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Professional development in the digital age: supporting improvements in teacher education through MOOCs

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ABSTRACT

Education policies across sub-Saharan Africa require teachers to change from being transmitters of knowledge to facilitators of learning. This means that teacher education needs to change as well and professional development which focuses on practical teaching is urgently needed. The Teacher Education for sub-Saharan Africa (TESSA) MOOC - *Making teacher education relevant for 21st Century Africa* - was designed to support teacher educators in changing their practice. The MOOC modelled socio-cultural theories of learning and focused on issues identified by the TESSA network. It ran four times, over two years, and nearly 9000 participants, mainly from sub-Saharan Africa (SSA), registered. For many it was their first experience of online learning. They studied on phones, in environments where electricity and connectivity were erratic, and supported each other in local communities. We draw on survey data from the first two presentations and in-depth interviews with four MOOC graduates to understand who took part, how they studied, what they learnt and how it has impacted on their practice and professional identity. For some individuals the experience was transformational. The study highlights the potential of this form of professional development, to make a difference particularly in a policy environment which is seeking pedagogic change.

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TESSA; MOOCs; OER; teacher education; professional development

Introduction

This paper demonstrates the potential of open learning to improve the quality of teacher education in sub-Saharan Africa (SSA). Massive Open Online Courses (MOOCs) and open educational resources (OER) promise a great deal for low-resource environments, yet the uptake of opportunities in the global south is low and there remains a disconnect between the OER developer and the target user community (Hodgkinson-Williams et al., 2017).

Drawing on professional knowledge gained in context, the FutureLearn MOOC '*Making teacher education relevant for 21st Century Africa*' was a purposeful attempt to harness open learning to address a development need. This paper explains the development

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need, reviews the potential of MOOCs to support professional development and explains the thinking behind the TESSA MOOC. It draws on data generated during two presentations of the MOOC including pre- and post- course surveys, and in-depth interviews with four successful MOOC participants to examine the motivations and aspirations of the participants, and evidence of impact. Data was collected in 2018 and 2019. Not only do we have evidence of impact on practice; there is also significant evidence to demonstrate impact on the lives of the teacher educators themselves, their professional identity, and the people they teach, despite already being highly qualified professionals. The initial analysis was presented at a conference (Stutchbury et al., 2019) and has been further developed here. The numerical data has been presented slightly differently (combining data from the two presentations) and interview data has been added, providing insights into participants' experiences.

We suggest that the success of the MOOC was a result of enabling access, the learning design, student support and recognition. These factors are critically reviewed, and the study will support other MOOC developers aiming to support professional development.

Background

The development need

Teacher education in Africa is in need of urgent change (Anamuah-Mensah et al., 2013; Harber, 2012; Moon & Villet, 2017). New policies and curricula advocating learner-centred approaches to teaching are requiring teachers to think and teach differently, which has significant implications for teacher educators (for example the new Competency-based Curriculum in Kenya). Such policies are rooted in constructivist and socio-cultural theories of learning which value collaboration and mutuality. Although teacher educators are well-placed to drive change (Cochran-Smith, 2006) – and perhaps have a responsibility to do so – there is a reluctance amongst this professional group to examine their practice and embrace the attitudes and values associated with active, learner-centred education (Moon & Umar, 2013; Stutchbury, 2019). Teacher educators in Africa have qualified in a system that positions learners as passive receivers of knowledge. Now they face preparing teachers to teach in a completely different way. Learner-centred education (LCE) conceptualises learners as agentive, capable, experienced and most likely to learn through active engagement in authentic activities (Schweisfurth, 2015). The global pandemic has made change more urgent as good quality teaching is essential to tackle the increased inequalities in education.

Teacher educators in Africa are held in high esteem. Many are qualified to degree and master's level, whereas teaching requires only a certificate or diploma. High achieving, newly qualified teachers are often posted to colleges of education rather than to schools before they have had chance to gather practical experience. This suggests that academic, theoretical knowledge about teaching is valued more highly than the practical knowledge of teaching (Dembele & Miaro-li, 2013). Our experience over ten years of working in Africa is that the 'why' of social learning is well understood, but that the 'how' is not. The need, therefore, is for professional development which focuses on the practical implications of policy aspirations.

Two major development projects co-ordinated by The Open University (OU), Teacher Education in Sub-Saharan Africa (TESSA) and Teacher Education through School-based Support (TESS-India), have focused on making available contextually relevant open educational resources (OER) to support teachers in developing active approaches to learning and teaching. In work to mediate the OER, teacher educators were identified as a key professional group, as they work with large numbers of pre-service and in-service teachers. However, research by Wolfenden, Auckloo, et al. (2017) showed that ‘the innovation in practice and the transformation in pedagogy promised by OER is still fragile, confined to a few converts working independently or with one or two collaborators within . . . institutions’ (Wolfenden, Auckloo, et al., 2017, p. 277). The TESSA MOOC is a purposeful attempt to support teacher educators in using OER to model the pedagogies that they are trying to promote. The aim of the MOOC was to provide an opportunity for this potentially influential professional group to achieve what has been termed as ‘participatory appropriation’ (Rogoff, 2008). Through the MOOC, teacher educators would ‘transform their understanding of and responsibility for activities through their own participation’ (p. 65).

Supporting professional development through MOOCs

MOOCs offer unrestricted access to learners, flexibility over how, when and where they learn, and choice over the extent to which they engage with the different parts of a course. They have the potential to provide professional learning at scale (Czerniewicz et al., 2014), but they are not always successful in doing so (Milligan et al., 2014). MOOC uptake in the global south is patchy (Garrido et al., 2016; Liyanagunawardena et al., 2013) and completion rates are generally very low (Jordan, 2015; Perna et al., 2014). However, evidence from a study based on the TESS-India MOOC (Wolfenden, Auckloo, et al., 2017) suggests that it is possible to disrupt traditional cascade models for professional development and challenge some of the previous findings about MOOCs (e.g. Milligan & Littlejohn, 2014), through the provision of authentic tasks related to practice, trained facilitators and organised support, and consideration of the sort of technology and access available.

The particular relevance of MOOCs to support teacher professional development is emphasised in a study by Misra (2018) who highlights the issues with traditional ‘cascade’ models and emphasises the benefits of training that is self-directed, takes place over time, and is school-based. We suggest that all the arguments that apply to teachers, also apply to teacher educators, particularly in contexts in which new curricula are asking for approaches to teaching that neither teachers nor teacher educators, have ever experienced themselves. Traditionally teacher educators are providers of professional development and the opportunities available to them involve working individually to study for higher degrees, rather than a focus on practice. The lack of collaborative spaces (both physical and intellectual) creates an atmosphere in which it is difficult to ask for help, and practice is rarely discussed (Stutchbury, 2019), despite the availability of OER which explicitly link theory and practice. In a meta-synthesis of the Researching OER for Development (ROER4D) studies, Hodgkinson-Williams et al. (2017) concluded that the uptake of OER in the global south requires both structural and cultural factors to be in place. The next section examines the rationale for the TESSA MOOC and demonstrates

how our understanding of the context (structural factors), previous learning and the findings from research contributed to the design of the MOOC.

The TESSA MOOC

The MOOC is rooted in sociocultural theories of learning and the assumption is that through participation in, and reflection on, practice teacher educators will come to understand pedagogies that they have probably not experienced themselves (Murphy & Wolfenden, 2013). It explicitly challenges the finding (Stutchbury, 2019) that pedagogic change is difficult in some African institutions because knowledge about teaching is seen as fixed, objective and unproblematic. The MOOC presents knowledge about teaching as being socially constructed in a social context. It does this not through philosophical discussions but by explicitly recognising that teaching is a problem-solving activity. It is about exploring possibilities and recognises that good teachers (and teacher educators) will seek to understand their context and their students, and will reflect together on their practice. The main purpose of this MOOC was to model active learner-centred teaching so that teacher educators would experience 'active control' (Schweisfurth, 2013, p. 20) and have the opportunity to develop collaborative networks. It was inspired by the observation that 'Within the teacher educator community there is, as we have observed, a resistance to change' (Moon & Umar, 2013, p. 234). Perhaps most importantly they would have the opportunity to learn something about themselves as learners.

Harnessing OER needs attention if the potential of OER to address professional development needs in low-resource environments is to be realised (Wolfenden, Auckloo, et al., 2017). The MOOC as a mediation tool for OER was developed and tested in India (Wolfenden, Cross, et al., 2017). Success, in the form of 40,000 registrations and a 50% completion rate, was attributed to 'a blend of digital and physical learning spaces, which help collapse the global into the local' (Wolfenden, Auckloo, et al., 2017, p. 139). In the MOOC model adopted for India, local facilitators, nominated by state education officers, were trained in face-to-face workshops. This gave participants the opportunity to study as part of a group and where technical support could be made available (Li et al., 2014). Teachers and teacher educators within a local area were under considerable pressure to participate and the hierarchical structures that prevailed ensured significant uptake.

In SSA, institutional structures are not as robust as those in India and there was not the element of compulsion that led to the initial uptake in India. Consequently, an African MOOC needed to be shorter and speak to local priorities. 'Participatory appropriation' (see above) would be achieved through the modelling of LCE. Schweisfurth has written extensively about LCE but her most useful contribution (Schweisfurth, 2015) is perhaps a set of 'minimum criteria'. These are:

- Lessons are engaging and motivate pupils to learn.
- Classroom relationships are based on mutual respect.
- Learning challenges pupils and builds on existing knowledge.
- Dialogue is used in teaching and learning.
- The curriculum is relevant to learners' lives and values a range of skills including critical thinking and creativity.

- Assessment tests a range of skills and gives credit for more than recall of knowledge. (adapted from Schweisfurth, 2013, p. 146)

We argue that these criteria, although written in the context of lessons, can be applied at all levels of the system. The MOOC therefore needed to be engaging and relevant to current issues (which we identified through working in-country as active teaching approaches, integrating ICT into classroom teaching and an introduction to OER); to model respect for learners and take into account their existing knowledge and expertise; to promote dialogue with colleagues and on the forums; to promote critical engagement and encourage creativity; and to provide assessment that supported learning.

Therefore, a four-week MOOC was designed with an introductory week, followed by one week on each of the priorities identified in the field. The deliberate modelling of LCE meant that the learning outcomes were delivered through both the subject content and the course pedagogy.

Research suggests that MOOC design should give learners choice, control, fun, the opportunity for professional growth and a sense of freedom to learn (Bonk & Lee, 2017). It should also include opportunities for collaboration, and guidance in finding and selecting resources. Activities should link new learning to previous experience and provide opportunities for sharing ideas and insights (Kop et al., 2011). This formed the foundation of the MOOC, which was conceptualised in terms of 'practice into theory'. This meant that the learning design focused on practice; describing, analysing, and planning activities that could be carried out with groups of pre-service or in-service teachers, with an emphasis on modelling the sorts of approaches that were being promoted and making explicit how theory manifests itself in the classroom. Most of the activities were 'productive' (participants produced something that might be useful to them or others such as a plan, or a teaching example), 'collaborative' (worked with others in their setting or responded to forum posts) or experiential (related directly to the experience of teaching). An example is provided in Box 1.

The aim of this learning design was to encourage the sharing and analysis of practice through open learning. We see 'openness' as a state of mind (Mackness et al., 2013) which enables participants to cope with uncertainty and accept that learning to teach is about exploring possibilities through practice and reflection. Activities started with questions about practice, or a case study describing an aspect of practice. Although TESSA OER were foregrounded because of funding from the Allen and Nesta Ferguson Foundation, OER were also included from other sources including UNESCO, Commonwealth of Learning and OER Africa. The TESSA MOOC was conceptualised as a mediating tool, supporting

teachers and teacher educators in finding and using OER to support new practices in teaching and learning.

On teacher preparation and in-service programmes which are assessed by formal examination, teaching is often presented as unproblematic. How to organise group work, for example, is reduced to a set of rules with the expectation that these can be applied in any context (Akyeampong, 2017; Stutchbury, 2019). This is not the case and student teachers (and therefore teacher educators) need contextual knowledge of their setting so they can work out a range of practical possibilities for teaching. The MOOC was therefore conceptualised as a starting point on a journey to developing a 'toolkit' to support teachers and teacher educators in developing 'knowledge in practice' and 'knowledge of practice' (Cochran-Smith & Lytle, 1999) – the knowledge of their context and the sort of teaching approaches that will support the learning of the students they teach.

Many of the MOOC activities were tested in workshops conducted in-country with teacher educators, bringing an element of co-design to the final product through a process of authentic feedback from, and revision by, the end users. One significant issue raised was that although many teacher education colleges in Africa have access to the internet, connectivity is often intermittent with narrow bandwidths. The MOOC design took account of this through the provision of descriptions and transcripts for participants unable to access multi-media.

For the first presentation in 2017, a facilitation model was developed training 142 face-to-face facilitators across several African countries and supporting them in setting up institutional study groups. The training gave facilitators a preview of the MOOC and the output from the facilitation workshop was a co-designed MOOC Facilitation Guide that reflected the reality of the contexts in which the MOOC would be studied. The idea was that the facilitators would study alongside their colleagues but would also organise weekly study groups in which the MOOC activities were discussed. This was an explicit attempt to challenge findings (Stutchbury, 2019) that the lack of collaborative networks (both physical and intellectual) is limiting the implementation of pedagogic change by creating a reason for professionals to meet and discuss practice. Whilst the details of local facilitation are not part of this study, there is evidence that it can be highly effective from a study of a course to support early reading in South Africa (Stutchbury et al., 2020).

In the second iteration in 2018, MOOC 'graduates' were given the opportunity to act as mentors, supporting a local group and contributing to forum discussions in this capacity. This deliberate attempt to encourage educators working in the same institution or locally to study together was a response to the observation (Moon, 2010) that

'Teacher education institutions, whether universities, colleges or other forms of organisation, sometimes find it challenging to create internal and external modes of cooperation. There is a certain form of individualism that can mitigate against creative use of external supports such as represented by TESSA.' (p. 133)

This highlights the importance of social structures to support OER use (Hodgkinson-Williams et al., 2017) and the challenge of creating a culture in which colleagues are open to learning in different ways, are open to new practices and are able to embrace uncertainty (Mackness et al., 2013).

Support for participants is a significant contributor to successful completion of MOOCs (Mackness et al., 2013; Wolfenden, Cross, et al., 2017) and this was evident in Kenya in the case

of the TESSA MOOC (Wambugu, 2018). Having attended MOOC facilitator training at a conference in Kigali, a team in Kenya encouraged colleagues within their university and locally based teachers, to take part in the MOOC. WhatsApp and face-to-face meetings were used to support and motivate participants. A study of this cohort found that one of the main advantages of this facilitation model was the way in which participants were supported in overcoming 'phobia of ICT' (p. 1155) and motivated through WhatsApp groups to complete the course. This use of mobile applications to support online learning is increasingly common and enables learners to take ownership of their MOOC programme (Fryer et al., 2019; Simui et al., 2018).

During the design phase of the MOOC, the importance of recognition for participants on their achievements became evident, alongside the fact that this should be without any cost attached. An assessment framework based on participation (visiting every page of the MOOC) and understanding of the content (through online quizzes) was designed. Negotiations with FutureLearn, enabled the TESSA MOOC team to pay for access to the learning management system so that participants from the TESSA network could be registered on the MOOC and certificates could be awarded to these participants at no personal cost to them. Subsequently this led to a new business model in which FutureLearn agreed to run 'sponsored MOOCs' and ensured that all participants who met the course completion criteria, got free recognition for their efforts.

The study

The study (2017–2019) took place within an interpretivist paradigm, based on the assumption that knowledge is socially constructed, contextual and subjective, and that people will come to know things in different ways. It set out to learn more about the participants, how they studied, what they took from the experience, and the potential for pedagogic change as a result of participation in the MOOC. We were also interested in the wider impact on individuals who participated in the MOOC. In this study we did not focus in detail on the facilitation models, beyond establishing that local support was helpful in securing completion. The contribution to knowledge is insights into how sociocultural theories of learning can be operationalised for this professional group.

There were four research questions:

- (1) Who were the MOOC participants and what were their aspirations and motivations?
- (2) How did participants experience the MOOC?
- (3) What is the evidence that the MOOC can impact on practice?
- (4) How did successfully completing the MOOC impact on how individual teacher educators see themselves as professionals?

The approach

Data was drawn from the pre- and post-course surveys from both presentations. Permissions to use the data for research purposes were obtained at registration and all the data was handled anonymously. In-depth interviews were also held with four MOOC completers.

The analysis was carried out in the context of what is known about the uptake of open learning. Survey questions relevant to the research questions were selected. The responses were analysed using an emergent coding system. The codes that emerged were different for each question and were then grouped together into categories in order to provide a clearer view of the findings. For example, 13 codes were identified in responses to the question:

What were you most proud of achieving or doing as a result of the MOOC? (Post-course, Q9).
For reporting purposes, the responses were grouped into

- using ICT more
- awareness and use of OER
- impact of teaching and learning (more learner-centred)
- completing
- being a better professional
- other

In response to the question: *Describe what changes you have noticed in how your students respond to your teaching (post-course, Q24)*, 17 codes were identified. These are reported under the headings:

- greater involvement in learning
- developed specific skills (more creative, more resourceful, more curious etc.)

Responses that did not fit into these categories were labelled 'other'.

Relevant questions were chosen from the pre- and post-course surveys. [Table 1](#) indicates which questions were chosen, the possible responses and the number of responses received.

In August 2019, the opportunity arose to interview four MOOC graduates. It was an opportunistic sample, as all were attending a conference in Lagos, and it was more than a year since they had completed the TESSA MOOC. However, in each case they were able to talk about aspects of their professional life which they attributed to their successful MOOC participation. This provided data relevant to the fourth research question.

Ethical considerations

The pre- and post-course surveys were optional and participants were informed that the anonymous data might be used in research publications. By responding they were aware that they were giving their consent for the responses to be used as part of an anonymised data set.

For the interviewees the purpose of the interview was explained and their participation was completely voluntary. All gave their full consent in line with BERA Ethical Guidelines. The risk of harm for the participants was minimal. Their responses were summarised and shared back to them to ensure that they were comfortable with the process. Taking part in the interviews was a positive experience for all of them and two participants commented on how valuable it had been to have the opportunity to reflect on their experience.

Table 1. A summary of the data set used to inform the research questions.

Research question	Pre-course survey question (number of responses MOOC1, number of responses MOOC 2), question no.	Post-course survey question (number of responses MOOC1, number of responses MOOC 2), question no.
Who were the MOOC participants?	Please tell us your job role (free response) (n = 247, n = 102) Q6	
What were their aspirations and motivations?	Which of the following best describes why you want to take this course? (career development, specific study goal, stay up-to-date, improve my well-being, intellectual curiosity, other) (n = 392, n = 164) Q1 What do you hope to achieve by taking this course? (free response) (n = 369, n = 148) Q2	
What was their experience of the MOOC?		How much did you enjoy your course experience overall? (not at all, not much, a little, a lot) (n = 262, n = 105) Q2 What was your favourite part of the course and why? (free response) (n = 259, n = 104) Q3 What were you most proud of achieving or doing? (free response) (n = 243, n = 99) Q9 Which of the following statements do you agree with (tick all that apply)? (content relevant, gained skills, changed perspective, used content in work, shared with colleagues, changed how I work, received recognition, positive impact on me, positive impact on my work) (n = 217, n = 89) Q7 How well did the course help you meet your learning goals? (Not at all, not much, a little, a lot) (n = 254, n = 104) Q8 What challenges did you face in studying the course? (connectivity, access to device, IT skills, navigating website, course tasks, working in English, other) (n = 250, n = 45) Q18 Did you use any of the following to help you study during the course? (See Figure 4) (n = 251, n = 99) Q16 In how many different weeks did you use the following to help you study the course? (n = 251, n = 97) Q17
What is the evidence that the MOOC can impact on practice?		Has there been a change in how your students respond to your teaching? (yes/no) (n = 226, n = 89) Q23 Describe what changes you have noticed. (free response) (n = 199, n = 61) Q24

Limitations

The response figures given in [Table 1](#) represent a return rate of approximately 10% for MOOC 1 and 7% for MOOC 2. Although not all participants and completers submitted responses to the surveys, the number of responses was judged to be sufficient to draw some tentative conclusions. The other notable limitation was the variation in detail provided in the free responses and the different meanings that may have been attached to terms used. For example, in response to Question 9 (see above) ‘knowledge and experience from others’ was interpreted as ‘being a better professional’ on the basis that being open to ideas from colleagues is one of the tenets of effective professional behaviour. This meant that a level of interpretation was necessary in the analysis. By grouping the codes together for reporting circumstances, some of this potential variation was removed.

The interviews were opportunistic: opportunities to meet MOOC participants arose which were taken. Much of the research in MOOCs draws on survey data, and even though there may be free response questions, it is rare that there is an opportunity to explore individual experiences. In this case the fact that a significant period of time had passed since the MOOC was completed enabled us to elicit some of the longer-term impacts that studying in a completely different way has had on these individuals. Although the findings presented here are tentative, they align with our sociocultural framing of learning and provide insights that highlight the potential of MOOCs to support professional development when the learning design takes account of local needs and contextual knowledge. These insights are particularly relevant in the context of the global pandemic (2020–21) which has increased the demand for online professional development. The focus of this study was who participated, and the potential for pedagogic change. Different models for facilitation and local support were not explored in detail and, as will be highlighted later, provide scope for further research.

Findings

The findings will be reported against the research questions.

Who were the MOOC participants? What were their aspirations and motivations?

The demographic information concerning MOOC participants is given in [Tables 2 and 3](#).

Three pre-course survey questions about job role, previous experience and understanding of the subject revealed that participants believed they had some prior understanding (93.5%) and understood the subject fairly or very well (73%). Unsurprisingly, most were working in a related field (65%).

Identifying the participants’ job roles from the free response question was more difficult. Non-specific responses such as ‘teacher’, ‘lecturer’, ‘educator’ gave no indication of the institution or phase of education. In both iterations of the MOOC, 14% of those who responded identified as lecturers. These were assumed to be working in higher education institutions, although no assumptions could be made about the courses they worked on or the nature of their work. Between MOOC 1 and MOOC 2, the percentage identifying as ‘teacher’ increased, while those identifying as teacher educators decreased, suggesting

Table 2. MOOC participants (joiners) (MOOCs 1 and 2).

Country	Number	%
Zambia	583	13.1
Nigeria	864	19.5
Kenya	559	12.6
Malawi	180	4.1
Uganda	308	6.9
Ghana	242	5.4
South Africa	217	4.9
Tanzania	81	1.8
Zimbabwe	46	1.0
Other/unknown	1362	30.7
	4442	100

Table 3. The demographics of MOOC joiners (MOOCs 1 and 2).

Age range	percentage
18–25	11
26–35	24
36–45	30
46–55	23
56–65	8
>65	1
Unknown /unreported	3

that having completed the course, teacher educators encouraged teachers to take part. It was assumed that ‘teachers’ were school-based, although that might not be the case.

In both iterations of the MOOC, participants’ reasons for doing the course were mainly connected to advancing, developing, or staying up to date in the profession (83%). To a free response question asking for other reasons or more detail, 368 participants responded in MOOC 1. Of these, 7% focused on career development or certification. Learning about ICT was cited as a driver by 45%, and 11% had reasons connected with staying up to date. For example, *‘I need to learn contemporary approaches’* and *‘I want to stay abreast with developments’*.

Across both MOOCs, sharing and networking were mentioned by only 3%. Improving the outcomes and experience of learners, whether pupils in school or students in HE, was only cited by 8%. Almost 42% were focused on developing their own professional knowledge and practice. Improving teacher education more generally was cited by 14% as an important reason for doing the course.

How did participants experience the MOOC?

The overall completion rate across the two MOOCs was 37%. This compares favourably with the average MOOC completion rate of 12–15% (Jordan, 2015), and in the context of SSA represents a significant success. In MOOC 1 facilitators were trained, and TESSA sponsored participants were registered through the OU (enabling us to issue a free certificate to those who successfully completed). The result was that on

MOOC 1 there were two groups of participants; those registered by the TESSA team (who got a free certificate) and those who registered themselves (who had to pay for the certificate). The completion rate for TESSA participants was 58% (but was 42% overall, for all participants). In MOOC 2 a 'sponsored MOOC' model was used that did not differentiate between TESSA and other participants and the completion rate was significantly lower at 30%. Here we consider what the participants enjoyed, what they were proud of having achieved, how they collaborated and the challenges they faced.

What participants enjoyed

Participants enjoyed the MOOC with 93% (MOOC 1) and 94% (MOOC 2) selecting 'I enjoyed it a lot'. The most popular part of the course was '*Integrating ICT into teaching*'. In response to the question 'What was your least favourite aspect of the course?' 46% of respondents selected 'none'. Of the remainder, 26% referred to some aspect of the learning design (such as the quizzes, the suggestion to talk to colleagues, or using the forums) and 25% identified a specific activity as their least favourite aspect. Downloading documents was unpopular. Opportunities to do this were deliberately included in the learning design to raise the academic profile of the course, as we knew that our target audience would be relatively well-qualified and assumed they would value academic content. Activities involving videos were 'least favourite', probably reflecting challenges with internet connectivity. Interestingly two participants highlighted 'people getting ahead' as a free response to their 'least favourite aspect' of the course perhaps reflecting how deep rooted the notion of a class moving together through a learning experience is in some places.

Across the two MOOCs, 96% of respondents reported that the course helped them to meet their learning goals.

What participants were proud of achieving or doing

Participants' pride in their achievements is presented in [Figure 1](#)

It is perhaps interesting to note in [Figure 1](#), that 'completion' was less important than the other categories, implying a high degree of intrinsic motivation amongst participants. This is counter to anecdotal evidence which suggested that a free certificate was very important and resulted in the course team going to considerable lengths (and expense) to provide a free certificate on the FutureLearn platform.

Challenges faced by participants

The challenges reported by participants are shown in [Figure 2](#):

The greatest challenge was 'downloading and viewing course documents'. This perhaps reflects the fact that many participants were studying the course on their mobile phones, making juggling multiple tabs and reading on a small screen difficult. Also, the cost of 'data bundles' in Africa is considerable. Other significant challenges reported in the free response section included power cuts and having enough time to study.

What were you most proud of achieving or doing?

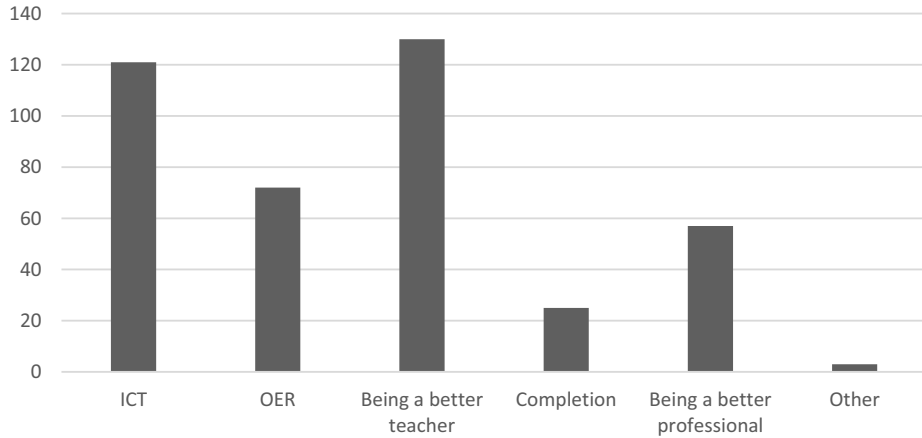


Figure 1. What are you most proud of achieving or doing as a result of taking this course?.

Describe the challenges you faced in completing the course

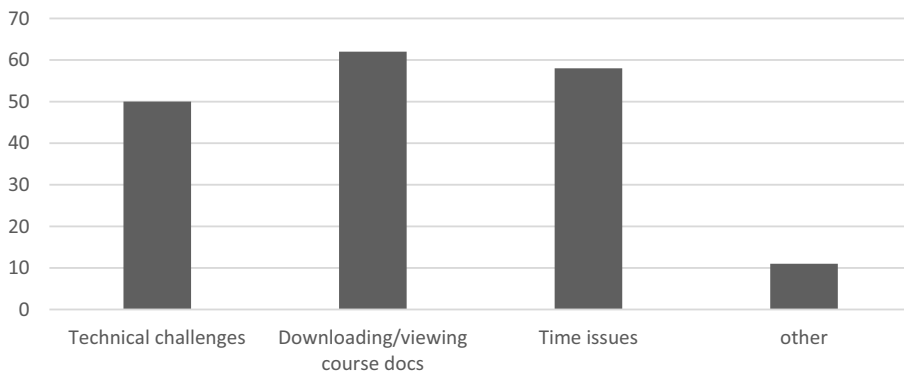


Figure 2. Challenges faced by MOOC participants.

How did participants study?

The course discussion and discussions with colleagues accounted for nearly 40% of the responses, which, given the emphasis in the literature on teacher learning on collaborative learning (e.g. Shulman & Shulman, 2007), and the relatively low percentage of participants who cited ‘sharing and networking’ as a motivation for taking part, is very encouraging.

What helped participants to study during the course is presented in Figure 3. Social media in the form of WhatsApp, Facebook and text messages proved to be a significant mode of support accounting for 29% of responses. ‘Discussions with colleagues’ was also

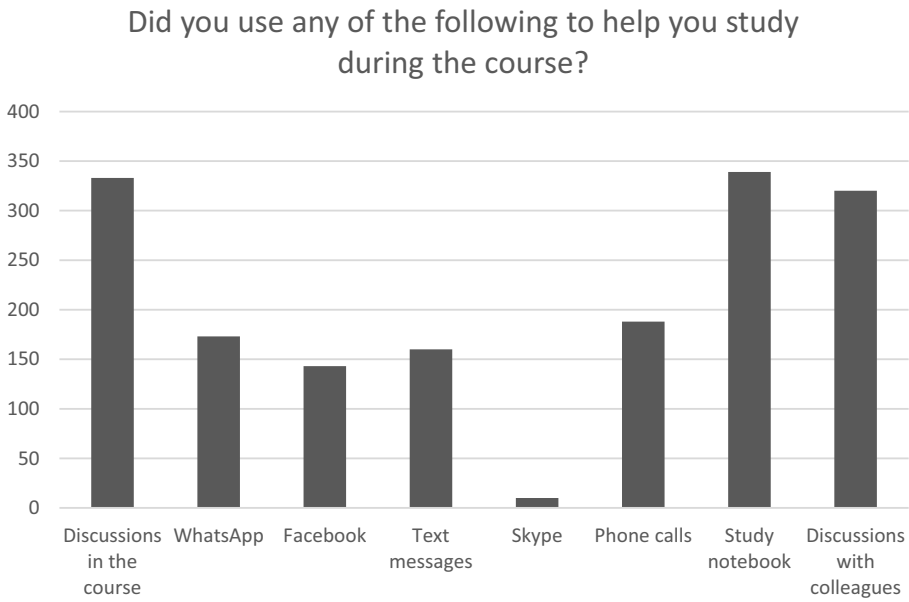


Figure 3. What helped participants to study during the course?.

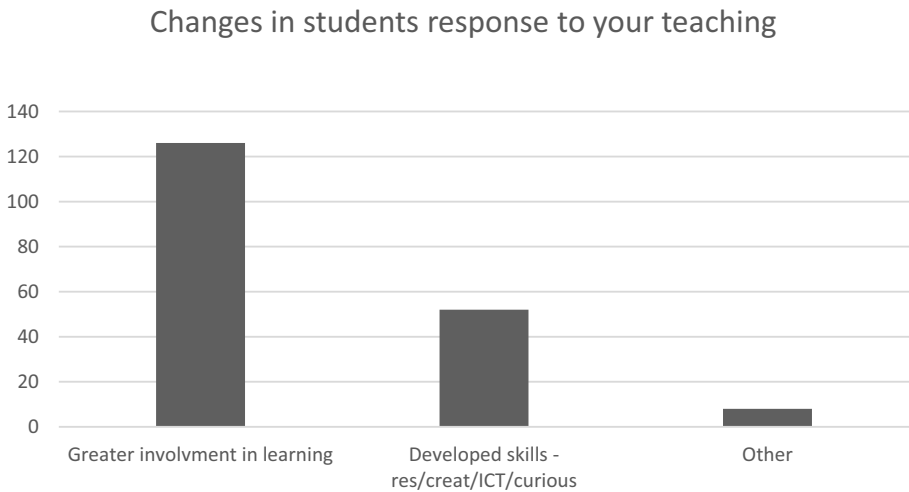


Figure 4. In what ways did your students' behaviour change as a result of you studying the MOOC?.

relatively popular which is encouraging given the aspiration in the learning design to promote collaboration and professional conversations.

In summary, participants enjoyed the course and found that it supported professional learning. They were proud of their efforts which they see as potentially impacting on teaching and learning. The challenges were as initially predicted by the course team, and the evidence suggests that a high proportion of participants enjoyed local support, through discussions with colleagues and on social media.

Table 4. The % of respondents agreeing with each of the statements provided.

Number	Statement	%
1	The course content was relevant to my profession or field	80
2	I gained knowledge or skills relevant to my profession or field by taking the course	89
3	My perspective has changed as a result of taking the course	68
4	I've used what I learned during the course in my work	52
5	I've shared what I learned with colleagues	58
6	I've changed the way I do an aspect of my work as a result of taking the course	63
7	Taking the course has helped me to receive recognition in my work (e.g. a new job, promotion, payrise, qualification, grade or CPD points)	11
8	Taking the course has had a positive impact on me personally	66
9	Taking the course has had a positive impact on my work	64

What is the evidence that the MOOC can impact on practice?

We asked participants if there had been a change in how their students respond to their teaching since studying the course. Across both presentations, 70% of respondents replied 'yes'. Analysis of the subsequent free response question, which asked them to describe the changes they had noticed, is given in [Figure 4](#):

'Greater involvement in learning' includes phrases such as, 'more participation', 'they contribute more', 'they are more engaged', 'they understand me better' and 'attendance has improved'. The skills that were specifically mentioned included: 'more creative', 'they are more resourceful', 'they use their smartphones more', 'they are more curious'. Several respondents declared that 'there have been great changes' without being specific. These findings are particularly encouraging in the context described in the section above (*The development need*) and suggest that the MOOC had successfully modelled active learning to the extent that participants felt able to take it forward into their practice.

How did successfully completing the MOOC impact on how individual teacher educators see themselves as professionals?

The pre- and post course comments provided some evidence that the MOOC had impacted on how individual teacher educators see themselves as professionals and how effective they are. For example, these two free responses from Q3 (what was your favourite part of the MOOC?)

Learner centered Education was my favourite because I practically used it during my teaching. It really worked as students seemed to like my lessons the more.

It opened up to me a wide range of teaching resources that I didn't know and yet very essential.

Q7 specifically asked respondents to consider 'which of the following statements do you agree with?' (they could tick as many as they felt to be applicable). A total of 306 responses were received. The number ticking each statement is expressed as a percentage of 306. The results are presented in [Table 4](#).

The response to statements 3–6 suggests that a significant proportion of respondents were doing things differently, and the very low response to statement 7 suggests that this was about their own professional identity rather than a specific professional goal. This

made the team keen to interview successful participants in order to explore what this means.

Qualitative interviews with four opportunistically sampled MOOC participants were conducted. The four participants all had an interesting story to tell, and two (Frieda and Agatha) describe the experience of successfully completing the TESSA MOOC as being transformational. Their stories are summarised below, followed by the results of analysis across all four interviews.

Frieda

Frieda first heard about TESSA at a conference in Nairobi 2013. She did not know how to contact the TESSA team, but knew they were based at Egerton University. She drove there (a 4-hour trip) in the hope of meeting some of the team but was unsuccessful. She paid for herself to attend a conference in Kigali in 2017 and signed up for the pre-conference workshop, which introduced the TESSA MOOC and the opportunity to become a facilitator. She embraced the opportunity by successfully completing the course and supporting others to do so. In the interview she talks about how her own teaching has completely changed and provides specific examples. She has gained promotion and used a TESSA small grant (for which she had to apply) to introduce TESSA to teachers in the schools where her students undertake teaching practice. She traces her current professional identity as an innovative teacher back to the MOOC experience.

Agatha

Agatha applied for a visiting professorship at a Nigerian university. She puts her success in being appointed (despite only being at Senior Lecturer level herself) down to having the MOOC certificate on the basis that it differentiated her from the other candidates and demonstrated her personal motivation. Furthermore, the forthcoming second presentation of the MOOC provided her with a concrete activity to undertake as part of her professorship. This is evidenced by the relatively large number of participants from Nigeria in the second presentation, many of whom were teachers of engineering, medicine and other disciplines rather than teacher educators. Agatha explained how they spend much of their time teaching undergraduates but have had no formal training in teaching. She used the TESSA MOOC to introduce them to teaching pedagogy and the impact was to encourage them to examine their own teaching practices. The crucial contribution of the MOOC was that it gave her a purpose for her visiting professorship and ensured that it was successful.

Interview analysis

The interviews were listened to repeatedly; analysis was iterative and collaboratively undertaken by two researchers. A set of themes emerged and evidence from each interview added to each theme. We present the evidence in a narrative form to give the meaning of the experiences of the participants. We start with what they have learnt from the course, how it has impacted on their practice, and the impact on their students. Finally, we consider the wider impact the MOOC had on their professional identity.

What they have learnt from the MOOC

All the four participants interviewed said that the MOOC provided them with a broader perspective of teaching and learning. They have learnt a lot of new creative ways to approach teaching, which make it more engaging for their learners. Some of the skills they have learnt, have brought wider benefits. For example, one of the participants suggested that taking the MOOC enabled him to develop proficiency in the use of computers.

I've benefited from the MOOC because, even during the study, I even developed on my computer skills. As I was navigating here and there, answering the task set in that content, I developed my computer skills (Nathan).

Another one saw her learning in terms of pedagogy:

I learnt how to engage learners examples of how others engage learners 'I emulated them' 'especially Think, pair, Share'. Used it in my lecture room where I teach 600 students. 'Now think about the point. Share your ideas' (Frieda).

How it has impacted on their practice

Participants agreed that the MOOC did not only significantly contribute to the knowledge and skills required in their current role, it also contributed to the skill-set required in future job performance. They also mentioned that, by participating in the MOOC, they have improved the quality of their practice.

I even wrote an action research after reading the OER. At the same time of course whenever I'm in the class teaching, I'll engage my learners. That aspect of learner engagement to me, I really see it as a great aspect I can bring into the classroom. I engage my learners in different active teaching and learning activities. I apply the active teaching and learning methodologies. For example, I apply learning station as a method (Flavia).

I mostly use TESSA ideas - I no longer just lecture. Just telling telling and students taking notes. I did not know that we could laugh, there would be time when students do activities. . . (Frieda)

Evidence of impact on students

Participants explain that the MOOC exposed them to the use of creative approaches to teaching. Their students became more engaged in learning due to the introduction of these creative teaching methods. However, one of the participants pointed out that, initially, the students were not open to this change and persistence was required before they began to enjoy the new approach to teaching. This is not uncommon as learner-centred approaches demand more of learners (Schweisfurth, 2015); adjustment is required by both teacher and learner. The participants explained that the group activities helped them to engage the learners and these activities, produced exciting classes. They suggest that the students have become more critical in their thinking, due to their engaging with the resources, and have put the new pedagogies into practice.

Learning station method is better because, originally, my learners will want me to come to class, greet them, then introduce the topic. Afterwards, I begin dictating the notes to them.

Because that is what they are used to originally. But, later, they come to like it. Since they are teachers in the making, they also liked the idea. Whenever I monitor these student teachers when they are doing their school practice, including examination school practice, I really see change. I really see difference (Fatima).

They call me 'Madam Curriculum' because I teach different from their other lecturers. We use TESSA in micro-teaching sessions in smaller groups. 'Don't think the learners don't know'. They are doing that very well. Students are clamouring for me to go and assess them. I start by asking them what they think about their lessons. I refer them to the TESSA materials for ideas. They can emulate the teachers in the resources (Frieda).

The wider impact on professional identity

One of the participants had engaged other lecturers in her department in the MOOC and supported them via WhatsApp. This gave her a chance to take on a leadership role and gained her esteem within her department. The newly acquired skills and techniques from the MOOC were seen to have had impact on their performances even with other programmes and projects.

Doing the course helped me acquire additional training because the MOOC course training helped me to do well in other courses after. The ICT training was not online. It was a one-month training sponsored by the ministry of education, but the exams were online. Still the MOOC helped me to do well in those exams (Nathan).

Actually, it was even because of TESSA MOOC that I even got motivated to apply for this job. Because I saw that it will make my work very easy because, I understood what active teaching and learning all is about. In fact, even my certificate, I also presented it when I was going to do an interview. So, that was an added advantage to me, that I have done that course in active teaching and learning (Fatima).

One of the participants shared how the TESSA MOOC positioned her as a dynamic professional, with a track record of openness to change – a requirement for a 21st century educator, especially in a context where online learning is still emerging.

When I applied for my fellowship, one of the things that stood out for me on my CV was my TESSA certificate. They look at what is your contribution to society, what new things have you learned. You have your PhD, you have other certificates but, what are you doing now? They realised that I'm relevant in various ways. I can talk about technology in Africa, how it can enhance education. So, I was picked for the fellowship (Agatha).

The TESSA MOOC also gave Agatha (a Kenyan) purpose to her fellowship, and when connected with a Nigerian university, she conducted a MOOC facilitation workshop (modelled on the one she had attended) and supported lecturers and professors from many departments in completing the MOOC. Despite being very well qualified, these academics found the emphasis on practical ideas very motivating and helpful. Many had never had any training at all in how to teach yet spent most of their time teaching students.

Nathan also described how he has set up a 'TESSA Committee' within his institution, with representatives from each department, tasked with identifying how to integrate TESSA OER into the curriculum. This willingness to take on leadership roles as result of the confidence they gained was a common thread across all four interviews.

In summary, therefore, it was evident from these interviews that successfully completing the MOOC had given these participants confidence, status, a feeling of being connected, and new opportunities.

Discussion

The significance of these findings is that they demonstrate the potential impact of well-established learning theories (socio-culturalism and constructivism) in an online environment. The work done to develop these theories (eg Lave & Wenger, 1991) took place in face-to-face settings; the TESSA MOOC demonstrates how they can be operationalised in an online environment. In the context of the global pandemic of 2020/21 this is particularly encouraging. Furthermore, if policy aspirations and improved educational outcomes are to be achieved in SSA, it is important that this professional group are able to operationalise new curricula and demonstrate new pedagogies so that pre-service and in-service teachers have the opportunity to experience the sort of pedagogy they are being asked to adopt. A significant finding for the team was that very well-qualified people gained a great deal from a course, despite the fact that by academic measures the content was undemanding. The focus on practice and the fact that the MOOC design drew specifically on the authors' experience of working in the field was important. Many of the MOOC activities had been developed and tested in workshops bringing an element of co-design to the MOOC and creating something that was novel in this context. This is something that other course designers should consider. Agatha's work in Nigeria made a strong contribution to this outcome.

Only 4% of respondents mentioned the opportunity to share and network with other professionals as a motivating factor. This is disappointingly low given that models of teacher learning cite collaboration as key in the co-construction of knowledge about teaching (Darling-Hammond, 2006; Shulman & Shulman, 2007) and it perhaps demonstrates the importance of providing opportunities like this, so that influential professionals begin to understand the benefits of collaborative working. Without collaboration it is difficult for teacher educators to make meaning of policy aspirations. It is encouraging that 40% reported that they had engaged with the online discussions and had discussions with colleagues. This, alongside the accounts of local facilitation (eg Wambugu, 2018 and interviewee Frieda), perhaps suggests that the MOOC experience has raised awareness of the benefits of collaborative working. One participant reported that, having completed the MOOC, she installed a kettle, some tea bags and mugs in an empty office in order to encourage her colleagues to congregate and provide an opportunity for the sharing of practice. Challenging cultural norms, which value expertise to the extent that people occupying higher positions of authority often go unchallenged and make it difficult to ask for help, is something which is urgently required in this sector. The MOOC provided an opportunity for groups of professionals to work together to make meaning of the concept of learner-centred education and to begin to understand what active learning looks like in a classroom or lecture theatre.

The high levels of satisfaction and the reported pride in what they achieved suggests that the learning design did provide fun, the opportunity for professional growth and a sense of freedom to learn (Bonk & Lee, 2017). The focus on practice is novel in this context (O'sullivan, 2010) with the result that even the very highly qualified people found

activities that stimulated and challenged them. The facilitation model worked well. For MOOC 1, the focus was Zambia and Malawi, resulting in significant uptake. For MOOC 2, similar resources were not available, but Agatha (see above), used her role as a visiting professor in Nigeria to encourage participation. Here we identified that very learned academics found activities in the MOOC to interest and motivate them. This is consistent with Peltier et al. (2007) who found that, to achieve a positive online learning experience, students found mentoring, a well-developed course structure, and stimulating student engagement as motivational factors for their continued online learning engagement. However, the study highlights the need for further research to better understand possible facilitation models.

The sought-after outcome for professional development is the possibility of pedagogic change. It has been suggested that for teachers (and therefore for teacher educators) this involves the 'on-going reshaping of professional identities on coherently positive lines, and the continuous strengthening of professional agency' (Hinojosa-Paredes, 2020, p. 4). The evidence from this study is encouraging, with teacher educators reporting increased engagement from their students and examples of changes to the teaching they saw on teaching practice. Having noticed positive changes in their students, educators will be encouraged to further develop their practice. It is possible that new practices will thus become embedded and that pre-service and in-service teachers will have the opportunity to experience the sort of teaching approaches that they are being expected to adopt. One of the interviewees (Frieda) talked about how her students have noticed that she teaches differently from her colleagues, and often ask her for the opportunity to discuss their ideas. This is significant as the analysis of teaching often focuses on the teacher rather than the learner (Stutchbury, 2019). The MOOC and this study highlight the benefits of focusing on how teaching is being experienced as a way of analysing practice and the impact of pedagogy.

The interviews and surveys suggest that the impact of the MOOC goes beyond changes in practice to include professional identity and agency. All four interviewees reported significant changes in the opportunities available to them, their confidence and their professional identity as a skilful practitioner. All of them had taken on leadership roles linked to their MOOC experience and were attempting to influence their colleagues.

Conclusion

The TESSA MOOC provides a concrete example of how sociocultural theories of learning can be operationalised for a professional group who are well-placed to facilitate the implementation of ambitious policy aspirations. The learning design explicitly modelled collaborative practice and the emphasis on practice supported 'participatory appropriation' (Rogoff, 2008). Student support was part of the learning design but has not been a focus of this study. It is currently being explored in the context of new MOOCs.

Instrumental in the success was the clear identification of a development need, a learning design that explicitly supports that need, and a facilitation model that provided localised support. It has been shown that, despite challenges in connectivity and the pressure of studying alongside other duties, participants were motivated to solve local problems to take part, and that they valued the opportunity. There is emerging evidence that pedagogic change can follow from such experiences.

Since this course first ran, the global pandemic of 2020 caused a sudden shift to the provision of online learning. As we emerge from the pandemic the world has changed: the technical skills of teachers and teacher educators have improved; more people have experienced online learning as educators and learners; and new ways of working together have been developed using platforms such as Microsoft TEAMS and Zoom. Working with The Commonwealth of Learning, the TESSA team have developed and run two further MOOCs to support inclusive education, these are being used to study alternative models for facilitation in a purely online environment. Given this new interest in online professional development, the learning from the TESSA MOOC experience remains more relevant than ever as more learners seek out high-quality professional development focused on improving practice.

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