Article 1

A Localized Socially Transformative Learning Technology Integration Framework for ODL

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Abstract

The School of Continuing Teacher Education (SCTE) in South Africa, a Newly Industrialized Context, trains about 24 000 in-service teacher students through Open Distance Learning (ODL). Student support includes printed study material, CDROMs, contact classes at 36 tuition centres, SMSs, and some Internet-based interventions. Few students use electronic technologies to augment their learning, and the SCTE employs few to support students. This does not comply with the South African Government's policy on e-Education that demands ICT mastery in teacher training. This paper describes the process of developing a learning technology framework for unqualified and under-qualified teachers to expand their qualifications. The SCTE needs a people-centred solution. Limited Internet connectivity, low computer literacy, technological disadvantage and technophobia hinder learning technology adoption. With the paper-based ODL history as a starting point, data reduction and concatenation filtered the needs of staff and students from firsthand accounts, interfaced with the affordances of evolving learning technologies. Cues from the Technology Acceptance Model provided structure for initial interviews and surveys, while the Technological Pedagogical Content Knowledge model guided implementation. University policies and statistics augmented the input from management. Careful implementation of learning technologies for ODL should take into account the diverse backgrounds of students, established courses, university culture and leapfrog into emerging technology implementation. The e-readiness of students and the e-maturity of the institution moulded the initial framework. The evaluation of implementation initiatives governed the cyclic process to match the multimodal implementation strategy. The influence of suspected technological disadvantage and technophobia seemed overrated. The initial framework remains emergent for the interim.

Sub Theme: 10 ODL and human capacity building

Keywords

Learning technology framework; newly industrialized context (NIC); human capacity building; localized contexts; learning technologies.

Background

This paper describes the process of developing a learning technology framework for unqualified and under-qualified teachers to extend their qualifications. The beneficiaries of a transformed School of Continuing Teacher Education (SCTE) are the teacher-students, who next in line, deliver education at the schools where they teach. The academic interaction of the university with the beneficiaries is through staff and technology, guiding the learning process

through a selected curriculum to enable learning. Every teacher-student benefits from interaction with peers, guided by lecturers. To enable innovative development of curriculum through evolving knowledge creation, lecturers have to maintain themselves as subject experts. In order to maintain optimum motivation, innovation and creativity, human capacity building drives the needs and challenges of the lecturers.

The SCTE, at the North-West University (NWU) in South Africa, trains about 24,000 in-service teacher-students through an Open Distance Learning (ODL) model. Student support currently includes printed study material, CDROMs, regular contact classes at 36 tuition centres, the use of SMSs, and some Internet-based interventions. Few students use electronic technologies to augment their studies and the SCTE employs few learning technologies to support their teacher-students. Not using Information and Communication Technologies (ICTs) in teaching and learning does not comply with the South African Government's policy on e-Education (2004) that demands ICT mastery in teacher training.

The American Federation of Teachers is of the opinion that "teacher quality is the single most important school variable affecting student achievement" (American Federation of Teachers, 2000). The importance of developing quality teachers for their own benefit, as well as for the multiplied benefit for their students is self-evident. The proposed framework for integration of learning technologies for ODL focuses on teacher training according to Taylor's (2001) first generation distance education, comprising of augmented contact tuition.

Examples abound the un-preparedness of living and learning with technology, especially of students from Africa (Blignaut & Lillejord, 2005; Schrum, Burbank, Engle, Chambers, & Glassett, 2005). The authors propose that the needs and fears of the SCTE students, especially regarding technology use, should be paramount in any proposed learning technology integration for in-service programmes aimed at under and un-qualified teachers in the teaching profession (Silva, 30 July, 2011). Barriers to using ICT range from basic computer literacy, through access or acquisition of a computer connected to the Internet with reliable bandwidth (Blignaut & Lillejord, 2005) and higher levels of competency, such as the ability to participate in online learning through interacting with facilitators and online communities (Schrum, et al., 2005).

The literature and research pertinent to student retention in online learning indicates high drop-out rates, even among societies with broadband and acceptable levels of computer literacy (King, 2002). The authors proposes a people-centred learning technology integration framework appropriate for a newly industrialised context that focuses on people, education and technology, and also in this order. Therefore, this study aims to initiate the development of a sociologically transformative integration framework for using learning technologies in an ODL environment where "professors, too, are beginning to discover the benefits of this technology in teaching and learning. The change among professors is marked by a decreased dependence on institutionally delivered technology and services, and an increased use of user-centric technology ... [with] increased emphasis on mobility and a proliferation of devices used for education and research" (Lowendahl et al., 2009, p. 4). Therefore, issues that link with developing a learning technology framework include the selection of learn-

ing technologies, tools for learning, as well as managing change (Chatterton, 2006).

Research methods

The question this paper addresses is: Which aspects are prominent in a framework for the integration of learning technologies in ODL at the SCTE, and how should they be addressed?

The SCTE requires a solution that is people-centred. The aim is to develop a socially transformative learning technology integration framework for ODL where the kingpin stakeholders, and consequently research participants, are: (i) the unqualified and under-qualified teacher-students in the process of upgrading their professional qualifications; (ii) the lecturers responsible for instructional design of courses and facilitators responsible for delivery of the curriculum at learning centres; (iii) the institution with its particular vision for teaching and learning. It is paramount to ascertain the perceptions of these involved people; and (iv) interviews with and observations of kingpin stakeholders as they go about grappling with preparing for using learning technologies in a context comprising both high and low technology penetration.

Qualitative and quantitative data, collected from these four groups of research participants by means of interviews, observations, and surveys were constantly and simultaneously verified and contrasted with information from other studies found in the literature on technology adoption and implementation. A process of data reduction and concatenation extracted an initial social transformative ODL learning technology integration framework.

The Technology Acceptance Model (TAM), adapted from the theory of reasoned action (Fishbein & Ajzen, 1975), formed the basis of the perceptions of teacher-students on their digital illiteracy experiences. Davis, Bagozzi and Warshaw (1989) used the TAM to investigate why people accept or reject information technologies. Based on the work of Davis *et al.*, the current study compiled a survey comprising single-input and open-ended questions that collected data from a purposeful sample of 339 teacher-students attending additional contact sessions after their unsuccessful completion of a computer literacy course. The questions probed perceived usefulness and ease of use of technology, technophobia, the availability of and access to computers and the Internet. While SPSS analysed the quantitative data, the researchers used Atlas.ti™ for qualitative analysis.

Through observations while working together, assisting with, and during training in the use of technology, the first author gathered data on the perceptions of academic staff at the SCTE during staff meetings, with surveys and during personal interviews. Perceived usefulness and ease of use of learning technologies, perceptions of the value of training, confidence in using technology, and lecturers' perceived needs of students (F. D. Davis, et al., 1989) contributed towards the initial themes of a cyclic process to elicit further responses. A further cycle comprised probing of lecturers, analysing of feedback, conducting of surveys at the end of learning technology training sessions, and assembling of remarks after requests for help with using learning technologies.

Strategic planning and policy documents of the NWU constituted the point of departure for meetings with other concerned academic departments and service units outside the SCTE. Discussions with staff in key positions and

responsible for support services, technology implementation and strategic planning provided additional information on the state of technology integration enablement for implementing ODL at SCTE.

The culmination of the above cyclic processes is presented as an overview of socially transformative ODL learning technology integration process.

Findings

Teacher-students

The quantitative data from the student survey offered six categories: (i) infrastructure; (ii) computer use; (iii) computer literacy; (iv) bridging traditional barriers; (v) attitudes; (vi) and future prospects.

The teacher-students indicated that, although approximately sixty percent (59.6%) had easy access to computers, about forty percent (41.6%) indicated no reliable Internet access. About half of the study population (54.3%) maintained that they were frequent computer users. They were able to use word processors, navigate documents with a computer mouse with ease, could type on a computer keyboard, and search for information on the Internet. The other approximate half of the population declared themselves as "usually in need of assistance when using computers." The majority of teacher-students (88.5%) were not afraid of computers, while about a third felt forced to work at their computer skills. In spite of these uninspiring statistics, the majority (92.3%) indicated overwhelming positive attitudes towards computers and "want[ed] to learn how to use computers better ... [as their own] learners will gain from using computers." In summary, the quantitative data portrayed a positive picture for technology adoption considering the respondents were teacher-students attending additional contact sessions after unsuccessful completion of a computer literacy course. The influence of suspected technological disadvantage and technophobia seems overrated.

The qualitative analysis of the open-ended question findings however revealed technophobia and other emotional perspectives which should not be overlooked. The data indicated that wide-ranging uncertainty and fear emerged and revolved from gratefulness, expectation and engagement to confidence as a result of hands-on training with patient and caring facilitators. This finding relates to the opinion of Kort, Reilly and Picard (2001). Davis and Wong (2007) translate this as the flow experience between challenge and skill when positive emotions dispel negatives after successful interaction with technology. With respect to teacher-students, it appears that technology adoption could be stimulated with interventions based on exposure to technology (Moolman & Blignaut, 2008) and promoting accomplishment.

Lecturers

The qualitative analysis of the lecturers, the enablers of adoption, emerged as a powerful positive group dynamic and pride, consciousness of student needs, established momentum in dedication through a strong work ethic. They are committed to development, further qualifications, and research. They are convinced of the need of technology adoption and perceive learning technologies as the way forward. They have expectations of technology mastery and are willing to learn through experience. Lecturer barriers link *inter alia* to excessive workload, insufficient time, unfamiliarity with the affordances of

new technologies, and consequently they requested training as first hand experiences. The conflict between paper-based distance education and technology-based distance learning demands extreme paper-based assessment duties, as well as the development of skills in using the new learning technologies. Some lecturers perceive their computer literacy levels inadequate. They have difficulty in downloading large files with the effect that YouTube™ videos can often not be viewed in real time. Downloading of videos for educational or research purposes is only possible at home using their private Internet connectivity. This is the result of the institution's Internet security and policy limitations. In other cases, technological disadvantage and technophobia hinder learning technology adoption and the lecturers are hesitant to experiment with the new technologies by themselves. Other prominent hindering themes for adopting technology adoption are critical insufficient time due to extensive workloads, and the need for comprehensive practice-based training.

Institution

Momentum towards expanding technologies on campus contributes towards enabling technology adoption and comprise a recent rollout of WiFi coverage across large sections of the campus (the SCTE is not included in current phase); an initiative to provide a small group of first year contact students with laptop computers; enabling of social networking through the institution's web services; and a mobisite for study information. As the institution is committed to quality, there is a perception that focussing on technologies, instead of on educational strategies, will negatively influence the quality of teaching and learning. This demands a first-time comprehensive technology teaching and learning strategy that will regulate access, support and adoption of learning technologies. While insufficient instructional designers and online curriculum implementation initiatives hinder speedy and effective implementation strategies, overcommitted academic staff is expected to initiate technology adoption without much institutional support.

Interviews with and observations of kingpin stakeholders

The analyses of institutional strategic planning and policy documents, four themes emerged which were used during interviews with strategic stakeholders. They relate to the curriculum, information, access and connectivity, and learning technologies.

The curriculum. The institution has an established history of quality assurance of the existing curriculum benchmarked against international standards. Ongoing research informs the curriculum and in-house programme evaluators assess existing courses (Kok, Rabé, Swarts, & Van der Vyver, 2008). However, ODL delivery does not yet comply with the South African Government's policy on e-Education (2004). Comprehensive instructional design relating to curriculum, pedagogy, and choice of an appropriate multi-media mix should focus on optimally engaging learners while learning with technology. There is need of evidence-based and collaborative decision making.

Information. It is possible to access electronic information sources off-campus through the institution's library web site hosting a large collection of electronic databases and free research publications. Search procedures are uncomplicated and specialist training sessions are available. However, ODL

students' limiting computer literacy and connectivity issues limit access to the library online facilities. Their unfamiliarity with the library services expands the virtual distance to library support services and students require timely training in information collection.

Access and connectivity. Campus internet connectivity is far in excess of the national norm and WiFi rollout is in progress on the central campus area. Country-wide mobile connectivity and affordable broadband availability has improved. However, up to 100-fold variations in internet speed may be experienced at times on-campus. A conflict exists between the institution's Internet security policies and free access. SCTE had to acquire its own interactive whiteboards and ODL students pay for their own access and connectivity.

Learning Technologies. Examples of successful adoption of learning technologies are: teacher-students are positive about technology use; staff has successfully adopted interactive whiteboard use for computer-mediated communication; mobile devices are proliferating; new generation teacher-students are familiar with mobile devices; use of social networking is becoming widespread. To the contradictory, limited computer literacy, technological disadvantage and technophobia of students and staff hamper SCTE's employment of the few learning technologies already in use.

The framework

The proposed socially transformative learning technology integration framework encompasses (Figure 1):

(a) the unqualified and under-qualified *teacher-students* in the process of upgrading their professional qualifications
(b) the *lecturers* responsible for instructional design and delivery of the curriculum at learning centres
(c) the *institution* with its particular vision for teaching and learning.

Learning interaction comprises proponents: the teacher-students, lecturers and learning contents. The learning content consists of:

(d) the *curriculum* as a subset of learning events or planned sequence of formal instructional experiences (Harrison, Blakemore, & Buck, 2001)
(e) information as the social activity of collecting and exchanging of information required for learning (Haythornthwaite & Wellman, 1998)
(f) *connectivity* required for interaction with lecturers and facilitators, collaborating with other teacher-students, interaction with the curriculum, and to reap the benefits and affordances of learning with technology (Smyth, 2009)
(g) appropriate *learning technologies* fit for purpose and purpose for fit (Johnson, Adams, & Haywood, 2011; Oldfield, 2003)

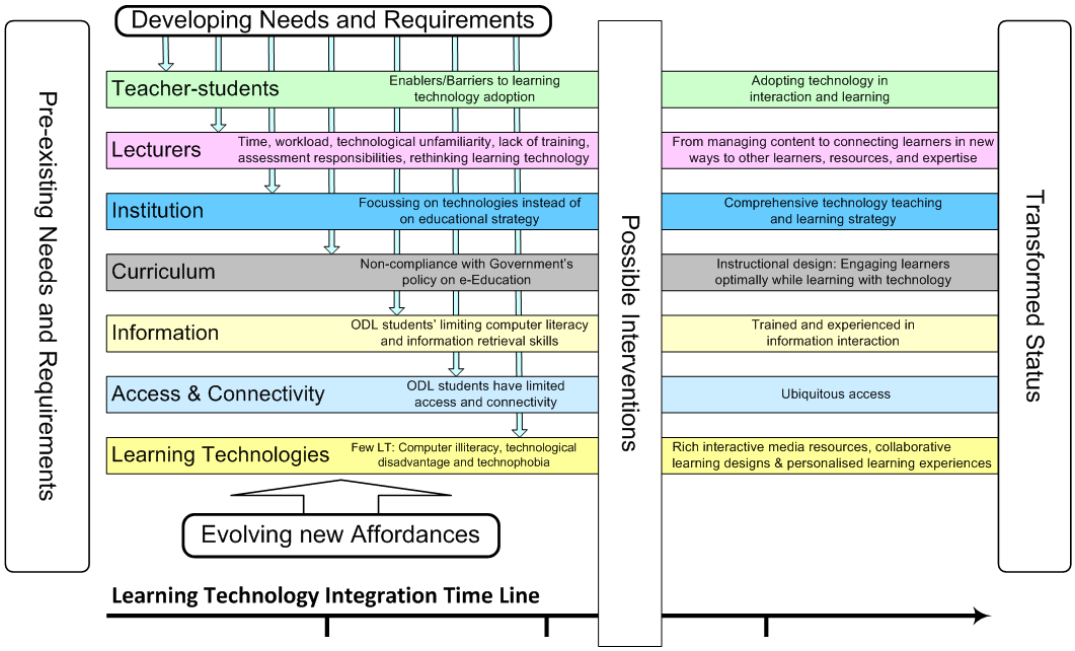

Figure 1: Overview of the Proposed Socially Transformative ODL Learning Technology Integration Framework

Conclusions

Transforming teacher-students, lecturers, the institution, curriculum, information, access and connectivity, and learning technologies at the SCTE in South Africa to successfully integrate learning technologies for ODL may require far-reaching interventions in certain instances. In other instances, time may provide solutions for this newly industrialised context. Continuous upgrading of Internet access and connectivity are envisioned, when one takes into account recent advances deep ocean broadband trends and promises. However, people-centred interventions are needed for the first five categories of the proposed socially transformative ODL learning technology integration framework. These interventions should be informed by learning technology systems life cycle processes (Stoner, 1996) that relate to the initiation, analysis and evaluation, selection of learning technologies, design integration, implementation, monitoring and adapting of the integration.

Teacher-students should benefit from interventions focusing on initial assessment of computer literacy, followed by tailor-made ICT training at contact centres. Research through cyclic review could inform online training and assessment possibilities for such training in the long run. Similar interventions could be suggested for new teacher-students regarding introduction to learner management system use, library use, information gathering techniques, study methods, as well as reading and academic writing competencies. Once acceptable computer literacy has been established, technological acceptance should enable some online and other interactive media alternatives such as mobile learning for the interventions envisaged. Progressive integration of technology into teaching and learning could develop together with e-readiness of the older generation of teacher-students. The younger generation could be expected to require less intervention in computer literacy, especially as the government laptops for teachers project gathers momentum.

Interventions that transform lecturers may require bold decisions to foster creativity and enable learning content and curriculum transformation as "educators' roles are changing from managing content to connecting learners in new ways to other learners, resources, and expertise" (Schwier, 2010, p. 91). In terms of local conditions, educational resources are limited, and not ready for use in online environments. However, much is available in the public domain that may be used under open education resource (OER) licenses (OER Africa, 2011).

Concerning management models, Laurillard states (2006, p. 73): "[I]f universities are to rethink their methods of teaching, they need a management structure that is capable of supporting innovation … a top down management structure is inimical to successful innovation precisely because management does not have the knowledge necessary." The delicate balance between cultivating an innovative environment given the staff-to-student ratios while maintaining the powerful positive group dynamic and pride may need a generous mix of resources. One of the most valuable resources leaders may allocate in order to foster creativity is time. Managers, however, demand productivity in terms of many tasks. Williams (2001) maintains that productivity goals seem to undermine creativity. In addition, access to funds, materials, facilities, and information support creativity (Amabile, Conti, Coon, Lazenby, & Herron, 1996). Creativity is needed to transform from a paper based distance learning curriculum into a higher order teaching learning experience made possible through the use of learning technologies. Rotation of duties between lecturers could provide time to generate online materials, though additional staff may be needed to reduce overall workload. Hands-on training of lecturers is crucial to build confidence and inform learning technology adoption along the Technological Pedagogical Content Knowledge (TPACK) model (Mishra & Koehler, 2006). Lecturers should have opportunities to experiment with e-learning techniques, develop skills, acquiring firsthand experience all of which should be informed by research. Additional academic staff should receive real-time support from in-house instructional designers, graphic designers, media designers and information technology assistance.

The institution needs transformation through interventions which prioritise focusing on learning strategies instead of technologies per se. Bold initiatives are needed to invest in capacity building with instructional design and technology based course curriculum renewal informed by localized research. Perceived information technology management barriers such as access, security, infrastructure and on-demand support should be addressed to the satisfaction of all concerned.

Comprehensive interventions are needed around instructional design and appropriate curriculum and pedagogy to design for online learning. Learning should be focused on optimally engaging learners while using technology.

Recommendations

The paper examined the aspects to be included in a socially transformative ODL learning technology integration framework from first-hand accounts of stakeholders. The research design was emergent, not predetermined. Findings include themes from the natural settings, evolving from the analysis of the needs, vision, fears and challenges as brought together from data relating to the

SCTE students, faculty and support staff, and the institution. Training of lecturers, innovative planning of time issues, acquisition of appropriate infrastructure, buy in from the institution and IT support services and orientation and initiation of teacher-students to foster the roll-out of the initial framework to evolve towards an e-mature organisation for the delivery of ODL to its vast numbers of newly industrialised context clients.

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