ENHANCING QUALITY IN ONLINE TECHNICAL TEACAHER EDUCATION IN SRI LANKA

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Abstract: Addressing the professional development requirements of the teachers in technical and vocational education institutions in Sri Lanka, the University of Vocational Technology (UNIVOTEC) offers a National Diploma in Technical Teacher Education (NDTTE) course. A project was implemented with the support from Commonwealth of Learning (COL) to integrate online teaching and learning in the NDTTE course, with the intention to further enhance its quality by supporting a flexible teaching-learning process and extended access to learning resources. This paper reports a case study on the capacity building of faculty in online course design and development in relation to the NDTTE course. During a series of intensive workshops, 24 participants in six teams actively engaged in developing their competencies in designing learning experiences in accordance with the constructivist pedagogy, integration of Open Educational Resources and effective online facilitation, resulting in six interactive online modules in the Moodle learning management system. Participants' feedback obtained via questionnaire surveys, reflective notes and focus group discussions revealed significant enhancements in their individual capability and confidence in creating quality online course materials. It was evident that participants' ability to design and develop interactive online learning environments using various asynchronous and synchronous communication strategies has been vastly improved. The "COL e-Learning Training Needs Checklist" that was used as pre and post-survey also revealed a significant increase in their proficiency in online course design, development and facilitation. Despite various challenges due to participants' heavy workload and other commitments they were able to achieve the expected targets to a great extent. Overall, the capacity building process has been a very productive exercise, during which the online course materials of the NDTTE course by UNIVOTEC were successfully created by the staff in a quality manner.

Keywords: Technical Vocational Education and Training (TVET), Online course design, development and delivery, Capacity Building, Teacher Professional Development

Introduction

Technical Vocational Education and Training (TVET) is increasingly given recognition as a very important aspect in the current times of rapid economic, social and technological change. TVET skills fill the gap of lifelong learning needs of the TVET workers to actively participate and contribute to the knowledge economy (UNESCO and ILO, 2002). The challenge is to develop innovative and affordable TVET solutions to achieve the desired outcomes (UNESCO, 2008). Addressing the professional development requirements of the teachers in technical and vocational education institutions in Sri Lanka, the University of Vocational Technology (UNIVOTEC) offers a National Diploma in Technical Teacher Education (NDTTE) course. The goal of this TVET diploma is to enhance the knowledge, attitudes and skills of the technical lecturers and instructors in relation to the teaching-learning process and improve their life-long learning skills (UNIVOTEC, 2016).

A project was implemented at UNIVOTEC with the support from Commonwealth of Learning (COL) to integrate online teaching and learning in the NDTTE course, with the intention to further enhance its quality by supporting a flexible teaching-learning process and extended access to learning resources. During an intensive capacity building programme implemented in two stages during 2015-2016, the academic staff actively engaged in developing their competencies in online course design, development and delivery, including designing learning experiences in accordance with the constructivist pedagogy, integration of Open Educational Resources (OER) and effective online facilitation, resulting in six interactive online modules in the Moodle learning management system (LMS). This paper reports a case study on the capacity building process of UNIVOTEC faculty in online course design, development and delivery, focusing on its impact on quality enhancement in technical teacher education.

Conceptual Framework

Enhancing Quality in Technical Teacher Education

The notion of quality in education offers diverse conceptualizations, processes, frameworks and models, signifying its prominence in educational development in all aspects including teaching-learning processes, curriculum design, as well as planning and management of educational processes (Tawil, Akkari, & Makedo, 2012). Various dimensions of quality in education are explained in terms of teaching, learning, methods, resources, training, programmes, content among many others (Gibbs, 2010; Pigozzi, 2004; Chapman & Adams, 2002). Attempts to address maintaining quality assurance in education systems have resulted in significant outputs such as quality assurance toolkits for teacher education institutions (Menon, Rama, Lakshmi, & Bhat, 2007), distance higher education institutions and programmes (Rama, Hope & Coomaraswamy, 2009) and open and distance non-formal education (Latchem, 2012), providing quality indicators and self-assessment guidelines. For instance, quality indicators for teacher education have been presented under six dimensions: Curriculum Design and Planning; Curriculum Transaction and Evaluation; Research, Development and Extension; Infrastructure and Learning Resources; Student Support and Progression; Organization and Management (Menon et al., 2007). Menon (2007) argues that four quality indicators - design of learning, learner-centredness, reflective practice and dialogue in instruction, are the critical factors influencing the quality of a professional education programme.

Quality assurance is a systematic monitoring and evaluation of the various aspects of systems, projects or programmes in order to maximize the probability of standards being achieved for specified performance indicators (Latchem, 2012) that may indicate directions for improvements, whereas quality enhancement is a deliberate process of change that leads to improvement. This implies that a greater emphasis should be placed on quality enhancement (Williams, 2014), especially in the case of initiatives with professional development and capacity building of teachers.

TVET refers to the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (UNESCO, 2002). It is mainly concerned with the acquisition of knowledge and skills for the world of work to increase opportunities for productive empowerment and socio-economic development in knowledge economics and rapidly changing work environment (Mclean & David, 2009). Among others, capacity building of TVET teachers and providing open and flexible learning experiences with ICT integration are identified as priority areas to take action upon (Neal, 2011). While teacher education is a lever to enhance the quality of TVET teachers, rigid and bureaucratized institutional procedures may hinder teacher competences developed turning into practice, whereas more flexible and dynamic institutional cultures would lead to innovative professional cultures (Grollman, 2008). Encouraging bottom-up initiatives from the faculty members, setting them in a propitious learning and teaching environment, providing effective support and stimulating reflection on the role of teaching in the learning process would contribute to quality teaching (Henard, 2010).

Technology-enhanced pedagogical designs for teacher professional development

Technology-enhanced learning is the application of information and communication technologies (ICTs) in teaching and learning. Teachers move through several stages as they adopt technology shifting from the simple use of technological tools to support their practices, towards using more learner-centred pedagogical approaches (UNESCO, 2002). Initiatives on ICT integration for quality enhancement in teacher education programmes (Deepwell, 2007; Henessey et al., 2010, Karunanayaka, 2008) reveal the necessity of continuous professional development of teachers in both technology as well as pedagogy. The essential need of a convergence between technology and pedagogy is a widely discussed issue (Beetham & Sharpe, 2007; Henard, 2010; Richards, 2006). The notion of technological pedagogical content knowledge has resulted in the TPACK framework (Koehler & Mishra, 2009) which presents three core constituents- content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK), and their interactions. This framework has been extensively adopted in the design of teacher education programs for ICT-integrated teaching and learning (Chai, Koh, & Tsai, 2013), indicating the prominence given to conjunction of technology and pedagogy in teacher professional development.

A constructivist approach to learning forms a strong theoretical foundation for the use of technology in education. Constructivist theory of learning is based on the notion that knowledge is constructed by learners through active engagement in learning experiences (Duffy & Jonnasen, 1991). Technology should be used to support knowledge construction, rather than knowledge transmission (Jonassen, Peck & Wilson, 1999). Further, learning would be most effective when taken place in a real-life context, or learners are 'situated' in authentic conditions (Brown, Collins & Duguid, 1989). A situated pedagogical design to learning or design of learning experiences plays a crucial role as an indicator in quality in teaching and learning (Naidu, 2004). Especially, pedagogical designs based on the principles of constructivism and situated cognition are considered most effective in the context of e-learning (Naidu, 2006).

Methodology

A case study approach (Yin, 2003) was adopted to explore in detail the effect of the capacity building programme at UNIVOTEC, to enhance quality in technical teacher education. The following research questions guided the study.
1. To what extent the proficiency in online course design, development and facilitation was enhanced among staff due to the capacity development process?
2. What challenges were faced by the participants during the process?
3. What is the impact of the capacity building process on quality enhancement in technical teacher education?

Twenty four (24) academic staff members of UNIVOTEC were the participants of this study. The participant profile is presented in Table 1.

Table 1: Participant Profile

Aspect		No	Percentage (%)
Gender	Male	13	54.2
	Female	11	45.8
Designation	Senior Lecturer	05	20.8
	Lecturer	17	70.8
	Teaching Asst.	02	8.3
Highest Educational Qualification	PhD	01	4.2
	MPhil/Masters	18	75.0
	First Degree	05	20.8
Professional Experience	>20	01	4.2
	11-20	03	12.5
	<10	20	83.3

A majority of participants were lecturers (70.8%) with less than 10 year of experience (83.3%). However, a majority (75%) were with educational qualifications of Masters degrees or above.

The capacity development programme was implemented in two phases. Phase I, that was conducted during January to March, 2015 involved reviewing of the current draft courses of NDTTE, assessing training needs of staff, conducting a series of workshops in course design and development in Moodle learning management system (LMS) and providing support to the course development team to review and revise the course components. Phase II involved conducting capacity development workshops for staff in online facilitation, during June, 2015.

The participants, in six teams, engaged in course design and development of the six blended online modules of Semester 1 of the NDTTE Course: Educational Psychology; Communication Skills for Teachers/Trainers; Training Programme Design (Basic); Instructional Resources Development; Assessment of Learning; Teaching Learning Methods-1. The workshops were designed focusing on both pedagogical and technological aspects, aiming at capacity development in key areas related to course design, development and delivery for online teaching and learning. The specific activities designed and implemented under the key areas are presented in Table 2.

Table 2: Activities designed and implemented in the capacity building workshops

Aspect	Key Focus Areas	Specific Activities
Pedagogy	Student-centred Learning Designs – based on Constructivist Pedagogy	Study various learning designs under the constructivist pedagogy, and decide on a learning design for each module

	ADDIE Model of Instructional Design Process and Design Aspects	Study different design aspects (Information/ Instruction/ Interaction/Interface Design) and plan how to incorporate.
	Constructive Alignment	Concept mapping the learning experiences according to an agreed learning design, based on objectives and contents.
	Designing online learning activities, assessments and feedback	Design online learning activities, assessment tasks and feedback strategies to enhance exploration & collaboration
Technology	Development of skills in using the Moodle LMS in course creation	Creation of basic elements of an online module in Moodle- eg: pages, discussion forums, assignments
	Using online tools to enhance various forms of interactivity (learner-content/teacher/learner)	Identifying and using tools available in Moodle LMS to develop an interactive learning environment (quizzes/forum/chat/wiki/journal…etc)
	Integration of interactive multimedia	Identify and integrate multimedia elements in the learning experience (text/graphics/animations/audio/video)
	Integration of OER as supportive learning resources	Searching, identifying and integrating appropriate OER to support learning and assessment activities
	Developing online facilitation skills.	Engage in online discussion forum activities

Participants engaged in the above sequence of activities integrating different online tasks in Moodle LMS, and at the end of each day, there were "show and tell" sessions, to receive peer and facilitator feedback. Data was collected using questionnaire survey, focus group discussions and reflections. In addition, the "COL e-Learning Training Needs Checklist" was used as a pre-survey and a post-survey, to observe changes in participants' skill levels.

Results and Findings

To what extent the proficiency in online course design, development and facilitation was enhanced among staff due to the capacity development process?

Table 3 presents a summary of the feedback received from the participants by the end of Phase 1.

Table 3 – Summary of Overall Workshop Evaluation – Phase 1

Aspect	5/4	3	2/1
1. To what extent are you satisfied with the following sessions: (5- Extremely; 4-To a great extent; 3-Moderately, 2- Just a little; 1-Not at all)			
1.1 Learning Designs – Constructivist Pedagogy (Learner-centred designs)	87.5	12.5	-
1.2 Design Aspects (Information/Instruction/Interaction/Interface Design)	75.0	25.0	-
1.3 Constructive Alignment between Learning Outcomes, Learning Activities and Assessment Tasks	100.0	-	-
1.4 Designing and integrating online activities to enhance motivation, exploration, collaboration and reflection among the onl ine learners	100.0	-	-
1.5 Integrating multimedia elements to the learning experience	62.5	25.0	12.5
1.6 Design and develop appropriate online assessment and feedback strategies and integrate them into the learning experiences	75.0	25.0	-
2. Relevance of the workshop to support the teaching-learning process.	75.0	25.0	-
3. Preparedness in applying the new knowledge and skills developed in to current teaching-learning process.	100.0	-	-

It was revealed that a large majority of participants (between 80% - 100%) were extremely or to a great extent satisfied with most of the aspects they experienced during the workshops such as; constructivist pedagogy, instructional design aspects, constructive alignment, designing online activities, and designing online assessments as evident by the data presented above. There was a minor dissatisfaction about the coverage in integration of multimedia elements. Also, a majority claimed that the knowledge on OER was the most valuable aspect of the workshop, as it was a novel concept they appreciated as very useful and important. The aspects identified as least valuable were: Moodle LMS - for a few participants; and Educational Theory - difficult to comprehend by some participants. Overall, it was inspiring to receive very positive comments by the participants as stated below:

"Very useful in improving online teaching-learning methods"
"I am very glad to have participated in this workshop"
"This was effective to improve designing online teaching and learning"
"I really wanted to explore the world of online learning-This was an unexpected opportunity"

The results of the pre-survey and post-survey results of the COL's e-Learning Training Needs Checklist were analyzed to determine the proficiency in skill development in relation to several aspects.

Proficiency in skills related to design and development of online courses in Moodle LMS is presented in Table 4.

Table 4: Proficiency in design and development of online courses in Moodle

Skill	Proficiency %	
	Pre-Survey	Post-Survey
Login to LMS	72.22	100.00
Navigate in LMS	55.56	91.67
Write clear course goals & learning outcomes	44.44	76.92
Select, assemble, and create online course materials with OER	27.78	84.62
Create course materials (syllabus, study guides, presentations)	29.41	69.23
Upload course materials including multimedia to the LMS	50.00	100.00
Organize the course site for students to navigate easily	16.67	53.85
Design online collaborative activities	11.11	69.23
Create assessments, surveys, and polls/using the tools in the LMS	5.56	50.00

The results revealed that prior to the workshops a majority of the participants had adequate basic MOODLE skills, yet those were improved extensively afterwards. However, certain skills such as creating online course materials and creating online collaborative activities and assessments were found to be very low during the pre-survey, but those too were enhanced considerably after the workshops, implying a significant effect of the workshops.

Online facilitation is another key aspect of skill development evaluated, which is presented in Table 5.

Table 5: Proficiency in Online facilitation

Skill	Proficiency %	
	Pre-Survey	Post-Survey
Provide clear guidelines to students for studying online	38.89	69.23
Use communication tools such as announcements, forum, email, chat	44.44	92.31
Maintain good student-instructor communication	16.67	69.23
Create announcements, forums, blogs and wikis to engage with students	27.78	84.62
Use the assignment activity for individual and team work	22.22	84.62
Use the workshop activity for peer assessment	5.56	76.92
Establish instructor presence in the course	0.00	38.46
Provide timely and constructive feedback in the learning environment	11.11	61.54

It was evident that a significant improvement in the participants' skills in online facilitation has occurred. For instance, except in the use of communication tools and providing guidelines to students, proficiency in all the other skills were observed as minimal at pre-survey. However, after the workshops vast improvements in online facilitation skills were revealed, especially in relation to use of different communication tools.

Table 6 presents the development of proficiency in skills in manage and administer of online courses.

Table 6: Proficiency in managing and administering online courses

Skill	Proficiency %	
	Pre-Survey	Post-Survey
Set up the gradebook and manage grades	11.76	33.33
Create badges and assign them to a course activity	11.76	33.33
Develop quizzes in either Moodle or Hot Potatoes	35.29	41.67

Create groups and groupings and link them to a course activity	11.76	61.54
Monitor and manage student progress using the tracking tool	5.88	38.46
Collect and analyse data from the system to evaluate the course	5.56	36.77

In contrast to the other two aspects, it was observed that 'Manage and Administer online courses' as an area where further skill development may be needed. Yet, since all academics are not given the LMS administrative powers and there is a Moodle Administrator at the University, staff are able to get the necessary support whenever required.

What challenges were faced by the participants?

The participants faced various challenges due to heavy workload and other commitments which hindered active engagement in the tasks. As revealed during the focus group discussions, time constraints and technical issues were two major challenges faced by them. Participants were engaged in various academic activities and other responsibilities which hindered their continuous participation at the workshop. While the overall attendance was satisfactory commitment to completion of work, in-between and after the workshop was a great challenge. Some participants who were not familiar with the Moodle LMS faced technical problems initially, yet, by Phase II, these were resolved. Dealing with both new pedagogy and new technology at the same time resulted in "cognitive load" (Sweller, 1989) among the participants, that demotivated some of them to continue with the activities.

What is the impact of the capacity building process on quality enhancement in technical teacher education?

Despite the challenges, it was evident that the development of necessary competencies in effective online course design, development and delivery, has impacted upon significant professional development of academic staff towards becoming competent and motivated online educators. The capacity building process that was carried out in two phases has been a very productive exercise. During Phase I, the participants developed their competencies in learning designs in accordance with constructivist pedagogy, various design aspects, constructive alignment between learning outcomes, learning activities and assessment tasks, integration of OER as supportive learning resources, designing online learning activities, designing online assessments and feedback, and developing an interactive and motivating learning environment. During Phase II, the participants developed their capacities in designing collaborative activities for effective online facilitation using various online tools and asynchronous and synchronous communication strategies available in Moodle, as well as improving their online facilitation skills.

It was evident by the final versions of the online modules, and participants' feedback and reflections, that the participants' capacity development as online educators has been significant. The development of necessary competencies in effective online course design, development and facilitation, the resulted in making the staff interested and motivated in implementing the online courses of the NDTTE programme of UNIVOTEC, as competent online educators.

Conclusions

As evident by the findings, the participants have developed pedagogical competencies in designing learner-centred, interactive online learning experiences as well as technological competencies in using the tools in the Moodle LMS in creating such online courseware. The convergence between the technology and pedagogy (Gordon, 2014; Henard, 2010; Koehler & Mishra, 2009; Beetham & Sharpe, 2007), has been facilitative in developing their competencies in both aspects. The design of the process that provided open and flexible learning experiences with ICT integration (Neal, 2011) has been effective in impacting on the participants' capacity building. Design of a situated learning experience (Naidu, 2006), where participants were situated in a constructivist learning environment (Brown, Collins & Duguid, 1989; Duffy & Jonnasen, 1991) enabled the them, the teachers, to act as designers and developers of effective online learning experiences for their own students. Encouragement of such bottom-up initiatives while providing effective support and stimulating reflection (Henard, 2010), would undoubtedly contribute to enhance the quality in technical teacher education.

Acknowledgements:

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