The TESSA OER Experience: Building sustainable models of production and user implementation

Freda Wolfenden

Department of Education
The Open University
Milton Keynes,
MK7 6AA
UK
www.tessafrica.net

Abstract: This paper offers a review of the origins, design strategy and implementation plans of the Teacher Education in Sub-Saharan Africa (TESSA) research and development programme. The programme is working to develop new models of teacher education, particularly school based training, including the creation of a programme webspace and an extensive bank of Open Educational Resources.   This paper identifies key research findings and literature which informed the TESSA approach and activity design. Drawing on participant experiences in different development activities and data generated in development testing activities, I offer a personal account of the programme to date. The paper concludes by suggesting a pattern of resource making and design that could be adopted by other programmes serving parallel development needs.

Keywords: teacher education, connectivity, open educational resources, Sub-Saharan Africa, localisation, sustainability

1. Introduction

Governments across the globe see new forms of information and communication technologies as contributing to solving a range of social and economic problems. This is particularly true in developing societies where the form and nature of social and educational problems are most acute. Nowhere are they more acute than across the countries of Sub-Saharan Africa. The global commitment, for example, to provide Education for All (EFA) (UNESCO, 2008) by 2015 represents a particular challenge to most African countries. As a consequence significant international resource is being directed to extending basic educational opportunities through massive programmes of school building. There is evidence (UNESCO, 2008) that progress is being made, although some countries remain unlikely to meet the 2015 deadline.

The expanding school systems clearly need increased numbers of teachers. The provision, retention, education and training of teachers is today a major issue for all countries (Moon, Leach and Stevens, 2005), especially those in the development phase. In such contexts both the need for new teachers and the imperative to train the many unqualified teachers working in schools are urgent. New modes of teacher training are, therefore, essential. The Teacher Education in Sub-Saharan Africa (TESSA) programme aims to bring to teacher education some of the advantages of new forms of communication technologies to address the challenge of designing programmes of school based professional learning. It is an ambitious undertaking giving particular attention to the creation of open educational resources in forms that can be adopted and localised to a variety of national situations.

In Sub-Saharan Africa nearly forty million children are without access to primary schooling. To remedy this millions of extra teachers are needed. To raise the quality, particularly the achievement levels in schools, around fifty per cent of existing primary teachers who are unqualified or underqualified need education and training. Alongside this, the world is witnessing today what some have termed (Rainey, 2007) a revolution, arguably a grassroots revolution of connectivity, coalition, collaboration and creativity. There now exists a space where information, communication and altruism meet to provide the potential for significant new educational opportunities. TESSA is an attempt to bring such potential to the teachers working in some of the most demanding places in the world.

2. The challenge of teacher education in Sub-Saharan Africa

Most teachers in most Sub-Saharan African countries have a difficult time. This is especially true in the primary, basic education sector and doubly true in remote rural areas. Teachers have no mention in the Millennium Development Goals (UN, 2000) and it is only within the last two or three years that the significance, but also the plight, of teachers has aroused interest. The realisation that Education for All (EFA) or Universal Basic Education (UBE; Millenium Development Goal 2 [1](UN, 2000)) meant little if drop-out rates were high and levels of achievement low, has come relatively late.

Teachers in these developing world contexts are highly challenged but this is not to suggest that they lack their own agency and there is plenty of evidence that in many situations this could be used more effectively. In a speech to the 2006 Commonwealth Minister of Education Conference in Cape Town, Graeme Bloch, Education Policy Analyst at the Development Bank of Southern Africa, said:

> *"The first acknowledgement we as a society need to make… is the depth and reality of the problem… Teacher's issues are crucial in this… Low content knowledge, suspicion and difficulties with new reforms, poor time spent on the job and much ill discipline: it is unsurprising that reports show that over half of teachers have thought of leaving and morale is uniformly low".*   Graham Bloch

The study of rural teachers in South Africa by the Nelson Mandela Foundation, *Emerging Voices,* is testimony to this (Mandela Foundation, 2005). Teachers have their own say collectively as well. And in some parts of the developing world this has become an important, if not always productive, phenomena.

The issues of teachers first featured in the 2005 evaluations of progress to Education for All (UNESCO, 2006). This was, however, something of a belated recognition. Few of the declarations, including the declaration of the World Forum in Dakar in 2000 or the Millennium Development Goals [1] explicitly recognise the importance of teachers to achieving these goals. This is despite the central position that teachers and schools hold in our conceptualisation and realisation of achievement of these goals; ideas of alternative models of schooling remaining the passion of a very small marginalised minority. (Yates, 2007)

The Report of the Commission for Africa (2005) made investment in teacher training a major recommendation:

> 'the push to achieve EFA will certainly never succeed without substantial investment in teacher recruitment, training, retention and professional development.' (p186)

The scale of need, however, is daunting (see Dembele, M. and Bé Rammaj Miaro-ll, 2003). Successive reports have pointed to the large numbers of unqualified teachers in schools and

the difficulty of attracting new recruits. A survey of eleven eastern and southern African countries by UNESCO (2000) indicated that a third of existing primary teachers were untrained. Lewin (2002) has documented the shortfall in trained teachers that has arisen, and will become greater, if expansion to meet EFA targets continues. Lewin and Stewart (2003) have shown how Ghana has only a quarter of the teachers it needs and Lesotho only a fifth.

Two factors in particular appear to be impacting on the teaching profession in most Sub-Saharan African countries. First, the decline in salaries relative to other comparable professions has been well documented (Colclough, Al-Somarrai, Rose and Tembon, 2003). Emergent knowledge economies offer alternative employment opportunities for those who provided the traditional pool of primary teachers. Second, HIV/AIDS are impacting on the existing and potential teaching force. UNICEF (2000) has estimated that nearly a million children a year lose their teacher to HIV/AIDS.

Data is difficult to substantiate. In Nigeria the proportion of trained primary teachers fell from 97% to 72% between 1999 and 2002 as a direct consequence of government policy to increase provision and keep costs low through the recruitment of volunteer teachers (UNESCO, 2006). The forces driving this move to para-professionals are complex. Some argue the importance of World Bank and IMF Macro economic policies (Global Campaign for Education, 2006). No doubt these contribute but other factors come into play, not the least the perceived status of teaching that takes time to evolve. This enormous number of para-professionals receives little formal training, is often unlinked to any labour or union support, and constitutes in many developing countries a form of teacher underclass.

Yet, as this problem becomes acute for policy systems, there is enormous leaps in the field of of telecommunications; the region is experiencing the fastest growth of mobile phone usage in the world. (Minges, 2004) Reliable broadband access is rarely available and a dependable electricity supply is also problematic but mobile phone coverage reaches close to or above 90% of the population in many countries of the global south (World Bank, 2006). Nigeria's mobile phone subscriber base grew from less than half a million to over 16 million in the five years to 2005 (World Bank, 2006). And the focus and nature of this revolution is evolving on an almost daily basis. Devine Kofilotos, principal analyst at Informa Telecoms and Media, is quoted in the BBC's Focus on Africa (2007) as saying that third generation mobile phones are the imminent phase of the revolution:

> '3G is all about multi-media services in the West… But in Africa it's going to be down to internet access. end of story….. There is a huge demand for internet access in Africa…. but most users are frustrated by the snail like dial up speeds offered by the typical African internet café. Consumers will jump at the chance to by-pass this old-school internet providers and get broadband pumped through their mobile phones… In the same way that a lack of copper wire infrastructure cased a pent up demand for mobile telephones in Africa, the lack of high speed internet infrastructure is causing a pent up demand for high speed access.'   (p12)

What is clear is that a variety of reasons and motivations to exploit new forms of communication is strong in both providers and consumers. At a structural level many African nations and International agencies are implementing ICT policies to harness the affordances of new technologies across a variety of sectors:

> 'Africa is on the move, and ICT-supported education is a core component of the development plans of most African Governments. ICTs are being integrated into many national educational systems in order to reach the millennium goals'

<div style="text-align: right">

Dr S Woldemichael, Ethiopian Minister of Education
E-learning conference, Addis Ababa, May 2006

</div>

(Hoffmann & Reif, 2006)

This presents new unique opportunities for the promotion of new social and educational policies. The Millennium Development Goals [1] recognise this with a specific focus within priority 8 (Develop a global partnership for development):

> *'In cooperation with the private sector, make available the benefits of new technologies, especially information and communication technologies'.*

A myriad of initiatives are in hand. Nicholas Negroponte's 'One Laptop Per Child' providing robust devices for school aged children is being piloted in a number of schools in countries of the global south. In India Intel is producing a dust proof 'kiosk' PC designed to operate in community settings and run off alternative power sources. 'Pay-as-you-go' PCs are being piloted in Brazil with users paying approximately half the normal retail price with users purchasing usage time after an initial period (Guardian, 2006)

In Venezuela the University of Momboy has pioneered the use of donkeys to provide mobile libraries to remote communities in Trujillo, one of Venezuela's three Andean States. The donkeys are now being equipped with laptops and projectors to exploit digital connectivity in the region. These 'cybermules' are providing economic possibilities for the villages as well as educational opportunities for the teachers and children. In Bangladesh 'cyber boats' travel around research rural island communities. And this technology, as we are seeing in a global media and communications revolution, is tapping into that unique human longing for social relationships and community experiences.

There is no shortage of interest by teachers. Technological change offers the opportunity to enrich the pedagogic toolkit of teacher educators and teachers in hitherto undreamt of ways. A number of studies point to the potential of these new technologies as learning tools (Soloway, Vath, Bobrowsky, Blumenfeld, Krycik, Meriweather, Sarratt and Wise 2005; Kukulska-Hulme and Traxler, 2005). The Open University's Digital Education Enhancement Project (DEEP) working in the Eastern Cape of South Africa and in Egypt demonstrated that the reluctance to embrace technology often experienced in the 'north' is not replicated in environments where traditional resources are so limited. (Leach, 2006) Using both quantitative and qualitative research instruments the project demonstrated conditions under which successful use of such technologies could be established.

The trend to incorporate these new forms of ICT into policy and practice is moving quickly. In Rwanda, for example, an ambitious plan to ensure nation wide connectivity is being put in place. And most countries have policies in place that seek to achieve similar outcomes. Thus within a decade or less many teachers have, or will imminently have, access to a one of a number of different mobile technologies. But outside South Africa the biggest challenge across Sub-Saharan Africa looks like becoming the imperative to provide content for these myriad forms of connectivity that are emerging. This is not unique to Africa. The uneven quality of commercial content is, here in the UK, highly problematic. And the closure of the BBC's 'Jam' as an online curriculum resource directly aimed at children and students, does not bode well (BBC, 2007). In Africa, however, just as the technology has leap frogged stages of development experienced in the north, digital content could do likewise.

3.   The OER context

This then raises the issues of accessibility and affordability of content and, in particular, the fascinating new developments around what are now commonly known as 'Open Educational Resources' (OERs). The OER movement offers the promise of free educational resources available across the global through the world wide web. Influenced by the development of

the Open Source Software movement the origins of the OER movement can be seen to lie in the convergence of three distinct strands of activity: in technological advances which are facilitating ever easier global communication through the internet, accessed through a variety of modes; the notion of education as a right; and, stimulated by activities in the virtual space, increasing concern around the restrictions that traditional copyright extends over ideas and materials. (Wiley, 2006) OER then suggest a unique opportunity for equalising access to knowledge across the globe. Marshall Smith of the Hewlett Foundation argues that the OER movement through provision of both content and tools for teaching, learning and knowledge development, will be able to 'connect the Millennium Goal of universal basic education…with the goal of closing the digital divide'. (p2 Smith and Casserly, 2006)

In common with the Open Source Software movement, the term 'open' here is taken to mean both freely available over the internet (no technical or price barriers) and with as few restrictions (copyrighting and licensing) as possible on the use of the resources. Users of the resources should be able to access the materials and also to adapt, develop and re-use them. But, whilst open is usually understood to mean 'without cost', there is as yet no consensus on whether it also means 'without restrictions' and authors may insist that use requires attribution, for example, as in the Creative Commons Licence.

OER can take many forms from a store of discrete learning objects such as photographs, data and text materials through to media rich pedagogically structured e-learning materials in a full course. The term also includes tools such as those in the Open University's Labspace [2] - software to support the development, use, re-use and delivery of the learning content including collaborative tools - and resources to assist in implementation, such as property licenses.

Since its inception in 2002 the OER movement has been mainly led by large institutions in the United States and Western Europe. Following in the footsteps of MIT, over a hundred universities have produced Open CourseWare offerings [3]. OpenCourseWare projects are characterised by the one directional flow of course support materials (syllabi, assignments, reading lists, calendars, simulations, video lectures and lecture notes) usually derived from traditional face-to-face courses at that institution. More recently we have seen the launch of OER projects comprising materials intended for independent self-study by learners such as that from the UK's Open University [4].

Most exciting in the context of teachers is the development of 'creation-centred' OER projects such Connexions from Rice University [5]. This repository of 'small knowledge chunks' is contributed by the user community; software tools are provided on the site to assist users in publishing content, collaborate and build and share courses from the materials within the collection. It focuses on building communities of consumers and producers of digital educational material (Atkins, Brown and Hammond, 2007). Other creation focussed OER initiatives include the vastly popular Wikipedia [6] and its offshoots such as Wikiversity [7].

Reports from the Hewlett Foundation (the prime global funder of OER initiatives), the EU and the OECD within the last year have all drawn attention to the shift in current thinking around OER (Atkins et al., 2007, Gleser, 2007; UNESCO, 2007). Until recently the primary concern of the movement was with the creation of OER by institutions and the associated processes, structures and financial models. Attention is now turning towards engagement with the users and the different ways in which they use and adapt OER. It is thus an appropriate moment in the development of OER to explore the issues and conditions which will determine whether the potential of OER is realised in developing regions of the world. In the African context there have been few OER projects. As the Hewlett Foundation admits the impact of OER here is still 'modest' with respect to the need and potential (Atkins, et al., 2007).

Access to high quality pedagogically sound learning materials is frequently inhibited by inability of African educational institutions to afford them. Consequently learning materials are scarce at all levels of the system. Thus the potential for OER to contribute to the support, education and training of teachers is considerable. As are the challenges. Given the current underdevelopment of OER in Africa, the challenges are far from fully conceptualised. The primary need is to ensure that colleagues across Africa are no longer seen as consumers of imported educational material but rather as collaborators in content production and distribution. Summarizing a recent discussion forum, an IIEP report commented;

> *'It was contended that OER could be improved most effectively by shifting from a provider-user model to one that employs collaborative development'.*

<div align="right">Albright (2005)</div>

Analysis of a number of global OER initiatives together with recent literature (Atkins et al., 2007; Geser, 2007; UNESCO, 2007) points to five key potentials for OER:

- increased access to a range of materials in different formats; offering greater flexibility when choosing materials for teaching and learning (saving time and effort) and enhancing practice;

- ability to enhance, adapt and modify materials for local environments and purpose;

- pedagogic innovation: supporting institutions and individuals in moving from the dominant traditional teacher-led methods of teaching to more democratic, learner-centred models through the design of the materials;

- enhancing development and stimulating growth: digital resources are fundamental to the knowledge society and economy, creation of OER enables institutions to contribute more fully to the global arena as producers of knowledge;

- developing networks and collaborations: alongside the provision of content tools can be provided to enable users to add comments on how best to use the content, create links to related content and discuss new issues in a particular subject area.

These potentials, whilst significant to education generally, are, I propose, particularly significant to the education of professional groups such as teachers, health workers of all kinds, and other occupations providing community based services. Work within our research group at the Open University focuses on teachers particularly in the context of Sub-Saharan Africa, a region which could potentially benefit hugely from the communication revolution and the growth of the OER movement. (Moon, Brown and Ben Peretz, 2000)

If we are to meet the scale of need for teacher education and training over the coming decades, then we must accept that the bricks and mortar institutions, built to train teachers in the twentieth century, will be wholly insufficient to meet needs in the twenty-first century. (Moon, 2006) That is not to say they have no place. Rather it is to point to the need for complementary and additional new forms of provision, involving new structures and working to scale. I want to argue that just as the problem becomes most acute, so the potential of connectivity, OERs and dimensions of the 'social web' offer a mix that could provide a highly creative response to these challenges.

4.   The TESSA initiative

Over the last two years the Open University has been involved in an audience specific OER; the Teacher Education in Sub Saharan Africa (TESSA) initiative [8]. TESSA is a consortium

of institutions concerned with the collaborative production of original OERs to support teacher development. The major funding for the TESSA initiative has come from the Allan and Nesta Ferguson Charitable Trust and the William and Flora Hewlett Foundation [9].

TESSA has five distinct characteristics:

First, it is a global consortium, including organisations like the BBC World Service Trust and the Commonwealth of Learning, as well as the South African Institute for Distance Education (SAIDE), but focussed on the needs of teacher education in nine African countries. Thirteen African universities are currently core members and the number of countries and institutions is planned to double in 2008-9.

Second, as an OER initiative it is unique in being audience specific to teachers. I would like to suggest that as the OER movement develops, the nature and form of audience-specific OERs will become an important source of interest.

Third, in TESSA the user, the teacher educator, has been at the centre of the initiative. The vast majority of the OER's have been created collaboratively by teacher educators from across Africa (over 100 authors have been involved). The development of both materials and the portal have involved extensive consultation with potential user groups building on local knowledge, materials and approaches. In contrast most OER projects transfer materials from existing courses to an open platform; often materials in each course originate from only one or two authors.
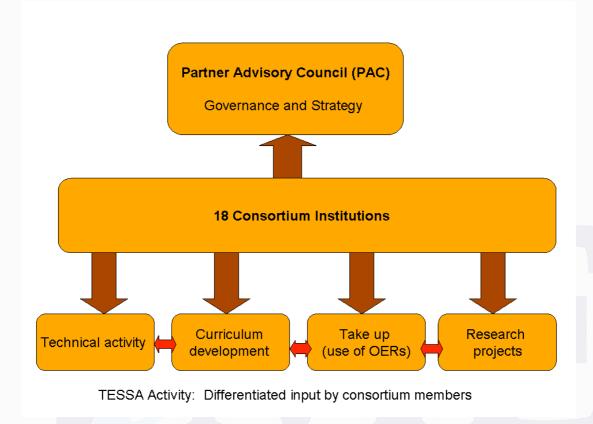
Fourth, the TESSA initiative is creatively exploring the use of OER audio content. Both different formats – drama, interviews, features – and modes of delivery including radio, CD and use of mobile phones.

Lastly significant time and resources is being put into the implementation and use of the resources, an aspect given insufficient attention in many OER initiatives (Atkins et al 2007). In TESSA the project design has allowed us to look in detail at issues such as adoption of the resources for different environments and how best 'users' can be supported in understanding ways of integrating the materials into what we have termed 'learning pathways'. TESSA development teams are actively exploring issues of reuse and interoperability (McAndrew, Weller, and Barrett-Baxendale, 2006).

Colleagues across the partner institutions have not been seen as consumers of imported educational material but rather as collaborators in content production, distribution and utilisation. Awareness of the current situation in these institutions together with likely short and medium term contexts for exploitation has been at the centre of TESSA OER development.

The dynamics of the TESSA consortium can be represented in the following diagram:

Partner Advisory Council (PAC)

Governance and Strategy

18 Consortium Institutions

| Technical activity | Curriculum development | Take up (use of OERs) | Research projects |

TESSA Activity: Differentiated input by consortium members

All eighteen partners institutions contribute to the strategic direction of the initiative through regular workshops, meetings and electronic discussions. Each partner institution is represented on the 'Partner Advisory Council' (PAC), the key governance forum for TESSA activity. Support for PAC is provided by a group of academics and administrators from the Open University, UK.

Working in a consortium across several countries inevitably brings challenges of coordination and communication; these are vastly increased by the unreliable and uneven infrastructure found in much of sub-Saharan Africa. Regular workshops in different locations across the region have been pivotal in maintaining momentum, building relationships and shared understandings.

Work around the four areas of activity - research, technological development (the TESSA portal), curriculum (TESSA study units) and take up - is determined in detail by a smaller working group for each area. Different partners input to different areas of activity. Some, such as the BBC World Service Trust, have been involved almost exclusively with only one sphere of activity, in this case production of curriculum materials. Other partners have contributed to several strands of activity, represented by the links on the diagram above. All thirteen institutions in Sub-Saharan Africa involved in teacher education have contributed to activity around implementing use of the OERs in courses and programmes.

Central to this model is the multi directional interplay between the concurrent different strands of activity. The structure and nature of the curriculum, for example, has been informed by planned contexts for use (take up), by the forms of technology available for distribution (technical) and by research activity within the project. The latter has included fieldwork exploring the lives of female primary school teachers living and working in rural or semi-rural areas in Ghana, Nigeria, South Africa, Kenya and Sudan.

Viewed holistically this activity has lead to the identification of a number of framing-factors which I would like to suggest are emerging as important in developing sustainable modes of OER production and use:

i Structure and contextualisation of the OERS

The underlying TESSA model is of the school as the site of professional learning supported wherever possible by local structures for advice and guidance; in the first instance from TESSA partner institutions. Thus teachers are able to continue to attend to their own learners whilst studying, integrating teaching and studying within their own context. There is no need for teachers to relocate, particularly from rural areas, to receive training and continuity in the classroom is maintained. Traditional pre- and in-service programmes have provided qualifications but frequently given little attention to the pedagogic dimension and hence often had minimal impact in the classroom (Moon et al, 2005). Here the professional tasks aim to integrate theory and practice; centring around daily classroom practice to improve the effectiveness of teacher–pupil interactions.

Within the TESSA programme teacher learning is conceptualised as being social, jointly constructed with pupils and peers; distributed, shared over the people, activities and artefacts within the environment; and situated, linked to the circumstances in which it occurs, the particular working practices and their associated ways of thinking. The TESSA materials thus needed to strive to recognise teachers existing deep experiences, teachers' current development level and the necessity to embed them within the culture and context of the teacher's practice (Devereux and Amos, 2005). They endeavour to overcome the dislocation which can exist between the curriculum of many African tertiary institutions and their local context. It was thus essential that the TESSA materials were constructed in a form which enabled easy contextualisation or localisation for use in different country contexts and environments whilst exploiting a common structure.

Our solution has been to develop a highly structured template framework for the TESSA text OERs. The smallest level of granularity for the text resources within the TESSA project is a *section*. Sections are designed to possess integrity and autonomy with a high degree of internal context. Sections can be reused, removed or altered with relatively little consequence on the remaining material. Each section comprises four web pages; introduction, learning outcomes, three activities and accompanying case studies with linking narrative, together with up to six resources. To determine the size of this learning 'granule' we drew on extensive experience across the consortium with a range of teacher education projects. As these sections are integrated into courses by institutions, sections may evolve into larger or smaller granules.

Teacher learning is scaffolded through the section to the final or key activity. This approach draws on recent work on learning activities in contexts where practice is, by its nature, tacit, transitory and negotiated (Conole, forthcoming). Supporting the activities and case studies in each section are up to six resources. These are presented as separate learning objects and take a range of forms both of purpose and mode; audio clips, images (photographs and drawings), text documents and web links.

Underpinning the materials is a curriculum of key pedagogical strategies and skills for the 'TESSA' teacher developed by the TESSA team to provide conceptual coherence. Authors have been encouraged to thread through the sections recognition of the challenging working conditions of many teachers in sub-Saharan Africa: large classes, multi-grade classes and scarcity of educational tools including books, paper and equipment. Use of resources from the local environment to support learning is a strong theme.

User institutions need to be able to make the OERs accessible to their students. Cultural factors require changes to content. I would suggest that the approach adopted in TESSA, in which there is little cross-referencing between different resources and the internal structure of the sections is carefully designed, greatly simplifies the task of adapting and amending for particular environments and integrating into both new and existing programmes of study.

Within the TESSA materials each section content can be classified as one of three types:

1. Generic
2. Some contextual references
3. Highly contextualised

Generic content is that which is transferrable across a range of environments. Type 3 content is viewed as requiring modification for each learning environment (country or region), to support a meaningful learning experience. Type 2 content may be adapted depending on the environment (cultural and physical) and resource available.

This designation has been translated into the authoring template for each section as follows:

Section component	Generic or versioned
Learning outcomes	Generic
Narrative (frames the problem, links the activities)	Generic
3 activities	One generic, two with some contextual references
3 case studies	One generic, two some contextual references or highly contextualised.
Up to 6 supporting resources	Highly contextualised – Up to two versioned

Working with educators within partner institutions, the TESSA project has held workshops to develop our collective understandings of the factors to be considered when adapting OER for use within a particular environment. Achieving an appropriate balance of 'localness' with an African and global dimension has been challenging and interpreted differently by each partner institution.

What has emerged from the TESSA workshops can be described as a two level process. Firstly users quickly amend and modify names of schools, people and so on together with replacement of appropriate local artefacts, wildlife and terminology to recognise the context in which the resources will be used. Then further adaptations at a deeper cultural and contextual level begin to be explored: implications and links to the National Curriculum; the culture of rewards and punishments used in schools; the assignment of grades or levels to pupil work and the value associated with them are some of the examples of localisation we are beginning to encounter within the TESSA materials.

This initial localisation of the TESSA materials has been carried out by teacher educators in partner institutions in Sub Saharan Africa. A 'value added' chain (OCLOS 2007) is being created in which case studies and other materials and products derived from the educators'

own experiences are being incorporated for use in that institution and sharing with other practitioners through the TESSA portal.

At the launch of the TESSA portal in 2008 the TESSA materials will be available in four languages (Arabic, English, French and Kiswahili), and in nine local country versions (Ghana, Kenya, Nigeria, Rwanda, South Africa, Sudan, Tanzania, Uganda and Zambia). In addition generic 'pan African' versions of the resources in English and French will be available.

ii Access to the OERs

The effectiveness of OER environments in an international setting is highly dependent on the capabilities and skills of the recipients. (OCLOS, 2007). In the TESSA initiative described here these recipients are both individual teachers and educational institutions engaged in delivery of a range of different teacher programmes, both pre-service and in-service. Partner institutions need to be able to access the TESSA OERs from the TESSA portal without difficulty and to easily integrate the TESSA OERs into their programmes. The TESSA portal has been designed on the assumption that currently users have limited funds and band width. Open source software is used throughout the portal and file size minimised as far as possible to reduce download times. Whilst varying across and within countries core commonalities limiting access and use emerge; these include lack of a reliable supply of electricity, access to new Information and Communication Technologies at an early stage (Saide, 2005) and skeletal infrastructures. High speed Internet access is expensive – currently the cost of such access in African universities is frequently many times higher than that paid by similar institutions in the developed world. Few teachers on training programmes have access to the Internet. A recent survey of students on distance teacher education programmes at the University of Pretoria revealed that only 2% of the students had access to the Internet.

To enhance access TESSA OER are being published in a variety of formats, both audio and text. Text materials are available as html pages in pdf and word format. Whilst the underpinning design of the TESSA portal is premised on the assumption that online modes of access and engagement will become more widely available, we envisage that at present most teachers in Sub-Saharan Africa will access the materials through the medium of print. A pdf template for materials has been developed enabling Institutional course developers to print materials in an attractively designed format. Partner institutions are compiling these into booklets for use with students or integrating into existing printed material. Modified materials can be published on the portal for use by other members of the TESSA community through the 'TESSAShare' area. The audio materials, including a series of short drama clips developed in partnership with the BBCWST 'Voices' project in Nigeria, can be downloaded for distribution in a variety of modes; CD, Cassette tape and MP3 files.

Key to the success of this and other OER projects is, of course, successful use by learners and teachers. The TESSA initiative has given high priority to this step in the OER process chain. The materials design approach allows institutional and individual users to construct courses by selecting and assembling these sections in sequences of different length and composition for their own particular purpose. Provision of the section template allows users to develop their own sections to further enhance the appropriateness of their course for their own environment. Weaving in of additional OER material, where available, is also possible. The development of these 'learning pathways' through the material is being supported through workshops with TESSA partner institutions. Key personnel with teaching, technical and production skills are involved and, where appropriate, the use of digital mapping tools such as Compendium is explored [2].

iii Balancing 'local' and 'global' dimensions

Within the TESSA approach we are attempting to create a balance between community collaboration across the region and the creation of materials which have a relevance in particular environments; in the original TESSA materials the solution has been the use of the adaptable template. On the TESSA portal community participation is realised through the provision of discussion forums and the TESSA Share area. The latter TESSA 'original' OERs have been subjected to an extensive quality assurance process involving teacher educators and policy makers for each version of the materials. TESSAShare allows anyone to contribute their own version of a TESSA section or complementary OER materials; a rating mechanism allows other users to express their preferences and to comment on the materials. Organisation of the TESSA portal is through country 'homepages'; each with its own set of materials and forum on the assumption that the curriculum and national context will be the defining for users. Initial user testing indicated considerable enthusiasm for the interactive features on the website and But as users engage with the website, different, consumer led forms of organisation of the materials and collaboration may emerge.

Consortium partner plans for use of the TESSA materials through 2008 involve a number of different teacher education programmes including a new diploma at the Open University of Tanzania, a B.Ed course at the Open University of Sudan for 67,000 teachers and a CPD course for 27,000 teachers at the University of Cape Coast in Ghana. Overall over 400,000 teachers in pre-service or in-service training courses are planned to use the TESSA materials across the partner institutions.

5.   Using the TESSA model for other development needs

A characteristic of the OER movement to date is costs diversity, in terms of origins, formats, style and purpose. Many would justifiably argue that this represents a strength that should underpin this growing and rapidly evolving phenomena. Such variety can also be seen as typical of a new technological application which over time will develop greater uniformity, even predictability. Like many new applications, the OER movement is currently relatively inward looking with the focus on the OER with all its technical and conceptual challenges and less on the wider social and educational context in which the resource might have a purpose and value. The relatively low investment in OER 'use' has been recognised in recent reports and publications (Atkins et al 2007).

The TESSA approach attempts to bring the power of the OER model into an overall model of purpose definition, provision and implementation. Whilst the development of OERs is extremely important, equal time and resource is being devoted to the adaptation of such resources to particular localities and the subsequent use of the resources in programme design, particularly the creation of learner pathways. TESSA is audience specific and, as such, has originated far more resources than hitherto has been the tradition of newly emergent OERs.

6.   Conclusion

TESSA is focussed on teachers but other occupations, working in parallel contexts, have similar needs. Health, and social workers, agricultural advisers and those seeking to develop new, perhaps small businesses, particularly in rural settings could all benefit from work based forms of education and training. Plans are being developed for piloting the use of the TESSA model in the health sector. In doing this, however, it is worthwhile to think about those aspects of the TESSA model that could merit emulation, and four such issues can be identified.

First is the use of a common template for the creation of resources, including a structural approach that facilitates adaptation or versioning into local contexts. The OER movement has a strong rhetoric about the potential of adaptation, but a relatively weak record of such

activity. The success of TESSA in creating materials for a number of very different environments and languages relates strongly to the adoption of a template. If the discipline (and to some extent loss of autonomy and creativity) that goes with this could be accepted, then the potential for collaboration and adoption across professional sectors (this could be important as the development agenda looks to move towards community rather than sector specific modes of education and training) would increase. Within the OER movement the acceptance of a few formats would, arguably, extend not restrict expansion and take-up.

Second, all the TESSA resources are collaboratively created. No authorship is attributed because each study section has been worked on by several colleagues in its original version and localisation for use. This collegial approach, central to the quality assurance process, has ensured that the need for collective originality and quality rather than individual authorship is at the centre of the creation process. It may be that in other contexts individual attributions are significant but in the quest for professionally relevant, practice focussed resources and courses the collective would seem to have a priority if high quality levels are to be sustained.

Thirdly, TESSA has exploited a range of media, particularly audio, in seeking to create resources that have motivational as well as informative power. There is a long tradition of audio materials within teaching and learning. New forms of communication technologies are seeing a resurgence in the use of audio (including broadcast radio), particularly within integrated teaching and learning formats. This seems of particular importance to the expansion and improvement of professional training in environments such as those in many parts of sub Saharan Africa.

Fourthly, in the TESSA model, users were part of the creative process and implementation and use was widely detailed and modelled across the consortium. The TESSA consortium sponsors a variety of institutional, cross-institutional and sometimes cross-national workshops looking at the use of TESSA resources, and other OERs in the reform of existing curriculum and the development of new programmes and courses. If OERs are to be successful in professional education and training contexts, then such an approach, integrating use at the start of the project process, would seem to be essential.

Overall, therefore, the need for stronger modelling, for more detailed identification of key training factors, and the processes by which decisions about such factors are made, would seem to be an important next step in the development of OERs. That is not an argument for uniformity but rather a recognition that experience brings with it the possibilities of mutual learning and co-operation that can be the hallmark of a maturing understanding of potential and use.

These potentials, whilst significant to education generally, are particularly significant to the education of professional groups such as teachers, health workers of all kinds, and other occupations providing services in communities across regions such as Sub-Saharan Africa.

References

Albright P. (2005) *Internet Discussion Forum, Open Educational Resources: Open Content for Higher Education,* Final Report, UNESCO

Atkins, D. E., Brown, J. E. and Hammond, A. L. (2007) *A review of the Open Educational resources (OER) Movement: Achievement, Challenges and New Opportunities.* Report to the William and Flora Hewlett Foundation.

BBC (2007), The Digital Currriculum, Acccessed online on 21 April 2008 at bbc.co.uk/bbctrust/news/press_releases/14_03_2007.html

Colclough, C., Al-Somarrai, S., Rose, P. and Tembon, M. (2003) *Achieving Schooling for All in Africa*, Ashgate, Aldershot.

Commission for Africa (2005), *'Our Common Interest'* Accessed online on 12 January 2008 at www.commissionforafrica.org

Conole, G. (forthcoming) 'Capturing practice: the role of mediating artefacts in learning design' in Lockyer, L. et al. (eds) *Handbook of Research on Learning Design and Learning Objects: Issues, Applications and Technologies*, Hershey, PA: Information Science Publishing.

Dembele, M. and Be Rammaj Miaro-II, (2003) Pedagogical Renewal and Teacher Development in Sub-Saharan Africa: A Thematic Synthesis. Background paper for the Beinnial Meeting of ADEA, Grand Baie Mauritius.

Devereux, J. & Amos, S. (2005) '*The University of Fort Hare's learner-centred distance Education programme'* Open Learning Vol 20(3) Nov 2005 pp 277 - 284

Guardian (2006) Accessed online on 12 January 2008 at guardian.co.uk/technology/2006/jul/27/microsoft.guardianweeklytechnologysection

Geser, G. (2007) *Open Educational Practices and Resources, OLCOS Roadmap 2012,* Open e-Learning Content Observatory Services.

Global Campaign for Education (2006) *'Teachers for all: What governments and donors should do'* London

Hoffmann & Reif Consultancy (2006), *Post Conference Report 1st International Conference on ICT for Development, Education and Training, UNCC,* Addis Ababa, Ethiopia, May 24-26, 2006.

Kukulska-Hulme, A. and Traxler, J. (2005) *Mobile Learning: A Handbook for Education and Trainers*, London, Routledge.

Lane A (2007) *'Open Content: When is it Effective Educationally*?' in Proceedings of Open Education 2007: Localizing and Learning. Logan, UT

Leach, J. (2006) *DEEP IMPACT: an investigation of the use of information and communication technologies for teacher education in the global south*, London, Department for International Development (DFID), Research the Issues Series.

Lewin, K. M. (2002) 'The costs of supply and demand for teacher education dilemmas for development', *International Journal of Educational Development*, 22(3-4)**,** pp. 221–42.

Lewin K M and Stuart J S (2003) ' Researching Teacher Education: New Perspectives on Practice, Performance and Policy ' DfID research Monograph Series, London

Mandela Foundation (2005) *Emerging Voices: A Report on Education in South African Rural Communities*, Houghton, Nelson Mandela Foundation.

McAndrew, P., Weller, H. and Barrett-Baxendale, M. (2006) 'Learning design and service-oriented architectures: a mutual dependency?', *Journal of Learning Design*, **1:3**, pp. 51–60.

Minges, M. (2004) *African telecommunications indicators 2004*, International Telecommunications Union.

Moon, B., Brown, S. and Ben Peretz, M (2000) *The Routledge International Companion of Education,* London, Routledge.

Moon, B., Leach, J. & Stevens, M-P (2005) *Designing open and Distance learning for Teacher Education in Sub-Saharan Africa: A Toolkit for Educators and Planners*   The World Bank

Moon, B. (2006) *Research analysis: A global overview of current policies and programmes for teachers and teacher education*, Paris, UNESCO

OCLOS (2007) *Open Educational practices and Resources*, OCLOS Roadmap 2012.

Rainey, M. T. (2007) 'The revolution will be uploaded', *The Royal Society of Arts Journal*, August 2007, pp. 19–21.

SAIDE (2005) *Online Access and Connectivity of Primary School Teachers in Sub-Saharan Africa* Report commissioned for the TESSA project http://www.open.ac.uk/tessa accessed August 2007

Smith, M. and Casserly, C. (2006) *The promise of Open Educational Resources,* Menlo Park, The Hewlett Foundation.

Soloway, E., Vath, R., Bobrowsky, W., Blumenfeld, P., Krycik, J., Meriweather, A., Sarratt, P., Wise, S. (2003) Supporting Teachers using Palm computers: Examining Classroom Practice over Time, NECC, Michigan.

UN (2000) Millenium Development Goals. Accessed online on 12 April 2008 at: un.org/millenniumgoals/

UNESCO (2000) *Statistical Document: Education for All 2000 Assessment*, Paris.

UNESCO (2006) *Teachers and Educational Quality: Monitoring Global Needs for 2015*, Montreal, UNESCO Institute for Statistics.

UNESCO (2007) *OECD Forum Final Report*.

UNESCO (2008) *Education for All by 2015. Will we make it?*, Paris, UNESCO.

UNICEF (2000) The Progress of Nations.

Wiley D (2006) *The Current State of Open Educational Resources.* Available from www.opencontent.org. Accessed 21 January 2008.

World Bank (2006) *Information and Communication for Development, Global Trends and Policies,* Washington DC.

Yates, C.(2007) *Teacher Education Policy ;International discourses and the development of teacher,* UNESCO Teacher poligy Forum for Sub-Saharan Africa, Paris

Footnotes

[1] UN Millenium Develoment Goals: www.un.org/millenniumgoals/

[2] OpenLearn Labspace, Open University, UK: www.labspace.open.ac.uk

[3] Open Courseware Consortium: www.ocwconsortium.org

[4] OpenLearn, Open University, UK: www.open.ac.uk/openlearn

[5] Connexions, Rice University, USA: cnx.org

[6] Wikipedia: www.wikipedia.org

[7] Wikiversity: www.wikiversity.org

[8] Teacher Education in Sub-Saharan Africa (TESSA): www.tessafrica.net

[9] The William and Flora Hewlett Foundation: www.hewlett.org