

Status of Usage of Information Communications Technology by Academic Staff at a Selected Nursing Training Institution in South Africa

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ABSTRACT Advances in information technology has impacted every sphere of human life including the training of health care professionals and the delivery of health care. Training institutions have addressed the need to incorporate information communications technology into all spheres of student life and service in varying degrees. This study sought to determine the status of usage of information communications technology by academic staff in a selected nurse training college in South Africa. The college offers training for nurses at eleven campuses located in urban and rural areas. A cross sectional survey allowed access to administer questionnaires to 95 academic staff at the selected institution. The results show that the majority of academics at rural (86%) and urban (96%) campuses had access to a desktop computer and printer. They also used personal cellphones to communicate with students and colleagues using Facebook (15-20%) and SMS (43 -58%). Staff had limited access to internet service or to electronic systems for student administration or research (<10%). Despite advances in information communications technology usage in nursing

education in several parts of the world, challenges exist in adopting it in the selected training institution.

INTRODUCTION

The global village has become a reality (McLuhan and Fiore 1967). Learners are able to access learning material anywhere and academics able to share intellectual content at any time. Information communication technologies (ICT) and E-learning have been embraced by South African universities since the 1990's (Ravjee 2007). This has promoted debates and practices which have taken access, student administration and monitoring and learning pedagogies to a different level. Despite the enthusiastic uptake of ICT to promote effective, efficient and instantaneous communication, a digital divide exists. The latter which impacts on participation may be attributed to, but not limited to institutional policies, resources, comfort in traditional practices and possibly a resistance to change (Ravjee 2007). Education paradigms have shifted to include more effective and efficient strategies namely online learning, blended learning, hybrid and collaborative models (Johnson et al. 2014). In South Africa, it is not clear whether the nursing colleges have kept abreast of utilizing ICT to the same extent as Universities.

In South Africa, Nurse training is offered at Universities and Colleges. Worldwide, the use of ICT in nurse training is not consistent. Button et al. (2013) reviewed 28 studies and noted that three themes, namely issues relating to pedagogy, workload and staff development in E-learning and associated technology as stumbling blocks to the adoption and use of E learning. As Phaneuf (2009) aptly states that while students in nursing are comfortable in using technology platforms for leisure and personal activities, nursing educators display limited abilities to incorporate IT into their classrooms and offices. If nurse educators do not adapt pedagogy to ensure stimulation of the internet generation inside or outside the classroom, student learning will be thwarted by boredom (Phaneuf 2009). In addition the inevitable assimilation of technology into the South African Health care systems will demand that nurses are equipped with the necessary skills and attributes to cope in the clinical environment. Real world experiences prepare graduates with the correct attributes required by employers.

Agile start up models are believed to use technology as a catalyst for promoting a culture of innovation in a widespread and cost effective manner (Johnson et al. 2014). Faculty training and digital media literacy (Johnson et al. 2014) promote the ability to use ICT to find,

evaluate, create, and communicate information. With the move to a paperless environment and increased reliance on technology, health care facilities in South Africa will seek health care personnel who are able to cope in such environments with minimal training. To meet this requirement, training of nurses and other health care professionals must keep abreast of technologically driven pedagogical strategies and administrative systems.

The college of nursing selected for participation in this study offers a three year Diploma in nursing, a programme which has been replaced by four year degrees at universities, in the province. Nurses who graduate with the college diploma take up positions in the health sector on the same level as those graduating with degrees. Nursing and other health sciences education at the Universities are increasing incorporating ICT to improve teaching pedagogies, student administration and support and research in an effort to ensure that graduates enter the work place with the necessary attributes.. The purpose of the current study was to determine the status of usage of ICT by academic staff at one large nursing college in in the selected province in South Africa.

METHODS

A cross sectional survey using questionnaires, was conducted on academic staff at the selected public college of nursing in one province in South Africa. The college has eleven campuses distributed in the northern and southern regions of the province. Approximately 50% of the academic staff from each of the eleven campuses of the college was randomly sampled. From the 326 academic staff, 176 were invited to participate in the study. About 55% of the staff were from the six rural campuses. The numbers of staff servicing the eleven campuses ranged from 20 to 40 with a mean and SD of 29 ± 3 . The academic staff included the Principal, Heads of Departments, and lecturers.

The questionnaire comprised of 27 closed ended and open ended questions which were categorized according to the specific themes raised in the aims of the study. The themes included the demographic profile of the participants, access to ICT, usage of ICT, computer literacy, support related to ICT, teaching, learning and communication strategies using ICT and views on the status of ICT in the college in relation to other higher education institutions. The questionnaire was validated using an expert group and a pilot study. Following minor revision of the questionnaire, Institutional Research Ethics approval and permission to access academic staff was obtained from the relevant authorities. All participants gave their informed consents prior to participation. The questionnaires were mailed to the campuses, by inter-campus mail or hand delivered by the researcher. The data were analysed using the

SPSS version 22. The Chi square test and Pearson's Correlation Coefficients determined relationships between variables. A 95% confidence level was set.

RESULTS

The response rate was 80%. Of the eleven campuses that participated in the study, six were located in rural areas with 55% of the 176 respondents from these campuses. A significant proportion of the respondents were female (96%, $p < 0.05$) and 55% of the total taught in rural campuses. About 89% of the respondents ranged in age from 41-60, $p < 0.05$). The remaining nurses were younger than 40.

Access to computers

The majority of the respondents had access to a desktop computer, photocopying and printing facilities (Table 1). Most of the staff did not have access to the other necessary office devices. Respondents in urban campuses reported more access to devices that should be routinely available to academic staff. Significantly more respondents in rural campuses had access to on-line facilities via the tablet.

Computer literacy

A significant proportion of the respondents (70%) could manage some computer operations. Only 14 % were competent in using all work related computer packages and three percent had a high level of computer literacy. The remaining staff either was unable or had minimal ability to use computers. Only 66% of the respondents indicated that they had access to computer training,

Frequency of usage of computers by academic staff members

The majority of the respondents, 95% and 78% from urban and rural campuses respectively used the computer daily at work. About seven percent of academic staff from rural campuses never used a computer at work whereas all participants from urban campuses use a computer at work.

Overall less than 50% of all respondents have online access (Table 2). This limits their ability to access required information that affects the delivery of their programmes. Less than a third of respondents indicated that they have online access to changes to course rules and regulations, and student information. Significantly more urban academics indicated that they have more on-line access to relevant updates affecting nurse training ($p = .016$).

Academic staff reported having access to internal search facilities, external search facilities, and access to off campus search facilities at 62% ($p = .007$), 36% ($p = .0005$.) and 14%

($p=.0005$.) respectively. Significantly more urban participants 44% ($p=0.44$) reported having access to external search facilities, compared to 29% in rural campuses.

Usage of the online library

Figure 1 shows that a significantly higher proportion of urban participants (49%) reported that they accessed the on-line library on a daily, weekly and monthly basis, as compared to rural participants (27%). A significant proportion of the rural participants did not access the on-line library at all, had no access, or did not know about the facility (61%).

IT Support

Respondents from all campuses felt that neither the ICT Help Desk nor the budget for upgrading ICT systems at their campus met their needs.

Communication using social media

Respondents from both the rural and urban campuses indicated that SMS, followed by emails, and face book serve as useful means of communication with colleagues and students. Fifty eight percent of respondents from rural campuses, and 43% from urban campuses rated having access to SMS as extremely useful. Some academic staff, 31% and 43 % of rural and 43% of urban respondents respectively, rated the email as an extremely useful tool, for communicating with students, while 15% of rural respondents and 23% of urban indicated that face book are extremely useful. Respondents from both rural and urban campuses did not think that twitter and blogging were important communication systems with a combined 16% rating for twitter and 12% rating blogging as an essential communication tool.

Online student management systems

As shown in Table 3, less than 10% of the respondents had access to an ICT system to perform key subject support functions. However participants rated it important to have access to all the online systems for student support. About 92% of respondents could not track student academic progress using an ICT tool because it was not available to them. About four fifths of the respondents indicated that there is no system for the announcement of clinical and programme updates, which is a critical aspect of any educational programme. There was no significant difference between the responses from rural and urban campuses.

Teaching Methods Utilised

The majority of respondents (60%) do not use ICT to teach their subjects. For those that used it for teaching, the majority use videos and simulations. About 40% used PowerPoint, A significant ($p\leq.001$) number of respondents stated that they needed assistance in order to be able to utilise the different teaching methodologies. using ICT (Fig. 2).

Views on status at other Higher Education institutions compared to own

A significant 82 % of participants felt that the college at which they worked lagged behind in terms of ICT. Fifteen percent (n=51) of respondents indicated that they were not aware of what goes on at other institutions. Respondents further stressed that their limited use of ICT was not sufficiently supported. It was further stated that computer training was vital to them in performing their academic functions effectively.

DISCUSSION

The response rate was good providing an opportunity to use the data to motivate for ICT resources in the selected nursing college.

Access to Desk Top Computers

The finding of good access to desktop computers by academic staff regardless of setting may suggest that there has been progress by the college towards increasing the use of computers, by the academic staff. The findings of this study, builds on the study by Asah (2011) which found that the selected college of nursing does not have sufficient computers. The divide in the access to computers between urban and rural campuses as indicated in (Table 1) may reflect on the usage of computers by these academics (Figs. 1 - 2).

Asah (2011), Hassler et al. (2011), and Hennessy et al. (2010) believe that access to ICT has a direct bearing on the perceived usefulness of the technology. If there is no access or inadequate access, this will affect the ability to use the technology. The inadequate access to computers by academics employed in rural campuses of the college may have negatively affected their ability to utilize the technology, resulting in lower levels of usage (Fig. 2). This finding is supported by Tagoe (2012), and Fall (2007) who argue that the divide between access in the rural as compared to the urban areas can affect the usability.

Access to computer training

The low levels of access of academic staff to computer training may reflect on the usage of electronic teaching and learning strategies (Fig. 2). Several investigators in this area (Barnard et al. 2005; Bradshaw and Lowenstein 2007; George et al. 2010;) believe that it is important to promote computer literacy and incorporate the use of technology, in nursing education to ensure conformity with other education sectors. Nursing academics need to be updated in terms of the latest technology and computer techniques, in order for them to be able to incorporate this into the learning/teaching environment. Nkosi et al. (2011) found that computer literacy is an essential variable which allows for ease of use of learning and teaching technologies. Ignorance on developments in educational technology would affect one's attitude to use and affect the actual use of such technologies. The changing landscape

of healthcare makes the inclusion of electronic technologies in education very important (Dzidonu 2010). Dzidonu (2010) found that the majority of African educational institutions have not invested in the training of their staff, or in developing and delivering teaching electronically is consistent with the findings in this study. This is in keeping with the findings of the literature review by Button et al. (2013) who noted that issues relating to pedagogy, workload and staff development in E-learning and associated technology were stumbling blocks to the adoption and use of E-learning.

Asah (2011), and Bemridge et al. (2010) concluded that nursing and health care is not exempt from the information technology explosion globally. This necessitates nurse educators, to balance the move to incorporate information technology in their teaching, in order for this to impact positively on healthcare. In a country with scarce nursing resources it is vital for nurse educators to adopt the most efficient and effective strategies to bring learning to students, similar to strategies adopted in the Philippines almost a 15 years ago (Mumtaz 2000).

Fetter (2009) supports the fact that information technology skills are vital for professional development and advancement in nursing and this will translate into improved care, access, quality and cost effectiveness. In order for nursing in South Africa to keep up with these changes and developments, nurse educators, including those at the college surveyed will have to be at the forefront of developments in ICT technology and its applications.

Level of Computer Literacy

The fact that the majority of respondents in the academic group can manage only some computer operations relates to their poor utilization of electronic and information technology in teaching (Fig. 2), and the need for specialized training in the usage of this technology. Ndlovu (2012) and Hennessy et al. (2010) concur with this finding, and maintain that training in ICT must match the strategies to be utilized in order for it to be effective. This should be supported by ongoing training based on developments in the field and continuously reinforced by support (Du Plessis and Webber 2012; Hennessy et al. 2010). Globally nurse educators are embracing the use of technology in their learning environments and integrating various technologies on an increasing basis to promote learning (Johnson et al. 2014). Techniques such as E-learning and simulations are some teaching strategies which require specialized knowledge, skills, support and training to promote application (Button et al. 2013; Jeffries 2005).

The trend of an increasing use of ICT in the educational environment (Hegney et al. 2007; Royal College of Nursing 2012) highlights the shift in nursing and nursing education practices. In order for the academic staff of the selected nursing college, to be on par with

academics in other higher education settings it is important for them to receive training that will enhance their skills and knowledge in ICT. Surry et al. (2010) emphasizes the importance of faculties to develop faculty members to keep up with the trend in higher education pedagogies.

Access to necessary office equipment

The lack of access of academic staff to necessary office equipment which is linked to an ICT system (Table 1) may reflect on the usage of the online facilities for example the library (Fig. 1) and e-learning (Fig. 2). This is consistent with the views of policy makers in the health sector, who have also realized that the basic tools necessary for learning, teaching and administration in nursing educational institutions are lacking, and there is a need to strengthen this. Surry et al. (2010) have suggested the need for proper planning to identify the technology needs of individual institutions to ensure optimal learning.

Globally, higher educational institutions utilize online libraries (Eke 2010). Academic staff in the current study either did not know about or rarely accessed the library. The low levels of access to communication and search facilities by academic staff may have had an effect on the academic staff accessing the online library system of the Department of Health, (Fig. 1). The limited access to external search facilities may have an effect on the research and information retrieval capability of academic staff to support research and teaching. It is clear that access precedes and is a necessary prerequisite for usage (Asah 2011; Hassler et al. 2011; Hennessy et al. 2010). Bhukuvhani et al. (2012) found a positive correlation between library information literacy training and the increased use of web resources. The importance of access to up to date and relevant information has been recognized by higher education institutions globally, and in South Africa. This has necessitated academic staff having access to the internet, in order for them to be able to have access to information and to promote research within their institutions (Balasubramanian et al. 2009; Moll et al. 2007). The usefulness of the web, has also been by recognized by Naude et al. (2010), whose study has revealed that over 90% of the respondents use the web at least weekly for academic and research purposes. Villanueva et al. (2010) found that 65% of the nurses reported that access to the internet was beneficial to them in terms of patient care. Casal (2007) also supports the view that the spread of information through different means such as online training or online discussions for sharing current medical information, new approaches in medical information and patient care, and current medical research can be useful for students and researchers.

Support for use of Technology

The lack of ICT support received by the academic staff in this study may reflect on their ability to adopt the latest trends, in respect of teaching (Fig. 2) and assessment strategies that are being adopted at higher education institutions. Wilmer (2007) believes that there is a need for continued support linked to the rapid development and use of ICT for educational and health care purposes. The need for technical support is recognized by Casal (2007) and Johnson et al. (2014) who highlight the fact that barriers still hinder the spread of ICTs usage in Africa and the rest of the world respectively. These problems are associated with the adoption of new technologies and are often connected with the scarce technical capabilities of users. Higher education institutions are using technology to change the traditional way that assessments are conducted and are making use of computer adaptive tests which are deemed to be more effective (Surry et al. 2010)

Social media and Communication systems

The majority of respondents would prefer SMS as a means of communication with their students. This finding is consistent with statistics on cell phone ownership by university students in South Africa and in America, which makes using this technology a viable option for students. Cassidy et al. (2011) found that cell phone ownership at the Sam Houston University in East Texas was 98.8%. In South Africa Moll et al. (2007) found that compared to the 10% of university students who had internet access, more than 90% had cell phones. This made cell phone communication amongst university students in South Africa high. These findings support the use of SMS, as a means of communication between the students and academic staff as a means of engagement for both academic and administrative purposes when institutional facilities are not up to date. This selected college of nursing lags behind despite the rapid shift to the usage of ICT in South African institutions of higher education.

ICT in student support functions

Electronic systems to support key student functions, which include the tracking of academic progress of students, are deficient according to the respondents. (Table 3). This finding is in keeping with Merzuki and Latif (2009), and Kyobe (2009) who reported that “it is time for the higher education institutions to focus on systematic handling of information to support academic staff advancement programs”, which should be designed to take into account the entire record and information life cycle starting from the inputs until the archival stages. Electronic management systems according to Kemoni (2009) are absent in most public sector organizations in Africa. The findings are however contrary to Kyobe (2009) who found that South Africa however has much better systems in place in the public sector than the rest of

Africa. Mavodza and Ngulube (2012) found that it is important for students and academics to manage electronic records effectively, as this could lead to efficiency and growth of that organization.

TEACHING METHODS

The use of technology in teaching and learning at the selected college of nursing is inadequate (Fig. 2). This may reflect the lack of access, training and support in ICT to these academic staff. Surry et al. (2010) reported that instructors were not able to integrate technology into their course due to the fact that their own skills were not strong enough to integrate technologies effectively. Bloomfield (2013) and Brown et al. (2009) believe that there is a need to relook at teaching strategies in order to prepare nurses to render safe patient care. Surry et al. (2010) agree that clinical education needs a major overhaul and has not kept up with the pace of changing health expectations. There should be a focus on improving quality, or new technologies should be used.

The assistance that is requested by the respondents to utilize technologically driven teaching methods indicates that the respondents are aware of the need for electronically driven pedagogies and that they are keen to incorporate these methods into their teaching. Several investigators (Khalaila 2014; Robinson and Dearmon 2013; Skiba et al. 2008; Jeffries 2005) agree on the benefits of using technology to enhance teaching. Simulations are viewed as an appropriate method for meeting the training needs of nursing students at the selected college. The changes may be reflected in the clinical environment which is becoming more technologically advanced, and also needs the graduating nurse to be able to function in this environment. Anecdotal evidence of this is the Inkosi Albert Luthuli Central Hospital in Durban, in KwaZulu-Natal, which functions as a paperless environment, and uses technology on a very advanced level, in order to maintain this paperless environment. This requires nurses functioning at this institution to be optimal in the use of these technologies. The pace of development in using technology is increasing so rapidly, and can be seen in the developments at Rietvlei hospital, a deep rural hospital in KwaZulu-Natal, which is also developing a paperless hospital system (www.kznhealth.gov.za). This suggests that academic institutions responsible for the training of nurses must ensure that their training programs are relevant to the needs of the health care system.

CONCLUSION

The findings of this study suggest that academic staff at the selected college of nursing is disadvantaged in terms of access to, training and support in ICT. This has impacted on their usage of ICT in pedagogical activities, student administration and communication and research. The use of personal ICT technologies, have however allowed communication with students. Staff at rural campuses is more disadvantaged compared to their urban counterparts

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Tables

Table 1: Response regarding access to ICT devices

Equipment	Urban % (n= 80)	Rural % (n=96)	p-Value¹
Desk top computer	96	86	.024
Lap top computer	35	17	<.001
Data projector	50	25	=.001
Photocopier	69	64	<.001
Scanner	56	29	<.001
Printer	71	68	<.001
Electronic library	45	20	<.001
On line Access			
Computer	75	67.7	<.001
Laptop	53.8	41.7	<.001
Cell phone	40	41.7	
Tablet	1.3	9.4	<.020

¹ p values show differences between urban and rural responses

Table 2: Access to online information: urban versus rural campuses

Information	Urban%	Rural %	Mean %
Policies	52.5	47.5	50.6
Procedures	36.3	41.7	39.2
Student information	26.3	33.3	30.1
Relevant updates affecting nurse training	51.3	33.3	41.5
Changes to course rules and regulation	26.3	31.3	29

Table 3: Responses to the availability of online student management tools

On-line System	Urban (%)	Rural (%)	Total (%)
On-line submissions of assignments	2 (2)	1 (1)	3 (1.7)
On-line testing of students	0(0)	1 (1)	1 (0.6)
Application for exam re-marks	8 (8)	7 (10)	15 (8.5)
Application for special examinations	7 (7)	8 (10)	15 (8.5)
Announcement of events of the college	19 (20)	20 (25)	39(22.2)
Announcements of Achievements of the college	9 (9)	11 (14)	20(11.4)
Announcement of clinical and educational updates	12 (13)	18 (23)	30(18.2)
Tracking of Academic Progress	6 (6)	8 (10)	14(8.0)

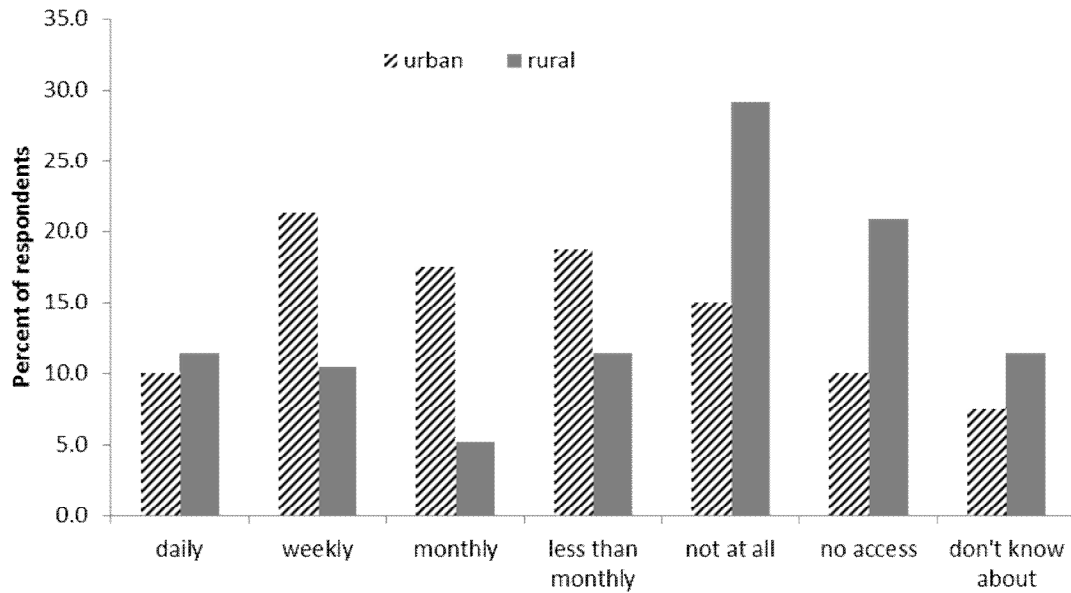


Figure 1: Proportion of respondents using the online library in urban and rural campuses

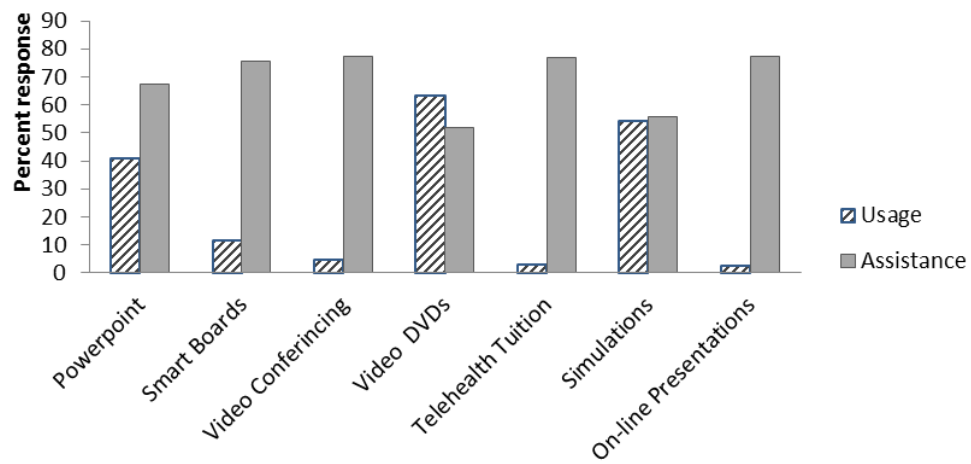


Figure 2: Responses regarding teaching methods utilised versus assistance required