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E-LEARNING INITIATIVES IN DELIVERING THE UNDERGRADUATE PHYSIOTHERAPY EDUCATION PROGRAM IN PAPUA NEW GUINEA

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Abstract

Formal medical and health care education or training in Papua New Guinea is provided by two universities and various colleges in the country. Divine Word University (DWU) is one of the tertiary educational institutes, where the modern technological systems are used for teaching and learning purposes. To add the university library is equipped with electronic databases and online resources which are aimed to provide high standards of education. In the virtue of establishing green university, DWU has initiated the paperless environment to provide an avenue to encourage the use of electronic media. eLearning educational environment was established with the resources such as laptops, overhead projector, simulation and multimedia rooms with internet access. The Blended learning approach was also integrated in teaching and learning practices. Therefore, the uses of electronic resources have allowed accessing information in the global context and adapting it to local practice. Hence, this article aims to describe the utilization of the information communications technology and e-resources, with the emphasis of such practice in physiotherapy teaching and learning methodologies at DWU, the only university to train physiotherapists.

Keywords: eLearning; Allied Health; Developing Countries; Tertiary Education; Technology; Teaching

1. Introduction

The use of Information and Communication Technology (ICT) has become embedded into everyday life as well as reshaping the world of higher education (Gumport & Chun, 1999). Currently, ICT has taken a prime role in teaching and learning methodologies, where the use of modern electronic devices (Ualesi et al., 2014) has rapidly increased in the tertiary educational systems. The current generation of students are referred to as 'Digital Natives' as they are growing up with the internet as a tool whilst, those who learn to adapt to these newer technologies are called 'Digital Immigrants' (Prensky, 2001; Günther, 2007). The modern theory of technology has been considered to impact higher education in the three major fields being: the nature of knowledge, the process of teaching and learning and the social organization of teaching and learning (Gumport & Chun, 1999).

Technologies such as books, pens, paper, projectors, radio and television were used in education, whereas the latest technologies are computing and the internet, which are typically referred to as eLearning (Ellaway & Masters, 2008). eLearning is a concept, which includes teaching and learning methodologies through digital media, Compact Disc (CD) or Digital

Versatile Disc (DVD) – ROMs (Read-Only Memory), web based learning and interaction through text, graphics, video and three dimensional animations (Keller & Cernerud, 2002). eLearning increases access to educational programs and addresses the shortage of health workers globally and it is considered to be an application and integration of education technology to the learning process (Al-Shorbaji et al., 2015). In recent years, televisions and radios (Takalani, 2008), DVDs, and high technological levels of video conferencing facilities were supported by simulation and online applications, that boost the students' motivation to interact with eLearning (Ualesi et al., 2014).

In recent years, eLearning evolved as a part of mainstream medical education (Masters & Ellaway, 2008), however, network connectivity and bandwidth are major challenges for both developed and developing countries (Andersson, 2008; Al-Shorbaji et al., 2015). Developed countries have constructed the medical education system with the aim of delivering quality education and ultimately health services (Houshyari et al., 2012). Nevertheless, it is reported that the effectiveness of eLearning in low and middle income countries lacks adequate evidence (Bediang et al., 2013). The United Nations and World Health Organization (WHO) have recognized the use of ICT as a key element to addressing the health care education in developing countries (Al-Shorbaji et al., 2015).

The WHO has reported that the scope of eLearning for an undergraduate health professionals education can be classified into five broad categories which include non-networked computer based eLearning, Internet and local area network-based eLearning, psychomotor skills trainer, virtual reality environments and digital game based learning (Al-Shorbaji et al., 2015). The ICT provides health care professionals to possess adequate and up to date skills and knowledge to provide a quality care for the patients, thus the health care students need to be provided with ICT skills training (Karsenti & Charlin, 2008; Houshyari et al., 2012) to access information globally during the under graduation. Masters and Ellaway (2008) have stated in their study that the educators have had to develop confidence and literacy in how eLearning can be implemented and the use of technology in education requires creativity and adaptability (Ellaway & Masters, 2008). Hence, this article focuses on the use of ICT and the electronic resources by the academic staff and students in undergraduate physiotherapy education program at Divine Word University (DWU).

2. ICT and medical education in Papua New Guinea

Literature on online education methodologies and the use of digital media dates back to the 1980s and were mainly used in distance education (Keller & Cernerud, 2002). The use of offline digital media (for example CD-ROM) for education in Papua New Guinea (PNG) has been recorded since 1980s at University of Papua New Guinea (UPNG) and the University of Technology (Wright, 1990).

Papua New Guinea is one of the developing Pacific island countries, where the medical education programs were started in 1961 at the Papuan Medical College and later incorporated with the Faculty of Health Sciences (FHS) at UPNG in 1965. PNG was the first amongst the South Pacific nations to establish a medical program and later, in 1974, the College of Allied Health Sciences (CAHS) was started and affiliated with the FHS (Sapuri, 1999) and it was in April 2002 the CAHS amalgamated with the DWU.

DWU is one of six universities within PNG, and has recent technological systems to assist academics and students in transferring, promoting and enabling good quality higher education teaching and learning. The university aimed to protect the environment by adapting paperless university where the community will tend to reduce the use of paper. Henceforth, it allows the

academics and students to spend more of their time with computers for researching via the World Wide Web (www) as well as for learning, preparing assignments and presentations. The university comprises of four faculties amongst them is the Faculty of Medicine and Health Sciences (FMHS) [formerly, known as Faculty of Health Sciences] offers Bachelor degree in Health Extension (officers), who are allied health workers, with administrative and basic clinical training (Kevau et al., 2004), Environment Health (officers), Health Management (officers) and Physiotherapy programs.

3. eLearning environment in DWU

DWU was established in 1996, in which the ICT resources were limited with desktop computers for academic staff and computer laboratory for the students. Eventually, the desktop computers were replaced by laptops and in 2010, the university initiated one laptop per student policy, which was the first of its kind in the Pacific (Pacific Islands Report, 2010). The provision of personal laptops for staff and students was aimed to promote independent learning, personal and professional development, thus, following the growing trend of other education systems (Czuba, 2010). Bediang et al. (2013) has referred that eLearning methods are found to improve the value of teaching and learning, and therefore academics and students in DWU were encouraged to use the electronic platform, besides the use of traditional teaching methods.

The Online and eLearning at DWU is facilitated by implementing the Open-Source course management system Moodle (*Modular Object Oriented Dynamic Learning Environment*) since 2008. Moodle supports the major formats of modern eLearning technologies including podcasts, videos and electronic document management. The university ensures that at the start of the academic year, academic staff and students of every department/faculty receive adequate training on the use of Moodle. A training manual for the use of Moodle was developed for the sustainable use of the eLearning systems. The university has developed a policy on Online Learning and established an advisory committee on eLearning and eTeaching to enhance the virtual learning environment (Divine Word University, 2015).

In general, educational software has also enabled the interaction of learner – content, learner – instructor, learner – learner and learner interface as described in earlier studies (Ellis et al., 2009). Thus, the use of Managed learning environment such as Moodle in DWU has provided an opportunity to support, facilitate and enhance interaction between academics and students improving the teaching and learning processes (Daniel, 2014).

Enrolment at DWU includes a mixed group of students from rural and urban regions of various provinces with a majority from rural areas of PNG and these students would have none or only little knowledge in computers and its application. Due to this fact, there is high possibility that majority of students are exposed to computers for the first time at university which was similarly found in the study by Keller and Cernerud (2002). Hence, computer skills training has to be provided during the first semester of year one university education (Bediang et al., 2013). Therefore, a unit (subject) was designed on End User Computing, which is being delivered across the faculties to prepare the students to cope with the use of ICT. In addition, like other countries, (Virtanen & Nieminen, 2002) email access is provided to each staff member and student for effective communication. Communication is strengthened by email, for “anywhere anytime” contact between the students and the faculty (Gumport & Chun, 1999).

The university has a well-established collection of text and references in the Friendship library in which there are about more than 40,000 volumes of books, journals, periodicals and magazines (Rothlisberger, 2008). The print-based resources are inadequate to supply the needs of staff and students, therefore, the electronic databases in the library allow access to an

immense collection of eBooks and journal articles. The electronic database in the library includes HINARI (Health Inter-Network Access to Research Initiative) – Access to Research in Health Programme, which is provided by World Health Organisation for low and middle income countries to access literature from major databases such as, Scopus (Elsevier), Informit Health Care, Global Health Archive and Cumulative Index for Nursing and Allied Health Literature (CINAHL) etc. These databases also allow access to full text articles for physiotherapy, nursing and other healthcare professions via Springer Link, Wiley Online Library, Science Direct, Informa Health Care, Cochrane Library of Evidence-Based medicine, Wolters Kluwer, JSTOR, EBSCOHost and Highwire. PEDro a free Physiotherapy Evidence Database of over 30,000 randomized trials, systematic reviews and clinical practice guidelines in physiotherapy also available.

4. Physiotherapy education and ICT

The Department of Physiotherapy (DoPT) was established in 2003 within FHS [now FMHS]. Physiotherapy education program at DWU is four years of a fulltime course that includes clinical placements with two years of residency after graduation. The Infrastructure of DoPT includes simulation rooms, and DWU Physiotherapy Research and Rehabilitation Center (DWUPRRC). The center facilitates the students to achieve hands on practice as well as to experience the clinical environment whilst on campus.

The DoPT has achieved various milestones in educating national physiotherapists to support the needs of people with disabilities (Ramalingam et al., 2011) in PNG. The Physiotherapy training program was funded by National and Non-Governmental Organisations. Currently, teaching and learning resources such as text books and digital media were funded by CBM one of the donor organizations. Hence, appropriate technologies were utilized in increasing the students' knowledge in line with the current trends of practice to suit the PNG context in accordance to the National Health Plan 2010 – 2020 (Papua New Guinea Department of Health, 2010) and Health Vision 2050 (Papua New Guinea Department of Health, 2010). The external audit in 2011, described Physiotherapy education program have achieved the international benchmarking of standards (Divine Word University, 2011).

Besides theoretical knowledge obtained from classroom teaching, the students acquire hands on skills and gain more in-depth knowledge on clinical reasoning and application of evidence based skills during the clinical placements in major provincial hospitals across the country. Clinical supervision was provided by the Office-in-Charge (physiotherapist) in the hospitals so as to strengthen the clinical skills of the students.

Physiotherapy education emphasizes on problem solving and evidence based learning, hence, the academics and students use variety of methods in delivering teaching and learning using ICT. For instance, assessment tasks including quizzes, submission of assignments and feedback, have occurred electronically through Moodle by the unit coordinator. The physiotherapy lecturers use Prezi hyperlink (a web based presentation software) for lectures, which also allows students to work as team.

Independent learning has been facilitated using the online forums and discussion boards in Moodle. The lectures were also facilitated through text book companion websites, whereas the lectures notes and the reference websites were hyperlinked in Moodle to allow students to understand the concepts more interactively within the material as described by Ellis et al. (2009). For example, Year 1 students' anatomy sessions were facilitated using Atlas software, 3D animations, websites (eg. www.getbodysmart.com) and videos. These education technologies

also provide students with computer assisted and self-directed learning opportunities (Choi-Lundberg et al., 2015).

Student's laptop has allowed readily accesses to information provided through Moodle are downloaded for referencing to use during clinical placements. The digital resources such as CDs, DVDs and software were made available to the students before they start their placements; thus enabling the students to use the teaching and learning materials during the placements where the resources are limited like lack of physical or electronic resources.

Physiotherapy students have been encouraged to use the online resources available through www.physiotec.org web based exercise software to design exercise programs for assignments and for patients attending the DWUPRRC. For instance, in Year 3, the students were challenged with case studies to evaluate their critical thinking and decision making skills gained during the clinical placement. Students were tasked to design an exercise protocol using the software as part of their assignment.

In addition, licenses were purchased to access teaching and learning content through websites like www.clinicaledge.com.au, www.clinicsinmotion.com, and these eLearning platforms enhances the skills to build their assessment and treatment knowledge in Physiotherapy. Physiotherapeutic resources and guidelines that are free and readily available in the virtual environment for physiotherapists, such as www.physio-pedia.com, www.sdc.qld.edu.au, www.elearnsci.org, <http://elearnhealth.ucc.usyd.edu.au/NP-S/>, www.rap-el.com.au, www.estroke.com.au, www.asthmaaustralia.org.au, www.pulmonaryrehab.com.au, www.electrotherapy.org were also recommended to students for independent research and learning. Continuous professional development for staff is being encouraged by means of attending online short courses (e.g. www.coursera.org, www.edx.org, www.alison.com), attending national and international conferences and specialized workshops, presenting e-poster and publishing research papers in the reputed journals.

Evidence based approach in teaching and practicing physiotherapy has evolved as a major component of physiotherapy education over the past couple of decades (Moseley et al., 2002). Therefore, the undergraduate research projects were provided with adequate support and guidance to engage in online sessions on how to do literature search using PubMed, Google Scholar and other online databases. Further, the students were trained in the use of free software such as Mendeley for referencing and MYSTAT Student Version for statistical analysis.

The international collaboration with James Cook University (JCU), Australia assists with capacity building of academics and program consultation, where staff members graduated with honors degree as part of research capacity building. The program was hosted through external mode, where the supervisors were in constant communication using email, Skype and video conferencing facilities available at DWU. The learning and referencing materials were posted in Blackboard Inc. and access to JCU database was used for the completion of the study.

5. Effective use of digital resources by students:

To analyze and understand the use of eLearning resources during their undergraduate course, a forum was opened in Moodle for the physiotherapy Year 3 & 4 students, who completed their clinical placements to register their feedback on the effective use of digital resources. The following are some of the students' statements about the use of electronic resources during the hospital placements and rural visits.

“The links and videos uploaded in the Moodle were useful to refer to for the skills required to assess and treat patients. The use of Physiotec and Clinic in motion websites was an additional advantage”.

“The electronic resources were handy even to use in hand-held devices such as mobiles and tablets”.

One of the returning students mentioned; *“In 2005-07 everything was hand written; lectures were delivered using a white board and markers and sometimes with printed handouts. It was very hard to maintain lecture notes and now, with the introduction of Moodle, it is very helpful to read the electronic resources when and wherever necessary”.*

“The electronic resources are light, portable and compact even to store in mobile phones” and it’s “like a library packed in the laptop”.

“During clinical placements as well as in the study times, electronic resources stored in my laptop assisted me to track my assessments and treatment for a particular condition. Electronic resources are user-friendly to read again for better understanding.

6. Challenges

Physiotherapy education program in PNG has attained a decade; however, there is still limited recognition of the profession in PNG(Karthikeyan & Jones, 2015). The Physiotherapy profile in PNG has been raised by advocating through partnership with Non- Governmental Organizations, celebrating National and International Disability Day and World Physiotherapy Day, and also through the National Disability Resource and Advocacy Center. The use of electronic technology in raising the profile of physiotherapy, as well as educating future health professionals, has been a key component in this.

The university is moving towards online teaching methods to provide access to higher education programs for neighboring countries in the pacific, every department within each faculty has been encouraged to design units or programs to be delivered online by 2016-17. The Physiotherapy department is in the process to deliver online training on Community Based Rehabilitation as well as Clinical Supervision for allied health professionals in PNG, this will enhance the two-way learning assisting both novice and experts in their respective fields(Karthikeyan & Ramalingam, 2013).

Though there are advancements in the use of electronic resources and the focus of moving towards a paperless teaching and learning environment, the major challenge that is being faced here in PNG is the internet speed. Unlike more developed countries, access to sites with high bandwidth is limited. Another challenge is there seeming to found limited literature regarding the use of ICT amongst staff and students. The internet quota provided by the university also restricts access; however, the academics are privileged to download larger files with the help of the ICT department and are able to share via Moodle or in CDs. The physiotherapy staff and students take continuous effort to present and publish papers in the field of physiotherapy using the available electronic systems.

Conclusion

The use of electronic resources has assisted the DWU to build the man power resources in a very effective and efficient way. Teaching and learning have been facilitated through Moodle, and the digital media provide access to evidence based practice for staff and students. In particular, DoPT has been utilized for several innovations to develop and maintain the standards. Students'

perception on the use of electronic systems found to be assisting their learning on campus and during clinical placements.

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