, and 27.3%(n=12) reported somewhat that there is a positive impact of using ICT on student learning; 47.7%(n=21) reported that students concentrate more on their learning a lot, and 36.4%(n=16) reported somewhat; 45.5%(n=20) reported that Students try harder in what they are learning a lot, and 40.9%(n=18) reported somewhat; and 29.5%(n=13) reported a lot that there is a positive impact of using ICT on student learning; 43.2%(n=19) reported that ICT facilitates collaborative work between students a lot, and 36.4%(n=16) reported somewhat that there is a positive impact of using ICT on student learning.; 40.9%(n=18) reported that Students remember more easily what they've learnt a lot, 36.4%(n=16) reported somewhat that there is a positive impact of using ICT on student learning. An overall score of positive impact of using ICT on student learning was calculated. Seven items mentioned above were considered and the responses was a likert scale ranging from 1=No at all; 2=A little; 3=somewhat, 4=A lot. The higher the score is, indicated a positive participants' opinion about the positive impact of using ICT on student learning; and the lower score indicated the negative participants' opinion about the positive impact of using ICT on student learning. The minimum score was 13 and the maximum score was 28. The mean score was 22.57, Standard Deviation was 4.4 and the median was 23 about the positive impact of using ICT on student learning. The 1st quartile was 19, 25, 2nd quartile was 23, and the 3rd quartile was 26. These findings indicated that the majority of the participants had a positive opinion about the positive impact of using ICT on student learning. A Spearman's correlation was run to assess the relationship between the positive impact of using ICT on student learning and various constructs. There was significant relationship between the following constructs: Gender (r_s [44]= .303, p= .045); number of subject taught by participants (r_s [44]= -.478, p= .001), and attitude towards the ICT use at school (r_s [44]= .474, p= .001).

Regarding the attitude of nurse educators towards the use of ICT at school, the results from this study revealed that the nurse educators had a positive attitude towards ICT use in school. It was found that out of 44 participants, the majority, 95.5%(n=42) were in agreement [22(50%) agreed, and 20(45.5%) strongly agreed] that ICT should be used for students to retrieve information; 95.5%(n=42) were in agreement [23(52.3%)agreed and 19(43.2%) strongly agreed] that ICT should be used for students to learn in an autonomous way; 95.5%(n=42) were in agreement [18(40.9%) agreed and 24(54.5%) strongly agreed] that ICT use in teaching

and learning is essential to prepare students to live and work in the 21st century; 95.5%(n=42) were in agreement [23(52.3%) agreed19(43.2%) strongly agreed] that for ICT to be fully exploited for teaching and learning radical changes in nursing campus are needed; 93.2%(n=41) were in agreement [24(54.5%) agreed, and 17(38.6%) strongly agreed] that ICT should be used for students to do exercises and practice; 90.9%(n=40) were in agreement [22(50.0%) agreed and 18(40.9%) strongly agreed] that ICT should be used for students to work in a collaborative way; 90.9%(n=40) were in agreement [24(54.5%) agreed and 16(36.4%) strongly agreed] that ICT use in teaching and learning positively impacts on students' competence in transversal skills (learning to learn, social competences, etc.); 88.6%(n=39) were in agreement [23(52.3%) agreed and 16(36.4%) strongly agreed] that ICT use in teaching and learning positively impacts on students' motivation; 86.4%(n=38) were in agreement [24(54.5%)agreed and14(31.8%) strongly agreed] that ICT use in teaching and learning positively impacts on students' achievement; 84.1%(n=37) were in agreement [20(45.5%) agreed and 17(38.6%) strongly agreed] that ICT use in teaching and learning positively impacts on students' higher order thinking skills (critical thinking, analysis, problem solving).

An overall teachers' attitude score toward the ICT use in school by nurse educators was calculated. Ten items were considered. The teachers' responses ranged from 1=strongly disagree, 2=Disagree, 3=Agree, and 4=strongly agree. The higher the score indicated teachers' positive attitude toward ICT use in school, and the lower score indicated a negative teachers' positive attitude toward ICT use in school. The minimum score was 20, and the maximum score was 40. The mean score was 33.14, the standard deviation was 5.156, and the median was 32.50. The 1st quartile was 30, the 2nd quartile was 36 and the 3rd quartile was 39. And this indicated teachers' positive attitude toward ICT use in school. A Spearman's correlation was run to assess the relationship between the Teachers' attitude about the use of ICT at school and various constructs. There were significant relationship between the following constructs: Highest qualification (r_s [44]= -.368, p= .014); number of the subjects taught (r_s [44]= -.419, p= .005); perceived nurse educators' skills in ICT(r_s [44]= .423, p= .004), and the positive impact of using ICT on student learning (r_s [44]= .474, p= .001).

The results from this study showed that the majority of nursing students, 96.9%(n=220) used Internet to access full web placed courses, 93.0%(n=211) for communication with theirs lecturers, 93.0%(n=211) for only the information on the course, 91.2%(n=207) for course registration, 87.7%(n=199) for major component of the course on the web, 86.3%(n=196) for thematic student to student correspondence, including students from abroad, 85.9%(n=195) for online admission, 82.4%(n=187) for support on web, 81.9%(n=186) for data base browsing, 79.7%(n=181) for mining information, 78.0%(n=177) for collection and analysis of information, 69.2%(n=157) for virtual conferences or forums, 63.9%(n=145) for exchange of experience and information via synchronous and asynchronous teleconferencing and discussion. It emerged from the findings that the majority of nursing students, 94.3%(n=214) were aware of electronic resources on the internet on campus, and it was found that the majority, 93.4%(n=212) were aware of electronic resources on the internet while a small percentage was not aware 6.6%(n=15).Regarding on how the nursing students were informed about the electronic resources, the majority 82.4%(n=187) were informed from their lecturers, 72.7%(n=165) from Google Scholar; 67.4%(n=153) were informed from library orientation; 58.6%(n=133) from yahoo; 49.8%(n=113) were informed from fellow students; 28.6%(n=65) were informed from the library web page. The findings from this study further revealed that that nursing students used various search engines to conduct research and get updated information to use their learning. Out of 227 nursing students, the majority, 94.7%(n=215) reported to get information from Google as a search engine; 79.7%(n=181) used Yahoo; 78.9%(n=179) used Google scholar; 43.6%(n=99) used Ask; 10.6%(n=24) used Being; 8.4%(n=19) used MSM; 4.4%(n=10)used Alta Vista; 4.4%(n=10) used Info Space.

The findings from this study revealed that nurse educators used various teaching strategies. Out of 44 nurse educators, the majority, 95.5%(n=42) reported to use self-directed learning, 93.2%(n=41) reported to use case studies , 88.6%(n=39) reported to use group discussions, 81.8%(n=36) reported to use small group activities, 72.7%(n=32) reported to use formal lectures, 70.5%(n=31) reported to use role play , 68.2%(n=30) reported to use brain storming, 63.6%(n=28) reported to use situation of integration, 63.6%(n=28) reported to use videos. An average of 50.0%(n=22) reported to use research; 43.2%(n=19) reported to use work books. A small percentage, 27.3%(n=12) reported to use projects, 25.0%(n=11) reported to use core lectures, 11.4%(n=5) reported to use portfolio. A Spearman's correlation was run to assess the relationship between teaching strategies used in the micro curriculum, and various constructs. There were statistically significant relationships between the following variable: years of working experience (r_s[44]= .382, p=.011); condition of accessibility to infrastructure in the target class (r_s[44]= .308, p=.042); source and the type of support (r_s[44]= .410, p=.006);ICT based activities used for teaching and material(r_s[44]= .413, p=.005), and perceived skills in ICT (r_s[44]= .387, p=.009).

The results further indicated that nursing students had a positive perception towards the outcome from using e-learning. The perception of the respondents about the outcomes of e-learning were put into 12 items, which are the following: The online support from peers were helpful; The course project is in line with their

expectations; they have gained more knowledge about technology; they have acquired proficiency in using internet; they have developed new skill in ICT, their attitude has changed; they will be able to use the new skill throughout their career; they have applied the new knowledge in their life; they initiated new ideas from the new knowledge, Interactive blogging was essential in the course; The assessment criteria is fair; they completed the required tasks for the project. In order to make the results more meaningful 5 Likert scale on figure was put into three categories, Positive perception (strongly agree and agree), Neutral, and negative perception (disagree and strongly disagree). The findings from this study revealed that out of 227 nursing students; 74.0%(n=168) had a positive perception, while 19.4%(n=44) had a negative perception that their attitudes has changed, 73.6%(n=167) had a positive perception, while 18.1%(n=41) had a negative perception that they have acquired proficiency in using internet, 73.6%(n=167) had a positive perception, while 21.6%(n=49) had a negative perception that they will be able to use the new skill throughout their career, 73.1%(n=166) had a positive perception, while 22.9%(n=52) had a negative perception that they have applied the new knowledge in their lives; 72.7%(n=165) had a positive perception, while 19.4%(n=44) had a negative perception that they have developed new skill in ICT; 72.2%(n=164) had a positive perception, while 17.2%(n=39) had a negative perception that the course project is in line with their expectations; 72.2%(n=164) had a positive perception, while 19.4%(n=44) had a negative perception that they have gained more knowledge about technology; 72.2%(n=164) had a positive perception, while 24.7%(n=56) had a negative perception that they initiated new ideas from the new knowledge; 66.5%(n=151) had a positive perception, while 18.9%(n=43) had a negative perception that they completed the required tasks for the project; 66.1%(n=150) had a positive perception, while 20.3%(n=46) had a negative perception that the online support from peers were helpful; 65.6%(n=149) had a positive perception, while 23.8%(n=54) had a negative perception that interactive blogging was essential in the course; 65.2%(n=148) had a positive perception, while 25.1%(n=57) had a negative perception that the assessment criteria is fair.

The overall score on the perceived outcomes from e-learning by nursing students was calculated, and 12 items mentioned above were computed. The responses ranged from 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. The minimum score was 12 and the maximum score was 60. The higher score indicated a positive perception on the outcomes from e-earning and the lower score indicated a negative perception on the outcomes from e-learning. The mean response was 42.92, the median and the mode were 48 and the Standard Deviation was 13.875. The 1st quartile was 36, 2nd quartile was 48 and the 3rd quartile was 52. These results indicate that the majority of nursing students had a relatively high positive perception on the outcomes delivered in e-learning. A Pearson's correlation was run to assess the relationship between perception on the outcomes in e-learning platform and various constructs. There were statistically significant relationships between the following constructs: the frequency of activities done on internet ($r= -.145$, n=227, p=029); problems encountered while using internet on campus ($r= -.228$, n=227, p=.001); biggest problems in using internet ($r= -.208$, n=227, p= .002); specific areas of orientation in ICT ($r= .146$, n=227, p= .028); perception on the content used in e-learning ($r= .918$, n=227, p< .000); perception of the delivery of the courses on e-learning ($r= .915$, n=227, p< .000);perception on the services provided in e-learning ($r= .945$, n=227, p< .000); perception on the structure of e-learning ($r= .960$, n=227, p< .000); perception on the evaluation done on e-learning ($r= .807$, n=227, p<. 000); learning activities performed in e-learning ($r= .131$, n=227, p=.049), and overall perception of the use of e-learning ($r= .981$, n=227, p< .000).

Benefits of e-learning according to the participants from qualitative data

In the presentation of qualitative data, the following abbreviations will be used to indicate the category of the participant quoted: TP (Teacher Participant), SP (Student Participant), and FGD-P (Focus Group Discussion Participant). From all qualitative findings, the following themes emerged on the use of e-learning in education of nurses: (a) promote student centred approach; (b) is blended learning; (c) faster production of nursing workforce by taking into consideration the history of Rwanda.

Theme one: E-learning promote student centred approach

A number of sub-themes emerged from this theme: (a) promoting self-directed learning; (b) is Collaborative; (c) is Inquiry-based Learning; (d) is Interactive learning; (e) promoting Integration of the theory into practice.

. The participants from this study revealed that **e-learning promote self-directed learning**. And based on the responses from the participants, self-directed learning accounts 60% of the time in academic year. In self-directed learning they learn on their own information, from lecturers or other resources.

"…it helps us because we can make the research from different websites and wherever you are…you can remind yourself what you have studied…because you know on the way…you can open the computer and you revise…at home you can use your computer and your revise…"(SP15).

Emerging from the data, it was found that for those who you e-learning platform **collaboration was a key point** between teachers, students, ICT managers, administrative staff and the various stakeholders. Students participants also revealed that collaborating with their peers was very helpful in terms of get more clarifications on various topics they might have not understood. The findings revealed that the participants used the forum group on LMS (Moodle), chatting, emails, groups' emails, Facebook and whatsup. The collaboration in e-learning expressed by the participants, indicate active involvement of teachers, students, and peers in academic constructive way. Some quotations from the interviews were

"…The first positive aspect to use Moodle, allows the students directly to share their views…in their courses with lecturers…and to ask many questions to the lecturers… when we are online, our lecturer send us different works…quizzes…sometimes the exams…we chat, we ask to our teachers the difficulties found in the course…and the lecturer give us answers… it is a kind of chat…"(SP4).

The participants from this study reported that **they use a number of ICT tools for e-learning platform.** These tools include :(i) computers programs, (ii) Internet, (iii) Moodle; (iv) social media; (v) phone; (vi) Automatic screen recording, (vii) Videos. Teacher's participants reported that they use to prepare their lesson and post them of on the LMS (Moodle), they help them to communicate with the students in their working places, as well doing research. Further teachers participants reported that they use these technologies to get updated information, because some of the books in the library are old.

"…Yeah… first mostly we use computers while preparing the course guidelines, the power points for presentations, and other materials, there different materials that I use for teaching so we use computers. We use also the internet where sometimes we download some books to read, some journals to give to the students…likely to download the updated ones compared to the formal library for instance where you can find the old books, and so on…so we have the update needs …we use also the internet for exchanging information…when we are teaching them we use this kind of internet while working...And also for instance when we are using computers you can keep these records, you can transfer the records easily and so on…" (TP18)

It emerged from the data that **interactive** learning was reported by the participants as a way of **engaging the students, and keep them motivated** for better understanding of the lesson. The participants to make the lesson more interactive reported that they use Videos, Pictures, animated Power Point, forum discussion, chatting including web link which may attract the attention of the students. Teachers also revealed that might request their students to use power point presentation. Furthermore participants said that they engage more through participative group discussion, Brainstorming, Small group discussion, and case scenarios. Some teachers participants said they use also socio-media and team to make e-learning more interactive

"…The first positive aspect…it allows the students directly to share their views…in their courses with lecturers…and to ask many questions to the lecturers…the students who use e-learning program…he has the ability…he has a knowledge…to use the ICT programs…you see we are going in the vision to use ICT…for us students who use e-learning program… we have enough knowledge…it is just to continue to show us how to use or how to enter in deep in ICT…"(SP4).

From the emerging data e-learning promoted **inquiry based learning**. Participants revealed that e-learning helps in collecting information from various sources, and critically analyse them, and later take decisions. It was found that this was done research on internet, because it was found by the participants that e-learning provided up to date information than the old books which can be found in the library. The inquiry based learning was also reported to be done through the questions asked in the forum discussion or online discussions, or assignment (individual and group assignment where learners have to have to find information from a number of sources in order to respond to the task give. From the findings from MOODLE platform, it was found that teachers or students could initiate discussion, and most of the time teachers used open ended questions.

"…it helps students in terms of research, when they are comparing different information, they try to analyse, criticize and take decisions…" (TP3).

"…we just use the forum…the chat…where students may give information or may ask questions…then maybe you don't provide an answer as a lecturer…you let other students answer, they challenge their colleagues…by the end you try to analyse if these students are really together,…are really working and you try to see even the attendance online…to see if all students are participating…" (TP6).

With the introduction of e-learning in Nursing Schools in Rwanda, the merging data reveals that students attending these programs assist them to integrate the theory into practice, therefore **correcting some malpractices**. Participants further states that it is a kind of **integration**, because what they learn at school during face period, they put them in action or practice. It also emerged that because these enrolling in e-learning program have been working in various settings, they bring the experience they have accumulated throughout the year into the classrooms which makes the course more interesting.

"…I think it is a good program in the context of Rwanda because the students remain working, they remain getting experience…and students who are more motivated it is easy because they leave the campus during face

to face sessions…going back to their clinical settings, it is like a kind of integration…the students may just come from the school and start integrating the new or…the new acquisition to the health centres and to the hospitals…And it is also good because sometimes lecturers maybe talking things but don't link them with what is on the ground…then the students are having the experience from the ground where when they exchange…interchange with the teachers…the course comes more interesting…" (TP6).

Theme two: E-learning as blended learning

Emerging data from this study revealed that participants reported that e-learning is blended learning: emerging subthemes were: (a) online teaching and learning; (b) face to face teaching and learning; (c) use of ICT in teaching and learning, (d) time saving; (e) accessibility of resources anytime and anywhere, (f) cost effective.

Emerging data revealed that the form blended learning used allow the participants to be more engaged whether face to face or via web based LMS (Moodle in the Context of Rwanda). It emerged that face to face accounts 40% and self-directed learning accounts 60% of the teaching period. Participants reported that this form of blended learning is flexible because it give chances to students to search for information and when they come back to school they can engage more with the teachers on particular points where they didn't understands. It was also noted that Teachers use interactive and innovating teaching methods in particular during classroom sessions, such as the use of videos, participatory teaching, and small group discussions. And for the part that is done online, a number of resources is made available to students, and may become proactive in their learning through forum discussion, chatting, doing quizzes and assignments. It was also noted that blended learning gives chances to participants to be more familiar with the technology whether in a synchronous or asynchronous manner.

Online teaching and learning: It emerged from the data that some teachers who benefited some training had enough package in terms of facilitation of the students via e-learning platform. It emerged as well that those who are more knowledgeable in using Moodle Platform facilitate these who do not master in particular the use of Moodle and a Learning Management System. The extract bellow shows how some of the teachers facilitate the students:

"…The facilitation is first is during the forum discussion, is where the teacher should facilitate the learner very well because when I post for example the part of the course which was not studied face to face…they should discussion or ask questions…there is once I posted a forum called "ask a question and get an answer"…unfortunately there is no student who posted anything. They should ask questions and then I give answers online via Moodle so that the students wherever he or she is should have my answer as a teacher…" (TP4).

"…to use this Moodle platform…we access the course easily when we are at our work place, we access the quizzes, the assignments…we can also chat with other students…we can chat with the lecturer to give us the explanation…it helps us to know new things in our study… When you are online on Moodle platform…we find…first of all…we have to get enrolled on Moodle, then after enrolling you can access the course, you can access the quiz, the assignments…interact, chatting with other students to get explanation. We can chat we the teacher to get also more clarification about the course." (SP12).

Face to face teaching and learning: Because e-learning is a blended learning, it emerged from the data that students spend 40% of total hours on face to face learning, and during that period the students have to come to school and student have two weeks to come to school. Some of the participants mentioned two weeks. It emerged that different teaching methodology were used and the final exam was done during face to face sessions. From various data, that during face to face, teachers facilitate them. Numbers of methods have been reported such as, brain storming, group works, group assignments, students' presentations, the use of videos and demonstration, lecturing and giving test and exams while they are at school. Participants reported that several factors influence them to use a give technique when facilitating students, such as the course, availability of resources, level of engagement of the students.

"…the first one, I choose which part of my course will be face to face…basing on the how difficult let me say…how difficult the part is, so with that one I look at face to face… so that the questions can be asked face to face. When it is practical I prefer to use face to face…so for each chapter I take one part to be face to face, then another part to be online. So when I see that it is necessary to include a video, so that a student who is apart from the campus could see, so then I prefer the use of video…" (TP4).

"…sometimes I use lecturing, group discussion, and very animated power point that are attractive to them, but this goes with lecturing, role plays, for example I can present something, and take students to do some role plays…" (TP17).

Use of ICT in teaching and learning: The participants from this study reported that they use a number of ICT tools for e-learning platform. These tools include: computers programs, Internet, Moodle; Social media; phone; Automatic screen recording, and Videos. Teacher's participants reported that they use to prepare their lesson and post them of on the LMS (Moodle), they help them to communicate with the students in their working places, as well doing research. Further teachers participants reported that they use these technologies to get updated information, because some of the books in the library are old. The later explained that they use images, power points, videos, and teach more students in a short time.

"…Yeah… first mostly we use computers while preparing the course guidelines, the power points for presentations, and other materials, there different materials that I use for teaching so we use computers. We use also the internet where sometimes we download some books to read, some journals to give to the students…likely to download the updated ones compared to the formal library for instance where you can find the old books, and so on…so we have the update needs …we use also the internet for exchanging information…when we are teaching them we use this kind of internet while working...And also for instance when we are using computers you can keep these records, you can transfer the records easily and so on…" (TP18).

"…nowadays we use the computers…we can save our documents…maybe on our e-mails, then we can find our documents easily and we can keep it for a long time…and even you can use it to search many things…to make research nowadays it is easy while in the past to make research was very difficult…" (SP12).

Time saving: Emerging data from students' participants revealed that it is time saving, in terms of travelling and attending regular classes. The can receive the messages from peers and from teachers without necessarily being at schools. So according to participants, it is time saving in a sense that they don't need to be at school in order to access a lesson or to ask a question to the teachers.

"...we use the Moodle when we are at work…our lecturer can give to us the instructions…he can also give the quiz…our lecturer put in the system how we are going to answer her…we answer…and we post it in the system and later we get the feedback…" (SP1).

Accessibility of resources anytime and anywhere: It emerged from this study that e-learning enables the participants to access the resources without being restricted by the time and the space.

"…we access the course easily when we are at our work place, we access the quizzes, the assignments…we can also chat with other students…we can chat with the lecturer to give us the explanation…it helps us to know new things in our study…" (SP12).

Cost effectiveness: The data emerged from this study revealed that e-learning is cost effective in terms that it reduces the money to travel while going to school or coming back to their work place. The participants were happy to study and to continue assuming responsibilities in their families. The participants revealed that because they study and work, they get opportunity to have money to care for their academic need and families.

"…I like to be e-learner…because I found the benefits of e-learning program…it is important for me …and I manage my family…and also I increase my knowledge and I study…by using these ICT technologies…Students are interested to use them instead of being in the school for a long time…and do…he can learn and at the same time he is learning…it will be…someone can be a student and a worker at the same time…in that case I find it is better than in the past…" (SP11).

Theme three: E-learning is the fast track production of nursing workforce taking into consideration the history of Rwanda

It emerged from the data demonstrated that after the Genocide against Tutsi; the Health Sector was seriously affected due to the shortage of the health professionals who were killed during the Genocide against the Tutsi killed and others left the country to exile. Data from document, analysis nurses with A2 level were predominant, and this had to change in order to meet the regional and international standards. A2 schools were closed and only 5 remained which could not feel the gap of nurses shortage. It emerged from the participants that a big number of nurses needed to be trained in a short period without leaving the gap in their respective areas, where they could study and work at the same time, and serve the population without creating further shortage in their department. The following themes emerged (a) Nature of the Graduate produced from the traditional curriculum (Inadequately prepared, Content driven curricula, Lower level of education diploma in Nursing); (b) need to upgrade the level of A2 nurses to A1 (Responsive to the need of the of the Health Sector, Self-directed-learning, Critical thinkers and decision makers (c) E-learning is a flexible tool for widening access to nursing education in resources constraint environment Nature of the Graduate produced from the traditional curriculum: It emerged from various data sources that the training of nurses and midwives in Rwanda is traced back in the colonial Era. Although several reformations have been made in Nursing and midwifery education,

nurses had still a low level of education with A2 level that was trained at secondary school level. It emerged from the data that the curriculum used was content based, which made them, not well prepared to meet the needs of the population. It emerged from the findings also that the majority of nursing workforce is constituted by A2 nurses and are wide spread across the country.

"…Historically, there were three levels of training for nurses and midwives in Rwanda—A2, A1, and A0. A2 level nurses and midwives are trained at secondary school level while A1 nurses and midwives have an advanced certificate following three years of tertiary education. A0 nurses and midwives possess a bachelor's degree. The MoH decided in 2006 that training and deploying A2 level nurses and midwives should stop as their skills were deemed insufficient to provide quality patient care. The minimum requirement for a Rwandan nurse is thus now A1. Despite this, many health facilities continue to use a large number of A2 nurses due to the lack of A1 nurses…"[35: 12-13].

Need to upgrade the level of A2 nurses to A1:It emerged from the data that the government of Rwanda decided to Phase out A2 level, and to upgrade them to A1. Under the initiative of the Ministry of Health and other state holders such as APEFE, AREA SANTE, BTC in order to get rid of the content based curriculum, a competency based curriculum was developed in 5 nursing schools in order to upgrade the level of nurses and Midwives (Byumba, Kabgayi, Kibungo Rwamagana, and Nyagatare).The aim of upgrading the level of nurses is to train competent nurses and midwives who can responds to the need of the Rwandan population at any health setting, to promote self-directed learning, long life learners and critical thinkers.

"…The competence based approach was introduced in schools of Nursing and Midwifery in Rwanda in 2007 and five priority nursing schools in Rwanda welcomed the first students in the new three-year, competence - based Registered Nursing and Midwifery A1 Programs, which was vital to the government's plans to phase out lower-level A2 programs and transition to a workforce of A1 or higher-level professionals…"[42: 1].

However due to the nature of competency passed curriculum, a small number of A1 graduates were being produced to fill the gap and it would take many years to upgrade the A2level nurses who are the majority in all three nursing and midwifery categories currently existing as highlighted above. There was then a need to train to upgrade A2 level with A1 level at a large scale using e-learning platform where A2 level nurses would upgrade their level without leaving their Job. It emerged that the project to start e-learning in nursing Schools was initiated by Ministry of Health in partnership with various stakeholders such as Rwanda HRH (Human Resource for Health), with the main purpose to upgrade the level A2 nurses (Diploma) to A1 level (Advanced diploma).

"…the concept of introducing e-learning in our institution it was for upgrading A2 nurse, upgrading more A2 nurses in a short time, reason is that they saw that it cannot be easily when these students are being taught like full time students. Because these students are working at their working places, they saw that if these students are requested to come for full time program, it could create a different problem, either at the work place they can have a shortage of staff, in health centres and so on…then introducing this approach of e-learning is for facilitating to upgrade more A2 nurses to A1in a short time…so that…and for them to come for a short time for face to face and more time to be used online at the same time they are doing their job…"(TP19).

E-learning is a flexible tool for widening access to nursing education in resources constraint environment: Emerging data from various resources revealed that, e-learning is a flexible tool for widening access to Nursing and Midwifery education, irrespective of the age. From documents analysis and from the participants, e-learning was introduced as a way of giving chances nurses to upgrade their level of education without leaving their Job, and in the Process of Phasing out A2 (Nurses with Diploma level) to advanced diploma. E-learning platform came to support the initiative that had already started to phase out A2 level nursing schools, and to keep 5 Nursing. Nurses continue to work while studying, which gives them chances to study, work and care for their families.

"…the e-learning program in 5 schools of Nursing and Midwifery is a special program which was developed to upgrade the A2 from the hospitals and Health centres to A1 level. The main objective is to upgrade the level of these nurses while they are still working on their respective places of work. The program begun in 2012 which a cohort of about 300 students specially head of health centres…"(TP20).

"…e-learning is a good program because it help many people in peripheral hospitals, health centres where learning was at lower level…it helps us because we increase our level of the study…"(SP13).

Hindrances to e-learning according to participants
Hindrances were both reported in quantitative results and qualitative results.

Reported hindrances to e-learning from quantitative data
Quantitative results from this study revealed that nurse educators participants encountered challenges in using ICT in teaching and learning, the majority of nurse educators, 81.8%(n=36) reported insufficient internet bandwidth or speed; 81.8%(n=36) reported insufficient technical support for teachers; 81.8%(n=36)

reported insufficient pedagogical support for teachers; 81.8%(n=36) reported lack of pedagogical models on how to use ICT for learning; 77.3%(n=34) reported lack of adequate skills of teachers; 75.0%(n=33) reported insufficient number of internet-connected computers; 75.0%(n=33) reported pressure to prepare students for exams and tests; 72.7%(n=32) reported insufficient number of computers; 72.7%(n=32) reported too difficult to integrate ICT use into the curriculum; 72.7%(n=32) reported school time organization (fixed lesson time, etc.); 70.5%(n=31) reported lack of adequate content/material for teaching; 70.5%(n=31) reported school space organization (classroom size and furniture, etc); 65.9%(n=29) reported lack of content in national language; 65.9%(n=29) reported most teachers not in favour of the use of ICT at school; 65.9%(n=29) reported lack of interest of teachers. Nursing students too encountered a number of challenges, an average percentage, 63.0%(n=143) reported a very slow internet connection (takes too long load pages), 35.2%(n=80) reported a restricted access to certain networking sites; 22.5%(n=51) reported very few internet connected computers; 21.1%(n=48) reported very little training in the use of the internet facilities is offered to students. This is inline the findings from two ICT managers (100%) who participated in this study who indicated that internet speed is between 10mbps (excl.)–30mbps (incl.) which is slow and may limit the access to certain resources. A Spearman's correlation was run to assess the relationship between the obstacles met by nurse educators to use ICT in teaching and learning and various constructs. There were significant relationship between the following constructs: Having been always lecturers in the country (r_s [44]= -.302, p= .046); working experience of the participants (r_s [44]= .368, p= .014); and the school shared vision about ICT use (r_s [44]= .438, p= .003). An overall score was calculated regarding the obstacles encountered by the nurse educators. Twenty items were considered and responses ranged from 1=not at all; 2=a little; 3=partially; 4=a lot. The higher the score was, the more participants encountered the challenges, and the lower the score is the less the participants encountered obstacles. The minimum score was 20 and the maximum score was 72.The mean score was 47.30 and the standard deviation was 14.08.The 1st quartile was 36.25; the 2nd quartile was 48.5, and the 3rd quartile was 59. These results indicated that the majority of nurse educators encountered obstacles while using ICT for Teaching and Learning.

The results indicated that also nursing students encountered a number of problems in e-learning program while using internet on campus, and out of 227, an average percentage, 63.0%(n=143) reported a very slow internet connection (takes too long load pages), 35.2%(n=80) reported a restricted access to certain networking sites; 22.5%(n=51) reported very few internet connected computers; 21.1%(n=48) reported very little training in the use of the internet facilities is offered to students4.4%(n=10) reported no training on how to use internet facilities. A Pearson correlation was run to determine the relationship between constraints encountered by the students while using the Internet facilities on campus and other constructs. There were significant relationships with the following constructs: Campus (r=-.260, n=227, p< .000); Year of the study(r=-. 142, n=227, p= .032); Gender (r= -.159, n=227, p= .016); how nursing students know about electronic resources (r=.256, n=227, p< .000); Search engines used by nursing students (r= .233, n=227, p< .000); Social networking sites used by nursing students (r=.276, n=227, p< .000); settings of access to the Internet services by nursing students(r=.143, n=227, p= .031); perceived biggest problems in using internet by nursing students (r=.583, n=227, p< .000); and the perceived need for orientation in specific areas (r=.217, n=227, p= .001); perception on the content used in e-learning (r=-. 262, n=227, p< .000); perception on the delivery of courses used in e-learning r=-. 277, n=227, p< .000); perception on the services provided in e-learning (r=-. 263, n=227, p< .000); perception on the outcomes from e-learning (r= -. 228, n=227, p= .001); perception on the structure of e-learning (r=-. 225, n=227, p= .001); perception on the evaluation done in e-learning platform (r=-.218, n=227, p= .001); learning activities performed in e-learning (r= .181, n=227, p=006), and overall perception of the nursing students on the use of e-learning (r= -.250, n=227, p< .000). These findings indicated that there are other factors related to the use of internet which should be taken into consideration, in making e-learning a user friendly.

Nursing students also reported that there are a number of biggest problems they encountered. Out of 227 participants, an average percentage, 58.6%(n=133) reported encountering sites that want the participants to pay to access information; 49.8%(n=113) reported sites that require participants to register with them; 30.4%(n=69) reported that it takes too long to view/download pages; 30.4%(n=69) reported sites that are not compatible with all browsers; 27.3%(n=62) reported that it costs too much; 23.8%(n=54) reported having problems with their browsers (e.g. freezing up, poor interface, getting disconnected, timing out); 23.3%(n=53) reported not being able to find the information they looking for; 22.9%(n=52) reported advertising banners that take too long to load; 21.6%(n=49) reported encountering pages with bad html; 21.1%(n=48) reported encountering links that do not work. A Pearson correlation was run to determine the relationship between the biggest problem perceived by nursing students and other constructs. There were statistically significant relationships between the following constructs: Campus (r= -.311, n=227, p< .000); gender (r= -.215, n=227, p= .001); how nursing students know about electronic resources (r= .140, n=227, p= .036), search engines used (r= .211, n=227, p= .001), social network used (r= .203, n=227, p= .002); number of hours spent on internet per

week (r= .185, n=227, p= .005); problems encountered while using internet on campus (r= .583, n=227, p< .000); perceived orientation in specific areas of ICT(r= .379, n=227, p< .000); perception on the content used in e-learning (r= -.266, n=227, p<. 000); perception on the delivery of courses in e-learning (r= -.269, n=227, p< .000); perception on the services provided in e-learning (r= -.256, n=227, p< .000); perception on the outcomes from e-learning (r= -.208, n=227, p= .002); perception on the structure of e-learning (r= -.225, n=227, p< .001); perception on the evaluation done in e-learning (r= -.173, n=227, p=009), learning activities performed in e-learning (r= .235, n=227, p< .000), and the overall perception of nursing students on the use of e-learning (r= -244, n=227, p< .000).

Reported hindrances to e-learning from qualitative data

Although the e-learning was being positively perceived a number of hindrances to the use of e-learning, a number of themes emerged from this study: (1) resource constraints, (2) insufficient ICT literacy for teachers and students (computer/Internet/Moodle), (3) challenges with the language of instruction (English), (4) lack of policies regarding e-learning, (5) resistance to change, (6) issues of interface design of Moodle. It emerged from the data from various participants that resource constraints was a hindrance to utilization of e-learning. Some participants reported: insufficient infrastructure, shortage of staff, work overload/ time constraint, poor motivation, financial problems, inaccessibility, internet/ website/ Moodle. It emerged from the data from various participants that resource constraints was a hindrance to utilization of e-learning. Some participants reported: insufficient infrastructure, shortage of staff, work overload/ time constraint, poor motivation, financial problems, inaccessibility, internet/ website/ Moodle. It emerged from data sources that there is insufficient infrastructure to accommodate both regular and big number e-learning students, such as the classrooms, poor library without sufficient online books, no expansions of the buildings such as ICT lab and skills laboratory, and no computer for all the students. From the field notes of the researcher, it was observed as well that in most campuses where the study was conducted there were no expansions of the classrooms, library or ICT laboratory and skills laboratory.

"…The equipment for video conferencing is not sufficient, there is no sound proof, and the same only computer lab is used for video conferences…the schools has insufficient classrooms to hold all the students…poor library and no sufficient of online books and journals…"(TP20).

Work overload had been reported by teachers, students and ICT managers. They reported that students have to work and study and combining both of two is not easy, and because the online facilitation is done during the evening or night, for nurse educators, they feel overloaded with work and without time to care for their families or even prepare the next teaching sessions. Short staffing was also reported from data sources that led to work overload mentioned above. The number of teachers who were teaching before e-learning start did not increase and those who were assigned to teaching e-learning found themselves teaching also regular students.

" …another challenge we have faced is that of the work overload because we were working with full time programs, and the e-learning came and they didn't provide specific teachers for e-learning…lectures who teaching e-learning are the same for full time program…and you see that this overwork load…"(TP19).

The participants to this study reported that there is no motivation despite the overwork load, and the campus managers who participated in this study reported as well that there are no incentives for using ICT in teaching and learning and one of them said that it was due to budget issues.

"…no motivation for lecturers who consider e-learning as an added task to their job and no motivation for IT for their support, considering that they work every time (Night and Week end)…"(TP20).

"…That motivation was not there…teachers were not motivated…the reason why even the use of Moodle platform the frequency rate of using was decreasing slowly and slowly because of lack of motivation…"(PT19).

In one of my field note I observed that in one of the campuses where the study was conducted, the ICT manager was not available and the ICT laboratory was closed almost for two months (From field note of the Research). And this made teachers and students unable to access computers and Internet most of which are in ICT laboratory. The extract below confirms it from one of the participants.

"…It is a long time that this computer lab is closed…even the students and teachers we don't have an access to it. For 2 months now we don't have an access to it…" (TP12).

Lack of internet network, and accessibility to Moodle have been a challenges to a number of participants which led to poor facilitation and to do online activities as it was required. It emerged that at a certain point Moodle stopped for one year due to a number of challenges and had to be relocated where now it well working and stable, Of course depending on internet accessibility in working area of the participants and electricity disruption, it is still a challenge to fully access Moodle platform.

"…network has been a challenge…when using Moodle, and we were at work…sometimes the network failed…and to meet the facilitator was a challenge…and to do some quizzes on Moodle platform it was a problem…"(SP8).

"…Moodle started in 2012, but latter on it had quite a lot challenges. It was down most of the time and Moodle hasn't been working for 1 year in2014... that is why it (Moodle) had to be relocated from Ministry of Health to ▮▮▮▮▮▮▮ University…" (FGD2).

Insufficient training of participants in ICT and language barrier: It emerged from the data that some of the inhibiting factors are related to non-training of students and teachers in terms of using Moodle, teaching and learning in e-learning platform, frustration of the teachers and the students over the use of technology, accessibility of academic related materials, and in particular computer literacy and language barrier among the students, slow internet connection.

"…there is computer literacy among students, language barrier [students don't master English], and on how to engage an online discussion…There is also lack of training among nurse educators and students on the use Moodle…" (FGD-P2).

"…we have the language problem. Because the academic language is English but many of them when you are teaching, they want you to explain in another language…maybe in French or Kinyarwanda…for more understanding…they are some students who don't have sufficient knowledge, or understanding the English…and when you try to explain you can put something in French or Kinyarwanda for more understanding…that is the problem…" (TP9)

Lack of policies regarding the e-learning in nursing school: From various data sources in this study, it emerged that there is no specific policy regarding e-learning in nursing schools, policies on plagiarism and copy right or how e-learning should be managed. Participants interviewed reported that the only policy they know is to teach 40% of module face to face and another 60% should be done in form of self-directed learning when students are at their working place. Some other participants reported that they have two weeks face to face and other two weeks they return to their working places, where they may continue to communicate with their lecturers.

"…now we don't have a policy regarding the plagiarism, or having some software to detect plagiarism, this reduces the critical thinking of the students…, I think we can use these kind of software to reduce this plagiarism rate, so that our students could work for themselves…"(TP19).

"…We are in the process of developing an online teaching and learning policy. So, there has not been any. You (referring to researcher) may need to look at the HEC (Higher education Council) distance learning policy (it may not necessarily apply though)…" ▮▮▮▮▮▮▮▮▮▮

"…ah…not much (referring to policies) in terms of using e-learning and Moodle…"(FGD-P2).

Resistance to change: It emerged from the data from the participants that some preferred teaching students face to face rather than using Moodle. Data further revealed that resulted in non-facilitation of the students online, and lack of motivation to use Moodle. The following extracts from the transcripts provide more explanation on why some teachers don't want to change from the traditional methods to innovative methods due to various reasons: Some of the reasons given by the participants on why they prefer face to face rather than using e-learning platform were the following: It allows the teacher to see the reactions of the students, and is aware when student don't understand, and can explain more, most of the time this Moodle platform is down; teachers try to give to students 80% or even 100% when they are here in two weeks face to face; students complain there is no internet network, nor electricity in the country side, teachers don't want to change their mind after Moodle was down for a year and they are used to face to face teaching; e-learning for the students is very difficult. It is difficult to get the time to collaborate with students when they are in their working place. Teachers think that the e-learning program level of perceiving the course is lower than the residential (full time students); it is difficult to use Moodle, Having not been trained and because teachers are not informed about using Moodle, and they don't use Moodle that is why they use face to face.

"…I can say I have never really facilitated students online, because we used to take the advantages of their face to face sessions, we try to cover everything. So I can't say I have facilitated students online… Network, most of the time the wireless connection is down, and sometimes the electricity, another thing is that you may indicate to the students about these resources but they don't have knowledge about that, they don't know how to go and look for information from online… (TP17).

"…when this Moodle from MoH stopped, all the persons set in their mind…you know…that they have to teach face to face…using face to face teaching e-learning students…now this ▮▮▮▮ university is introduced…people are now used to the other method of teaching…so I tell you if there are 10 people who teach e-learning program…maybe one is using this…I know because our academic officers...they are always saying…you put this on Moodle… when I was engaged, I had to teach e-learning but I didn't teach e-learning…I teach face to face…this Moodle platform is down and then this internet network which is also down…"(TP8).

Issues of interface design of Moodle: It emerged from the data collected on Moodle from three campuses were this study was conducted that there is lack of proper organization of Modules on Moodle. It is quite difficult to

know which level a given module is taught, and the semester and even the weeks in which various units were covered. From Moodle analysis from the 3 campuses, the findings revealed that there is no Turnitin integrated in Moodle thus inability to check the Plagiarism, there are no ethical guidelines on how Moodle should be used for academic purpose, and there is no Moodle user guide document. From further analysis, it was found that the quality of forum discussion and chat was low. Log reports indicate overall a poor participation of students and teachers, some students have never login, some teachers, co-teachers, and campuses managers don't follow what teachers and students are posting online. Another observation from Moodle platform is that the majority of students who use it from the three campuses, open it to view what has been posted and very few interact with their teachers via this platform It was also note that there is no Integrate Adobe captive software to Moodle, nor Big Blue Button which would take MOODLE to another level. Due to ethical issues the screen capture is not presented for the issues highlighted above (From Researcher's memos on Moodle Analysis).

V. Discussion of the Findings

The finding from this study indicated that the majority of the participants were females. And this is not surprising as nursing has always been as a profession for females. According Neighbours [43] nursing combines professional values as well as feminine values of caring and support. This combines with the patriarchal construct that men are valuable and that women nurses support their male colleagues, consciously or unconsciously. However as it was revealed from the results from this study males are gaining the ground into nursing. Neighbours [43] further argue that the major rationale for attracting men into nursing is to raise the prestige of the profession as a whole. Whether this will actually work or not is debatable. In the context of Rwanda men are increasing joining nursing and midwifery as it was revealed by this study where out of 227 nursing students who participated in this study; regarding the gender; though the majority 64.3% were females and a significant percentage, 35.7% were males. It was found from the findings that the minimum age of nursing students was 28 years old and the maximum age was 50 years old. The mean age was 36.09 years; the standard deviation (SD) was 4.434). This indicate that nursing students enter e-learning at an advanced age (mature entry), compared to the regular students who enrol into nursing school, after they secondary school also known as direct entry, and implies that adult teaching methodology should be applied, and e-learning is one approach which can be applied in adult education. E-Learning engages nurses irrespective of their age by building interest and motivation while providing opportunities for active participation and protecting organizational interest with documented training. However, optimal success comes from consistent engagement. The fast evolving nature of the nursing role and the requirements of registration bodies require continuing professional development and lifelong learning in all nurses[44]. However as it has been reported by nursing students it sometimes to work and study, as they feel overwork loaded. According to Dalhem et al.[44] continuing education in a clinical environment is challenging for all health care organizations.

Benefits of e-learning in selected campuses

The results from this study indicated that the participants were aware of the benefits of using e-learning in education of nurses in particular in the context of Rwanda. The merged themes were (1) E-learning promoting student centered approach; (2) E-learning is a blended learning, and (3) E-learning as tool for track production of nursing workforce taking into consideration the history of Rwanda.

E-learning promoting student centred learning

E-learning promoting students centered approach was reported participants from this study who revealed that e-learning promote self-directed learning. And based on the responses from the participants, self-directed learning accounts 60% of the time in academic year. In self-directed learning they learn on their own information, from lecturers or other resources. Emerging from the data, it was found that for those who you e-learning platform collaboration was a key point between teachers, students, ICT managers, administrative staff and the various stakeholders. Students participants also revealed that collaborating with their peers was very helpful in terms of get more clarifications on various topics they might have not understood. The findings revealed that the participants used the forum group on LMS (Moodle), chatting, emails, groups' emails, Facebook and whatsup. The collaboration in e-learning expressed by the participants, indicate active involvement of teachers, students, and peers in academic constructive way. The participants from this study reported that they use a number of ICT tools for e-learning platform. These tools include :(i) computers programs, (ii) Internet, (iii) Moodle; (iv) social media; (v) phone; (vi) Automatic screen recording, (vii) Videos Teacher's participants reported that they use to prepare their lesson and post them of on the LMS (Moodle), they help them to communicate with the students in their working places, as well doing research. It emerged from the data that interactive learning was reported by the participant as a way of engaging the students, and keep them motivated for better understanding of the lesson. The participants to make the lesson more interactive reported that they use Videos, Pictures, animated Power Point, forum discussion, chatting including web link which may attract the attention of the students. From the emerging data e-learning promoted inquiry based learning.

Participants revealed that e-learning helps in collecting information from various sources, and critically analyse them, and later take decisions. It was found that this was done research on internet, because it was found by the participants that e-learning provided up to date information than the old books which can be found in the library. The inquiry based learning was also reported to be done through the questions asked in the forum discussion or online discussions, or assignment (individual and group assignment where learners have to have to find information from a number of sources in order to respond to the task give. From the findings from MOODLE platform, it was found that teachers or students could initiate discussion, and most of the time teachers used open ended questions. With the introduction of e-learning in Nursing Schools in Rwanda, the merging data reveals that students attending these programs assist them to integrate the theory into practice, therefore correcting some malpractices. Participants further states that it is a kind of integration, because what they learn at school during face period, they put them in action or practice. It also emerged that because these enrolling in e-learning program have been working in various settings, they bring the experience they have accumulated throughout the year into the classrooms which makes the course more interesting.

These findings corroborate with quantitative data where participants reported activities promoting students cantered approach in teaching and learning in selected campuses. This is proven by the activities done by the students and nurse educators in e-learning platform which promoted students cantered learning. The majority of nursing students, 90.7% reported that internet was very important in their lives, and it was also the majority of nurse educators 97.7% reported to use computer and/or internet to prepare and to teach lessons. It was also found from this study that 52.3% reported to use internet in more than 75% of all lessons, 22.7% reported between 71-50%. And further all campus managers who participated in this study, 100% use computers for school management related tasks (budgeting, planning, timetabling, etc); searching for information; making presentations; communicating online with teachers (email, web site announcements, etc.),and communicating by emails with educational authorities (at local, regional, or central level). The students' participants also reported to use the use of ICT tools for various reasons such as getting to learning resources, following the course anytime without necessarily being at school, searching for information about diseases even when they are in their clinical placements. Another aspect reported by the students' participants is being able to save their documents and keep them for a long period. The rich information provided by the participants revealed that is a necessity to use ICT tools in e-learning. Inline to student centred approach mentioned by the participants in the qualitative phase and the use of technology in teaching and learning, it was found from this study that the majority of nursing students, 96.9% used Internet to access full web placed courses, 93.0% for communication with theirs lecturers, 93.0% for only the information on the course, 91.2% for course registration, 87.7% for major component of the course on the web, 86.3% for thematic student to student correspondence, including students from abroad, 85.9% for online admission, 82.4% for support on web, 81.9% for data base browsing, 79.7% for mining information, 78.0% for collection and analysis of information. Interestingly the majority 94.3% were aware of electronic resources on the internet on campus, and it was found that the majority, 93.4% were aware of electronic resources on the internet.

Nurse educators also reported the use of activities that promotes student centred approach. The majority of nurse educators, 95.5% reported to use self-directed learning, 93.2% reported to use case studies, 88.6% reported to use group discussions, 81.8% reported to use small group activities, 72.7% reported to use formal lectures, 70.5% reported to use role play, 68.2% reported to use brain storming, 63.6% reported to use situation of integration, 63.6% reported to use videos. An average of 50.0% reported to use research, and based. And based on the responses from the participants and data from various sources, self-directed learning accounts 60% of the time in academic year. In self-directed learning they learn on their own information, from lecturers or other resources. However as it has been found in this study that the use of teaching strategies that promote student centred learning is related to other factors such as years of working experience ($r_s[44]= .382$, p=.011); condition of accessibility to infrastructure in the target class ($r_s[44]= .308$, p=.042); source and the type of support ($r_s[44]= .410$, p=.006);ICT based activities used for teaching and material($r_s[44]= .413$, p=.005), and perceived skills in ICT ($r_s[44]= .387$, p=.009). These results corroborate with the findings from qualitative data where participants reported that the infrastructure, availability and accessibility to Moodle, as well as the competences in ICT would determine which teaching strategy to use.

According to Motschnig-Pitrik and Derntl[45] Student-Centred teaching in e-learning can be characterized by the following goals. It aims toward: a participatory mode in all aspects of learning and decision-making; a climate of trust in which curiosity and the natural desire to learn can be nourished and enhanced; helping students to achieve results they appreciate and consider worthwhile, to build their self-esteem and confidence, while, at the same time, keeping to the curriculum; uncovering the excitement in self-initiated discovery, which leads students to become lifelong learners; developing in teachers the attitudes of realness, authenticity or transparency; acceptance or respect and empathic understanding that research has shown to be most effective in facilitating learning; helping teachers to grow as persons finding rich satisfaction in their interactions with learners. According Saxena [46] Self-directed learning is a type of learning in which learners

are allowed to work on authentic problems and tasks of their own choice, and are still provided learning support in context to their problems[46]. Self-directed learning is an essential skill required in the 21st century educational world. This learning approach increases the motivation of students to learn, since they are the makers of their own knowledge, they experience a sense of independence while learning [46, 47]. It emerged from this study that in e-learning platform, collaboration was a key point between teachers, students, ICT managers, administrative staff and the various stakeholders. Students participants also revealed that collaborating with their peers was very helpful in terms of get more clarifications on various topics they might have not understood. Van Tassel[48] argue that whether higher education is delivered face to face or through multimedia online instruction, core educational processes remain intensely communicative. Thus, the present research examines adult learners' communication and interaction expectations, contrasts these learners' expectations with their actual online classroom experiences, and analyses the effects of meeting (or not meeting) their expectations on students' satisfaction with interaction in online courses, perceptions of locus of instructional control, and self-reports of their online course learning [48].According to Anderson [49], information communication technology (ICT) rises an increasing interest in PBL (Problem Based Learning), particularly the research opportunity provided by the internet and the array of multimedia tools for assembling and presenting the result of projects. Oliveira [50] further argues that the use of ICT tools gives a voice for students and, therefore, their needs, abilities, interests and learning styles determine classroom activities, consequently it will help to reduce the dropout rates, because students are self-motivated.

As it has been reported in this study that E-learning promote inquiry based learning and helps them in collecting information from various sources, and critically analyse them, and later take decisions, Anderson [49] state that there are specialized software including modelling and simulation, expert systems, semantic networking and other interactive learning tools, as well as learning management systems, are often employed to support pedagogical innovation. By using accepted learning principles and current trends in pedagogy, teachers are aided in developing, delivering and managing open and flexible learning programmes, and this is a step in teaching with and through ICT is linked to the transforming stage in the ICT integration model. In 21st century, with ICT, there are a number of tools such as television, text messaging, camera phones, iPods, MP3, and interactive video games. They can watch television, listen to their iPods, send text messages, and work online all at the same time [49]. Anderson [49]further argues that in inquiry based learning, the problems for investigation arise from students' backgrounds and experiences, which make these more real and motivating, authentic is a word you sometimes hear. The data students collect in finding answers to problems they have chosen are not limited by a particular subject or discipline but usually cross subject boundaries. Because students commonly work in small groups, they learn from each other in planning how best to solve problems, and they learn to work in teams.

With the introduction of e-learning in Nursing Schools in Rwanda, the merging data reveals that students attending these programs assist them to integrate the theory into practice, therefore correcting some malpractices, because what they learn at school during face period, they put them in action or practice. It also emerged that because these enrolling in e-learning program have been working in various settings, they bring the experience they have accumulated throughout the year into the classrooms which makes the course more interesting. Mather and Cummings [51] state that the implementation of health technology and informatics into healthcare environments has enabled new opportunities for developing patient-centred approaches to care. The emergence of mobile learning as a new pedagogy for learning and teaching of undergraduate nurses and for continuing professional development can be used to strengthen the nurse-patient relationship. Incorporation of e-Health literacy education and health promotion by nurses, using digital technology tools and resources, will assist with empowering patients to access information and options for managing their own health [51]. In a study conducted by Dlamini[52] on the perceptions of students and nurse educators on the integration of theory and practice in nursing education, it was found that educators favoured the use of problem-solving approaches to the conventional method of teaching and learning. Dlamini[52] further found in her study that the participants alluded to the use of case studies, and real life or clinical problems to stimulate teaching and learning, as well reflections of theory on practice experiences and vice versa. It also emerged that nurse educators agreed to the preference of guided reflection as a learning technique that can be used to integrate theory and practice. It also emerged that self-directed learning (SDL) was likewise viewed as another element of the problem-solving approaches which facilitate the integration of theory and practice in nursing education [52].Over the last few years, e-learning has emerged as a practical solution for learning and education in the hospital setting [44]. Accessing to a number of resources is vital to success of e-learning. According to Évora[53] argue that in nursing the Internet can be used as a tool for research by accessing to available resources. Special attention should be given for the search sites, electronic mail, database access, forums and discussion lists, transfer of files (FTP), homepages and videoconferencing. It is concluded that the internet is a valuable resource for who do not have the information needed when findings answers in for nursing problems. The computer allows the person to easily find every type of information. When the information is on-line, an appropriate search can

recover the information that is needed much faster than when accomplished manually [53].Similarly to the findings of this study, Kader [21] found in his study that respondents used internet mainly for communications, including communication with their teachers and colleagues. The internet has a potential to become an important tool for communication, information and in the longer perspective, a new tool for participation in a democratic process. It can be utilized to receive and publish information by anyone, at any time, for whatever purpose. This quality of internet makes it possible for the users to bypass all traditional and official channels for information and communication. This is particularly relevant in a context where freedom of expression is limited and tolerance to opposition and is low [54]. Kheswa[5] argued that many universities required students to use the Internet for various administrative and course-related functions, which impelled students to use a technology they may not have had the inclination to try or incorporate into their academic lives.

Similarly emerging data from students' participants in this study revealed that it is time saving, in terms of travelling and attending regular classes. They can receive the messages from peers and from teachers without necessarily being at schools. So according to participants, it is time saving in a sense that they don't need to be at school in order to access a lesson or to ask a question to the teachers. It also emerged that e-learning enables the participants to access the resources without being restricted by the time and the space. Participants from this study reported that e-learning is cost effective in terms that it reduces the money to travel while going to school or coming back to their work place. The participants were happy to study and to continue assuming responsibilities in their families. The participants revealed that because they study and work, they get opportunity to have money to care for their academic need and families.

Accessing to a number of resources is vital to success of e-learning. According to Évora[53] argue that in nursing the Internet can be used as a tool for research by accessing to available resources. Special attention should be given for the search sites, electronic mail, database access, forums and discussion lists, transfer of files (FTP), homepages and videoconferencing. It is concluded that the internet is a valuable resource for who do not have the information needed when findings answers in for nursing problems. The computer allows the person to easily find every type of information. When the information is on-line, an appropriate search can recover the information that is needed much faster than when accomplished manually [53]. The literature further indicate that the term e-learning more specifically relates to electronically-mediated learning which has its foundations in the Internet and associated computer-based technologies [55]. E-learning has the capacity to provide accessible, resource-efficient methods of clinical skills education [56]. Student's predominantly engaged with e-learning through the institutional VLE, where they accessed course materials and information [57]. E-learning can provide flexibility in not only how, but also where and when students learn. It can also offer a way to individualise the educational experience in terms of pacing learning in accordance to the learner's needs while retaining consistency in what is taught [56, 58]. This is important for ensuring quality education that meets identified learning objectives and regulatory standards. As there is now wider access to learning resources available via the World Wide Web, e-learning also has the potential for increased learning opportunities for those who are autonomous and self-directed, and this promotes a constructivist and active approach to learning which focuses on the student rather than on the teacher [57].

E-learning as a blended learning
E-learning being a blended learning, nursing students reported that it helps them to keep their job and manage their families. Nurse educators also share the same positive perception on how it changed the way they teach about using e-learning and in particular Moodle. They reported that students gain more knowledge, and help them to upgrade their level without losing their job. Even nurse educators were quite happy because they could get updated information to share with the students, and assist them to facilitate them, by reducing the time they should spend face to face. It emerged that face to face accounts 40% and self-directed learning accounts 60% of the teaching period. Participants reported that this form of blended learning is flexible because it give chances to students to search for information and when they come back to school they can engage more with the teachers on particular points where they didn't understands. It was also noted that Teachers use interactive and innovating teaching methods in particular during classroom sessions, such as the use of videos, participatory teaching, and small group discussions. And for the part that is done online, a number of resources is made available to students, and may become proactive in their learning through forum discussion, chatting, doing quizzes and assignments. It was also noted that blended learning gives chances to participants to be more familiar with the technology whether in a synchronous or asynchronous manner. It emerged those participants of this of learning as time saving, cost effective, accessibility of resources anytime, anywhere, and a tool for widening access to nursing. It emerged that different teaching methodology were used and the final exam was done during face to face sessions. From various data, that during face to face, teachers facilitate nursing students using a number of teaching strategies. Numbers of methods have been reported such as, brain storming, group works, group assignments, students' presentations, the use of videos and demonstration, lecturing and giving test and exams while they are at school. Participants reported that several factors influence them to use a give

technique when facilitating students, such as the course, availability of resources, level of engagement of the students.

In this study the results corroborate with overall perception on the outcome of e-learning by nursing students was positive and promising the future of e-learning, as it was found that after computing the constructs related to the perceived outcome from e-learning, The minimum score was 12 and the maximum score was 60, the mean response was 42.92, the median and the mode were 48 and the Standard Deviation was 13.875. The 1st quartile was 36, 2nd quartile was 48 and the 3rd quartile was 52. These results indicate that the majority of nursing students had a relatively high positive perception on the outcomes delivered in e-learning. Although students had an overall positive perception on the outcome of e-learning there are factors that are related to this perception which should be taken into consideration. A Pearson's correlation was run to assess the relationship between perception on the outcomes in e-learning platform and various constructs, and it was found that here were statistically significant relationships between the following constructs: the frequency of activities done on internet (r= -.145, n=227, p=029); problems encountered while using internet on campus (r= -.228, n=227, p=.001); biggest problems in using internet (r= -.208, n=227, p= .002); specific areas of orientation in ICT (r= .146, n=227, p= .028); perception on the content used in e-learning (r= .918, n=227, p< .000); perception of the delivery of the courses on e-learning (r= .915, n=227, p< .000);perception on the services provided in e-learning (r= .945, n=227, p< .000); perception on the structure of e-learning (r= .960, n=227, p< .000); perception on the evaluation done on e-learning (r= .807, n=227, p<. 000); learning activities performed in e-learning (r= .131, n=227, p=.049), and overall perception of the use of e-learning (r= .981, n=227, p< .000).These results indicated that the perceived outcome from e-learning is related to frequency of activities done on internet, biggest problem encountered, special areas of orientation, content, structure, services, evaluation, and learning activities performed in e-learning.

Regarding the attitude of nurse educators towards the use of ICT at school, it was found from this study the results corroborate with qualitative findings, that the nurse educators had a positive attitude towards ICT use in school. It was found that out of 44 participants, the majority, 95.5% had a positive attitude that ICT should be used for students to retrieve information; 95.5% had a positive attitude that ICT should be used for students to learn in an autonomous way; 95.5% were in agreement that ICT use in teaching and learning is essential to prepare students to live and work in the 21st century; 95.5% had a positive attitude that for ICT to be fully exploited for teaching and learning radical changes in nursing campus are needed; 93.2% were in agreement that ICT should be used for students to do exercises and practice; 90.9% were in agreement that ICT should be used for students to work in a collaborative way; 90.9% had a positive attitude that ICT use in teaching and learning positively impacts on students' competence in transversal skills (learning to learn, social competences, etc.); 88.6% had a positive attitude that ICT use in teaching and learning positively impacts on students' motivation; 86.4% had a positive attitude that ICT use in teaching and learning positively impacts on students' achievement; 84.1% had a positive attitude that ICT use in teaching and learning positively impacts on students' higher order thinking skills (critical thinking, analysis, problem solving).

The results corroborate with qualitative findings that overall nurse educators' attitude was positive toward the ICT use in school by nurse educators was calculated. Ten items were considered. The teachers' responses ranged from 1=strongly disagree, 2=Disagree, 3=Agree, and 4=strongly agree. The higher the score indicated teachers' positive attitude toward ICT use in school, and the lower score indicated a negative teachers' positive attitude toward ICT use in school. The minimum score was 20, and the maximum score was 40. The mean score was 33.14, the standard deviation was 5.156, and the median was 32.50. The 1st quartile was 30, the 2nd quartile was 36 and the 3rd quartile was 39. And this indicated teachers' positive attitude toward ICT use in school. However this positive attitude of was related to other factors. A Spearman's correlation was run to assess the relationship between the Teachers' attitude about the use of ICT at school and various constructs. There were significant relationship between the following constructs: Highest qualification (r_s [44]= -.368, p= .014); number of the subjects taught (r_s [44]= -.419, p= .005); perceived nurse educators' skills in ICT(r_s [44]= .423, p= .004), and the positive impact of using ICT on student learning (r_s [44]= .474, p= .001). These findings collaborated with the findings from qualitative data as reported by nurse educators that the use of Technology in teaching and learning was important, and in order to optimize its utilisation more training was required on technological and pedagogical domains.

Ginns and Ellis [59] argues that parallel with the growing use of ICT in the educational setting, blending learning approach can be contributing tools to complete face to face experiences According to Bodie, Powers and Fitch-Hauser [60] blended learning refers to a method of instruction that utilizes two or more complementary approaches to teach the same material. By combining classroom lectures, activities, discussions, and/or web-based modules. The literature reveals that learning delivery is the most often cited advantage of e-learning and includes increased accessibility to information, ease in updating content, personalized instruction, ease of distribution, standardization of content, and accountability. Accessibility refers to the user's ability to find what is needed, when it is needed. Improved access to educational materials is central, as learning is often

an unplanned experience. Updating electronic content is easier than updating printed material; e-learning technologies permit educators to revise their content simply and quickly. Learners have control over the content, learning sequence, pace of learning, time, and, often, media, which allows them to tailor their experience to meet personal learning objectives. Internet technologies permit the widespread distribution of digital content to many users simultaneously anytime and anywhere [61-63]. Bichsel[63] further argues that offering more courses online can also improve efficiency and decrease the cost by limiting reliance on often scarce physical classrooms.

Mercado [64] states that it is crucial establishing the characteristics of successful online learners and online teachers as well as an online learning, ready institution, one is able to assess the state of readiness of students, teachers and the organization along the implementation of an e-learning environment. The readiness criteria provide a goal for the institution as it develops its capability to implement an online learning environment. Being able to assess the status as to where the institution is currently positioned in relation to where it envisions itself to be already sets a milestone. Having this vital information sets already institution to develop strategies as well as timetable for achieving readiness in all the categories identified. High-quality Web bases learning programs provide outcomes such as lower costs for learners, learning institutions, and employer and other personal advantages for the learner, while achieving learning objectives[65]. Learning outcomes also include personal benefits for the learner, because he/she does not experience the personal stress resulting from financial risk, leaving a job, or moving themselves or their whole family to be close to an academic institution, and by providing a program in which learners are satisfied with the learning experience and acquire new and relevant skills and knowledge, from which they can apply new knowledge and skills in their workplace, and add value to the services delivered by them [65, 66].

E-learning as the fast track production of nursing workforce taking into consideration the history of Rwanda:
Emerged from the data various sources that after the Genocide against Tutsi; the Health Sector was seriously affected due to the shortage of the health professionals who were killed during the Genocide against the Tutsi killed and others left the country to exile. Data from document, analysis nurses with A2 level were predominant, and this had to change in order to meet the regional and international standards. A2 schools were closed and only 5 remained which could not feel the gap of nurses shortage. It emerged from the participants that a big number of nurses needed to be trained in a short period without leaving the gap in their respective areas, where they could study and work at the same time, and serve the population without creating further shortage in their department. The following theme emerged: A need to upgrade the level of A2 nurses to A1 (Responsive to the need of the Health Sector, Self-directed-learning, and Critical thinkers/ decision makers.

It emerged from the data that the government of Rwanda decided to Phase out A2 level, and to upgrade them to A1. The aim of upgrading the level of nurses is to train competent nurses and midwives who can responds to the need of the Rwandan population at any health setting, to promote self-directed learning, long life learners and critical thinkers [67-69]. The competency-based nursing and midwifery school curricula were used with the first A1 class starting in 2007, and are now used in all five nursing schools across the country to train approximately 300 graduates per year [69]. The Project also provided operational support through subcontracts to five nursing and midwifery schools and helped with their launch of the Registered Nursing and Nurse Midwifery A1 Programs, including financial support for the renovation of classrooms, dormitories and the purchase of office equipment. For each of the five schools, the Project provided computers, Internet connections, training equipment and technical reference materials; organized library management training; updated faculty and clinical preceptors in HIV/AIDS, FP, EmONC and gender; and supported the development of five-year strategic plans for 2009-2013[69]. It emerged from various data sources for this study that due to the nature of competency passed curriculum, a small number of A1 graduates were being produced to fill the gap and it would take many years to upgrade the A2 level nurses who are the majority in all three nursing and midwifery categories currently existing as highlighted above. There was then a need to train to upgrade A2 level with A1 level at a large scale using e-learning platform where A2 level nurses would upgrade their level without leaving their Job. It emerged that the project to start e-learning in nursing Schools was initiated by Ministry of Health in partnership with various stakeholders, with the main purpose to upgrade the level A2 nurses (Diploma) to A1 level (Advanced diploma).

Regarding nurse and midwifery training, Ministry of Health [70: 58], stated that there are currently five nursing schools (Byumba, Kabgayi, Kibungo, Nyagatare, and Rwamagana) under the MOH, and responsible for A1 nursing and midwifery education, which is now the minimal acceptable standard for nurses and midwives. This means that most A2 nurses and midwives will need to upgrade to A1. The schools are relatively small and have insufficient teaching capacity to meet the national desired annual enrolment of 250 students. Furthermore, the schools are faced with inadequate laboratory capacity, major lack of equipment and supplies, and inadequate hygiene facilities [70: 58]. It emerged from also from data sources of this study that the Introduction of the e-

learning in nursing and midwifery schools was based on the need of the country and had the following objectives: to improve nurses' and midwives' knowledge and skills using the modern methods of teaching and learning, to equip different health settings with well trained & qualified nurses and midwives, to contribute to the reduction of infant and maternal mortality rate (refer to MDG # 4 & 5), to have upgraded & qualified about 1500 nurses and midwives by the year 2020 using e-learning [36]. However in a Special report in 2013,Binagwaho et al.[71] stated that approximately 5000 nurses will have their qualifications upgraded from secondary- school level to 3 years of postsecondary school (registered nurses, or A1 level) by means of an online training platform. Improved clinical education including an online health-learning platform will connect district hospitals with university classrooms in Rwanda and in the United, and these specific time-limited targets are expected to be met by 2018.

The rapid upgrading of thousands of nurses from A2 to A1 requires a very different model. These are existing health workers who are required to upgrade their skills rapidly, and schools are expected to make this possible without a significant increase in faculty. The strategy proposed here reflects this unique situation, emphasizing the training of existing educators and introducing novel programs, such as e-learning, to allow for the continuing education of practicing professionals [36: 151]. E-learning program was structured to upgrade a big number of A2 nurses without leaving the gap in their working environment, thus having a time for face to face and online interaction with the teachers. From data source of this study e-learning was perceived e-learning as a flexible tool for widening access to Nursing and Midwifery education, irrespective of the age. From documents analysis and from the participants, e-learning was introduced as a way of giving chances nurses to upgrade their level of education without leaving their Job, and in the Process of Phasing out A2 (Nurses with Diploma level) to advanced diploma. E-learning platform came to support the initiative that had already started to phase out A2 level nursing schools, and to keep 5 Nursing Schools. A similar initiative of upgrading the level of enrolled nurses to registered nurses using distance learning has been reported in Tanzania on the initiative of Aga Khan Development Network. Diploma in Nursing Conversion, Enrolled Nurse to Registered Nurse (EN to RN): A diploma in nursing which has been offered in distance learning mode since 2006 in Tanzania aims to upgrade the knowledge and skills of Enrolled Nurses to the level of Registered Nurses [72]. Distance learning is offered at the main campus in Dar es Salaam as well as in Morogoro (at the Public Health Service Training Centre) and in Zanzibar (at the Aga Khan Development Network offices). Students follow modules covering general nursing skills and health-care practices through specially designed materials that allow for study at home and in the workplace, including audio-visual tutorials. Discussions with lecturers are also organised, along with clinical practicums that are supervised by qualified Registered Nurses [72].

Emerging data from various resources revealed that, e-learning is a flexible tool for widening access to Nursing and Midwifery education, irrespective of the age. From documents analysis and from the participants, e-learning was introduced as a way of giving chances nurses to upgrade their level of education without leaving their Job, and in the Process of Phasing out A2 (Nurses with Diploma level) to advanced diploma. E-learning platform came to support the initiative that had already started to phase out A2 level nursing schools, and to keep 5 Nursing. Nurses continue to work while studying, which gives them chances to study, work and care for their families. In a study conducted by McVeigh [56] on the factors influencing the utilisation of e-learning in post-registration nursing students, it was found that the flexibility of e-learning was the principal positively rated factor which supported evidence from much of the literature highlighting this as the most significant benefit. However positive comments made were qualified by the relationship with necessary skill needed to obtain the benefit. The link with level of literacy, confidence and perceived skill was also evident. If e-learning programmes are granted sufficient time for development by experienced and knowledgeable nurse educators, with additional technical and administrative support, these can be successful in educating and training nurses. Well-designed online programmes acknowledge prior learning and allow this to be built on by groups of participants sharing and pooling knowledge and experiences that can be brought back to the workplace. Not only can online programmes assist with the problem of nurse shortages by providing flexibility in learning, they can also support differences in learning styles and study time [73].

Hindrance to e-learning in selected campuses

It emerged from the data from various participants that resource constraints was a hindrance to utilisation of e-learning. Some participants reported: insufficient infrastructure, shortage of staff, work overload/ time constraint, poor motivation, financial problems, inaccessibility, internet/ website/ Moodle. It emerged from the data from various participants that resource constraints was a hindrance to utilization of e-learning. Some participants reported: insufficient infrastructure, shortage of staff, work overload/ time constraint, poor motivation, financial problems, inaccessibility, internet/ website/ Moodle. It emerged from data sources that there is insufficient infrastructure to accommodate both regular and big number e-learning students, such as the classrooms, poor library without sufficient online books, no expansions of the buildings such as ICT lab and skills laboratory, and no computer for all the students. From the field notes of the researcher, it was observed as

well that in most campuses where the study was conducted there were no expansions of the classrooms, library or ICT laboratory and skills laboratory. The results further indicated insufficient training of participants in ICT and language; lack of policies regarding the e-learning in nursing school, resistance to change from some educators and issues related to LMS design. The issues related to LMS design was seen in three campuses where this study was conducted. It emerged from the data collected on Moodle from three campuses were this study was conducted that there is lack of proper organization of Modules on Moodle. It is quite difficult to know which level a given module is taught, and the semester and even the weeks in which various units were covered. From Moodle analysis from the 3 campuses, the findings revealed that there is no Turnitin integrated in Moodle thus inability to check the Plagiarism, there are no ethical guidelines on how Moodle should be used for academic purpose, and there is no Moodle user guide document. From further analysis, it was found that the quality of forum discussion and chat was low. Log reports indicate overall a poor participation of students and teachers, some students have never login, some teachers, co-teachers, and campuses managers don't follow what teachers and students are posting online. Another observation from Moodle platform is that the majority of students who use it from the 3 campuses, open it to view what has been posted and very few interact with their teachers via this platform It was also note that there is no Integrate Adobe captive software to Moodle, nor Big Blue Button which would take MOODLE to another level. Due to ethical issues the screen capture is not presented for the issues highlighted above. The quantitative findings it was found that nurse educators and nursing students encountered challenges while using e-learning platform.

Quantitative results from this study corroborate with those challenges met by both nurse educators and nursing students which were reported in qualitative data. Nurse educators participants encountered challenges in using ICT in teaching and learning, the majority of nurse educators, 81.8% reported insufficient internet bandwidth or speed; 81.8% reported insufficient technical support for teachers; 81.8% reported insufficient pedagogical support for teachers; 81.8% reported lack of pedagogical models on how to use ICT for learning; 77.3% reported lack of adequate skills of teachers; 75.0% reported insufficient number of internet-connected computers; 75.0% reported pressure to prepare students for exams and tests; 72.7%(n=32) reported insufficient number of computers; 72.7% reported too difficult to integrate ICT use into the curriculum; 72.7%(n=32) reported school time organization (fixed lesson time, etc.); 70.5% reported lack of adequate content/material for teaching; 70.5% reported school space organization (classroom size and furniture, etc); 65.9% reported lack of content in national language; 65.9%reported most teachers not in favour of the use of ICT at school. These challenges were related to others constructs and Spearman's correlation was run to assess the relationship between the obstacles met by nurse educators to use ICT in teaching and learning and various constructs. There were significant relationship between the following constructs: Having been always lecturers in the country (r_s [44]= -.302, p= .046); working experience of the participants (r_s [44]= .368, p= .014); and the school shared vision about ICT use (r_s [44]= .438, p= .003). An overall score was calculated regarding the obstacles encountered by the nurse educators. Twenty items were considered and responses ranged from "not at all to a lot". The higher the score indicated the more participants encountered the challenges, and the lower the score is the less the participants encountered obstacles. The minimum score was 20 and the maximum score was 72.The mean score was 47.30 and the standard deviation was 14.08.The 1st quartile was 36.25; the 2nd quartile was 48.5, and the 3rd quartile was 59. These results indicated that the majority of nurse educators encountered obstacles while using ICT for Teaching and Learning.

Regarding nursing students, it was found that they encountered also a number of challenges while using Internet on campus. An average percentage, 63.0% reported a very slow internet connection (takes too long load pages), 35.2%reported a restricted access to certain networking sites; 22.5% reported very few internet connected computers; 21.1% reported very little training in the use of the internet facilities is offered to students. This is inline the findings from two ICT managers who participated in this study who indicated that internet speed is between 10mbps (excl.)–30mbps (incl.) which is slow and may limit the access to certain resources. These challenges encountered were related to a number of constructs related to e-learning. Thus a Pearson correlation was run to determine the relationship between constraints encountered by the students while using the Internet facilities on campus and other constructs. There were significant relationships with the following constructs: Campus (r=-.260, n=227, p< .000); Year of the study(r=-. 142, n=227, p= .032); Gender (r= -.159, n=227, p= .016); how nursing students know about electronic resources (r=.256, n=227, p< .000); Search engines used by nursing students (r= .233, n=227, p< .000); Social networking sites used by nursing students (r=.276, n=227, p< .000); settings of access to the Internet services by nursing students(r=.143, n=227, p= .031); perceived biggest problems in using internet by nursing students (r=.583, n=227, p< .000); and the perceived need for orientation in specific areas (r=.217, n=227, p= .001); perception on the content used in e-learning (r=-. 262, n=227, p< .000); perception on the delivery of courses used in e-learning r=-. 277, n=227, p< .000); perception on the services provided in e-learning (r=-. 263, n=227, p< .000); perception on the outcomes from e-learning (r= -. 228, n=227, p= .001); perception on the structure of e-learning (r=-. 225, n=227, p= .001); perception on the evaluation done in e-learning platform (r=-.218, n=227, p= .001); learning activities

performed in e-learning (r= .181, n=227, p=006), and overall perception of the nursing students on the use of e-learning (r= -.250, n=227, p< .000). These results indicated that the challenges encountered by nursing students were not isolated but connected to a number of other factors. This becomes imperative to assess every factor that might hinder the accessibility of internet on campus and act according. Nursing students also reported that there are a number of biggest problems they encountered. An average percentage, 58.6% reported encountering sites that want the participants to pay to access information; 49.8% reported sites that require participants to register with them; 30.4% reported that it takes too long to view/download pages; 30.4% reported sites that are not compatible with all browsers.

The literature indicate that there are issues, however surrounding the computer literacy, the information literacy and e-learning facilitation which are hindering the advancements of nursing students and nurses in general[6, 74-78]. Despite e-learning's high profile, e-learning is not straightforward and very often raises many issues[75]. According to Alkharang and Ghinea[79] there is a great necessity to meet the challenges posed by the development of information technology and its potential for greater access to knowledge [79]. Rhema and Miliszewska[80]; Kundi, Nawaz and Khan [26] state that in most developing countries, the use of ICTs and the implementation of e-learning are still in an early stage. However the literature reveals that the existing face-to-face learning paradigm is no longer the only educational paradigm due to the advent of e-learning that makes it possible to receive education without being restricted by time and space [81, 82]. With digital divide, language has become a barrier with globalisation, a phenomenon which turned the world into a global village, encourages educational interaction and collaboration amongst institutions even where great geographical distances separate them[83]. Globalisation, therefore, had a profound effect on developing the open and distance learning (ODL) system [84]. While South Africa remains the leader in the field of open and distance learning in Africa, the regions in the west, namely the francophone countries, are neglected because English is mostly the medium of instruction. In a study conducted by Roets and Maritz [83] it was found that the most challenging aspect that all students and the supervisor mentioned was the language barrier. Most studies on internationalisation and globalisation emphasise English proficiency by the parties involved as essential [85]. If the achievements are considered, it becomes evident that the affective and attitudinal aspects that motivate the students and supervisor (such as resilience and self-regulation) outweigh even the language problem. Even though it required more effort, innovative thinking, focus and commitment, the language problem could be breached by on-line translation support and the valuable support of an interpreter [83]. In a study conducted by Childs, Blenkinsopp [75]on effective e-learning for health professionals and students and barriers and their solutions, it was found that the managers/trainers agreed on barriers caused by requirement for change, poorly designed packages, inadequate technology, lack of skills, costs, need for a component of face-to-face teaching, time intensive nature of e-learning (though they were less concerned about trainers time issues), and need for standardization (though this was not mentioned by many respondents). The learners gave some agreement to the barriers caused by time issues, poorly designed packages, lack of face-to-face teaching, lack of skills, lack of support and costs.

While distance education holds promises, a number of obstacles have to be addressed before it can be fully utilized in Africa. There are a number of technological constraints that hinder distance education. Infrastructures outside of major cities remain inadequate. Connectivity beyond major capital cities poses a potential problem in creating a national distance education strategy. Another challenge is the lack of a trained cadre of professionals to support the implementation of distance education [86]. In a study conducted in Zimbabwe it was found that a majority of the lecturers (97.5%) facilitating Open Distance e-Learning Digitization have no experience in distance education [87]. Effective use of distance learning technologies demands that teaching staff be properly trained in using distance education as a delivery mode. To date, few African scholars are familiar with teaching in an online environment. This situation poses a major challenge in introducing distance education on the continent [87]. A National Education Association (NEA) survey in the United States reported that teaching staff members' top concern about distance education was that they would do more work for the same amount of pay, apparently a merited concern [86, 88]. The National Education Association (NEA) (2000) found that most teaching staff members do spend more time on their distance courses than they do on traditional courses, and 84% of them do not get a reduced workload. Similarly, 63% of distance teaching staff members receive no extra compensation for their distance courses [88].In a study conducted by Kisanga and Ireson[89] participants reported the problems related with infrastructure including inconsistent electrical power supply, insufficient Internet connectivity (bandwidth capacity) and inadequate computer laboratories and computers or the Internet is slow, there problem of power was reported as well.

It is argued that in order to minimise the resources constraints, Khan's Octagonal Framework that has eight dimensions would be helpful. These dimensions are: institutional, pedagogical, technological, interface design, evaluation, management, resource support, and ethical. All the dimensions presented in the framework are strongly interrelated and interdependent and represent issues that need to be addressed by educators who aim to plan a blended learning programme. Khan's framework serves as a guide to plan, develop, deliver, manage, and evaluate blended learning programs [90]. The original use of the phrase "blended learning" was often

associated with simply linking traditional classroom training to e-learning activities, such as asynchronous work (typically accessed by learners outside the class at their own time and pace). However, the term has evolved to encompass a much richer set of learning strategies or "dimensions." Today a blended learning program may combine one or more of the following dimensions, although many of these have over-lapping attributes [91].

Regarding the lack of policies which have been reported by participants in this study, Waterhouse and Rogers [92] state that it is necessary to have e-learning policies in the course syllabus; and student privacy. Recent trends and current policies guiding the direction of higher education indicate that effectively embedding an e-learning culture within its structure is an essential element to future educational development [56].According to Waterhouse and Rogers [92] virtually every academic course has a course syllabus that lists the course goals, sets a course schedule, identifies course texts and other required materials, and explains how to contact the instructor outside of scheduled class activities. Typically a course syllabus also sets forth general criteria used to administer the course, such as an attendance policy, and a grading policy that explains how student performance will be evaluated[92]. In any learning environment, students should have a clear understanding of what the instructor expects from them, as well as what they can expect from the instructor. This need is more urgent for e-learning students than for traditional students because e-learning activities typically technology-based and self-directed often occur in an environment where students may have difficulty getting timely answers to important questions[92]. Thus, instructors should anticipate their students' needs for clarity by posting detailed policy documents in a prominent section of the course site. These policies will help instructors as well as students, since they make managing an e-learning course much easier[92]. However Nyerere et al. [86] pointed out that the absence of clearly defined national distance education policies in most African countries poses another challenge. Policies are needed to provide a framework for the development of distance education. With the exception of South Africa, few African countries have clearly defined national policies to guide the development of distance education in their respective countries. The absence of such policies is a clear obstacle to the development of distance education[86]. For instance, there are challenges when it comes to learner support services as evidenced by a study carried out in Botswana which revealed that the greatest challenge facing the open distance e-learning tutors was the minimal learner support [86, 93].

As the findings from this study indicated a resistance to change by some nurse educators, similar findings from a study conducted in Tanzania by Kisanga and Ireson[89], it was found that Resistance to change was associated with fear of adopting new technologies, fear of exposing one's ignorance, poor mind-set, old age, subject discipline, low attitude towards e-learning and a perception that e-learning is an extra load. Respondents accounted comments from teachers such as "I already have enough on my workload, don't add unnecessary things" and "it is not necessary for me to know computers, only blackboard and chalk are enough to me to deliver materials" to be practical indications that there is a lack of e-learning knowledge to some teachers [89]. According to Nursing Times [94]There is an ideological dilemma between higher education's change in approach and the reality of what students and educators see as a responsibility to prepare them to provide safe patient care influenced their decisions over the use of technology. This is particularly because e-learning has been tailored and promoted as a tool to facilitate self-directed and autonomous learning. A number of nurse academics chose to continue teaching in a traditional didactic approach to appease student [94].

It emerged from the data collected on the Learning Management System which is Moodle in the context of the three campuses in Rwanda where this study was conducted that there is lack of proper organization of Modules on Moodle, and not all modules are online. It is quite difficult to know which level a given module is taught, and the semester and even the weeks in which various units were covered. From Moodle analysis from the 3 campuses, the findings revealed that there is no Turnitin integrated in Moodle thus inability to check the Plagiarism, there are no ethical guidelines on how Moodle should be used for academic purpose, and there is no Moodle user guide document. From further analysis, it was found that the quality of forum discussion and chat was low. Log reports indicate overall a poor participation of students and teachers, some students have never login, some teachers, co-teachers, and campuses managers don't follow what teachers and students are posting online. Another observation from Moodle platform is that the majority of students, who use e-learning from the 3 campuses, open it to view what has been posted and very few interact with their teachers via this platform. It was also note that there is no Integrate Adobe captive software to Moodle, or Big Blue Button which would take MOODLE to another level.

Similarly to the findings from this In a study conducted by Nyandara[95] it was found that till March 2011, most of the courses at Open University of Tanzania were not uploaded in the Moodle, implying that there is minimal use of Moodle at the Open University of Tanzania for teaching and learning. Almost the same idea was observed by Maro[96] that even though computers are not enough, instructors use internet for general browsing, electronic mail, research and for e-material development, and not for teaching students via learning management system and voice over internet protocol, although some instructors give electronic reference to students. This is surprising because apart from incentives and rewards outlined in some guiding documents, for the innovative and effective use of educational technology like extra pay for the course developed and uploaded

into Moodle, still the practice is not satisfactory [95].In his study on Moodle and Traditional Teaching Jabłonowski[97] argues that as the world is changing faster also teaching has to undergo some modifications. The main problem with changing teaching practices is that results of amendments in this area are difficult to compare, because they usually can be seen and assess after few (or more) years and they may influence in various ways people who were taught with new tools or methods. Therefore all these changes has to be made very carefully and with highest responsibility[97]. On the other hand it is necessary to look for new, more effective and better suited for today's demands ways of teaching. Therefore it seems to be extremely important to disseminate experiences with various successful approaches to improving teaching quality. Adopting new tools is certainly important and promising way in that direction. We only have to assure that the new tools are used not just because they are new but because they are really useful [97]. According to FAO [98] a number of organizations and educational institutions use learning platforms to deliver and manage their learning processes. A learning platform is a set of interactive online services that provide learners with access to information, tools and resources to support educational delivery and management through the Internet. There are a variety of learning platforms with different levels of complexity, but their most important features include: learning content management, creation, storage, access to resources, curriculum mapping and planning, lesson planning, personalized learning experience, assessment, learner engagement and management learner information, progress tracking, tools and services forums, messaging system, blogs, and group discussions [98]. FAO [98] denotes that the use of Moodle promotes a collaborative approach. It was originally made for education, training and development environments to help educators create online courses with a focus on interaction and collaboration, although lately it has been extended to business settings as well. Moodle has more than one million users and almost 50 000 registered sites around the world. Numerous modules extend its functionalities (e.g. graphical themes, authentication and enrolment methods, games and activities and resources). Moodle runs without modification on Unix, Windows, MacOS and many other systems that support PHP scripting language and a database compliant with SCORM and AICC standards. A learning management system (LMS) such as Moodle, are solutions to facilitate delivery and management of all learning offerings, including online, virtual classroom and instructor-led courses. It automates the learning course and easily delivers training, manages learners and keeps track of their progress and performance across training activities, which reduces administrative overhead [98]. According to Snowball, Silvey and Do [99] teaching transitioning students about academic integrity and enabling them to find their authorial voice is a prime concern to educators in the higher education sector. Increasingly the text matching software Turnitin has become the platform of choice to detect plagiarism and assist universities to uphold their academic honesty policies. Learning writing skills and understanding academic integrity is a challenge for many transitioning students, particularly second language and alternate pathway students [99].

VI.   Integration and Conclusion of the Findings

To reiterate the aim of this study were to analyse the utilisation of e-learning platform in selected school, in Rwanda. Both quantitative and qualitative data were collected, analysed, presented and discussed. The qualitative data were dominating, and were rich in information due to possibility of probing during the interviews and focus group discussion, as the final outcome would be to develop a middle range theory that would guide, and enhance a better utilisation of e-learning platform. The results presented were preliminary data from cycle one as an action research was used in this study. From analysis and discussion of results, it was found that both quantitative and qualitative corroborated on the benefits and challenges on using e-learning in selected school in Rwanda. It was apparent that the benefits of using e-learning from participants that e-learning came as a solution to rapidly update the lower level of nurses (A2: diploma) to more competent and skilful nurses (A1: advanced diploma). To achieve that, it was found that a new innovative approach was needed, and e-learning was introduced in selected nursing schools. The benefits of e-learning reported by the participants in education of nurses in particular in the context of Rwanda included (1) e-learning promoting student centered approach; (2) e-learning is a blended learning, and (3) e-learning as tool for track production of nursing workforce taking into consideration the history of Rwanda. The types of teaching and learning activities reported by the participants indicated that they were putting the students at the centre of their learning, and teachers using active teaching strategies, be it online or face to face, and while students taking the learning into their hands as they reported by using resources from ICT tools in particular MOODLE being the Learning Management System at the centre. The majority of nurses in Rwanda still have a low level of education; through the training of A2 nurses stopped they are working in the health sector. The e-learning was one of efforts of Government of Rwanda, to upgrade the level of nurses, thus increasing the quality provided to the clients as it emerged from the findings of this study.

Although a number of benefits have been highlighted, both quantitative and qualitative data revealed a number of hindrances to the effective implementation of e-learning in nursing schools. Participants reported the challenges such as insufficient infrastructure, shortage of staff, work overload/ time constraint, poor motivation,

financial problems, inaccessibility of internet/ website/ Moodle. The results further indicated insufficient training of participants in ICT and language barrier; lack of policies regarding the e-learning in nursing school, resistance to change from some educators and issues related to LMS design. The issues related to LMS design was seen in three campuses where this study was conducted as the researcher was granted access to Moodle. In particular, it was noted that the Learning Management System which is Moodle in the context of the three campuses in Rwanda where this study was conducted that there is lack of proper organization of Modules on Moodle, and not all modules are online. It is quite difficult to know which level a given module is taught, and the semester and even the weeks in which various units were covered. From Moodle analysis from the 3 campuses, the findings revealed that there is no Turnitin integrated in Moodle thus inability to check the Plagiarism; there are no ethical guidelines on how Moodle should be used for academic purpose. From further analysis, it was found that the quality of forum discussion and chat was low participations of the students was quite low in a number of modules, and nurses educators/ managers not following properly what is being done on the platform as it can be seen from logs and activity reports generated by Moodle.

E-Learning remains a new frontier for many nursing students, nurse educators. When compared to the traditional classroom, E-Learning requires the talents of many team members from a variety of departments as well as the use of different teaching and learning strategies, thus a proper training and orientations is recommended before they start e-learning system, ideally in on a continuous basis. The findings from this study reveal that the benefits of e-learning in the selected school are positively apprehended; however facilitation of e-learning is still face some challenges due a variety of challenges reported above. It is imperative to note that the success of e-learning depends not only on the availability of technology, but also heavily on the pedagogical design. The future of e-learning in educations nursing in Rwanda depends highly on its perceived usefulness by all stakeholders, and expansions of infrastructures.

Acknowledgment

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