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Online Teacher Professional Development in ICT Integration in Tanzania: An Experience Report

Lucian Vumilia NGEZE* & Sridhar IYER
IDP in Educational Technology, Indian Institute of Technology Bombay, India
*lucianngeze@iitb.ac.in

Abstract: Integration of Information and Communication Technology (ICT) in teaching and learning in schools has been hindered by many barriers, including lack of in-service teacher training, teacher beliefs and lack of infrastructure. In the effort to solve the challenge of teacher training in Tanzania, few in-service teachers, based on different parameters, are selected to participate in the face to face ICT training at the specified training centre. Scaling of such teacher training initiatives has been challenging over time. To reach more school teachers, we developed a ten-day online course, run over Moodle. A total of 134 teachers from all the regions of Tanzania registered and participated. Topics were developed based on the preference of the in-service teachers. Online surveys were used to collect qualitative and quantitative data before and after the course. Teachers were active during the duration of the course and many of them applied the skills in their schools by improving their teaching strategies, use of technology tools and sharing experiences with other teachers in their schools.

Keywords: Online course, ICT integration, teacher professional development, scaling.

1. Introduction

While governments and other stakeholders are merging efforts to integrate technology in schools, there are many barriers that have been highlighted to hinder effective integration. Ertmer (1999) identified two barriers: factors that are extrinsic to the teachers themselves such as lack of equipment, time, and lack of teacher training on ICT, and support from the management; and factors that are intrinsic to teachers such as attitude change.

Training teachers on ICT integration in Tanzania has been done on face to face mode, where selected in-service teachers meet at a training centre to be trained on a number of ICT modules over a period of intensive 5-10 days. In many cases, transfer of learning does not happen. To solve this, Tsai and Chai (2012) suggested designing topics that are relevant for immediate application, with activities that help in designing technology-enhanced lesson planning. However, to have a larger number of teachers, disruptive technologies such as MOOCs can come into the picture.

Despite the growing interest of MOOCs for Teacher Professional Development (TPD), implementation in the context of developing countries such as Tanzania has not taken place. Liyanagunawardena, Williams and Adams (2014) pointed out that varied levels of access to digital tools, ICT facilities; differences of language and accent from one country to the next are barriers to adoption of MOOCs in TPD in developing countries. We developed an online course with topics to help teachers in integrating technology in their teaching and learning. Online courses can be in different formats: synchronous, asynchronous and blended (Elliott, 2017). Advantages of using online learning for teachers include reflection on their practice (Rienties, Brouwer, and Lygo-Baker, 2013); participation in discussions about their practices (Rodesiler, 2017). To solve the challenge of diversity for teachers participating in global MOOCs for TPD, contextualization of the courses is important. This led to a need to develop a local online course to train teachers on ICT integration. This research was guided by the following research questions (RQs):

i) What are the perceptions of teachers on the usefulness of the online course for their professional development?
ii) How do teachers intend to apply their learning from the online course?

iii) To what extent have the teachers applied their learning from the online course in their own practice?

2. Methodology

2.1 Online Course Design

Course design started with a needs analysis survey form for school teachers to suggest topics they would like to be trained on during their June 2018 vacation. This was done to 1) ensure that the selected topics were relevant to most of the school teachers who filled the survey, and 2) allow the different school teachers teaching diverse subjects to participate in the course. A total of 303 school teachers responded to the online survey mentioning up to three topics each. Analysis of the responses gave a total of 19 different topics. The first 8 topics with the highest frequencies were selected. We then developed a 10-day online course named "*Online ICT Course for School Teachers*".

The course consisted of short videos (4-8 minutes) with reflection spots which required participants to respond to questions related to the content. Each topic was followed by a short quiz to test understanding and a discussion forum with a focus question to guide the interactions. The course was run on MOODLE learning management system, from June 15 - 25, 2018. Videos were uploaded on YouTube Channel named *Tehama Shuleni*. The flow of the topics covered is shown in Figure 1.

Day	Topic (Session)	Purpose
1	Introduction to ICT	Basics of ICT, technology integration models
2	Electronic devices in teaching and learning	Use of smartphones in teaching and learning
3	Internet Connection to laptops and mobile phones	Internet sharing
4	Internet Browser and browsing	Searching for educational content
5	Live Session using YouTube Live	Use of live interaction tools
6	E-mail Basic operations	Compose, reply, forward, include attachments to email.
7	Use of visualizations (videos, animations and simulations)	Effective use of visualizations in teaching and learning
8	Online Collaboration tools	How to collaborate in the online environment
9	Teacher professional development through MOOCs	Introducing MOOCs to teachers
10	Live Session using YouTube Live	Answering questions and concluding the course

Figure 1: Selected topics and their purpose

2.2 Procedure

Information about course starting was shared among teachers' networks. They registered and enrolled into the course. The instructor changes the role to the researcher during analytics and reporting of findings. Before the course started, the instructor developed needs analysis and entry surveys; deigned the course, customized MOODLE platform and uploaded contents. Participants were required to complete course modules, interact with peers in the discussion forum and participate in live interactions. Impact analysis and learning analytics were done by the researchers after the course duration.

2.3 Sample Characteristics

A total of 134 teachers, majority with 4-10 years of experience; teaching different subjects from sciences, business and arts; majority aged between 31-40 years; from all the 26 regions of Tanzania mainland registered and participated in the course.

2.4 Data Collection

Data were collected using online course entry survey, course end survey and impact evaluation survey. Entry survey consisted of open-ended questions and few scale questions intending to find out subjects taught, teaching experience, and purpose to join the course while exit survey had some questions to measure the usefulness of the course, plan to use the knowledge and confidence to teach the topics. An impact evaluation survey was conducted at the end the two months after the training to collect data on knowledge application in schools.

2.5 Data Analysis

Quantitative analysis of the closed-ended questions was performed to generate frequencies and scales that were needed for determining research constructs such as usefulness and confidence. *interactive Stratified Attribute Tracking (iSAT)* was used to show the proportions of the different strata to one or a combination of the desired attributes of the course (Majumdar, Alse, & Iyer, 2014). iSAT is an interactive visual representation tool developed at the Indian Institute of Technology Bombay is to highlight transitions in a dataset.

Thematic analysis, following Braun & Clarke (2006), was applied to open-ended questions from all the three surveys to identify patterns. Each participant's response was taken as the unit of analysis. We first read all the data from participants to understand their responses. After familiarization with data, categories of responses that had the same meaning were generated. This made it easier for us to create six themes from the categories. These themes were then reviewed to make sure that there are not equal with the same meaning. Finally, we defined the last four themes that are presented in the result section.

3. Results

Results of the three research questions are explained in this section.

RQ1: What are the perceptions of teachers on the usefulness of the online course for their professional development?

At the end of the course, we asked about its usefulness on a scale of 1 to 5 where 1 means Not Useful at all and 5 means Most Useful. 95% of all the participants found the course useful. However, 76% of the participants with 4-10 years of experience found the course very useful. This could be due to the way topics were selected taking into account diversity and applicability. The variation is shown in Figure 2.

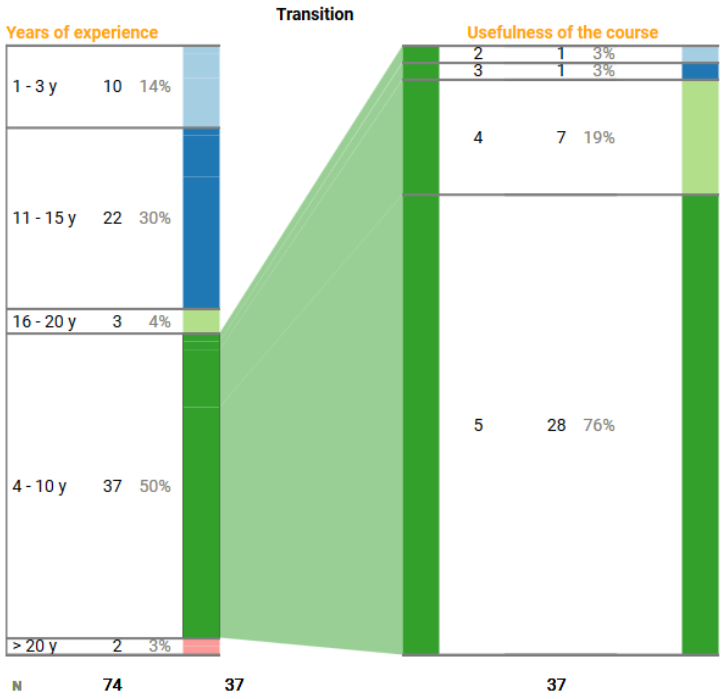

Figure 2: Usefulness of the course

RQ2: How do teachers intend to apply their learning from the online course?

Participants suggested different approaches to use the knowledge from the course. Figure 3 provides a variation in age group, usefulness and plan to use the knowledge gained. 57% of those who said the course to be very useful planned to start using some technology in some activities during teaching and learning while the rest thought of improving their teaching and sharing with teachers in their schools.

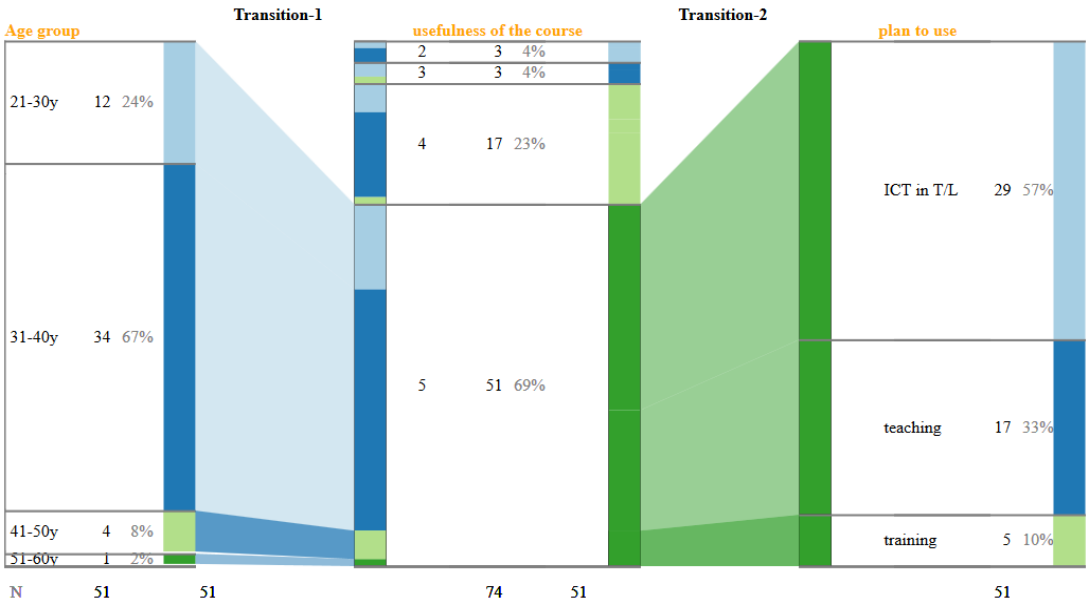

Figure 3: Approaches to use knowledge from the course

RQ3: To what extent have the teachers applied their learning from the online course in their own practice?

Two months after the course, we conducted an online evaluation to find out the impact of the course and how participants might have applied the knowledge from the course in their own settings.

Thematic analysis was applied to the open ended question and generated four major themes. Majority of the participants who had access to the Internet used visualizations (animations, videos and simulations) in teaching different abstract concepts. Figure 4 shows the themes and the voices from participants.

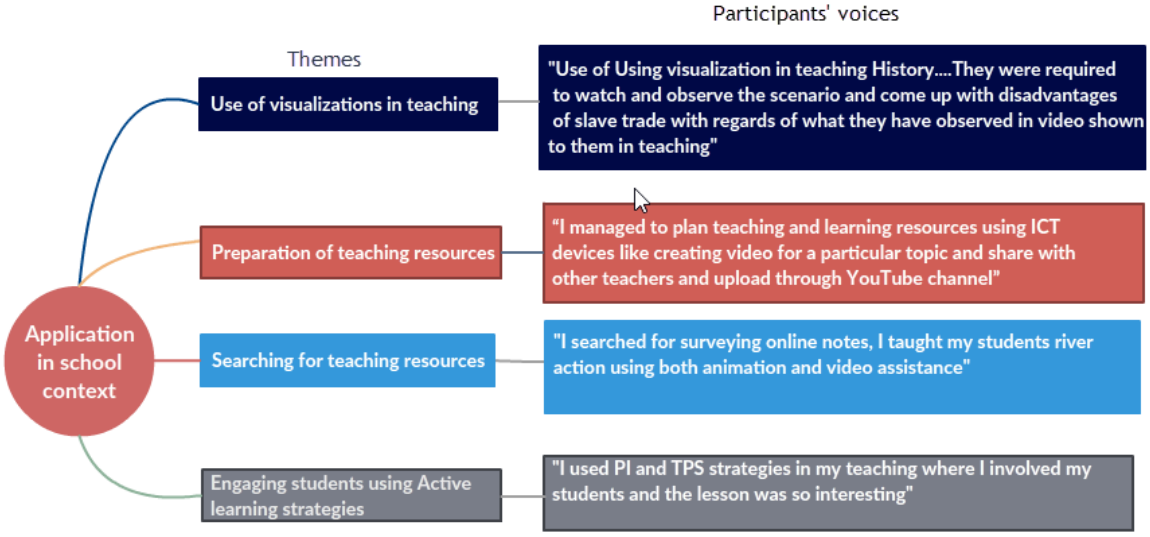

Figure 4: Themes generated from analysis of open-ended application questions

4. Discussion and Conclusion

This work presented an online course that extends the training of teachers to scale the formal face to face teacher training sessions in Tanzania. The design of the course involved teachers in the selection of relevant topics. This was one of the motivating factors to participate in the online course. It also helps to increase the course completion rate. The findings show that Training teachers on ICT integration is a step towards teachers' growth and improved teaching practices.

With 82% of the participants being new to online courses, interactions among the course participants in the discussion forum were during the course were high. The fact that participants knew that they would receive completion certificates kept them working hard. The first research question as shown that 95% of all the participants found the course useful. This level of satisfaction is consistent with the work by Nir and Bogler (2008) which says that teacher satisfaction with professional development courses is an important factor in transforming knowledge. This can be attributed to the fact that the teachers were involved in selecting the topics to be covered (Ketelhut, 2006), and hence making it relevant to the participants.

Previous studies have shown that demographic differences between teachers (age, years of experience) have an influence of teachers' readiness to use technology (Inan, & Lowther, 2010). However, in this case, teachers planned to use the knowledge in many ways: in teaching and training others and improving their teaching practices. This implies that, as long as the course is relevant to the participants, they can be able to transfer the learning in their contexts.

It is always important to evaluate the transfer of knowledge that happens after teachers have completed a professional development activity. Course impact evaluation was done two months later. Milheim (1994) pointed out factors such as structuring expectations and establishing awards as ways to increase learning transfer. In this regard, participants transferred the learning to their own schools in many ways including preparation of teaching resources and improving their own teaching practices. Depending on the course objectives, this study therefore suggests that evaluation of online courses need to be done as long as the number of participant is not massive.

Contextualization was implemented in two ways: topic selection and language. Course topics were suggested by the teachers and this ensured that those with the highest frequency were used in the design and development. On the other hand, participants followed up the lessons with ease since they were familiar with the language accent of the course instructor. In this way, participant diversity in the online course can be addressed and hence leading to effective learning.

5. Conclusion

Online courses, if well designed, based on the needs of the teachers, can help in improving teaching practices at the same time improving the performance of students. This course has shown that teachers are excited to learn specific topics of their choice in the online environment. They have, however, been able to transfer knowledge from the course in their teaching and learning activities. Another finding is that using the available resources such as smartphones, TPD initiatives can be extended to reach teachers who are in under-resourced schools. These online courses also open doors of sharing experiences among teachers across different subject domains. Through this course, teachers in Tanzania continue sharing experiences through their social groups and YouTube channel. This brings up a professional learning community of teachers making them grow professionally. Overall, this research shows that contextualization reduces the level of diversity and hence learning is enhanced. Future research work would look into how online courses can be deployed to benefit in-service teachers at large scale in the local context.

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