

Teacher educators and OER in East Africa: Interrogating pedagogic change

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Summary

This study examines the use of Open Educational Resources (OER) in six teacher education institutions in three contrasting East African settings – Mauritius, Tanzania and Uganda – all of which had previous engagement with OER initiatives. Drawing primarily on interviews with teacher educators, the study examines how and when teacher educators engage with OER, the factors that support and constrain sustained OER engagement, and the influence of such engagement on their teaching practice. It seeks to answer the following three research questions: What kinds of OER are teacher educators aware of and how do they access them? How and for what purpose are they using the OER? What intended and enacted pedagogic practices are associated with OER use?

The study takes a sociocultural approach, paying attention to the practices of teacher educators and the context and culture of the teacher education institutions within which they work, as well as the national policies relevant to these institutions. Surveys were sent to academic staff at each of the participating institutions who were, or had been, involved in curriculum development work involving OER. Male and female educators from different disciplinary backgrounds and with varying roles and periods of service within the institutions were targeted. From the respondents, selected individuals were asked to participate in semi-structured interviews concerning OER and their pedagogical practices. A total of 58 surveys were completed by teacher educators along with 36 in-depth teacher educator interviews and six institutional stakeholder interviews. ►

The results of the study indicate that teacher educators' understanding and use of OER is highly fragmented, with little traction at department or institutional level. At all the study sites there was dissonance between the ways in which individual educators are using OER and the dominant institutional values and discourse. There were also numerous structural and cultural factors acting to limit agency with regards to OER use. The demands of curriculum and assessment, professional identity, digital skills, provision of equipment and connectivity, values and weak cultures of collaboration all exerted an influence and enabled or constrained teacher educators' efforts to achieve agency with OER.

For a small number of teacher educators (OER "champions"), OER provides a tool for extending their agency to move towards more participatory practices. In their interviews, several of these educators spoke of the formative role of academic training and many were linked to external OER networks. These elements of historic identity formation influence how they respond to OER, and enhance their confidence to take risks in moving beyond conventional practice.

Enabling educators to act in an agentic way with OER is not easy. Moving forward, attention should be given to issues of access so that educators are able to locate and view OER relatively easily and experiment with their use. This study recommends that time be made available for educators to enhance their skills in working digitally and to become familiar with principles of learning design such that these become integral dimensions of their professional identity. It is also argued that extending and deepening engagement with OER requires opportunities for professional dialogue and collaboration to support the development of productive educator identities with OER and transformation of the community's field of practice.

Acronyms and abbreviations

COL	Commonwealth of Learning
HEI	higher education institution
ICT	information and communication technologies
MOOCs	Massive Open Online Courses
OER	Open Educational Resources
ORELT	Open Resources for English Language Teaching
TESSA	Teacher Education in Sub-Saharan Africa

Introduction

Across the world there is great concern about the quality of classroom teaching and learning processes. Research studies from Sub-Saharan Africa highlight disturbingly low levels of basic skills for large numbers of pupils after several years of schooling (Bold & Svensson, 2016). In recent years, national policies across the continent have advocated a shift towards

“learner-centred” education to support improvements in student learning (Schwiesfurth, 2013). A set of teaching skills and practices that is congruent with such a learner-centred approach has been identified and reported to support improved learning outcomes (Muijs et al., 2014). However, as yet, such practices are only rarely observed in African classrooms and there is much attention being given to how pre-service teacher preparation and in-service programmes can work in cost-effective ways to help teachers develop these learner-centred practices (UNESCO, 2014).

Teacher educators are recognised as playing a critical role in the transformation of teachers’ practice, but the dominant discourse positions them as a barrier to pedagogic change, chastising them for failing to model the enactment of learner-centred pedagogy in their own practice (Westbrook et al., 2014). Such characterisation, however, often fails to recognise the ways in which teacher educators’ mediation of learner-centred education policy is influenced by multiple factors, including their own histories of participation in learning and teaching, their skills, the contexts in which they work, and the tools made available to them (for instance, teachers frequently only have ready access to limited, outdated proprietary teaching materials) (Moon & Villet, 2016). Their pedagogic choices are influenced by deeply embedded cultural scripts which act to authorise and reproduce ways of being as a teacher (Bruner, 1996).

Open Educational Resources (OER) are distinguished from other educational resources by their characteristics of being legally free to access, copy, distribute, use, adapt or modify (UNESCO, 2002). Like other educational resources, they can take multiple forms, and range from short videos or lesson plans to full courses. Over the last 10 years, there has been much rhetoric about the potential of OER to improve the quality of education, particularly in regions of the world such as Sub-Saharan Africa where access to high-quality resources is scarce. OER have been proposed as having a role to play in improving teacher education in these contexts (Moon & Villet, 2016), and they are increasingly being produced for and utilised in both in-service and pre-service teacher education programmes. Advocates outline how OER offer educators access to high-quality materials at low cost and, critically (because they are open, shareable, adaptable and promote co-construction of knowledge), how the overarching concept behind OER promotes the ethos of a learner-centred approach. Thus they also offer opportunities for participation in practices that are associated with such an approach (Brown & Adler, 2008; Hewlett Foundation, 2013; Umar, Kodhandaraman & Kanwar, 2013; Wolfenden, 2008). However, to date there is little documented evidence of OER supporting such transformational change in practice, whether in formal education institutions or informal learning episodes, in both high- and low-income contexts (Beetham, Falconer, McGill & Littlejohn, 2012; Ngugi, 2011; Scanlon, McAndrew & O’Shea, 2015).

This study attempts to examine teacher educators’ practices with OER in three contrasting settings in East Africa – Mauritius, Tanzania and Uganda – all of which have national policies supporting the enactment of learner-centred education. The empirical work was situated in six teacher education institutions which had previously reported involvement with OER initiatives and different ways of using/adapting OER within educational provision. The study took a sociocultural approach, paying attention to the practices of the teacher educators and the context and culture of the teacher education institutions within which they work, as well as the national policies relevant to these institutions. No distinction was

made between learning in informal, everyday situations and formal learning in programmes (Lave, 2008). This perspective encouraged us to focus on the opportunities for and constraints to participation in learning with OER in each context. In-depth interviews with teacher educators were utilised to better understand teacher educators' perceptions of the possibilities for action with OER that are available to them, and the impact of these actions in terms of shifts in their pedagogic practice.

Regional context

Throughout the East African region, national information and communication technologies (ICT) policies single out the importance of training teachers in ICT skills and the use of ICT for pedagogic purposes. They point to a belief that use of ICT in teaching and learning will improve standards in primary and secondary schools. However, implementation of these ambitious policies has been inconsistent and, in most countries, inhibited by slow progress with establishing ICT infrastructure (as well as, in some locations, the absence of reliable power supply). Whilst OER have yet to appear in the national policies of the countries studied here, over the last 10 years OER use in East Africa has been promoted by a number of institutions and initiatives, most notably OER Africa (an OER advocacy and policy initiative) through its work in various advocacy workshops and, most recently, in an action research project with four institutions, including one of the Tanzanian institutions included in this study (TU1) (Ngugi & Butcher, 2016).

Mauritius

Since 2011, the government of Mauritius has invested considerably in educational technologies. Primary schools have been given digital classrooms complete with projectors and interactive whiteboards, many through the Sankore Project (Bahadur & Oogarah, 2013). In secondary schools, the government has been purchasing thousands of tablets for students and teachers on an annual basis, whilst concurrently improving internet connectivity with fibre-optic connections. At present, internet connectivity is variable, although many teachers have internet access at home (Government of Mauritius, 2016).

At national level, government strategy makes explicit reference to the use of OER (MECHR, 2009). The adoption of OER and ICT was discussed at the Commonwealth Conference for Education Ministers held in Mauritius in 2012, which was followed up with support from the Commonwealth of Learning (COL) in 2014.¹ Following this engagement, the Mauritius Tertiary Education Commission proposed an OER policy for the country and a national OER repository. This government-level engagement with OER has influenced the policies and practices of higher education institutions (HEIs). The University of Mauritius, for example, has been involved in several OER initiatives, including hosting a mirror site of the Massachusetts Institute of Technology OpenCourseWare, making this open content available across the MU1 campus; contributing to the European Union SIDECAP² project, which focuses on the repurposing of OER for distance learning programmes; and participating in the Virtual University for Small States in the Commonwealth project.³

1 <https://www.col.org/news/blog-posts/progress-oer-2014-stock-taking-commonwealth>

2 <http://sidecap.pbworks.com/w/page/33114051/Sidecap%20Home>

3 <http://www.vussc.info/>

Tanzania

At national level, policy documentation such as *The Tanzania Development Vision 2025*, (URT, 2010a), the *National Strategy for Growth and Reduction of Poverty* (NSGRP II) (URT, 2010b) and the *Education Sector Development Programme 2008–2017* (URT, 2008) promote education as a key driver for socioeconomic development and for improving the quality of life of the citizens of Tanzania. The last 10 years have seen a rapid increase in total enrolment in primary schools, accompanied by a smaller increase in pupil numbers at secondary level. At both levels there is a shortage of qualified teachers, resulting in high pupil–teacher ratios and very low pass rates in national examinations (UNESCO, 2014). Teacher education is guided by the Teacher Development Management Strategy (2008–2013) (MoEVT, 2008), which sets targets for teacher education. These targets do not, however, include use of ICT or OER. The Tanzania Beyond Tomorrow initiative aims to integrate ICT into teaching and learning in basic education (Hooker, Mwiyeria & Verma, 2011), but the very recent *National Information and Communications Policy* (URT, 2016) recognises the inadequacy of ICT facilities in many educational institutions and the ineffectiveness of teacher training programmes with respect to ICT. This policy also addresses higher education. Activity in this sector has been taken forward previously in the *Higher Education Development Programme 2010–2015* (URT, 2010c, p.30), where there is a focus on “taking advantage of ICT enhanced approaches to improve teaching and learning”, but again with no mention of OER. This use of ICT in higher education and teacher training reinforces earlier ambitions outlined in the *Education Sector Development Plan 2008–2017*, but recent research indicates low use of OER across the higher education sector in Tanzania, with a range of structural barriers inhibiting engagement and uptake (Mtebe & Raisamo, 2014; URT, 2016).

Uganda

Demographic pressure on the education system in Uganda is immense. The school-aged population is growing rapidly, constraining the ability of the education sector to support national development goals. Current education performance indicators are low, with national and international assessments indicating that many students do not acquire minimum standards, and there is a perceived need both for more teachers and for additional primary teachers’ colleges to improve pedagogical training (UNESCO, 2015). The *National ICT Policy for Uganda 2013–2017* (Ministry of Information and Communications Technology, 2014), which was revised in 2014, points to the importance of ICT training and use in education, in particular that teachers should be trained in the use of computer skills and how to make use of ICT in lesson preparation and in producing teaching materials. The policy does not contain any reference to the use of open content, but it does indicate an aspiration for the sharing of educational resources and for digital content to be translated into local languages.

Literature review and theoretical framework

This literature review begins by briefly identifying the problems of practice in teacher education in developing-country contexts, and then examines contemporary evidence for shifts in practice with OER. It concludes with the theoretical positioning adopted in this study.

Teacher education: Problems of practice

Since the dawn of the new millennium, the pursuit of pedagogic change in classrooms to improve the quality of teaching and learning has been an education priority for governments in Sub-Saharan Africa (UNESCO, 2014). Such change is predominantly expressed as a movement from didactic, teacher-led classrooms characterised by rote memorisation, to a more participatory “learner-centred” pedagogy. “Pedagogy” as a term is much contested, with multiple definitions and realisations. The definition used in this study is congruent with a sociocultural approach: pedagogy is taken to be what people deem to be important, meaningful and relevant in conceptions of learning and knowledge as they engage in teaching-related activity (Nind, Curtin & Hall, 2016). A learner-centred pedagogy emphasises a view of learning as occurring through participation in social enterprises, and recognises learners as active, reflective agents engaged in the construction of knowledge (Murphy & Wolfenden, 2013; Schweisfurth, 2013). Thus, a participatory learner-centred pedagogy will be characterised by practices (see Figure 1) that enable interaction between learners as they work with others on problem-solving through dialogic inquiry, creating opportunities to exchange prior ideas and consider new ones drawing on the cultural and linguistic “funds of knowledge” they bring to the classroom (Gonzalez, Moll & Amanti, 2006), as well as the language and artefacts used and valued by their communities (James & Pollard, 2011; Lave & Wenger, 1991).

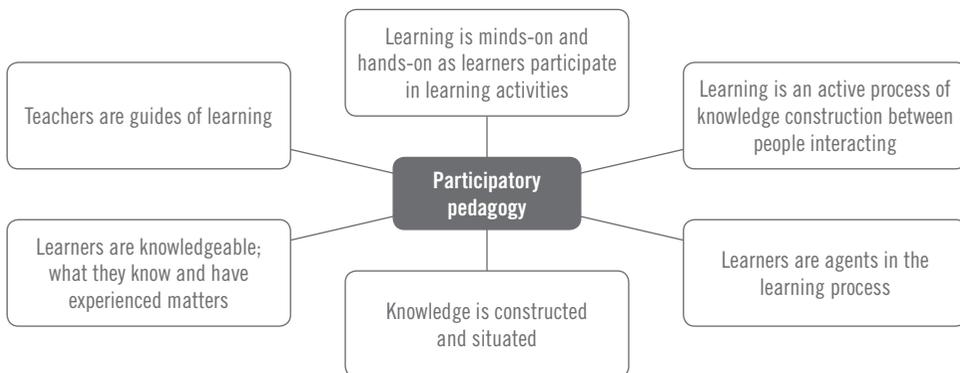


Figure 1: Characteristics of a participatory, learner-centred pedagogy

Enacting this participatory, learner-centred approach in classrooms requires a repositioning of teachers to a more facilitative role. However, across the globe, pre- and in-service teacher training is frequently identified as having failed to support teachers to move towards this new form of identity (UNESCO, 2014; Westbrook et al., 2014). Programmes and courses for teachers are reported to be predominantly theory-based and isolated from the context of the schools and local communities they serve. There is, for example, little recognition of the multilingual context of many classrooms or the presence of students with disabilities (Akyeampong, Lussier, Pryor & Westbrook, 2013). Teacher educators' practice within colleges of education and universities is usually described as lecture-based, positioning student teachers as passive receivers of transmitted knowledge, with little opportunity to argue or challenge (Dyer et al., 2004; Kunje, 2002). Thus, for trainee teachers there is a mismatch between the pedagogy that they hear being advocated in policy and lectures, and that which they experience. For most, there are few opportunities to engage with a more participatory, learner-centred pedagogy (Pryor, Akyeampong & Westbrook, 2012). This is critical: studies find that many early-career teachers draw mainly on knowledge and experiences gained through their training rather than on evidence from practice in their own classrooms (Akyeampong et al., 2013).

Teacher learning can be conceptualised as "learning to be" (Cook & Brown, 1999), occurring through participation in a community built around a particular practice (in this case, the practice of becoming a teacher). This shared endeavour involves both teachers and teacher educators building on the cultural practices of previous generations (Rogoff, 2003). Thus, for lasting classroom improvement, revision of the pedagogical practice of both teachers *and* teacher educators is required. Changing the practice of teacher educators requires a shift in their understanding of their learners (trainee teachers), learning and the nature of knowledge – i.e. a fundamental revisiting of what is valued as knowledge and how it is constructed (Tabulawa, 2003).

Making such ontological and epistemological shifts is not easy. Epistemological movement, for example, is frequently undermined by the hierarchical view of knowledge embedded within the specified curriculum, assessment policy and curriculum tasks in which local knowledge is given little status. Teacher educators therefore often negotiate tensions between different views of knowledge – between valuing knowledge as an abstract commodity transferable across situations and contexts as expressed in the curriculum and assessment regimes, and an understanding of knowledge as dynamic and contextual, constructed through a social process mediated by prior knowledge and personal and community experiences. It is this latter social view of knowledge that underpins the move towards more learner-centred practices (Trigwell & Prosser, 1996; White & Manton, 2011).

The discourse around teacher educators' pedagogy frequently implies a set of binary practices: learner-centred or teacher-centred. The situation is, however, more complex, and teacher educators are usually to be found at different stages of a trajectory of change towards more participatory practice (Murphy & Wolfenden, 2013). Each individual's trajectory will be mediated by their beliefs about learning and knowledge, their prior experiences, the kinds of knowing made possible in their institution through the availability of tools (such as OER), and conventions, rules and expectations of what can and cannot be enacted (Putnam & Borko, 2000). It is the influence of ways in which educators have taken up possibilities for OER use, on these trajectories of pedagogic change, that is the focus of this study.

OER use and impact

There is a rapidly growing body of OER (Wiley, 2016), but as yet few studies which interrogate the influence of OER on the agency of educators to enhance learning opportunities and contribute to long-term educational goals. In the Global North, from which most OER content originates, the focus of many institutional OER initiatives is on the creation of OER, their publication in repositories, and modes and tools to access OER, whilst much of the scholarly discourse about OER has been concerned with policy, business models, accessibility and modes of implementation (de los Arcos, Farrow, Perryman, Pitt & Weller, 2014; Ehlers, 2011; Shear, Means & Lundh, 2015). There is a focus on the generation of quantitative data and evidence to influence policy. An example of this is the large-scale, quantitative Open Educational Quality Initiative survey, which examined contextual and social influences on OER use across higher education and adult learning in eight European countries. It noted that in the highly digitally connected environment of Europe, critical success factors for use include institutional policies and support and, at a personal level, rewards for professionals to engage in OER adaptation and use (OPAL, 2011).

The access dimension dominates the discourse of policy and scholarship in low-income countries (Butcher, 2010; Ngugi, 2011). Previous reports of OER usage in Sub-Saharan Africa have highlighted the need for improved technology infrastructure and reduced internet access costs, alongside support for professional development to raise educators' awareness of OER and enhance their skills in utilising OER in their teaching (Okonkwo, 2012; Wright & Reju, 2012). As internet infrastructure is extended and the price of online access decreases (Bruegge et al., 2011), a growing number of local OER platforms and repositories are being established in Sub-Saharan Africa – for example, OER Africa,⁴ the African Virtual University OER repository⁵ and the University of South Africa institutional repository.⁶ Studies from the continent do, however, indicate that there is still relatively low awareness of OER (Gunnesh, 2011; Hodgkinson-Williams, 2015).

Studies of OER in schools, mainly but not exclusively from the Global North, report tentatively but positively on both the quality of OER compared to conventional textbooks (Kimmons, 2015; Pitt, 2015), and improved learner attainment and engagement with open textbooks (Cartmill, 2013; Livingston & Condie, 2006; Robinson, Fischer, Wiley & Hilton, 2014). Work with educators has found that perceived quality is a key criterion for selection of resources, usually expressed as confidence in the creator or a recommendation from a trusted source (Clements & Pawlowski, 2012). There has, however, been little investigation into how or whether such open materials might support educators in developing more participatory, inclusive pedagogies. In a relatively rare OER study including a lens on educator practice, Petrides, Jimes, Middleton-Detzner, Walling and Weiss (2011) found open textbooks stimulated more interactive and collaborative classroom activities, in addition to greater classroom dialogue in American community colleges.

Studies of OER use in higher education, also mainly from the Global North, similarly focus principally on the impact on students rather than educators. Studies that include educators have reported small positive impacts on educators' practice through an enhancement of

4 <http://www.oerafrica.org/teachered>

5 <http://www.avu.org/avuweb/en/faculty/avu-oer-opportunities/>

6 <http://uir.unisa.ac.za/handle/10500/4663>

pre-existing practices associated with a more participatory approach, such as collaboration and sharing of resources (Masterman & Wild, 2011), and the use of OER is claimed to prompt positive feedback from students, leading to greater use of OER (Jhangiani, Pitt, Hendricks, Key & Lalonde, 2016; Masterman & Wild, 2011). Some innovative pedagogic models utilising OER – most notably the connectivist model (Downes, 2013) – have emerged from the plethora of Massive Open Online Courses (MOOCs) being produced globally, but such models remain outliers in the MOOC world and have yet to gain traction within formal institutional provision.

A relatively rare example of a formative exploration of the influence of OER use comes from the Teacher Education in Sub-Saharan Africa (TESSA)⁷ project (Harley & Barasa, 2012). The TESSA appraisal found evidence that TESSA OER have been used in a wide range of teacher education programmes in different kinds of settings and contexts in different models and for different purposes. It identified TESSA as having:

... [a] significant impact on the identity and practices of teacher educators and a profound impact on those of teacher-learners. It has fused theory and practice; shifted perceptions of the teacher as a “know it all” to “teacher as facilitator of learning”; and greatly enhanced the relevance of pupils’ learning experiences. (Harley & Barasa, 2012, p.8)

However, in campus-based institutions, notwithstanding expressions of managerial support, the study located little evidence of TESSA being formally inscribed in curricula or in faculty statutes or guidelines. Indeed, use was often highly dependent on the activities of one or two teacher educators acting as agents of change. Greater evidence of the sustainability and embedding of TESSA OER use was found in distance learning programmes, with their collaborative planning and production of learning materials. However, there has been little new work in this area despite the call from Umar et al. (2013, p.194) to explore the link between OER adoption in the developing world “and their [practitioners’] dominant pedagogic norms and values”.

It is possible that the transformational role of OER with respect to pedagogy is being limited by the way in which educators frequently draw on OER in an “atomised” way (OPAL, 2011, p.148), integrating a wide range of discrete OER from multiple sources (especially videos) into their teaching, rather than adopting an entire course or module (de los Arcos et al., 2014). Course designers report that using OER to generate entirely new programmes or modules is challenging for a variety of reasons: many resources purporting to be OER lack detailed information on licensing and usage rights; locating OER in repositories is not easy; and the variety of formats and technical information makes linking a collection of OER on a single platform challenging (Richards & Marshall, 2010; Tonks, Weston, Wiley & Barbour, 2013). Accounts of such initiatives commonly include little discussion of changes in pedagogy enabled by OER use. One exception is the AgShare⁸ project in which contributing academics are reported to have become more aware of new possibilities for teaching and learning underpinned by a more interactive pedagogic approach (OER Africa & University of

7 <http://www.tessafrica.net>

8 <http://www.oerafrica.org/agshare-ii>

Michigan, 2012). In Malawi, a midwifery module developed with OER introduced a problem-solving-based approach in which students were able to access resources in advance of lectures. This reportedly led to greater student participation, although it is unclear whether this has been sustained (Ngalande, 2013). A recent study in British Columbia (Jhangiani et al., 2016) found faculty in teaching institutions are slightly less likely to create and adapt OER than their peers in research-focused institutions. Such hesitation could also act to limit pedagogic change.

Researching the use of open content is intrinsically problematic. As Pitt, Ebrahimi, McAndrew and Coughlan (2013) argue, the inherently open nature of the materials and courses makes it difficult for course providers to gather specific information about users, and embedding instruments to generate usage data can limit participation. A further challenge in examining the impact of OER use is identifying when educators are specifically using appropriately licensed OER, rather than merely drawing on free online resources. The OER Research Hub team tackles this by using the criterion of “adaptability” – the extent to which resources can be revised and repurposed – as an indicator of the influence of openness (de los Arcos et al., 2014). Their most recent global interrogation involved educators who engage with OER to increase the relevance of materials for their learners and who experiment with different teaching approaches. In this work, de los Arcos and colleagues point to some evidence of OER use prompting reflection on practice by educators and increased collaboration around teaching – practices congruent with the social and subjective philosophies underpinning learner-centred education. Such practices were less frequently identified in an earlier study by Beetham et al. (2012), who reported educators making use of content found online but in a manner associated with reuse or consumption rather than sharing. Implicit in many of these studies is a tension between OER as a personal tool for educators, and as an institutional tool to be employed in support of a number of objectives (ranging from access to cost saving and marketing). Pedagogic shifts are rarely mentioned explicitly as a high priority at institutional level, although this may possibly be implicit in institutional quality enhancement initiatives and/or initiatives to improve student motivation (Ives & Pringle, 2013).

Theoretical framework

Interrogation of the literature suggests that exploration of the link between OER use and pedagogic transformation has received little attention to date, and there has been little work relating OER to the global rhetoric around learner-centred practice. Conole (2008) offered a mapping of Web 2.0 tools against learner-centred approaches to illustrate the overlap in philosophical positions. In developing this work, she has suggested that OER have the potential to support more interactive, social learning experiences (Conole & Ehlers, 2010). Still, there is little published work examining educator agency with respect to pedagogic change in contexts where the use of OER has been introduced.

The OER movement is premised on the understanding that knowledge is a collective social project, and that producing OER – or, more powerfully, adapting OER and sharing these resources with a global community – offers the possibility for educators to be in dialectic engagement with the world, accessing and contributing to a global community’s experiences through mutual negotiation to articulate their own position and be transformed

through these interactions (Deimann & Farrow, 2013). From a sociocultural position, both formal and community perspectives are necessary for learners to be able to develop new knowledge and understand how that knowledge functions in the world. Adaptation of OER enables the generation of situational knowledge by connecting formal “school” knowledge to “community” knowledge (including indigenous knowledge), and by connecting school or classroom experiences to wider community experiences. OER thus offer epistemological and practice tools for educators, and the use of OER has the potential to support dialogue and practice in teaching and learning that is traditionally not made available through proprietary resources or conventional institutional support.

An educator engaged with OER can therefore become increasingly positioned as an agentive curriculum developer. This ontological repositioning articulates a position for educators as reflective, empowered, professional practitioners. Agency is defined here as a phenomenon which emerges in the “dialectical interaction of person and practice” (Edwards, 2015, p.779), and which is influenced by the cultural environments in which educators practise – in particular the demands exerted on teacher educators in the context of their institution and wider social world. It is past-oriented in terms of the cultural resources that educators acquire from previous experiences, but future-oriented within the cultural, material and structural possibilities of the present context (Biesta, Priestley & Robinson, 2015). Agency is thus what teacher educators do in response to problematic situations through dialogic engagement with others (peers and students) in contexts of action – their classrooms, lecture theatres and staff meetings – drawing on their beliefs, values and attributes.

This study employs this sociocultural framework to explore how teacher educators working in low-income contexts perceive that the use and adoption (including adaptation) of OER in their teaching influences their ability to achieve the agency required to move to new and more effective participatory practices. The study first identifies where practice has embraced engagement with open resources and then examines the ways in which such use has influenced and modified educators’ conceptions of knowledge, knowing and learning (Cook & Brown, 1999) through attention to their descriptions of intentional teaching actions.

Methodology

This study is informed by a sociocultural approach in which meaning and experience are understood to be socially produced and reproduced. It employs an interpretative methodology (Cohen, Manion & Morrison, 2007; Habermas, 1989) to explore when and how teacher educators have used OER and how this use changed their practice with respect to teaching and learning. From this perspective, a study of teacher educators’ practice cannot be understood in isolation from the teacher educators’ histories of participation in the teaching endeavour and the institutional context within which they practise. Whilst contexts and structural conditions at institution level and sub-institution level will influence individual accounts of practice, institutions themselves are situated within particular national policy frameworks and structures (Bruner, 1996), and are defined by features such as their purpose, location, staff and student demographics, cultural practices, conventions, and local economic and social situations. This study is therefore not limited to either individuals

or the environment, but extends across individuals, institutions and the social environment. It pays attention to the national policy context within which each institution is located, and the institutional structures – procedures, course designs and arrangements – which frame professional interactions and enable or constrain emerging practice.

The study utilised a mixed-methods approach at six teacher education institutions in the contrasting settings of Mauritius, Tanzania and Uganda. All six institutions had previously engaged with OER through at least one OER initiative (primarily the TESSA project), thereby increasing the chances of further OER use (de los Arcos et al., 2014; OPAL, 2011). Access was facilitated through existing professional relationships with teacher educators and permission to undertake the research was obtained from senior staff in each institution. Data collection took place between July 2015 and April 2016. In each institution, one member of the academic staff was invited to take on the role of local “research collaborator”. A consultative briefing meeting was held for these research collaborators in July 2015 to ensure that there was a shared understanding of the aims of the research and to establish ways of working across the team. The research collaborators participated in the instrument design process and provided support for access and data collection.

Drawing on contemporary thinking, the research team rejected the idea of a rigid “insider/outsider” researcher dichotomy (McNess, Arthur & Crossley, 2013), in that the research team was neither fully one nor the other. Other than at the home institution of one member of the research team, we were all “outsiders” at the research sites in terms of racial and cultural differences. However, as fellow professional teacher educators with previous relationships with the institutions, the research team was seen as engaged in the joint enterprise of teacher education rather than as intruders. Furthermore, each team member’s relational identity as a researcher (i.e. how we understood our position relative to participants) varied across institutions, mediated by previous personal interactions with the institution and the local research collaborator within the institution (Milligan, 2016). Such relationships were important to consider during the data collection process; the balance of power between researcher and participants had the potential to influence what became known in the enquiry.

Data generation and analysis

The study generated evidence from multiple sources, with data generation methods centred around interviews with key informants at the six research sites. Participating institutions varied in scale, mode of delivery, complexity and external environment, and data collection activity at each site was planned in consultation with research collaborators.

The study began with a review of relevant national-level policies in each of the three countries to better understand the context in which teacher educators in each research site were working, as well as the external opportunities and constraints which frame the educators’ work and their institution’s trajectory.

Following this policy analysis, a survey was designed to identify OER users at each institution. In consultation with the research collaborators at each study site, the survey was adapted slightly for each institutional context, drawing on the national and institutional policy analyses so that questions resonated with teacher educators’ professional experiences in each location.

The local research collaborators used their knowledge of institutional activities to identify an initial cohort of staff to invite to participate in the study at their institution. In general, these were staff who were, or had been, involved in curriculum development work involving OER. At each institution, 10 to 12 members of staff were sent digital copies of the project information sheet and the survey by the research collaborator. These respondents did not constitute a representative sample, and the aim was not to produce an overall evaluation of OER use and impact but rather to identify staff engaged with OER who could be invited to participate in in-depth interviews. These semi-structured, thematically organised teacher educator interviews focused on the actions and decisions that the teacher educators made in relation to resources in order to explore the influence of OER use on developing knowledge and practices.

Survey response rates varied and although the research team intended to review all survey responses prior to the institution field visits, technology challenges and resource constraints meant that many surveys were collected from research collaborators during, instead of before, the field visit. On the positive side, this made for immediacy in linking the interviews directly to the survey responses.

In general, participants invited to participate in interviews were teacher educators who, from their survey responses, appeared to have drawn on specific OER (from TESSA or other OER repositories) in their teaching on more than one occasion. In light of the challenges of ICT infrastructure (particularly internet access) at these institutions, the interview respondents included those teacher educators who use OER that are not online or in digital form.

The research team aimed to select a cross-section of interviewees at each site, targeting male and female educators from different disciplinary backgrounds with varying roles and periods of service within the institution, and who had demonstrated previous engagement with OER. The aim was to interview a minimum of five academics at each institution. However, staff who had been pre-identified for interview were not always available during field visits. It was possible to interview some by Skype at a later date, but the number of academics interviewed varied across institutions, depending on what was logistically possible. A breakdown of the data collection activities and sample numbers by research site is presented in Table 1.

Table 1: Respondent numbers for data collection activities by research site

Institution/ country	Type of institution	Number of teacher educator surveys	Number of teacher educator interviews	Number of stakeholder interviews
MU1/ Mauritius	HEI focused on professional training of teachers across all phases. Offers undergraduate and postgraduate programmes, including distance education courses.	9 (4 male, 5 female)	7 (2 male, 5 female)	1 (male)
TU1/ Tanzania	Distance learning institution with over 50 000 students; approximately one-third of students studying education courses.	8 (3 male, 5 female)	5 (2 male, 3 female)	1 (male)

TU2/ Tanzania	Constituent college of an HEI established to increase the supply of graduate teachers. Campus-based provision with the recent introduction of a distance learning postgraduate programme.	10 (8 male, 2 female)	6 (4 male, 2 female)	1 (female)
UU1/ Uganda	Large campus-based institution offering a wide curriculum, including teacher education. Distance learning programmes added to the portfolio 20 years ago.	14 (7 male, 7 female)	6 (4 male, 2 female)	1 (male)
UU2/ Uganda	New campus-based university focused on vocational courses, including science, technology and education. Includes distance learning unit. Responsibility for national standards of teacher education.	7 (5 male, 2 female)	5 (3 male, 2 female)	1 (male)
UU3/ Uganda	Small institution training primary school teachers (Teachers' Certificate).	10 (7 male, 3 female)	7 (5 male, 2 female)	1 (male)
Total		58 (34 male, 24 female)	36 (20 male, 16 female)	6 (5 male, 1 female)

All interviews were conducted by members of the research team in English at the interviewee's institution or via Skype. The interviews lasted between 20 and 60 minutes; they were audio-recorded and field notes were taken during the interviews.

Analysis of the research data was undertaken by the core research team. The survey responses were analysed for patterns in OER and online resource use (a site-specific analysis was followed by cross-case analysis), paying attention to the type of resource selected and the context of practice, for example the availability of technology tools such as laptops. The interview transcripts were then analysed in two stages. The first analysis was done to identify instances of OER or other online resource use, the purpose for which it was being employed, and the rationale for selecting the resource. A second analysis was then undertaken on the descriptions of practice with these resources. For each description of use, analysis was undertaken to identify characteristics of learner-centred pedagogy drawn from the literature. A detailed coding scheme was not used as this approach has a tendency to atomise the data, isolating it from its context and limiting the understanding of relationships across different elements of the data, which is in tension with a sociocultural approach.

Study-site OER contexts

At institution MU1, there has been sporadic OER-related activity for some years, including sensitisation workshops conducted by OER Africa and COL (2014), participation in the Sankore Open Project (from 2008 onwards) (Udhin et al., 2016; Udhin & Oojorah, 2013), and use of TESSA OER in pedagogy courses (from 2010 onwards) – including an elective module, “The Creative Pedagogy Project” (Auckloo, 2011). At the institutional level, the emphasis has been on foregrounding the development of ICT and further develop staff skills in this domain. In support of this, all staff have been allocated a laptop and all classrooms are now equipped with digital projectors. MU1 leads the development of school-level curriculum materials for Mauritius and the institution has made large

numbers of resources freely available in digital form. However, there is as yet no formal policy on open content, and engagement with OER has typically been at the level of individual staff action.

The first of the study sites in Tanzania (TU1) has been involved with the use of OER since 2006 through engagement in the TESSA programme, and the TESSA OER are integral to the diploma course for primary teachers (Wolfenden, 2012). More recently, there has been strong senior leadership support for the creation and use of OER, as evidenced by a collaboration with OER Africa aimed at supporting academics to publish their instructional material under an open licence (Ngugi & Butcher, 2016). Under this collaboration, all academic staff have attended workshops focused on the characteristics and properties of OER, and a draft OER policy has been developed. This is currently progressing through the institutional governance process, but appears to have had little impact on the use of OER by academics at TU1 (Muganda, Samzugzi & Mallinson, 2016). Internet connectivity was reported as good by respondents, although access to laptops and desktop machines was not ubiquitous and several respondents reported having to supply their own devices.

As part of quality enhancement in teacher education, the second study site in Tanzania (TU2) has embraced the use of technology to enhance teaching and learning, including the use of OER, but there are as yet no explicit policies on either technology or OER. TU2 was involved in the second phase of TESSA activity (development of resources for the teaching of secondary science) from 2010 under the guidance of a senior institutional leader whose term of office has now expired (Stutchbury & Katararo, 2011). Whilst other colleges which share the same university affiliation as TU2 have collaborated with external agencies in the creation and use of OER, there has been no structured cross-college engagement at TU2 itself. Internet connectivity on the campus is not reliable or comprehensive, and not all staff have their own individual institutionally supplied laptop or desktop computer. The institution is moving towards the use of Moodle as a learning management system and there is a dedicated department to support staff in sharing materials online with students.

The first and second study sites in Uganda (UU1 and UU2) have ICT policies that outline strategies for ICT use across various areas of institutional activity. At UU1, the recently revised ICT Policy makes mention of the use of OER, as does the Policy on Open and Distance Learning. Neither of these policy documents, however, extends beyond high-level support for OER; there are no targets or objectives for OER use or creation and there is no evidence of any systematic institutional support for a shift towards use of OER in teaching. At UU2, the ICT policy does not include reference to open content or open resources, and no policies were available at the third study site in Uganda (UU3). All three institutions have, however, been involved in the TESSA initiative in various ways (Wolfenden, 2012) – UU1 and UU2 since the inception of TESSA through engagement in the creation and adaptation of OER prior to use of the OER in various programmes, and UU3 through more recent (2012) use of TESSA OER. At UU1 and UU2, internet access is available across the campus, but there is limited bandwidth (staff commented on difficulties with downloading videos). At UU1, all staff have ICT hardware and there are also projectors available. There is a computer lab at UU3, but no internet connectivity, and staff provide their own hardware for offline professional use in the institution.

Sample profile

The 58 survey respondents (see Table 1) were all employed in academic roles in their institution; almost all of them were experienced teacher educators (with a mean average of 13 years' experience as a teacher educator) and included professors, senior lecturers, associate professors, lecturers, assistant lecturers and tutors. They all had "lived experience" of the reality of the school context through teaching in primary or secondary schools prior to working as a tutor or lecturer, although in several cases this experience dated back a number of years. This experience had given them familiarity with the challenges faced by teachers, which they described as useful in establishing trust with teachers and head teachers. Interviewees were selected from survey respondents who indicated a willingness to participate further in the research and who had indicated use of OER in some aspect of their practice.

Ethics

The ethical procedures followed in this study were in accordance with good practice endorsed by the British Educational Research Association and the Research on Open Educational Resources for Development project, and were agreed to by the Open University's Human Research Ethics Committee. Informed consent was sought from all participants, who were made fully aware of the research aims and methods. All institutions and participants are de-identified in this account.

Findings

The findings are discussed under three headings relating to the research question: the kinds of OER teacher educators are aware of and how they access them; how and for what purpose they use the OER; and what intended and enacted pedagogic practices are associated with OER use.

Access to and awareness of OER

In line with the findings of numerous previous studies, the critical issue for OER across all institutions in this study remains access to hardware (desktop computers, laptops and internet-enabled mobile devices) and to the internet. Access to the internet is central; without this, individual use of OER is static. Mobile phones were the dominant device for access to the internet, used by all but five of the respondents. Approximately half the sample (26 educators) accessed the internet using a desktop computer, slightly more than half used a laptop (29 educators) and a few employed a tablet computer. Access to the internet across multiple devices was common only amongst the educators in Mauritius. At both sites in Tanzania and at UU1 and UU2 in Uganda, regular access to the internet was through one or two devices only, one being a mobile phone. Thus, although institutional connectivity was not always stable or comprehensive across institutional buildings, teacher educators at these institutions had found personal solutions to access the internet. UU3 in Uganda was an outlier, with no institutional connection and 50% of respondents reporting no access of any kind to the internet. This is possibly caused by multiple intersecting factors: UU3 is a

lower-status institution with no research activity in its mandate, it is the one research site situated outside a capital city (although located in a commercial city only 80 km from the capital city), and staff are on lower pay scales than those at other institutions, making it more difficult for them to afford their own internet-enabled devices and the cost of online access. It could, however, be argued that UU3 is typical of the majority of institutions training primary school teachers across the continent.

Familiarity with online resources and OER

The survey generated data on respondents' knowledge of and familiarity with different online resources, including OER. Overall, the level of awareness of different OER repositories was low and many educators' responses indicated confusion in their understanding of the characteristics and definition of OER, with some respondents listing MOOC platforms (e.g. Coursera), virtual learning environments (e.g. Moodle) and online search engines as OER. With the exception of educators at UU3, 90% of the remainder of the educators surveyed were familiar with Wikipedia and Google Scholar, with a slightly smaller number reporting familiarity with YouTube and TESSA. Slightly fewer educators (25) expressed familiarity with resources from OER Africa. Given the ubiquity of Wikipedia, Google Scholar and YouTube, and the prior collaborative work with TESSA and OER Africa at almost all the sites, these results are not unexpected. More interesting, perhaps, is that almost half of the sample (22) indicated a familiarity with OpenCourseWare offerings, although most respondents were able to give little further detail in interviews. Other OER resources mentioned included those from COL and the Khan Academy.

Familiarity with OER repositories and sites was highest at institutions where external agencies have conducted OER-specific workshops (MU1, UU1 and TU1). Interview data indicated that these workshops served to raise awareness of the range of OER available. By contrast, many educators at UU3 indicated awareness of only one source of OER – TESSA.

In summary, with regard to awareness and access, there was a wide variation in levels of awareness of different types of OER and OER repositories across institutions and survey respondents. Unsurprisingly, access to and familiarity with OER is strongly linked to educators' access to the internet and their prior participation in OER-focused activities. However, a notable feature was educators' agentive accessing of online resources through their own mobile devices rather than being limited to institutional internet provision.

Engagement with OER

Levels of engagement

Overall use of OER across the institutions was limited, but a small number of educators (five) were passionate about the use of OER, both for their own personal learning and in their teaching with students. These individuals were, however, acting autonomously, with little institutional support despite evidence of prior institution- or department-level involvement with OER. Critically, their OER activities have also not extended to integrate with their colleagues' practice. For example, at MU1, the policy environment is favourable to the use of OER, at both national and institutional level, but the student project module utilising OER initiated by one member of staff has remained very much part of her individual practice. Other colleagues were aware of this activity and several had supported teaching

of the module, but there was little evidence that this had stimulated them to undertake personal innovation and move to similar activity with their own classes.

These five OER “champions” were encouraged in their use of OER by what the OER enabled them to make available to their students, the subsequent reactions of their students (greater enthusiasm and engagement) and their own personal learning gains. One educator at a distance learning institution explained that for her students, open materials offered advantages but required skills to use proficiently:

Yes, openness, I see it as things are regularly available for use, students don't have to be there in the classroom with the instructor, everything is there. The only problem that I see with my students, my own students, for example, since they find a lot they think they can put everything they have read in their answers in responding to assignments. There's too much information and sometimes the students are not capable of synthesising and ... choosing what fits where, what fits where. But I like the openness; students can get their diplomas without difficulties we experienced in the past. (TE08)

For these champions, use of OER offered a perception that they were involved in a wider education community and that they had access to the work of a broad range of education experts, including some with whom they were familiar and admired. But even amongst this group there was modest evidence of OER adoption, although many spoke of using OER in multiple ways to meet specific learner needs, as one educator in teaching education management explained:

... that's the topic I am teaching – total quality management in education. What I do is borrow ideas and give examples from Tanzania. What this aspect relates to, or what they represent in a Tanzanian context, that's what I do. So the challenge is how to adopt ... to adapt the context reading from another context to a Tanzanian context, because examples and practices must be from our experiences, our students' experience, and my own experience. (TE03)

With the exception of these individual OER champions, overall use of OER was limited and group (departmental or institutional) engagement was confined to use of one OER or use of OER within a particular module or curriculum topic. In some cases, OER use has become part of the enacted curriculum. For example, at UU3, several years previously tutors were introduced to TESSA OER through a UU2 outreach programme, in which they mapped modules to the TESSA OER. UU3 tutors retained their print copies of the TESSA OER and continue to draw on the activities and ideas from these OER in lectures and classes with their students. In three institutions (MU1, UU1 and TU1), use of specific OER is reified in the specified curriculum. For example, at TU1, TESSA OER are integral to course handbooks, as instructional designers and course writers drew on the TESSA OER when creating programme materials for a pioneering distance learning diploma programme.

Factors enabling OER engagement

Beyond engagement with a specific OER initiative such as TESSA or Open Resources for English Language Teaching (ORELT),⁹ there was no substantial evidence of collective engagement with OER within departments or faculties, and it was rare for one specific OER initiative to stimulate more extensive individual engagement with other OER repositories. Where there was more extended individual engagement with OER, this was found to have been stimulated by one of the following:

- An external visitor to the institution who showcased the range of OER available and examples of use.
- Study at another institution, usually abroad (the UK, New Zealand, India, South Africa and Uganda were mentioned).
- The advent of improved technology within the institution or personal acquisition of a device which enabled internet connectivity (for example, a laptop or modem).
- Support from library staff, or staff leading internal staff development sessions, such as instructional design specialists who acted as a resource for practice.

Factors constraining OER use

A number of material and discursive structures were identified which impacted directly on the agency of the teacher educators with regards to OER use. Lack of a reliable power supply; an absence of fast, consistent internet connectivity; and limited access to laptops and desktop computers were all reported to limit teacher educators' exploration of and familiarity with OER, most acutely at UJ3 in Uganda. Physical conditions also inhibited teacher educators' direct use of OER with their students, as teaching rooms frequently lacked internet access or projectors to facilitate sharing and use of OER. Several respondents mentioned the large sizes of their classes (one respondent cited up to 1 000 students in a class) as deterring pedagogic experimentation and more participatory approaches.

In addition to these material structures, discursive structures also acted to constrain teacher educator exploration of OER in practice and limit the growth of confidence. For many teacher educators, being an expert in the reuse of online resources has yet to be seen as an integral part of their professional identity, which limits their agency regarding OER use. Preparation of original, "unique" resources does, however, remain integral to their professional identity – i.e. a public expression of their expertise and competence as teachers, necessary to retain authority and student respect. One respondent described in detail how she had previously shared a presentation prepared for her classes and then been very disconcerted to find it being used by someone in another university: "... that's very scary, that limits us maybe sometimes to just giving the students even those PowerPoints" (TE17). Additionally, many believed that using OER would add to their preparation time, and the absence of any visible reward for adapting, using or creating OER further deterred some from engaging in more depth with an open culture.

Many respondents found the sheer volume of available online resources daunting and were anxious for quality guidelines; without these, they doubted whether they had sufficient expertise to judge whether a resource was of appropriate quality. Several respondents mentioned that they looked for evidence that the resource originated from an academic as

9 www.orelt.col.org

an indicator of authenticity and quality. There were some misconceptions that resources in PDF format have higher credibility, and much scepticism that content from another context would be appropriate for their students or would be accurate: “I don’t know if the material is year 1 or diploma level, is the language appropriate?” (TE25); “so many cheating [false] things are posted that are not real [accurate]” (TE04). The latter respondent attempted to be more positive, continuing “maybe it will improve and change and we’ll find ourselves trusting what is being posted” (TE04). Such reservations extended to the sharing of online resources created by these educators: “I wouldn’t like to share my material if I’m unsure of the quality and if someone can look at it and not learn from it” (TE14). Thus, uncertainties surrounding dimensions of quality act to inhibit both the selection and publishing of resources.

Many teacher educators felt that they lacked the various skills required to make use of individual OER in their teaching. These ranged from technical skills in uploading content to the internet (sharing) to skills needed to adapt or “restructure” OER. At the course level, several educators discussed how they felt deficient in course or instructional design competence and hence were not confident about their ability to organise materials in a way which would offer students an effective learning journey. Anxiety about copyright issues also inhibited exploitation of OER in teaching.

For some educators working in campus-based universities, their relationship with their students acted to discourage the promotion of student use of OER. Students were frequently perceived as being interested only in what they needed to know or do to pass examinations, and having little interest in exploring new ideas or participating in different kinds of learning experiences. Three educators claimed that inviting students to engage with OER within a class would distract them from the learning task, as it would “give students an opportunity to catch up on their Facebook pages” (TE09). Occasionally these teacher educators print and distribute OER to their students. They do, however, recognise that this limits the extent and type of OER that can be used, and restricts the form and extent of student interaction with OER.

Teacher educators often referred to students’ limited access to technology, particularly laptops and internet connectivity, as a reason for limited OER use within their courses: “Students know they can get a lot of material they need from the open resources, but the internet connections preclude this” (TE12). This rationale was extended by some educators, who argued that an absence of internet connectivity and technical support for teachers in schools would inhibit student teachers from continuing to use OER when on their school practicum. Students’ limited experience of different cultures and languages was also raised as an impediment to promoting student use of OER: “Most of the videos we find online are from the UK or that sort of thing and sometimes when the people are talking and there is an accent, an English accent, and sometimes I find that students would find it a bit difficult to follow” (TE14).

Purpose of OER use

Across the six institutions, teacher educators were found to be using OER in one of three ways: teaching *about* OER; teaching students *with* OER; and personal learning or preparation for teaching *with* OER.

These are not discrete categories as educators' practice may include one or more areas of activity. The categorisation is intended as a way of illustrating the multiple ways in which educators in this study engage with OER in their teaching practice.

Teaching about OER

In two institutions (MU1 and UU1), the study sample included teacher educators who taught formal courses with specific sessions on the forms and properties of OER. At MU1, these courses were for teachers on an in-service training programme or pre-service teachers on the diploma programme, whilst at UU1, the course was designed for university staff. At MU1, the stated aim of the in-service programme was to support teachers' use of technology in their classrooms; the lead teacher educator for the programme also wanted to "develop a culture of OER in the teaching profession" (TE06). Within the sessions, teachers were informed about open licences and key OER stakeholders and innovators, and they were also involved in creating short videos to support the teaching of a particular topic. These resources were shared within and beyond the group through a designated Facebook page. Further work arising from the digitisation of the curriculum at MU1 prompted the lead teacher educator to design and develop original OER (such as an interactive dynamic solar system). Teachers on the programme were then required to develop lesson plans to demonstrate how they would use these OER with their students. In the pre-service programme, the 45-hour module aims to highlight for teachers "how OER are important and how they can be of use to teachers in their teaching and learning" (TE2). The sessions in a multimedia lab involve supported searching for OER and assignments based on adapting an OER for a specific class and learning need.

At UU1, an educator was using OER in professional development sessions aimed at equipping staff across the institution with skills in creating resources for e-learning and distance learning. In preparation for his sessions, he identified suitable OER which might be useful to colleagues (such as COL resources) and used TESSA OER as a model structure for writing OER: "taking the methodology and grafting the content in" (TE16). He spoke eloquently about how many staff had a binary approach to OER: they either use OER in its original form or reject it outright as inappropriate. In his experience, many colleagues adopt the latter position. He suggested that this may be due to the fact that use of OER would reduce their authority, in that "students might think they have no brains of their own" (TE16) and were relying too heavily on others. He also had the impression that colleagues believed that content from another context could not be appropriate and "locked it out rather than thinking what good [they could] get out of it". He described how some of his colleagues worried that if students had access to all the knowledge in OER, there would be no need for the students to attend class. He also reported that some colleagues cited work pressure as a reason for non-engagement, and had asked about their reward for adapting and using OER. In this context he was acting as a mediator, supporting colleagues to move across boundaries of practice to a point where they would begin to engage with OER and perhaps make small adaptations. He found this a slow process, but one in which early adopters of OER could become advocates.

This educator had noticed that those colleagues who were open to working with OER could experience profound shifts in their thinking and practice. Exploring other OER gave them a quality benchmark, which sometimes caused them to feel they were doing a "substandard"

job compared to their international peers and that they were using “old” methods. Staff who did engage with OER often commented on how this made their lives easier. What was covered in their teaching was now more explicit and students had easier access to the content, methods and assignments. He reported that some colleagues had moved to a flipped classroom approach and claimed to have observed more student engagement. A recent institutional review had noted that external BSc students (in distance learning mode) were achieving better learning outcomes than internal BSc students, despite lower entry requirements for those on the external programme. The university senate had asked whether examiners were being lenient on the external students, but this educator attributed their higher performance to greater use of resources (including OER), which motivated students and enabled them to engage more productively in independent learning.

Teaching students with OER

The practice of teaching with OER has been divided into three sub-categories to illustrate different levels of engagement. In reality, these are not discrete categories; the practice of teaching with OER is on a continuum of both increased use of OER and increased awareness of the characteristics and affordances of open content.

1. Using only one “named” OER in teaching

All respondents at UU3 and many at TU2 and UU2 described the use of only one “named” OER in their teaching. They had been introduced to specific OER collections, such as TESSA or OREL, which had become core resources in their practice. Many of these educators were accessing the OER offline, in either print form (held in the library) or from CDs, and using them as a resource to inform their teaching – i.e. providing ideas for sessions and encouraging student teachers to use them, albeit often in a didactic manner which did not disturb the existing lecturer–student relationship, as this statement implies: “TESSA is activity-based approach and being activity-based approach when you actually read these materials you should be able to actually copy and then you are able to do in your teaching” (TE13). However, in all three institutions, respondents discussed how the use of these OER required increased preparation time (particularly in the initial stages of use), and how some colleagues were not prepared to devote time to this. Use of OER was thus not embedded across the institution.

2. Using multiple online resources in teaching

This practice was described by the largest group of educators, but many were unclear whether the online resources they were using were OER. Understandings of “open” were highly limited and being “open” was not often considered when selecting and using resources in the classroom. However, a small number of educators commented that recent institutional activity (at TU1 and UU1) had alerted them to the nature of different licences and they now realised they might have been using OER. Much more prevalent, particularly in TU2, was a concern regarding plagiarism and the need to acknowledge the author or publisher in both their own and their students’ work. Checking the authenticity of the source was important to this group, but most were satisfied if the resource had originated from a university.

Lack of awareness of the licence did not preclude educators from adapting resources (even in cases where this may not have been permissible in terms of the resource licence) and there was much reported sharing of articles and videos directly with students through multiple channels, such as email, print and posts on Facebook and other social media platforms.

Wikipedia and Google Scholar were mentioned frequently by educators in this group. One educator offered a detailed description of how he used Wikipedia, despite many of his colleagues dismissing it as an unauthorised source. He found Wikipedia a good starting point for books and articles on particular subjects, which he then followed up: “I use Wikipedia to just provide a guide and not sources. It directs me to the sources which I then review, and cite if appropriate” (TE23).

3. Using multiple OER in teaching

This was a much smaller group, with no educators from UU3 or TU2 describing this practice. The group primarily comprised educators who were adapting materials for distance learning from multiple sources (UU2 and TU1). They described changing or modifying the material whilst trying not to amend the intended meaning of the author. They were often frustrated at their inability to adapt video to make it more appropriate for their context, and sometimes the use of the OER made considerable demands on their students – for example, students accessed resources in English, but were then expected to use these in their practice in Swahili. Many were not specifically searching for open resources but using “open” as a criterion for selection and use. One educator described her practice as “going through Google and get this article, this resource, if it’s good and at the end of the day they mention it’s an open resource so I might use it” (TE08). Some distance educators in this group suggested OER to students when they met for face-to-face sessions.

Educators using OER appeared to receive confirmation of the efficacy of their use from their students. One educator, an early adopter of OER, spoke passionately about how her students have developed an interest in the subject through use of varied OER and how these resources have “added life to teaching and learning environments” (TE19). Others spoke of student enjoyment, active engagement and how students became curious to learn more. Characteristic of this group of educators was the value they accorded to participating in a wider community of educators and their desire to support other educators: “I feel bad that I’m a kind of consumer of open resources rather than producing something for others” (TE20). Several described how they shared their own resources and those of their students under a Creative Commons licence that would allow future adaptation, thereby making them available for the next cohort of students: “the work [from students] is so nice that I wouldn’t like it to be lost. Others can use it, not only in [here] but anywhere in the world” (TE03).

Personal learning or preparation for teaching with OER

Six educators described use of OER for their own learning or preparation of materials and/or teaching sessions rather than direct use of OER with students. The most common OER used were Wiki Educator and YouTube for exploring the speeches and work of popular scholars, engaging with contemporary thinking and finding and stimulating ideas for teaching: “I use for my own study but not for my students” (TE21) and “expanding your knowledge, your

ideas about the course” (TE23). One educator (whose background included over 40 years of teaching and a journey from a diploma to a BEd and a master’s degree studied through distance programmes) described exploring the physics materials from the Massachusetts Institute of Technology and Stanford University: “I just like to read what others are doing, I’m lulled by the dream of going to university to study physics” (TE5). In two of the institutions, small groups of teacher educators attempted to disseminate regularly what they had learned from such exploration, wanting to create an explicit sharing culture in their organisation. While this activity was tentative and on a small scale, it offered a promising space for shaping the community regime of competence in these institutions.

In summary, the data on OER engagement indicate differences between the institutions, but the discourse was remarkably similar across the sample and the analysis revealed many shared practices and attitudes. Most educators had only a limited understanding of the OER concept and described multiple factors which influenced, and most frequently constrained, their position and identities with respect to OER use. However, the language of “possibilities” was detected in discussions, together with a sense that OER use might support change in styles of teaching, although this was not yet feasible in their particular context. Collective engagement with OER was limited to interactions with external OER projects whilst individual commitment to OER was on a continuum from highly marginal to regular incorporation in practice. Deepening proactive use of OER was found to have been influenced by peripheral participation in other OER activities that were often external to the institution. The data showed that the educators’ purpose for use of OER varied from personal learning through to support for peer educators.

Pedagogic change through OER use

The imperative to improve school pupils’ productive learning requires pedagogic change in teacher training institutions in order to enhance the core skills and competencies of school teachers. Across the institutions in this study, the dominant culture of teaching was described as highly teacher-centred, characterised by lecturers “going to the classroom and telling about the topic” (TE14), although there was widespread recognition that this approach was not making opportunities available for students to develop as independent learners. One educator described the situation as follows: “so we are preparing teachers who are dependent, it’s a problem. There is little emphasis on democratic opportunities for learning in schools” (TE20).

To explore shifts in pedagogic practice through OER use, the interview data were analysed against dimensions of pedagogy aligned with a more learner-centred approach. Analysis revealed three aspects of a more learner-centred pedagogic approach in these descriptions of practice with OER: engagement with multiple valued forms of knowledge; students as autonomous agents in their learning; and moving to a participatory learning culture.

Engagement with multiple valued forms of knowledge

If OER are understood as a tool for enabling changes in pedagogy, then one feature of this evolution will be teacher educators’ greater confidence and competence in problematising what is valued knowledge and drawing on multiple forms of knowledge from OER to enhance student learning. In this study, institutional movement towards offering students

opportunities to engage with codified knowledge, other cultural knowledge and personal knowledge was observed at multiple levels, although in most instances these shifts are modest and not yet embedded in collective practices. Educators using multiple OER, either by design or by accident, disrupt the idea that knowledge is only available to a privileged few (“building walls around the few who are prosperous” [TE12]) and directly make available different sources of knowledge to their students, as this educator explained: “I recommend resources for the students ... they are given a wider panorama to broaden their perspective” (TE22). Another explains: “I tell students to read about what is happening in other countries” (TE17). Some educators articulated how such activities with OER enabled them to deepen their understanding of learning as a social practice and to draw on the knowledge brought to the learning endeavour by students.

However, engagement with knowledge from across the globe was often guarded as educators balanced their desire to extend understandings with embedded ways of participation and forms of knowledge. An educator at TU2 was introducing a new course on counselling with her students and utilising video clips from different countries to position the approach in her country within a global framework, but her choice of resources was constrained by her position that she should “use resources which are highly scaffolded and familiar to the local textbook” (TE24). Other educators also spoke about carefully selecting OER, starting with OER close to their context to counter prevailing views that OER are mainly from the USA and not appropriate to the local African context. This approach was more prevalent in the distance learning institutions, where materials (including choice of external resources) are shared and are highly visible. This hesitancy was not universal. In UU2, educators on the distance learning programme were very concerned that open resources should not be restricted to examples from Uganda, but should be varied to enable students to extend their knowledge of the world.

In the more private spaces of face-to-face lectures, educators engaged with OER could be more adventurous. For example, an educator at TU1 was compiling a set of open resources for teachers and young people to explore personal topics not previously covered in school, such as sexual risk. A few educators were encouraging their colleagues to draw on more extensive resources and directly encouraging both in-service or pre-service teachers to make use of global and local knowledge repositories to augment and challenge embedded ways of understanding knowledge. However, in some institutions or programmes, the pressure on lecturers to deliver the syllabus content acted to marginalise these activities from the enacted curriculum.

A small number of educators described the process of attuning resources to the local context and culture, drawing on shared knowledge to enhance student participation, as this educator describes:

I borrow ideas from other countries and then I give examples from Tanzania. What this aspect relates to, or what they represent in a Tanzanian context. So the challenge is how to adopt ... to adapt the content reading from another context but, because the concepts are the same, examples and practices must be from our experiences, our students' experiences and my own experience. (TE14)

Students as autonomous agents in their learning

The use of OER can challenge teacher-centred pedagogy associated with a hierarchical teacher–learner relationship, and support an understanding of teacher learning (i.e. student learning) as movement into practice – becoming a more competent and effective professional rather than being limited to the acquisition of abstract, external knowledge. Some of the teacher educators interviewed perceived learning to be more than the “conceptual–mental”, concerned instead with negotiation and renegotiation of meaning in the world (Lave & Wenger, 1991). One educator spoke eloquently about his own journey:

my own pedagogy was actually very poor ... I must say I used to be that kind of person who'd stand in front of students and talk for an hour because I copied that from my predecessor and the student would be very busy recording, recording, recording. But the first exposure was I think TESSA and then we had several seminars on OER. (TE11)

Now, although he has classes of about 100 students, he sets up opportunities for collaborative learning in which each group of students researches a topic (using some open resources) and then leads discussion on the topic. Educators at MU1 described how students are positioned in a problem-solving role in projects, working in groups to select, adapt and transform OER into a new practice for a school context – an inquiry approach which makes learning purposeful and authentic.

Currently, such innovative practices remain the result of individual efforts, hindered both by students' prior experiences in schools (as TE18 recognised: “these things are not there so they cannot just come here and start afresh, just abruptly go online and communicate their thoughts ... it should begin with our schools”) and by lack of a supportive culture and practice within tertiary institutions. In general, students are not recognised as agentive and able to take on a problem-solving role, but as one educator commented, a collective approach is required: “I will not be successful alone to practise that way of learning unless the university, the whole society, is empowered to be aware of this way of learning” (TE21). The strictures of formal assessment in the study-site institutions emerged as a barrier to new forms of practice, but project activity, where available, offered a space that could be exploited for more innovative, independent activity in which the student is positioned as a thinker.

Moving to a participatory learning culture (informal and formal learning)

Coming together to understand each other's perspectives through sharing and acknowledging the agentive nature of mind was recognised by a small number of educators as critical to learning, and in particular to the professional learning of teachers. As one educator explained: “the real learning with teachers comes from when they share, they talk about it, they listen and they discuss about it” (TE2). This reconceptualisation of learning as jointly constructed and occurring with both student partners and peers was a thread in some of the interviews, particularly those with the OER champions. One educator spoke of how using OER with students “promoted team work and innovation” (TE20). Educators described how, through sharing activities such as consultation and conversation with other staff around resources (including OER), the learning situation could be reimagined. Positional leaders were rarely present in these OER activities and their lack of a shared history of participation

in these activities placed them beyond the boundary of practice with OER. In their absence, hierarchies were flatter and informal leaders emerged, some of whom brokered practice across disciplinary boundaries with other educators to extend OER engagement. For example, at MU1, institutional engagement had allowed one key champion of OER to work with colleagues from the agriculture department on a project with school teachers. Such instances were, however, sparse and for many educators there were few opportunities to *jointly* develop a meaningful professional identity of knowledge and competence with OER – and hence to become productive with OER. In several institutions, the centre of expertise of OER was seen to reside in the e-learning, distance learning or ICT unit, resulting in a gap between the technical issues related to OER use and the social practice of their use in teaching. Brokering the boundaries of these different communities of practice relied on the voluntary activities of individuals and was therefore often subject to resource constraints.

Very few of the educators in this study were involved in OER networks. Those networks that were present emerged in institutions through initiatives such as TESSA, global Open Educational networks and informal groupings from study abroad, and enabled educators to interact with other educators on issues. Although difficult to maintain on a practical level, these interactions beyond the institution offered resonance and reinforcement for their identity as educators with OER competence, and they were characteristic of the OER champions.

As a qualitative study, the research presented here does not aim to draw generalisable conclusions about the impact of OER use on teacher educators' practice. Rather, the data presented aim to provide some insights into pedagogical movement shaped by OER use. Three pedagogical themes emerged, characteristic of a more learner-centred approach, from educators' discussions of their pedagogical intentions and enactment. These are influenced by the settings in which the educators practise. However, more detailed research involving observation of practice is required to understand the impact of these practices on student participation and learning.

Conclusion

This small-scale study suggests that as access to digital resources improves, educators are beginning to draw on these resources (including OER) to experiment with more interactive and participatory practices in their teaching, moving towards greater use of problem-solving activities and drawing on a wider range of knowledge sources. The innovation in practice and the transformation in pedagogy promised by OER is, however, still fragile, confined to a few converts working independently or with one or two collaborators within study-site institutions. For these "OER champions" the potential offered by OER resonates with their beliefs and values about effective teaching and their view of the kind of teacher they aspire to be. They are able to subjugate the OER to their own practice needs and speak convincingly of shifts in their practice facilitated by the use of OER. For them, OER act as a practice tool in extending their agency to move towards more participatory pedagogy. They adapt OER to fit their own and their students' learning needs in their specific setting and hold understandings of quality which are derived from contextual use (Conole & Ehlers, 2010). Uncovering such pedagogic shifts was not easy; the evidence is highly emergent and

the dominant discourse around OER is focused on the processes of use, in particular issues of access (how and in what ways), rather than on the pedagogical or learning purpose of such use.

Policy initiatives at the national level have yet to be meaningfully mediated into practice at the institutions in this study and explicit institutional policy on OER is limited. Even when there is explicit institutional support for OER, use of OER is commonly fragmented and many individual teacher educators' engagement is, as yet, sporadic. For most respondents for whom OER has become part of their lived practice as teacher educators, this is the result of personal action rather than collective endeavour. Transformation occurs at a personal level and is not extended through collective action because there is typically a lack of obvious channels or mechanisms which can be leveraged to do so. Greater use of OER was generally reported in the distance learning institutions where there has historically been greater collaborative development of resources and a more embedded culture of sharing. In other institutions many educators were unaware of their colleagues' use of OER. This comment from an educator at UU1 expressing his frustration at institutional practices reflected those of colleagues at other institutions: "... there is no systematic way to introduce and sustain innovations like OER. Projects come and go, leaving only a few people engaged" (TE02).

In all institutions, structural and cultural factors acted to limit agency with OER. The demands of curriculum and assessment, professional identity, digital skills, provision of equipment and connectivity, values and weak cultures of collaboration were all important in enabling or constraining teacher educators to achieve agency with OER. These findings resonate with those of other researchers who describe similar constraints on practitioner agency with OER across sites in the Global South (Karunanayaka & Naidu, 2016; Ngugi & Butcher, 2016). Demand is currently perceived to be limited primarily by access issues, but also by issues of identity and confidence amongst teacher educators, some of whom fear losing respect if they use too many resources from other educators and who are troubled by the possibility of ridicule if they share an open resource which is perceived to be "incorrect". Those educators who are using OER have considerable cultural resources on which to draw. In their interviews, several of these educators spoke of the formative role of academic training (notably PhD study) at other institutions (usually abroad), and many were linked to external OER networks. These elements of historic identity formation influence how they respond to OER, and enhance their confidence to take risks in moving beyond conventional practice (Wolfenden, Buckler & Keraro, 2012).

Enabling educators to act in an agentic way with OER is challenging. Moving forward, attention should be given to issues of access so that educators are able to locate and view OER relatively easily and experiment with their use. This study recommends that time be made available for educators to enhance their skills in working digitally and to become familiar with principles of learning design such that these become integral dimensions of their professional identity.

Alongside these practical issues, there is a need to consider how the social and cultural context can more effectively support teacher educators to achieve agency with OER. The authors suggest that this requires a conceptualisation of agency extending across the individual and the collective (Edwards, 2015). Increasing OER use and movement towards transformational change in teacher education requires creating opportunities for collective activity with OER; currently this is absent. Participation in professional dialogue about

teaching, pedagogy and content is critical. Networks of interactions within and beyond institutions need to be nurtured to enable more collaborative endeavour (including that with OER) in support of improved quality of teacher education. It is only through this engagement (i.e. relational work) that collective agency with OER – a dialectic relationship of understanding and productive activity – can be achieved. Such communities could foster the articulation of “everyday problems of practice or dilemmas of practice” (Schwen & Hara, 2003, p.4) to which OER could be brought to bear, and support renegotiation of professional identities through changed educational practices. The public sharing of modified OER would reify the practice in the community and make it accessible to others. The ways in which participation in these networks and interactions is made available to educators will be facilitated or constrained by the educators’ context, and their institutional and social environment, but peer OER champions who understand what is possible in that context could play a mediating role (Macintyre, 2013).

The practices of the OER champions who participated in this study show that OER can act as a tool to enable educators to achieve professional agency, allowing them to exert judgement over and transform how they teach through using ideas and materials appropriate for their context and in line with their beliefs. The educators’ trajectory with OER can thus be expressed as *access* leading to *participation* leading to *innovation* in teaching and learning (Wolfenden, 2015). It is important to note that this framework moves beyond the discourse of teacher educator and teacher deficit, which frequently underpins some OER projects and where it is assumed that better outcomes can be reached merely by making open content accessible.

Currently, there is a dissonance between the ways in which individual educators use OER and the dominant values and discourse in the study-site institutions. Coherent policy is important; it legitimises the use of OER, raises awareness of issues such as licensing and stimulates consideration of facilities, assessment and the relationship of OER creation and use with promotion policy and markers of academic esteem. Most critically, participation in policy implementation activity prompts collective engagement with OER. It is through such collective engagement that professionals are able to generate shared professional visions for education which include professional autonomy for teacher educators and move beyond the immediate demands of practice.

The educational change process is complex and the findings of this study suggest that in examining the influence of OER and ideas of openness in teacher education, it would be helpful to undertake more in-depth observations of practice over longer timeframes, to involve students and to explore more deeply the activities and characteristics of OER champions.

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