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The Facilitation and Support of a Blended e-Learning Course for Science Educators in a Rural Setting, South Africa

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ABSTRACT— *This paper presents the findings of both qualitative and quantitative case study research of the implementation of a blended eLearning course for Science educators in the Eastern Cape, Mthatha. The Centre for Innovative Educational and Communication Technologies (CIECT) at the University of the Western Cape (UWC) designed and developed a course, namely: “Designing an Instructional Event”, registered with the South African Quality Authority (SAQA) at a National Qualification Framework (NQF), Level 6. This course was offered in collaboration with the Education Faculty, for the Bachelor of Education (Honours) (BEd Hons) Programme; specifically Science Education. The researchers highlight the importance of the provision of extensive facilitation and support by the CIECT team, in order to motivate the educators (full-time working professionals) to become self-directed learners. In this case, the educators were expected to complete activities; and design an online environment to enhance their Science instruction. Considerable challenges were faced by the facilitators and educators due to limited infrastructure; and a lack of commitment by some participants to commit to the completion of tasks.*

Keywords— blended- learning, self-directed learning, professional development, facilitation and online support

1. INTRODUCTION

The blended learning course, “Designing an Instructional Event”, aimed at contributing to the Professional Development (PD) of a group of Science educators (full-time working professionals) within the Eastern Cape, Mthatha. Research indicates that, many South African class rooms lack quality teaching skills; therefore there is a need for PD that should be “linked to subject content and pedagogy as the key to improve learners’ performance” (South Africa, 2007 as cited by Steyn, 2010:212-213). The South African teachers’ skills situation is characterised as lacking “the necessary knowledge, skills and expertise to understand and assist learners, which causes frustration, demotivation and serious feelings of inadequacy, which disrupts effective teaching and successful learning” (Walker, Clover & Ramsey, 1995; Silberg & Kluff, 1998; Nissen, 2000; Sethosa, 2001 as cited in Prinsloo, 2006:346).

Furthermore, the Ministerial Committee on Rural Education report (2005) identified that teacher-educators faced challenges in the area of PD, which continues to hinder their teaching methodologies. Issues related to PD are acknowledged in the South African Government National policy framework for teacher education. This policy focuses on the “need for suitably qualified teachers across” the country, to ensure continuous and sustainable PD Programmes (South Africa, 2007; Steyn, 2010:212-213).

This research focuses on PD, specifically the integration of eTools within Science Education. The design course was offered as part of the BEd Hons Module, Computer Based Education. Hence, the design course broadly aimed to: explain the current trends in eLearning and how they affect the teaching practice; and understand the educational philosophies that could inform the online teaching/learning/instructional practices. Therefore, PD directly links to the available comprehensive literature on the roles of Information Communication Technology (ICT) in Education as discussed under literature review.

2. RELEVANT LITERATURE REVIEW

ICTs are transforming peoples’ ways of lives; for example, the manner in which businesses are conducted, information and services are accessed, entertainment and communication is occurring across societies (Hennessy., Onguko.,Harrison., Ang’ondi., Namalefe., Naseem & Wamakote , 2010:6). The role of ICT in education has not been left out, but has continued to receive attention across the globe. Acknowledgement on benefits of ICT are made by various researchers, such as North Central Regional Education Laboratory (NCREL,Undated), which indicated that “studies of the impact of technology on teaching and learning conclude that technology has an important role to play in education at

all school levels from Grade 0 to Grade 12”. Marshall (2002:1) likewise indicates that “research both historical and contemporary, suggests that technology-based instruction can and does result in learning”.

It’s evident that, efforts are being made by governments to ensure that their national policies incorporate ICT’s frameworks’ for purposes of enhancing teaching and learning in a general perspective. The white paper on e-Education in South Africa (2003:3) is a good example as it acknowledges ICT as one of the drivers of positive change in education. The white paper furthermore, debates that ICT provides “new learning opportunities and access to educational resources opportunities” needed to support traditional forms of teaching. Other researchers have also supported the opinion on the positive roles played by ICT in fostering change in education at all levels. This denotes that educators have no reason to not embrace any available opportunities in terms of technologies so as to support their traditional forms of teaching and help the learners become computer literate. School management processes also benefit on opportunities provided by ICT (Ferrari, Cachia & Punie, 2009; Condie., Munro., Seagraves & Kenesson, 2007:3). Therefore, any government that capitalises in educational ICT would impact largely on economic and social development of a country; an example of the United States (US) is provided - where the government has invested in ICT as “there are many more computers per 1, 000 people than in the less developed countries such as those in Africa”. This particular research acknowledges that ICT development in terms of distribution in South Africa is lacking; hence, need for a balanced distribution between urban and rural areas (South African Institute for Distance Education , 2010:13).

Whoever, in efforts to ensure effective and efficient ICT adoption in the education sector in the developing countries’ like South Africa, numerous challenges are experienced such as, the high cost involved, lack of trained staff and frameworks, among others (Fundmen, 2010). This specific Programme under study has therefore played a major part in enhancing the educators ICT skills, specifically eSkills. Besides it has been commonly agreed that though a country like South Africa has one of the best policies in the world, it has also proved demanding when it comes to implementation these policies on the ground- which is a common scenario in developing economies. Henceforth, an existence of a policy doesn't imply an automatic execution. These challenges’ have partly resulted to low adoption of ICT’s in poorer parts of the country and in particular teacher-educators have not yet fully enjoyed the benefits of ICT in line of their professions. According to International Forum of Educational Technology & Society (2005), “educators should aim to use technology to enhance individual learning as well as to achieve widespread education and expect the technology to blend with their individual approach to instruction”. This may include an eLearning blended-learning course to enhance traditional face-to-face instruction; a course that can be marketed to other South African educators especially across rural-areas. Therefore, educators’ making efforts to acquire relevant ICT skills need be supported; and any generalisation on adult-educators being self-directed learners must be avoided. Literature has shown that adult learners also need online support so as to become self-directed learners, as discussed below.

Every learner young or adult is expected to take control of their own learning (traditional modes and online modes), as this promotes effective instruction and the achievement of set goals. This statement emphasised on the need for a “paradigm shift from instructor-led to learner-centered instruction”. This shift views traditional modes of instruction as no longer adequate in impacting new skills on learners (Grace, 2009:3; Collins & O'Brien, 2003). Traditional modes of instruction can be enhanced with online instructions; as online interactions have substantiated their relevance to the learners, due to benefits such as; in providing a platform for sharing of ideas among course participants, a good forum for discussing issues, provides opportunities for numerous ways of solving problems, and a consistent interaction is maintained within the online environments between instructor and learners-which is regarded as “the most essential component of any successful web-based course, as cited by Lim,1998 in (Grace, 2009:3). Thurmond & Wambach (2004) also views online “interaction as key to the success of distance learning”.

The researchers of this paper feel that, consistent interaction creates a strong support component which further can automatically encourages self-directed learning among the learners, especially when dealing with adult learners whom are not interested in technology as compared to younger generation. Interaction in this research Programme entailed what Thurmond (2003) called, an interaction among learners and facilitators, as “the learner’s engagement with the course content, and technological medium used in the course ,which results to reciprocal exchange of information”, (Thurmond and Wambach, 2004). Constant facilitation and support is also relevant as Lai (2011:98) maintains that, online learning still remains “relatively new domain of adult education practice and its advanced and unique features require adult learners to have some preparations and skills beforehand”. Though adult learners are described as more motivated to learn as compared to younger generations, having been “away from formal learning and having to adapt to the online learning environment can be quite challenging even for the most motivated and intelligent students” (Kelly, 2012). Therefore, adult learners need relevant motivation and support so as to become self-directed learners (SDL). Support is needed even more by those who have limited or no previous basic ICT skills and specifically in the application of relevant eTools.

The participants in this research had very limited basic eSkills which required the facilitators to commit on supporting them throughout the 3 phases. Such support enabled most of them to finalise their course as expected, though more time had to be added as majority had failed to meet the deadlines. Every course designer must therefore, acknowledge “that online learning support is an essential part of the online learning process in guiding learners and

providing feedback” as cited by authors such as Coomey & Stephenson, 2001; Oliver, 2001, in (Grace, 2009:4). Consequently, assumptions must not be made/generalised that every adult student is SDL; therefore those in charge need to investigate and make decisions on some of the key Pedagogical concerns of the target course participants for example; adult learners’ fluency and perception in using (ICT), basic literacy skills in ICT, and commitment to learning or Self-Directed Learning Readiness (SDLR). This will lead to a successful effectiveness of any online learning environments as well as face-to-face interactions (Lai 2011:98).

3. METHODOLOGY

This research entailed a case study of 29 Science teacher-educators (full-time working professionals) within the Bachelor of Education (Honours) Degree Programme, at UWC. These educators had to engage in a Computer-Based Education module; specifically the eLearning Design course, where they were expected to engage in the integration and use of eTools to enhance teaching-and-learning. The Design course was designed and structured into three (3) phases whereby each participant underwent two face-to-face training interventions (1 week each); and four (4) weeks active participation within an online environment.

Both qualitative and quantitative inquiry design were applied. Data was collected through distributing questionnaires prior to; during and after the face-to-face eLearning Design workshop. In addition, feedback from discussion forums related to the online phase of the course were analysed and documented.

The questionnaires were distributed and 29 participants responded to each. These questionnaires focused on: access to resources; resources and time management; skills/eSkills; competencies and attitudes; team work; institutional ICT capacity and previous teachers’ professional development. The retrieved information was valuable as the facilitators gained a better understanding of the participants’ skills and course expectations; as well as the benefits of the eTools for teaching-and-learning.

During the online phase an environment was created whereby the participants were expected to engage and submit formal tasks: respond to 11 discussion topics; develop an instructional strategy and planning document; and create a small online instructional event. The researchers analysed and reported on the responses and submission of tasks. Lastly, the researchers reported on the participants’ presentations which were recorded on the final day of phase 3. The educators were expected to demonstrate the affordances of the use of various eTools – in relation to their specific subject-matter.

Hence, the following discussions reflect the findings of the extensive facilitation and support of this blended eLearning Design Course that encouraged and motivated the working educators to become self-directed learners and complete the course.

4. DISCUSSIONS

The discussion below highlights five main categories, with related themes which are aligned to an existing body of literature. The structure of the blended eLearning course is discussed in detail to highlight a scaffolding support methodology which enabled the participants to complete and attain certification. The researchers identified the following themes: (i) structure: scaffolding approach for working educators; (ii) linkage between access to resources vs. time management, face-to-face interactions, competencies and skills, and team/group work relations; (iii) ICT capacity and previous teacher Professional Development (PD); (iv) communication and support; and (v) constant monitoring and evaluation.

4.1 Structure: Scaffolding approach for working educators

The course was designed and structured into three (3) phases whereby each participant underwent two face-to-face training interventions (1 week each); and four (4) weeks active participation within an online environment. This structure enabled the working participants to complete related tasks and inevitably attain certification. Scaffolding approach in course structuring has been found as one way of ensuring authentic learning tasks are in place, which enables students to both engage and “improve their learning experiences as cited by Herrington & Oliver 2000 in (Abraham & Jones, 2008:1).

4.1.1 Phase 1: Familiarisation and support

During phase 1, the facilitators focused on the preparation and support of the educators to enable them to engage within an eLearning platform and within Personal Learning environments (PLEs). Hence the educators were expected to complete digital components which would be integrated into their online classrooms, namely: a picture collage, digital photostory and an edited video (formative assessment tasks).

Despite a lack of internet connectivity during this phase, sixteen (16) participants managed to complete online tasks within the institutional eLearning platform, SAKAI (iKamva) – using their cellular/mobile phones and 3G cards. It should be noted that all participants managed to complete their offline digital components.

4.1.2 Phase 2: Substantive online engagement and support

During this phase, the facilitators focused on the creation of a scaffolding learning pathway which included discussion topics and practical tasks. Hence this approach enabled the educators to complete incremental milestones (assessment tasks); which inevitably assisted them to complete their formal assessment task. The ‘Creation of a small online teaching/instructional event’, focusing on the application of the eTools for their specific subject matter. Adult learners may be very motivated in taking an online course, but this exercise may face lots of challenges, hence need for constant support (Kelly, 2012).

4.1.3 Phase 3: Application and support

During this final phase of the Programme, the facilitators extensively assisted the participants with the final completion of their ‘small learning interventions’, as most of them had not completed as expected during the online phase 2. Hence the facilitators had to support the educators during this face-to-face workshop in order for them to: structure course content/learning material into manageable units of work; add relevant articles/reading material into online course resource folder; link relevant reading material to content pages; and embed digital media components (relevant graphics, videos, digital poster and digital story). In addition the online classroom had to include relevant discussion topics and assessment tasks.

Furthermore, the facilitators had to assist the participants with their final presentations for the last day of the face-to-face workshop. This assistance included the creation of narrated PowerPoints, video and digital stories. These final presentations were video-recorded; and contributed to their overall performance.

4.1.4 Relevance of designing a scaffolding learning pathway

The facilitators used a scaffolding approach, creating a learning pathway which included incremental milestones (completion of assessment tasks). These milestones were aimed at encouraging the working educators to achieve certification for the design of an online classroom. Vygotsky defined scaffolding as “role of teachers and others in supporting the learner’s development and providing support structures to get to that next stage or level” Raymond, 2000, cited in (Van Der Stuyf, 2002: 6).

4.1.4.1 Learning Pathway 2A: Creation and Application of Collages and Digital Stories

This learning pathway included 4 discussion topics and related practical tasks, which were aimed at assisting the educator to complete components that would be integrated into the final assessment task. “Learning pathways” refers to what and how students learn as they move towards their learning and career goals. As well as the subjects they choose, this learning includes the key competencies and the ability to manage learning and career choices” (New Zealand Curriculum, 2011:1).

The facilitators expected that the learning pathway would enable the educators to complete their components without difficulties. However, only 64% of participants responded to discussion topics; and submitted related tasks. Figure 1 represents the participation in learning pathway 2A.

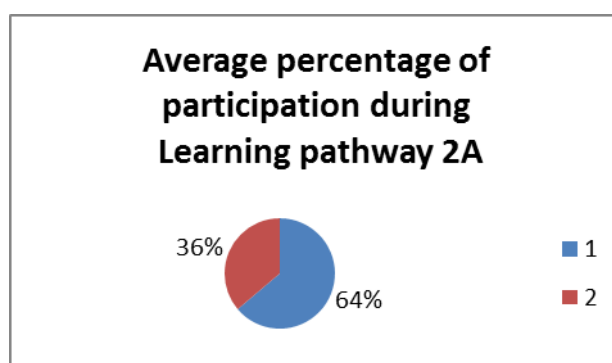


Figure 1: Participation during learning pathway 2A

4.1.4.2 Learning pathway 2B: Completing your final assessment task

This learning pathway included 7 discussion topics and related practical tasks, which were also aimed at the completion of an interactive online classroom. It should be noted that even though the facilitators enhanced the pathway

with instructional material (screen captures); only 71% responded to discussion topics and submitted related tasks. Figure 2 represents the participation in learning pathway 2B.

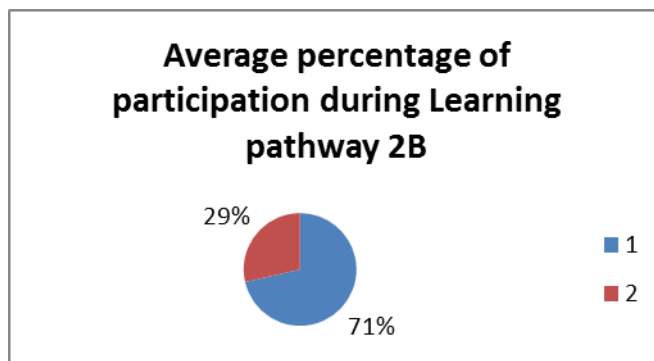


Figure 2: Participation during learning pathway 2B

The researchers highlight that the overall online participation was a success, as 69% managed to respond within discussion topics and submit related tasks. Moreover the facilitators observed that through the provision of a scaffolding support approach, the participants were able to commit and complete tasks.

4.2 Relating themes

This section aims to demonstrate to the readers' how the following themes: access to resources vs. time management; skills and competencies; face-to-face interactions; and team/group work relations relate to each other and influence participant commitment.

4.2.1 Access to resources vs. time management

The availability of resources had a direct impact on time management and commitment to online course participation. The prior-learner questionnaire reflected on ICT capacity. Eighteen (18) respondents had internet-connected computers at home; while 10 participants had home computers with no internet access. It should be noted that only 1 participant stated that he/she had no access to a computer and internet.

In addition, the prior-learner questionnaire reflected on issues related to time-management. Seventeen (17) respondents made effort to meet submission deadlines; whilst 12 respondents stated that they could not manage their time optimally.

Furthermore, the availability for personal study time was addressed. Twenty-six (26) respondents indicated that they were able to commit between 0 – 7 hours per week; whilst 3 respondents indicate 8 or more hours per week. However, the post-questionnaire confirmed the observations made by the facilitators, indicating that most participants were only able to commit 2-4 hours per week. A lack of resources also had a direct impact on the competencies and skills of the participants.

4.2.2 Skills and Competencies

The prior-questionnaire indicated that 98 % of the participants were able to make use of basic word processor functionalities. However, only 14 responded that they were able to upload files (basic word processing skill).

Additionally the prior-questionnaire indicated that only 4 respondents were able to take on troubleshooting issues. Twenty-two (22) participants indicated that they would need assistance. Requested to comment on the quality of their reading skills, 12 respondents indicated that they had good reading skills; 16 respondents described themselves as fair readers; whilst 1 respondent described him/her as a poor reader.

If educators have the necessary ICT competencies and skills, their teaching methodologies will be enhanced, as ICT is seen as an important component in “the future of education (Bingimlas, 2009:1). Hence, “during the teaching and learning process, that means blend it in education, not put it at the centre of education” (Trucano, 2012). Moreover, Torgesen (Undated) reflected on the importance of good reading skills for adult learners. A lack of necessary competencies and basic skills impacts the face-to-face interaction and facilitation.

4.2.3 Face-to-face interaction

Participants’ prior-learner questionnaire established that 24 respondents placed relevance to face-to-face interaction. They stated that face-to-face interaction always has a place during learning interactions. As a result during the face-to-face phases the facilitators reported that 100% of the participants sought for assistance/support from the facilitation team; to complete milestones.

Face-to-face interaction has for a long time received positive responses by different course participants in different regions across the globe, for example research carried in the University of Melbourne, in the department of Informing Science Institute, students interviewed emphasised on relevance of face-to-face communication as the most motivating reason when it comes to selecting preferable program model (Miliszewska, 2007:1; Shackelford and Maxwell, 2012). Face-to-face interaction offers participants’ opportunity for group relations.

4.2.4 Team/ work group relations

Twenty (20) respondents indicated that they preferred working in groups as it provides an opportunity for sharing of ideas. On the other hand 9 respondents preferred working independently. A team is defined as work group or unit that aims at working “with a common purpose through which members develop mutual relationships for the achievement of goals/tasks” as discussed by Harris and Harris, 1996 cited in (Luca & Tarricone, 2001:369).

Working in groups might not directly mean experiencing good relations. As a result, participants were also asked to comment on how they relate with their colleagues. Twenty-eight (28) respondents reported that they value good working relations with others colleagues. Evaluation reports indicated that, the facilitators observed high levels of participants’ work-relations during face-to-face phases.

The above discussions have demonstrated the linkage between: access to resources vs. time management; competencies and skills; face-to-face interactions; and team/group work relations relate to each other and influence a participant’s commitment. The Figure (3) below represents a graphical summary of the responses.

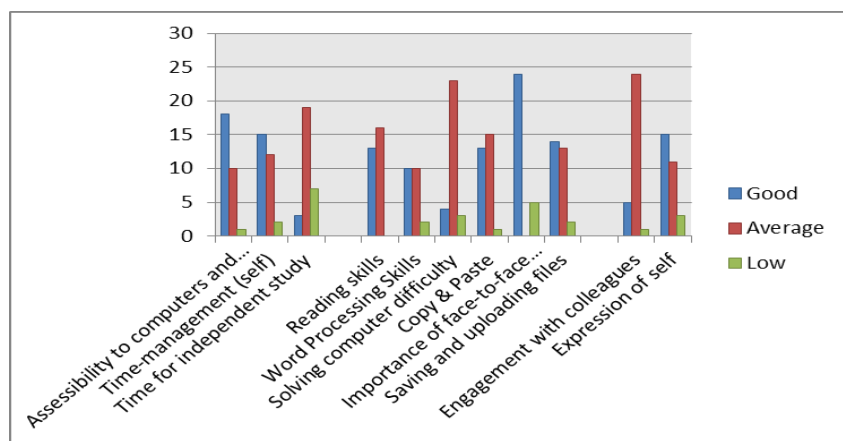


Figure 3: Graphical presentation of responses.

4.3 ICT capacity and previous teacher Professional Development (PD)

Participants were from 21 different secondary schools in Mthatha such as, St. James Senior, Mcobohoho, Khanya Naledi Combined School, Ntukayi Senior, Nomaka Mbeki Senior, Badi Senior and Msobomvu. These educators had access to various ICT resources (refer to Table 1).

ICT Resource	Available?	Not Available
Desktop/laptop computer for work use	21	5
Personal email account	25	1
School intranet	3	23
Internet	9	17
Printer	24	2
Digital cameras	9	17
Technical support	9	19
Digital projectors/interactive whiteboards	7	19
Desktop computers for student use in your classroom	17	20
Desktop computers for student use elsewhere at school (eg. computer lab)	6	13
Laptop computers for student use	2	24

Table 1: ICT resources available within schools

The table points to a minimal state of ICT resources within the secondary schools. However, this blended eLearning Programme provided the educators with a basket of Open Source eTools, making them less dependent on the school resources. The eTools and attained eSkills enabled the creation of teaching-and-learning objects to enhance their face-to-face instruction. Moreover, these eTools also enable the educators to effectively conduct administrative and reporting duties; for example “new innovative technologies can help schools’ improve the quality of administrative activities and processes” (infoDev, 2010:8).

In addition, the educators had been engaged in various PD Programmes. However, none of the participants had engaged in an eLearning design course, focussing on the infusion of ICTs. Instead, 80% of the respondents indicated they had been exposed to basic computer literacy skills Programmes, funded by the Department of Basic Education or self-funded initiatives.

According to Harwell (2003), PD should not be a once-off activity, rather entail continuous events. Thus the lack of ICT resources did not hinder this PD Programme. The provision of Open Source eTools by the CIECT team enabled the participant to achieve milestones independently (i.e. not dependant on school resources).

4.4 Communication and support

Constant communication and support was maintained throughout the Programme, through various modes of delivery such as, uploaded instructional manuals; discussions forums; telephonic support and emails. For example, regular emails were sent on a weekly basis to remind participants about submissions; and also entailed instructional manuals related to the completion of specific practical tasks.

“Dear educators we are currently in the sixth (6) week of the Design an Online Teaching/Instructional Event online phase. By now you should have submitted your posters and digital photo stories and we thank those who have contributed in the discussion forum thus far. We would like to encourage you to continue to visit the iKamva site (<http://ikamva.uwc.ac.za>) in order for you to complete the final assessment task”.

Providing appropriate support for participants was critical, especially during the online phase, as they were expected to work independently. Sims, 2000 (cited in Sims, Dobbs & Hand, 2002:515), maintains that “in addition to the typical help systems, announcements and guides, a more explicit support is required to bring the learners’ into the online

environment, especially by eliminating assumptions that learners' will know what to do and why they are doing it". Constant communication and support encouraged the participants to achieve milestones; and moreover demonstrate they could achieve this independently (working online within their specific environments).

4.5 Constant monitoring and evaluation

Facilitators continuously monitored and tracked the progress of each participant as they proceeded through the learning pathways (1 – 3). An average result of 58% was recorded for the completion and submission of practical tasks, online engagement and oral presentation during the final face-to-face session. However, 3 participants did not complete the Programme, due to 1 participant only engaging in the final face-to-face session; and the others only engaged in some online activities. Most (99%) participants created online environments, which included elements of structure and lesson plans. It should be noted that only 8 participants managed to create relevant links to resources; only 9 participants setup online assessment activities; and only 4 participants managed to setup an online discussion environment with relevant topics linked to subject matter.

According to the analysis of the evaluation questionnaires, respondents indicated that the basket of eTools received during the Programme would benefit these educators. eTools within the LMS and PLEs (picture collage, digital photostory, and narrated PowerPoint and youtube videos) were acknowledged as very beneficial for the enhancement of face-to-face teaching.

Continuous monitoring and evaluation entailed extensive support processes by the CIECT team, which motivated the participants in completion of their milestones. The goal of monitoring and evaluation is to observe progress and explain change (Wholey, Hatry & Newcomer, 2010).

The above discussions reflect on the continuous monitoring and communication which entailed considerable commitment and support by the CIECT team, motivating these educators (full-time working professionals) to complete tasks; and moreover enabling them to become self-directed learners within interactive online environments.

5. PROGRAMME CHALLENGES

Both participants and facilitators faced challenges during the training Programme phases. During the face-to-face phases, the lack of internet connectivity impacted largely on the interactive participation. Even though, the participants were expected to bring along necessary resources (3G cards, laptops, flash-drives and relevant content related to their subject-matter); only a few participants could access and create online environments during this phase. Hence, the workshop was described by participants as very costly as they had to purchase data-bundles in order to access the online environment via their mobile cellphones.

It should be noted that the main challenges which impacted the Programme were experienced during the online phase, as the participants were expected to engage in discussion topics and submit tasks. Despite the facilitators continuously supporting the educators through various modes of delivery (uploaded instructional manuals; discussions forums; telephone support and emails), most of them failed to meet submission deadlines. This led to the extension of the time-frame of the Programme; and added to the extensive support by the CIECT team.

Also if a participant was not computer literate, it impacted on the attainment of advanced eSkills (creation and embedding of digital stories; posters; podcasts; videos into an online environment). Thus, the participant required extensive assistance with basic functionalities, such as copying, pasting and downloading instructional materials.

6. CONCLUSION AND PROGRAMME RECOMMENDATIONS

The research paper has reflected on the relevance, impact and lessons learnt of the blended eLearning course, 'Designing an Instructional Event' for educators (full-time working professionals). The successful completion rate of the course is highlighted due to the extensive facilitation, motivation and support by the CIECT team. Additionally, a scaffolding support methodology further enhanced the participants to actively engage in both the face-to-face and online phases of the Programme. The Programme was aligned to PD for educators (full-time working professionals); and structured to enable them to become self-directed learners.

The researchers recommend that more time should be allocated to the face-to-face training phase as it requires extensive facilitation and support methodologies. Furthermore, a dedicated support team is required to follow-through from conceptualisation to delivery of the Programme. In addition, there is a need for continuous Professional Development (PD), specifically, the infusion of ICTs into the curriculum. This will enable full-time working professionals -educators to attain eSkills; and apply the effective use of eTools to enhance teaching-and-learning.

It is important that the Government, in collaboration with other stakeholders (Civil Society, Business and HEIs), invest optimally in ICT infrastructure and relevant PD training Programmes. Hence, this research paper will be followed by a comparative research study, focusing on the delivery of the blended eLearning Programme, in an urban and rural setting.

The researchers stressed that through the effective design and implementation of a blended eLearning Programme; full-time working professionals -educators will be able to select relevant eTools for effective teaching-and-learning within their various disciplines.

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