Chapter 4
Teachers Co-creating for Teachers: Design and Implementation of an Online Teacher Professional Development Course in Sub-Saharan Africa

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Abstract As schools closed during the Covid-19 pandemic, different digital platforms were available for remote teaching. However, the majority of the school teachers were not trained on how to use different digital technologies to continue their teaching. Rather than waiting for technology experts to provide such training, one approach is co-creation, that is, to identify teachers who are adept at using technology in their teaching and mentor them to create materials for training other teachers. Co-creation is collaborative and is created by peers and hence easier for adoption. This chapter reports on a four-week online course developed by co-creators (teachers mentored by a trainer) for school teachers (course participants). The course aimed at introducing participants to different electronic and digital technology tools to engage students remotely. Selected teachers co-created the lessons, activities and resources, including guidelines, tips and procedures that participants could use while preparing their own lessons. Participants reflected on how the course changed their mindset in using different technology tools and how they were able to engage students during and beyond the course duration. A model to engage teachers as co-creators and co-facilitators of such training programs evolved.

1 Introduction

The closure of schools due to Covid-19 affected approximately 1.7 billion students who then had to keep learning even from their homes (Organisation for Economic Co-operation and Development, 2020). Ministries of Education in different Sub-Saharan African countries tried different approaches to continue remote teaching (Association for the Development of Education in Africa Report, 2020). These

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approaches helped to engage students whose families could afford tools and equipment with support from their parents/guardians (Belay, 2020). However, many schools did not manage to engage students because of reasons such as poor Internet connectivity and lack of teacher training to use technology (Dube, 2020). While some teachers managed to engage students using technologies, mostly mobile apps and other tools (Dzinamarira & Musuka, 2021), many teachers were left behind as they did not have knowledge of the available technologies to engage students (Association for the Development of Education in Africa Report, 2020).

In order to address this gap, the authors who are also the mentors decided to use their expertise as faculty members. As teachers with training abilities in technology integration in education from the region, they both engaged school teachers to design, develop and implement a professional development online course. They aimed to respond to two evaluative questions: (1) What are the teachers' experiences when learning from a co-created online course for teacher professional development?; and (2) What are the experiences of the co-creators of an online course for teacher professional development?

The course was carried out in two phases, each phase focusing on different aspects of the course. In the end, a proposed model for designing such training programs evolved.

2 Phase 1: Creation of the Course

2.1 Teachers' Experiences and Needs Assessment

The first step in the first phase of this course was to identify activities that teachers were engaged in during the pandemic and determine the topics on which there was a need for training. Teachers were surveyed by asking "What are you doing during this Covid-19 pandemic when schools are closed?" A total of 735 (502 males and 233 females) teachers from different Sub-Saharan African countries responded to the survey. It was found out that 99.3% of the total participants possessed mobile devices (smartphones, or tablets) which made it easier to access the online resources. Some of these respondents engaged students using electronic broadcasting systems, while other teachers started using mobile apps to share learning resources with their students and others mentored other teachers. Some teachers said that:

"*I am working at home and I tried to help children by using online, radio and TV programs for teaching*", Rwanda English primary school teacher.

"I am preparing questions and answer to send to my pupils and they answer and send back to me to mark them through WhatsApp", Tanzania primary school Mathematics and ICT teacher.

"*I am mentoring teachers remotely and calling in and students to the progress of their assignments*", Liberia school teacher.

These respondents acknowledged where help was needed and knowledge of technology tools in these times would help.

Having known what teachers were engaged in, the next activity was to complete a needs assessment. The responses produced five topics to be offered over 4 weeks (1) the use of radios and television at home showed a need to develop a topic on distance education technologies and effective ways they can be used; (2) the possession of smartphones by most teachers meant that there was a need to include a topic on how to use smartphones in teaching and for professional development; (3) the sharing of resources using mobile apps such as WhatsApp implied including a topic on mobile apps in teaching and learning; (4) a topic on emotional intelligence was introduced as a way for teachers to address the well-being of their students, and (5) a need to learn how to create activities that engage students on the content led to the final topic on techniques to engage students. Table 4.1. shows the weekly topics and the goal of each topic.

2.2 Course Co-creators

The second step was to identify teachers who had the requisite expertise to deliver the topics. For this purpose, an online Google form was shared among teachers to identify names of volunteering teachers to develop resources and activities for 1 week. Questions asked about teaching experience, experiences with online courses, experience in recording video lessons, their experience of using mobile apps (Edpuzzle, Padlet and Google form) in teaching their classes, and their availability to engage participants in the course. Each teacher was allowed to select only one topic from Table 4.1.

Twenty two teachers responded to the survey and they were selected against the following criteria.

1. At least 5 years of teaching experience;
2. Completed at least 2 online courses and

Table 4.1. Weekly topics and goals

Week	Topics of the week	Goal
Week 1	Distance educational technologies To engage students remotely	To introduce teachers to distance education technologies commonly found in households
Week 2	Smartphones in teaching and Professional development	To find ways to effectively use mobile devices in class and for their professional development
Week 3	Mobile apps for teaching and Learning	To use the differently available mobile educational apps in teaching and learning
Week 4A	Emotional intelligence for Educators	To use emotional intelligence in controlling emotions and promoting Well-being
Week 4B	Techniques to engage students	To use active learning strategies while teaching

3. Experience in recording videos using mobile phones.

Moreover, motivation to volunteer and availability to engage participants online for the duration of the course was determined through close-ended questions on the Google form. Three teachers from Tanzania were selected as the course co-creators.

- Teacher A, Geography and ICT secondary school teacher who developed content for the topic Smartphones in Teaching and Professional Development (offered in Week 2) and Mobile Apps for Teaching and Learning (offered in Week 3).
- Teacher B, Geography tutor who taught the topic Emotional Intelligence for Educators for Week 4A.
- Teacher C, History and English secondary school teacher who developed and taught the topic Techniques to Engage Students (for Week 4B).

2.3 Course Design and Development

The third step was to mentor the co-creators to produce the online course. Table 4.2 shows the activities performed in 2020 by both the mentor and co-creators at different stages.

The mentor carried out multiple online orientation meetings to help the co-creators develop their topics. An introduction to online courses, their components and topic selection were discussed in the first orientation meeting. This meeting helped the co-creators understand the different components of an online course and why each topic was selected. After the orientation, the co-creators recorded their video lessons with video editing being completed by two multimedia experts.

Table 4.2 Activities and duration of the co-creation process

Activity	March	April	May	June
Phase 1 – Co-creation Process				
Needs Assessment - Gather details from expected participants, requirements and expectations				
Identifying co-creators from the shared online survey				
First orientation meeting – mentor action				
Lesson content design and sequencing				
Lesson video recording and editing				
Second orientation meeting – mentor action				
Creating activities and assessment by co-creators				
Phase 2 – Online Course Implementation				
Moodle Customization and Course Setup				
Third orientation meeting – mentor action				
Course Start				
Course orchestration – both mentor and co-creators				
End of the course				

Each grey-shaded box indicated the time (month) in which that activity took place

The second orientation meeting aimed at equipping co-creators with skills to design learning activities. These included video lessons followed by practice questions on how to use specific mobile apps in teaching. Others lessons were on how to effectively engage participants in discussion forum and setting up weekly graded quizzes. The third orientation meeting focused on how to engage participants in the course activities, initiating and extending discussions in the discussion forum, responding to questions from participants in the course WhatsApp groups.

To engage participants in the course, the learner-centric MOOC (LCM) model was used in the design (Murthy et al., 2018). The learner-centric MOOC (LCM) model guides MOOC developers through the process of conceptualizing, creating and conducting online courses. The model consists of structural elements: video lessons, practice questions, discussion forums, additional external learning resources and course orchestration dynamics. It provides a set of guidelines, activity formats and actions that developers can apply during various stages of the MOOC design process to create different elements for their courses.

As recommended by the LCM model, each video lesson was followed by three ungraded multiple-choice questions for immediate practice; one discussion forum thread was set for each week followed by a reflection quiz with questions from the discussion forum; and two external resources (videos, research articles, web pages) per week followed by an assimilation quiz with questions from the given resources. The knowledge quiz consisted of questions from all of the weekly lessons.

At the end of Week 4, a collaborative group activity was given to participants. 183 participants divided into 27 groups, each with six to seven participants in the activity. Participants were required to develop a lesson plan highlighting the use of different technology tools to reach their students; select mobile apps to engage students and to register for a relevant MOOC course.

Using co-created guidelines for a lesson plan, 80% of the groups worked on the activity by collaborating online and each submitted a group report and a video summary of how the activity was completed. Some video submissions from participants were uploaded on a YouTube channel named Teachers Learning Hub (2021).

2.4 Resources Generated During Co-creation

The three co-creators collaborated online to develop guidelines, tips and procedures. The co-creators conducted collaborative meetings to discuss the resources. When a resource was ready it was shared with the participants as an activity for them to work on and submit. Table 4.3 highlights the questions involved in each meeting and the subsequent resources generated.

Table 4.3 Questions used during co-creation

Question	Owner	Resource
How best can Edpuzzle app be used by teachers to create quizzes?	Teacher A	Guidelines
How can knowledge of emotional intelligence help teachers to instill a growth mindset	Teacher B	Tips
How can teachers increase student engagement using strategies such as Quick Write and Polling?	Teacher C	Procedures

Fig. 4.1 Countries where participants come from

3 Phase 2: Implementation of the Course

3.1 Course Participants

The course was configured in Gnomio, a free hosting service for Moodle users. A total of 270 teachers were enrolled into the course. Tanzania had a highest enrollment (78.02%) followed by Ghana (8.38%), Rwanda (6.56%), Nigeria (2.13%) with the rest occupying 4.93%. Fig. 4.1 shows the locations of the participants in this course. Participants were enrolled in the course based on the emails they submitted during registration. They went through the video lessons, did questions and quizzes. They also completed assignments and activities that were part of the assessment of what they learned. As the course was running and participants were doing activities, the co-creators changed their roles to become co-facilitators. Facilitators provided responses to their questions in the discussion forums and in the various WhatsApp groups.

3.2 Participants and Co-creators Experiences

In total, 218 participants submitted at least one assessment activity. Certificates of Completion were given to the 107 participants who participated in the discussion forum more than twice and with at least 50% of the total course score. Certificates of Participation were awarded to the 51 participants who participated in at least two discussion forums and scored between 25%–49% of the total course score.

Course completion rate (the number of participants who passed the course divided by the total number of registered participants in that course) is 58.5% while persistence rate (the number of participants who passed the course divided by the number of active participants) is 72.5%. Compared to the 5–10% completion rate of major massive open online courses (Gillani & Eynon, 2014), the high completion rate from this course implies that participants of this course found it useful and may have engaged more in the course.

Understanding the participants' experiences as demonstrated by their achievement, readiness to co-create and level of application of their learnings was determined by end-of-module survey. A total of 118 participants responded and were analysed using thematic analysis (Braun & Clarke, 2006).

A Linguistics and Literature in English secondary school teacher in Tanzania explained the change as he said: "*Now I can prepare and teach the lesson via television, radio, and other educational apps like Edpuzzle, Google classroom, Padlet and to create quizzes via Google form*".

The response of a kindergarten teacher in Ghana who says, "*I never knew I could even download an app until I joined this course and I have gained a level of understanding when it comes to using the smartphone*" shows that, teachers have realized teaching-related uses of smartphones, apart from using them for communication and socialization.

One teacher reported that "*After learning this course, I started to engage my students through padlet. I instructed them how to use it and we started to use it*".

When asked how they had engaged students after the course, it was found out that 66.7% of the course participants made immediate application of knowledge and skills to their students. 12.8% did not have a chance to apply their learning as schools were still closed. Despite the challenges such as the closure of schools, lack of devices and network challenges, 20.5% of the participants planned to start using some technology tools in engaging students when schools open. The work done by the co-creators, through their guidelines, tips and procedures for different activities helped participants continue learning.

Co-creators reflected on their experiences of creating resources. One co-creator said: "*Becoming a content creator and an online facilitator needs one to have a passion and good mentor to encourage him*". Another co-creator stated: "*I learned a lot how to create videos, questions, and group work activities. I also learned how to share experience and knowledge with others. Use of various digital tools such as Padlet, Edpuzzle in teaching and learning*". It implies that the experience from co-creation created opportunities for the co-creators to learn and share with others. The

last co-creator expressed commitment and tolerance as key to becoming a co-creator, by saying "*This process needs consistence and tolerance. Someone must dedicate his/her time to make sure the mission is successful*. These reflections imply that the mentorship sessions were helpful to make them grow in creating resources.

4 A Model to Engage Teachers as Co-creators

The design, development and implementation of the online course led to a model on how teachers can become co-creators and eventually facilitators of an online course. The model is called *Teacher Co-creator Facilitator (TCCF) model (see* Fig. 4.2). Each of the nine stages is explained below:

Stage 1—Mentor identification: The mentor guides the completion of the activities in the model.

Stage 2—Needs Assessment: A needs assessment survey is completed to identify what resources are available with teachers and the knowledge and skills gap that needs to be addressed.

Stage 3—Topic Formation: The relevant needs from the survey responses and forms the topics that will be developed into a course.

*Stage 4—Co-creators Identification: T*eachers with the desired criteria are identified to develop the topics.

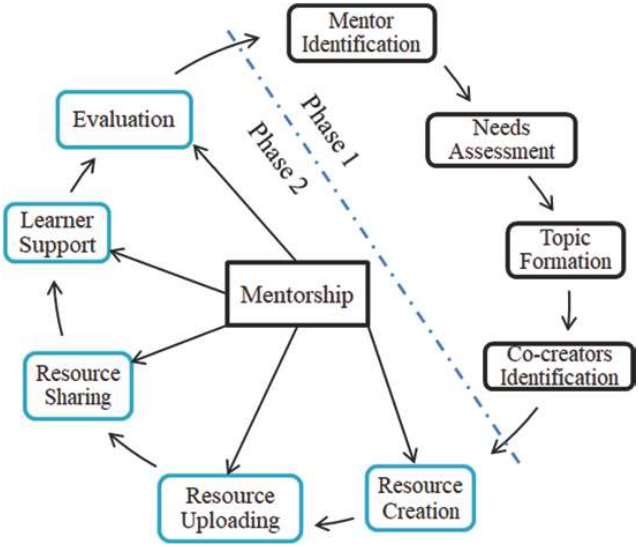

Fig. 4.2 TCCF model

Stage 5—Resource Creation: The mentor helps the identified teachers in creating content, resources and activities for the course participants.

Stage 6—Resource Upload: The mentor guides the co-creators in setting up the learning platform and uploading the content.

Stage 7—Resource Sharing: The co-creators make the course available to the learners.

Stage 8—Learner Support: The mentor guides the co-creators on how to engage learners in the course by participating in the discussion forums and responding to questions in the WhatsApp groups.

Stage 9—Evaluation: Evaluation is done at the end of the course to get feedback on learning, experiences and challenges. Fig. 4.2 shows the developed model.

Successful completion of this course and the effort from each of the co-creators evolved to produce the TCCF model. The model has several advantages, such as reducing dependence on external technology experts for training, scalability of implementation and empowering teachers to take charge of their own professional development needs. Reflections from participants of the course, based on knowledge and skills gained, showed that the TCCF model contributed to the participants professional development. The course has brought about a change in the ways teachers become co-creators in Sub-Saharan Africa and engage their students.

A key recommendation for regions that are struggling with sourcing the appropriate expertise in teacher professional development can be achieved among teachers who are knowledgeable and experienced in specific areas of interest. TCCF model can be used to identify and engage teachers who can create context-related resources for the professional development of other teachers. Through this co-creation process, empowering skilled teachers by becoming course facilitators to mentor their peers not only enhanced the skills needed for emergency remote teaching but also encouraged newfound growth through a facilitated-mentorship model.

References

Association for the Development of Education in Africa Report. (2020). Impact of COVID-19 on Arica's education: Reflecting on promising interventions and challenges, towards a new normal.

Belay, D. (2020). COVID-19, distance learning and educational inequality in rural Ethiopia. *Pedagogical Research, 2020*(4), 2468–4929. https://doi.org/10.29333/pr/9133

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Dube, B. (2020). Rural online learning in the context of COVID 19 in South Africa: Evoking an inclusive education approach. *Multidisciplinary Journal of Educational Research, 10*(2), 135–157. http://dx.doi.org/10.447/remie.2020.5607.

Dzinamarira, T., & Musuka, G. (2021). The paradox of re-opening schools in Zimbabwe in the COVID-19 era. *Public Health in Practice, 2*, 100070. https://doi.org/10.1016/j.puhip.2020.100070

Gillani, N., & Eynon, R. (2014). Communication patterns in massively open online courses. *The Internet and Higher Education, 23*, 18–26. https://doi.org/10.1016/J.IHEDUC.2014.05.004

Murthy, S., Warriem, J. M., Sahasrabudhe, S., & Iyer, S. (2018). LCM: A model for planning, designing and conducting learner-centric MOOCs. In *IEEE Tenth International Conference on Technology for Education (T4E)* (pp. 73–76).

Organisation for Economic Co-operation and Development. (2020). Education and COVID-19: Focusing on the long-term impact of school closures. https://www.oecd.org/coronavirus/policy-responses/education-and-covid-19-focusing-on-the-lon/-term-impact-of-school-closures-2cea926e/

Teachers Learning Hub. (2021, June 30). Reflections from Collaborative Activity for the Online Course TPDRT by Alexis Arakaza from Burundi [Video]. YouTube. https://youtu.be/zPNIwon77Kk