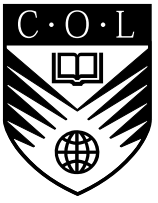
COMMONWEALTH *of* LEARNING

PERSPECTIVES ON DISTANCE EDUCATION

Teacher Education through Open and Distance Learning

Patrick Alan Danaher and Abdurrahman Umar, Editors



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The Commonwealth of Learning (COL) is an intergovernmental organisation created by Commonwealth Heads of Government to encourage the development and sharing of open learning and distance education knowledge, resources and technologies.

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Contents

Preface

Now that most countries have made solid progress towards the achievement of universal primary schooling by 2015, the world faces two other major educational challenges. The first, which results partly from the success of the campaign for primary education, is to give older children and young adults opportunities for secondary schooling. This is a massive task. One estimate puts the number of 12- to 17-year-olds who are not receiving education at 400 million (Binder 2006).

Scarcely less daunting is the second global challenge – and the primary motivation for this book – which is the need to recruit and train many millions of teachers. UNESCO estimates that some 10 million teachers must be recruited and trained in less than a decade. They will be needed to: replace the large numbers of teachers due to retire in many countries; complete the drive to universal primary schooling, particularly in Africa and South Asia; and address the challenge of secondary schooling (UNESCO 2008, p. 22).

Sadly, because the status of the teaching profession has declined in all but a few countries, recruiting teachers on this scale may prove to be "mission impossible." However, even if we can recruit them, it will certainly not be possible to train them using the traditional methods of institutional pre-service education. Open and distance learning (ODL) must be harnessed to the task because many countries have already found that it allows them to provide training of consistent quality to large numbers at low cost.

But the importance of ODL for the future of teacher education is far more than a simple matter of volume and economics. It is an answer to the third major challenge preoccupying education ministers, namely the quality of schooling at all levels. When I met South Africa's newly appointed Minister of Basic Education, The Hon. Matsie Angelina Motshekga, in 2010, she was proud of her country's progress in expanding access to primary education but disappointed in the achievements of the pupils. Her fellow ministers worldwide have similar anxieties.

UNESCO has provided a useful analysis of the elements that make for educational quality (UNESCO 2004, pp. 66, 142). Well-trained teachers feature high on the list – provided that their training focuses as much on classroom realities as on pedagogical theories. This is where ODL comes into its own. It not only enables in-service teacher education to take place in the schools, but also, through the growing use of information and communication technology (ICT), it makes possible the creation of virtual communities of practice in which working teachers can learn from experienced practitioners and from each other.

As the book's title implies, the various chapters explore the challenge of ODL in teacher education from many perspectives. Elsewhere (Daniel 2010, p. 84) I have

noted that that teacher education is a "confused mess" in many parts of the world. The authors in this book have grappled with that confusion and with the often incoherent goals of teacher education. They have had to bring new thinking to the field because teacher education policy inherited from the 20th century has little relevance to the 21st century. It failed to address the crisis of teacher recruitment; it was poorly co-ordinated with school systems; and it did not take account of the potential of ODL and ICTs to do things differently.

The irrelevance of earlier policy has given the authors in this volume a fresh canvas on which to work. Their various contributions examine the research base and underlying principles and policies before exploring new learning and teaching strategies for both pre-service and in-service teacher education. Much space is devoted to the potential of ICT but, lest it be thought that ICT is mainly a rich-world phenomenon, we learn how hundreds of thousands of African teachers are receiving training in their schools through the TESSA (Teacher Education in Sub-Saharan Africa) programme and its use of open educational resources.

I congratulate the editors, Patrick Alan Danaher and Abdurrahman Umar, on bringing these contributions together and providing a scene-setting introduction and concluding remarks. For three reasons the book should be seen as a work in progress. First, the world is only just waking up to the crisis of teacher recruitment. Second, teacher education is in a period of transition as its focus switches from long pre-service courses to school-based in-service education and continuous professional development. Third, ODL is itself in a state of flux as it draws upon an increasingly powerful mix of media and technologies.

Teacher educators must find their way across these shifting sands. This book provides some of the answers to the questions they will face as they tackle the most pressing educational challenges of the 21st century.

Sir John Daniel
President & CEO, Commonwealth of Learning

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CHAPTER

1

Setting the Scene for Interrogating Teacher Education through Open and Distance Learning

Abdurrahman Umar and Patrick Alan Danaher

Abstract

Teacher education and open and distance learning (ODL) are separately complex and critically important fields of endeavour. Used together, they have the potential to enhance the effective, efficient and equitable provision of education and to maximise access to such provision by various categories of disadvantaged learners. This chapter sets the scene for the book's interrogation of the pressures on, and the possibilities of, teacher education through ODL that can generate long-term and sustainable outcomes for learners, their families and their communities in developing and developed nations. The chapter outlines the key issues framing the book, identifies previous and current publications that it is intended to complement and extend, and explains the book's rationale, development and structure. Three organising questions are then articulated that are covered in the intervening chapters and responses to which are synthesised in the final chapter in the book.

Introduction

This book presents various perspectives on the intersection between two domains of research and practice equally crucial to individual empowerment, national development and global sustainability in the early 21st century and beyond: teacher education and open and distance learning (ODL). These domains represent the hope – not unaffected by stark empirical and material realities – that teacher education through ODL can contribute substantially to redressing decades, even centuries, of inequitable access to the provision of formal education in so-called developing countries. They also constitute an opportunity for the deployment of innovative technologies and equally innovative educational applications of those technologies in teacher education in developing and developed nations alike.

As we elaborate below, the chapters in the book take up the challenge of interrogating this intersection between teacher education and ODL in multiple ways. The result is intended to be conceptually significant, methodologically rigorous and empirically and strategically useful – a snapshot across several countries at the beginning of the second decade of the 21st century of what is possible, and of what remains difficult if not impossible, in relation to harnessing the dispositions, practices and technologies of ODL in order to make teacher education as effective, efficient and equitable as possible.

The Issues

Why is it so important to use ODL to design, implement, evaluate and enhance teacher education? The chapters in this book take up this fundamental question from varied perspectives. We have space here to sketch only a broad overview of the situation. A useful starting point is the aspiration of Education for All (articulated in declarations in Jomtien, Thailand, in 1990, and in Dakar, Senegal, in 2000), and accompanied by a stated international commitment to achieving Universal Elementary Education (Daniel 2009; Dyer 2009).

If we turn to the six goals of Education for All as outlined in the Dakar Framework for Action (UNESCO 2000), we perceive some of the complexity of the challenges facing efforts to attain those goals:

"1. Expanding and improving comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children;
2. Ensuring that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality;
3. Ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programs;
4. Achieving a 50% improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults;
5. Eliminating gender disparities in primary and secondary education by 2005, and achieving gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality; and
6. Improving all aspects of the quality of education and ensuring excellence of all so that recognised and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills."

While these are clearly highly diverse statements of intention traversing a widely ranging terrain, they are linked by a common reliance on a highly skilled teaching force attentive to the specific needs of these various categories of learners, and able to deploy strategies that are successful in meeting those needs. This reliance in turn relies on the teachers' own learning needs – in terms of initial pre-service training and continuing professional development – being fulfilled. Yet, as illustrated by the difficulties facing teachers working with Nigerian nomadic pastoralists (Umar and Tahir 2009), these requirements generate demand for high quality teachers that cannot easily be achieved at individual, provincial and national levels using conventional face-to-face, campus-based teacher education strategies.

According to UNESCO's Institute for Statistics (2009), half of the world's countries (i.e., 96 out of 195) need to expand their stock of teachers significantly if they are to enrol all primary school age children by 2015. Sub-Saharan Africa has the greatest need for teachers: its stock of teachers needs to be increased to 3.7 million by 2015 (indicating a gap of 1.2 million teachers), if the Education for All goals are to be met by 2015. Similarly, the Arab states region will require 282,000 additional primary school teachers by 2015, while South and West Asia will require 240,000 additional teachers.

Enter ODL. While it is important not to see ODL as a panacea that can redress existing socio-economic inequities and political instability easily, the opportunities for large-scale educational provision afforded by information and communication technology (ICT) and other technologies deserve to be recognised and considered carefully. Moreover, it is not only the technological dimension that is significant: ODL is designed to break the demand for face-to-face attendance at a particular institution, which places additional obstacles in the way of streamlined access to such education. This form of learning is therefore intimately connected to efforts to democratise educational provision. Again, enthusiastic and energetic teachers are needed, both as participants in and as purveyors of ODL.

Related Books

Against the backdrop of these issues, this book's timeliness is highlighted by the fact that it builds on and extends the insights from earlier books on the same topic, as well as by its complementing more recent books. An example is *Teacher Education through Open and Distance Learning*, edited by Bernadette Robinson and Colin Latchem (2003) (the latter being one of the contributors to this book). That book presented 12 chapters covering Africa, Brazil, China, Egypt, India, Korea, New Zealand, Paraguay, Russia, Sri Lanka and the United Kingdom, and dealing with issues such as: policy, planning and management; initial teacher training; continuing professional development; non-formal, community and adult educators; school managers; media and ICTs; evaluation, research and quality; and costs.

This present book takes up some of the same issues, while also examining evidence seven years on since the release of the 2003 publication, taking the discussion in new directions (as addressing, for example, educational principles and policies, a capabilities focus, learning and teaching strategies, open educational resources, and quality assurance), and including a focus on some additional countries (Australia, Canada, Iceland, Indonesia and Sub-Saharan Africa).

Another publication that helps to frame this one is *International Case Studies of Teacher Education at a Distance*, edited by Hilary Perraton, Bernadette Robinson and Charlotte Creed (2007) and including chapters about Burkina Faso, Chile, Mongolia, Nigeria and South Africa and discussions of interactive radio, television and videoconferencing, child guidance, teachers of English as a second language, and head teachers. A companion text, *Teacher Education Guidelines: Using Open and Distance Learning – Technology, Curriculum, Cost, Evaluation* (UNESCO 2002), expanded on the case studies that were commissioned by UNESCO and which informed Perraton et al.'s 2007 book. Teacher education was also briefly discussed in a number of chapters in *Higher Education through Open and Distance Learning* (Harry 1999). That book's "Afterword," written by Sir John Daniel, sought

conceptual clarity in defining "open learning" and "distance education" and concluded with the timely reminder that while there are "many challenges facing education and training that open learning and distance education can help us to meet ... there are no panaceas and we should make clear in each case how we are trying to match solutions and problems" (p. 299) – a reminder that the contributors to this book have certainly heeded.

The present book is also intended to complement two others published recently by the Commonwealth of Learning: *Perspectives on Distance Education: Open Schooling in the 21st Century* (Abrioux and Ferreira 2009) and *Learning to Live Together: Using Distance Education for Community Peacebuilding* (Baksh and Munro 2009). While all three books have a different focus and organising questions, they have in common the conviction that the technologies and techniques of ODL can be channelled to achieve significant outcomes that make a profound difference to individuals, institutions and societies, provided that appropriate settings are in place and all gatekeepers and stakeholders are fully committed to attaining such outcomes.

This Book

The chapters in this book have all been written by nationally and internationally renowned scholars in the fields of teacher education and/or ODL. The editors invited particular authors to contribute. While not all who were approached were able to do so, those who have written chapters have exhibited considerable knowledge of and enthusiasm for their respective topics. Each chapter was anonymously peer-reviewed by at least one reviewer, as well as being carefully read by at least one editor. The result is what we hope will be seen as an authoritative, contemporary and thoughtful extension of current understandings about several different aspects of teacher education and ODL in a number of countries and contexts.

Here is a synopsis of the book, from Chapter 2 to Chapter 13:

- Chapter 2, by Patrick Alan Danaher from the University of Southern Queensland, Australia, and Abdurrahman Umar from the Commonwealth of Learning, presents a selective overview of contemporary research on ODL in teacher education.
- In Chapter 3, Mary Simpson and Benjamin Kehrwald, respectively from New Zealand's University of Otago and Massey University, consider the educational principles and policies that underpin teacher education through ODL.
- In Chapter 4, Ann Shelton Mayes from the University of Northampton and Hilary Burgess from the Open University in the United Kingdom focus on the specific challenges and opportunities facing ODL for initial teacher education.
- In Chapter 5, R.E. (Bobby) Harreveld from CQUniversity in Australia takes up a capability approach to ODL for in-service teacher education.
- In Chapter 6, Glen Postle and Mark A. Tyler from the University of Southern Queensland, Australia, investigate distinctive learning and teaching strategies and practices that they contend help teacher education through ODL to become a dynamic and sustainable reality.

- In Chapter 7, Colin Latchem, a very experienced Australian educational consultant and former academic, pursues recent and current developments in the vital project of using ICT to train teachers in ICT use.
- In Chapter 8, Ken Stevens, who holds dual academic appointments at Memorial University in Newfoundland, Canada, and Victoria University in Wellington, New Zealand, ponders the multiple uses of media in teacher education through ODL.
- In Chapter 9, Sólveig Jakobsdóttir from the University of Iceland, Lindy McKeown from the University of Southern Queensland, Australia, and Debra Hoven from Athabasca University, Canada, turn to what might be gleaned from using new ICTs to inform the continuing professional development of teachers through ODL.
- In Chapter 10, Bob Moon, from the United Kingdom's Open University, uses the Teacher Education in Sub-Saharan Africa (TESSA) programme as a striking example of how open educational resources can stimulate and strengthen new forms of teacher education.
- In Chapter 11, Bruce Thompson, an independent education consultant based in Vancouver, Canada, scrutinises the critical role of cost-effectiveness in determining how affordable and sustainable teacher education via ODL actually is.
- In Chapter 12, Tian Belawanti and I.G.A.K. Wardani from Indonesia's Universitas Terbuka appraise quality assurance programmes for distance teacher education, using their own university as an illustration.
- Finally, in Chapter 13, Patrick Alan Danaher and Abdurrahman Umar use a synthesis of the book's major themes to present some possibilities for creating new perspective on teacher education through ODL.

The Key Questions Ahead

The process of interrogating perspectives on teacher education through ODL in the chapters in this book is thus facilitated by a backward mapping of the principal findings of those chapters, as well as underpinned by the other publications listed above and considered in greater detail in the next chapter. That interrogation is centred around three organising questions, responses to which are outlined in Chapter 13:

- What are the intentions, forms and effects of current enactments of ODL?
- What are the implications of those enactments for envisaging and implementing effective, efficient and equitable teacher education?
- What new perspectives on educational provision are created by the contemporary and possible future intersection between teacher education and ODL?

The answers to these and other questions – explored in the next 12 chapters – contain the seeds of possibility for facilitating the attainment of the vision so well evoked by Sir John Daniel (2009, p. iv): "to bring forward that great day when the world will be able to say that Education for All has been achieved."

That aspiration encapsulates both the concerns of the book introduced at the beginning of this chapter and the broader project to which its editors, authors, readers and many others remain steadfastly committed.

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CHAPTER

2

Contemporary Research on Open and Distance Learning in Teacher Education

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Abstract

This overview chapter considers teacher education and ODL separately and then in combination, examining their synergies and divergences. The focus, context and politicised character of each domain are discussed, as is their diversity across individuals, institutions, nations and regions, and also the links between each domain and wider debates about such issues as access, development, equity, social justice and transformation. The discussion provides a framework for the chapters that follow. Policy-makers, practitioners and researchers who use ODL in teacher education to develop large numbers of capable and proficient teachers will need to engage with the types of themes canvassed in the current research reviewed here.

Introduction

As we elaborate later in this chapter, contemporary research on open and distance learning (ODL) in teacher education is much more than an intellectual interest: on the contrary, this domain of professional and scholarly activity is directly implicated in a broader set of historical and current forces that go to the heart of the human condition and that continue to evoke questions not only around educational policy-making and provision but also around freedom and justice. Like the other chapters in this book, this chapter is predicated on the sometimes invisible interplay between those larger forces and the more specific issues of how to ensure the most effective education of teachers for wide disparities within and among countries. At the same time, we realise that, if those larger forces are to be understood and engaged, it is vital to give careful attention to maximising the impact of such teacher education. Thus, it is essential to strengthen and expand existing teacher education systems particularly in developing countries if they are

to address the current and projected shortfalls in teacher supply adequately and thereby facilitate the attainment of the goals of Education for All by 2015.

This important point was encapsulated in a 2009 report by the UNESCO Institute for Statistics (USIS), *Projecting the Global Demand for Teachers: Meeting the Goal of Universal Primary Education by 2015*. According to the report, 10.3 million teachers will be needed worldwide by 2015 if universal primary education is to be attained. Sub-Saharan Africa faces the most severe teacher shortfalls. The USIS report (2009, p. 15) observed that:

> "Of the 10.3 million teachers needed, 8.1 million will be deployed to maintain the current capacity of education systems (i.e compensate for attrition). About 2.2 million recruits will be needed to expand education systems in order to achieve UPE [Universal Primary Education].... In other words, one in five teachers that need to be hired by 2015 will be part of global efforts toward EFA. This reflects the massive investment which is required by governments. This perspective highlights the dramatic burden for sub-saharan Africa. The region needs to recruit and train about 1.1 million teachers to maintain the current situation in the classroom, which already falls short in terms of education quality. But to attain UPE, these countries must recruit an additional 1.3 million teachers, bringing the total to 2.4 million. In short they will need to recruit almost as many teachers in just eight years as are currently teaching in classrooms across the region."

This huge need for teachers in Africa and other developing countries is alarming if viewed in the context of the limited capacity of teacher education institutions to address it while simultaneously upgrading the large proportion of untrained or unqualified teachers already in the system and providing adequate opportunities for teachers' continuing professional development.

As Umar (2004, p. ii) summarised the situation: "Teacher recruitment, retention and professional development are increasingly becoming the key issues in the quest for adequate supply for teachers at all levels of education."

All of this reinforces the potential value of ODL for teacher education, and indeed most governments in Africa and other developing countries recognise the possibilities of ODL in helping to address the severe teacher gaps in their respective countries. This is partly because the experiences of many developed and developing countries have shown that, if properly organised and managed, ODL can enable countries to train a larger number of teachers in a shorter time and with lower costs than can conventional campus-based teacher education. The work of Robinson and Latchem (2003) and the international case studies on the use of ODL for teacher education in Perraton et al. (2007) indicate that ODL is increasingly being used to:

- provide cost-effective pre-service and in-service teacher education;
- support school-based pre-service and continuing professional development programmes for teachers;
- upgrade unqualified teachers and enable qualified teachers to acquire higher teaching qualifications;

- provide teachers in remote or rural areas with access to professional training, thereby meeting their continuing professional development needs; and
- ensure quick dissemination of information to large numbers of teachers about curriculum innovations, new teaching methodologies and practices, and new professional standards for teaching.

This snapshot illustrates both the complexity and the urgency of enhancing the intersection between teacher education and ODL. A key aspect of that enhancement lies in viewing and understanding current scholarship about that intersection – and that is the function of this chapter. In exploring that scholarship, we begin with specific issues in teacher education. We then examine particular elements of ODL, and next consider the interface between these two domains. We conclude by linking that interface with the wider forces identified above – in particular, national development, social justice and global transformation.

Specific Issues in Teacher Education

Teacher education is a vast terrain of scholarly activity. Our purpose here is not to provide a representative overview but instead to identify particular aspects of that activity that provide a framework for engaging productively with the possibilities of ODL. Given the concern noted above about the quality of contemporary teachers and their education, it is important to acknowledge what current trends in teacher education mean for that quality.

Within that context, there is ongoing debate about the most appropriate forms of teacher education. Johnston (2007) contrasts the academic rationalist, experiential and critical, holistic approaches to teacher education curriculum and andragogy. While Johnston's concern lay with the Studies in Society and Environment curriculum documents, her more general point was "the importance of interrogating any current curriculum documents to challenge an impetus toward implementing conservative, controlling and limited approaches to teaching and learning," and to "sound a warning note and highlight the need for ongoing interrogation and critical analysis of blueprints by teacher education students" (p. 362).

Clearly there is equivalent debate about the appropriateness of imposing a particular curriculum approach on teacher education in the conditions outlined in the introduction to this chapter. At the same time, it is important to recognise the different types of teacher education curriculum and associated differences of purpose and impact. For example, Hussein (2007, p. 209), reporting on teacher education experiences in Ethiopia, advocated critical practitioner inquiry that he argued "enables teachers and teacher educators to work toward making their students become conscious of where they are politically, socially, economically and structurally." He also noted, however, that this approach's "transformative potential is constrained by various institutional and personal factors."

Another conceptualisation of teacher education was provided by Singh (2007, p. 347), who explored the notion of "robust hope" – something we believe has considerable resonance with the concerns of this book:

> "Robust hope begins with the knowledge that there are virtues in imagining better futures, for instance better approaches to initial, beginning and continuing teacher education. Effective tools and concepts to help deepen and extend a sound research base for rational inquiry in all three phases are a means to making hope robust and practical."

Both Johnston (2007) commenting on teacher education curriculum and Singh (2007) analysing teacher education research highlight the importance of ensuring that real and sustained connections are made between teacher education approaches and the particular conditions, needs and aspirations of the prospective teachers and their students. We concur with Singh that teacher education research needs "a diversity of sound, robust methods, theories, principles and procedures" (2007, p. 348) if it is to assist the project outlined here: that is, of constructing ODL in teacher education that is effective, sustainable, transformative and genuinely hopeful.

One potentially useful way of helping to bring that about is to consider the Vygotskian perspective on teacher education, which Van Huizen et al. (2005, p. 267) contrasted with "competency-based, personality-based and inquiry-based approaches ... [to] representing alternative paradigms for designing curriculum and pedagogy." They identified six basic principles of a Vygotskian paradigm for teacher education:

- learning through participation
- orientation toward ideal forms
- attuning of a public standard to personal motives
- interaction between performance and assignment of meaning
- development of a professional identity
- learning from emotional experience

They also elaborated four dimensions of developing meaning in relation to teaching:

- macro-level: societal interests into broad policy frames
- meso-level: individual schools and educational establishments
- micro-level: interactive situations in a teacher-education environment
- personal level

We are not seeking to advance this approach to teacher education above others. On the other hand, we see it as one beneficial way to deconstruct several elements of effective teacher education that could have wide applicability across a range of contexts and countries. A related strand of research is the attempt to interrogate and deconstruct the concept of pedagogy so as to enhance our understanding of what and why – but more importantly how – we think about learning and teaching. For example, Leach and Moon's (2008) meta-analysis of the concept of pedagogy sought to unveil "the multiple theoretical and practical perspectives" it embraces. Their aim was to determine "why pedagogy is situated in educational cultures in the way it is, what function pedagogy serves and the role it can play in our lives as teachers." The expected outcome of this process is the emergence

of "a new set of tools, concepts, and ways of thinking about pedagogy that will be of use to educators, teacher educators and others interested in analysing the processes of learning and teaching."

The teacher education literature also contains accounts of national developments in teacher education that simultaneously reflect that country's particular history and culture and contain possible approaches that might work in other nations as well. For example, Shi and Englert (2008) recounted two decades of change to teacher education in China, moving "from central control to devolved and distributed management and decision making," and from "a planned economy to a socialist market one" (p. 347). Surprisingly (or perhaps ironically) the issues highlighted by Shi and Englert as being those that currently exercise Chinese teacher education policy-makers are also familiar to their counterparts in capitalist and Western countries – namely, "the merger and amalgamation of institutions, teachers' professional development under the auspices of market and knowledge economy, educational information, internationalisation and others" (p. 347).

Similarly Koshmanova and Ravchyna (2008) traced equivalent changes in teacher education provision in Ukraine and argued that transformative approaches to that provision needed to engage with the following seven stereotypes of teacher education:

- A content-based curriculum delivered by an informed teacher will guarantee students' effective, successful and productive education.
- A good teacher possesses a system of profound theoretical knowledge about instruction.
- Learning is the hard, responsible work of a student.
- An educator should maintain distance and be strict with students.
- A highly qualified instructor does not have learning conflicts.
- Education of teachers and students should be monocultural.
- Ukrainian ethnic consciousness and patriotism make a starting point for building a civil society.

For us, the significance of these stereotypes is that they are inextricably linked with Ukraine's national history and culture, and also that equivalent stereotypes attend other countries' approaches to teacher education. The authors quoted earlier in this section of the chapter have advocated developing approaches that are at once sensitive to teacher education's cultural "situatedness" and directed at challenging and changing inequitable and unethical aspects of its status quo. One example of this is Ravindranath's (2007) study of efforts to develop a globally conscious yet nationally and locally relevant environmental education in Indian teacher education.

In summary, this section's focus on selected contemporary issues in teacher education highlights the complexity, diversity and importance of these issues. Although there is consensus about the need for more and better qualified teachers, debate continues about the most appropriate forms of educating those teachers and providing their ongoing professional development. The rest of the chapters in this book take up this sometimes uneasy but necessary tension in relation to particular dimensions of teacher education policy-making and provision.

Particular Elements of Open and Distance Learning

We begin here by acknowledging the diversity of forms of what in this book we have called "open and distance learning." This field has been variously named "distance learning" (Danaher 2001), "open learning" (Danaher 1994; Danaher et al. 1998), "flexible learning" (Danaher 1997; Moran and Myringer 1999), "online learning" (Danaher 2006; Danaher et al. 2007) and "blended learning" (De George-Walker et al. 2010).

Rather than being diverted by the intricacies of definitional debates, we focus here on forms of educational provision that use contemporary technologies to enact varied combinations of synchronous and asynchronous communication and on learners and educators physically separated from one another for part or all of the educational experience.

As with teacher education, so ODL is a multifaceted phenomenon that eludes easy classification and ready analysis. It is also a domain characterised at times by excessive optimism and unrealistic claims on its behalf, as a panacea and a substitute for wholesale engagement with the kinds of local, national and global inequities noted above. In that context, it is timely to recall Rumble's (1989) seminal and still relevant clarion call from more than 20 years ago:

> "The term 'open learning' is now being used as a banner to describe systems which are anything but open. This is a monstrous misuse of language which needs to be stopped now. Access is about individual learners, not about corporate providers; openness is about structure and dialogue, not about instrumental training.... Few systems are open in the sense that they comply with all the characteristics of openness mentioned in this article, but we should ensure that individual systems exhibit at least some of the characteristics of openness before we accord them the accolade of being open." (p. 35)

In some ways, subsequent developments unimaginable in 1989 contain the possibilities of genuinely open systems of learning and teaching, one example being the exciting advent of open educational resources (see Chapter 10 in this book; see also Kehrwald and Danaher 2010). On the other hand, the forces of capture and compliance to which Rumble (1989) referred are even more evident now and growing. This situation places considerable pressure on learners, educators and designers and tends to encourage and reward competition rather than collaboration (Dodds et al. 1999), standardised rather than flexible provision, and a closed rather than open enactment of access and equity. These potential contradictions were effectively synthesised by Sir John Daniel (1999) 10 years after Rumble's (1989) warning, and the underlying argument repays ongoing attention:

> "This book has illustrated well the variety of purposes and the richness of applications that are being pursued in the names of open learning and distance education in the last part of the twentieth century. The diversity of the field is now so great, however, that these terms, when used without qualification, are of limited usefulness for our professional discourse. I conclude with the plea that we discipline ourselves to specify more clearly the particular dimensions of openness we seek to develop through open learning and the educational objectives that we wish to achieve by distance education.

> There are many challenges facing education and training that open learning and distance education can help us to meet. However, there are no panaceas and we should make clear in each case how we are trying to match solutions and problems." (p. 298)

These possibilities and tensions are evident in selected current scholarship related to ODL. For example, recent research into the characteristics of distance learners (Wang et al. 2008) highlighted complex connections among self-efficacy, learning motivation, learning strategies and learning results. While this is also true for face-to-face learners, most researchers contend that spatial and temporal separation creates distinctive challenges – and opportunities – for learners and educators alike, and which have a strong influence on students' dispositions and capacities for success in those environments. Similarly, recent doctoral research has explored the particular affordances of distance, open, flexible, online and/or blended learning with regard to opportunities for transformative learning (Reushle 2005), the establishment of social presence (Kehrwald 2007) and the links between learner-to-learner interaction and knowledge construction (Rossi 2010).

As with the teacher education literature examined in the previous section, much of the ODL scholarship has a regional and national focus. For instance, Latchem (2007) considered ODL research and practice in the many countries of Asia, asserting that "while there is growing use of ODL in formal and nonformal education and training in Asia, planning and practice are not always informed by rigorous and sustained research and evaluation" (p. 133). Likewise Jung and Latchem (2007; see also Latchem and Jung 2009) contended that, despite the continuing flourishing of Asian ODL in the higher education sector, "there is still need to ensure that increasing access does not result in lowering standards and to prove that ODL is at least as good as conventional education and, in many cases, more innovative, effective and efficient" (p. 235). They elaborated their argument with a timely warning that applies to ODL provision regardless of region or country:

> "Whatever the external imperatives, QA [quality assurance] should be internally driven and accepted as an integral part of the institutional missions to teach and research.... Such a culture entails asking awkward questions, admitting to things that go wrong, acknowledging the changes needed and implementing these changes. Such behaviour may well represent a considerable paradigm shift in some of Asia's more hierarchical and bureaucratic institutions that currently only pay lip-service to the idea of QA, but is essential if ODL is to deliver on its promises and to be held in high regard." (p. 246)

Individual countries are well represented in the ODL literature, with national strengths and areas for development helping to frame the analyses. For example, Mays (2005) took up the complex but crucial question of providing a true cost analysis of ODL (see also Hülsmann 1999; Oliveira and Orivel 2003; Rumble 2009) in Sub-Saharan Africa (see also Chapter 10 in this book). Olakulehin (2008) examined the potential for ODL as a strategy to promote human capital development in Nigeria. Siaciwena and Lubinda (2008) discussed the sometimes contentious connections between ODL and implementing the right to education in Zambia. Power and Shrestha (2009) considered possible applications of the burgeoning field of mobile learning technologies to enhancing distance English language teaching (see also Rumble 1999).

Clearly then, like teacher education, ODL has a regionally, nationally and organisationally contextualised and differentiated character. Nevertheless, it closely reflects broader debates such as individual empowerment, national development, programme evaluation and the quality of learners' experiences. Many of the following chapters in this book investigate these and other themes in greater depth, again from the perspectives of particular countries and institutions. This kind of scholarly attention is vital if the potentially transformative impact of ODL is to be realised.

Combining Teacher Education and Open and Distance Learning

We turn now to consider the research that investigates teacher education and ODL in combination. In doing so, we examine the potential synergies and divergences between these two fields of endeavour.

A growing literature has been devoted to reviewing the strengths and limitations of ODL in teacher education. A useful synthesis of those strengths and limitations was provided by Perraton (2003), who focused on three themes requiring careful consideration by planners and practitioners: social expectations of teaching as a profession; identification of the stakeholders influencing and controlling that profession; and the curriculum of teacher education. *Higher Education through Open and Distance Learning* (Harry 1999) traced efforts to develop teacher education programmes using varying degrees of ODL in institutions as diverse as the Bangladesh Open University (Rumble 1999), the Indira Gandhi National Open University (Panda 1999), the Open University of Tanzania (Mmari 1999), the University of the South Pacific (Matthewson and Va'a 1999) and the University of the West Indies (Brandon 1999). Included in the same book were ODL experiences in China (Ding 1999), Latin America (Chacón 1999) and South Africa (Dodds et al. 1999).

Some of this literature has focused on the rapidly developing technologies available to support teacher education via ODL. For example, Fung (2005) investigated the use of printed materials in an in-service primary school distance teacher education course and found that the participating teachers agreed that the materials achieved the course objectives, but that "distance teacher educators must find ways to encourage learners to engage in in-text activities" if such activities are to achieve their potential and that "research on print materials – particularly on ways of achieving goals in teacher education – should not be neglected at a time of increasing use of distance education in teacher education" (p. 182). This is a timely reminder, given that the capacity to afford more technically sophisticated technologies is unevenly distributed among countries and institutions, and given the widespread assumption that providing content in a particular format automatically facilitates learners' engagement with that content.

Similar concerns attend a very different set of technologies more recently associated with distance learning for teachers' professional development: mobile devices. Aubusson et al. (2009) reported that "mobile learning is ideally suited to allow reflection-in-action and to capture the spontaneity of learning moments," and that "authentic artefacts and anecdotes, captured through mobile technologies, can enable the sharing, analysis and synthesis of classroom

experiences by teachers and students" (p. 233). However, they also stated that "Practical, school systemic, attitudinal and ethical factors may inhibit mobile technology adoption; these factors need to be researched and addressed to realise the potential of teacher mobile professional learning" (p. 233).

These factors apply also to other technologies, including print as noted by Fung (2005), and reinforce the need for caution in selecting a particular technological mix when planning a teacher education programme for open and distance learners.

Considerable diversity also exists in target groups for teacher education programmes via ODL. With more teachers taking on postgraduate study, Butcher and Sieminski (2006) focused on the development of a Doctor of Education programme via distance at the Open University in the United Kingdom (see also Janse van Rensburg and Danaher 2009; Moriarty et al. 2008). Butcher and Sieminski contended that four themes were crucial to the success of the doctorate: "professionalisation; professional change; bridging the academic/professional divide; and professional self-esteem"; and that those themes, to take effect, required "a highly structured but flexible support system" (p. 59). That claim was elaborated as follows:

> "For these graduates, the professional outcomes described above would not have occurred without the availability of the EdD [Doctor of Education] through distance education. The OU [Open University] EdD is not only very different to many full-time or part-time PhDs, it is more effective at retaining students, and supporting them to completion. It is the structure of the doctoral programme (pre-entry requirements and tightly scheduled assessment points mediated by a supervisor) that enables the flexibility (the diverse ways students are able to research their own professional contexts) to be effective." (p. 68)

This is a definitive assertion, not only of a distinct differentiation between face-to-face and distance education, but also of the superiority of distance education – provided it is accompanied by the appropriate andragogical principles and support mechanisms – to face-to-face education for these particular learners.

A similar view was expressed by Hall and Knox (2009) about language teacher education by distance (LTED) for Teaching English to Speakers of Other Languages (TESOL) teachers. The authors reported the findings of a large-scale international survey of TESOL teacher education providers, with the goal of mapping current provision and research in the field. Their conclusions resonated with the hesitancy, and even ambivalence, related to ODL in teacher education.

On the one hand, Hall and Knox went on to say (2009, p. 78):

> "… [J]udging by the large number of programmes, teacher educators, and students, LTED is firmly established in language education. This presents a number of opportunities. For (prospective) language teachers, it is a chance to participate in the discourse community of language education in ways and from locations where it would once not have been possible. For language teacher educators, it is an opportunity to be involved in a field whose practices and knowledge base are undergoing rapid and important change, and to contribute to

> the directions of those changes. For researchers, it is an opportunity to explore, document, and theorise these developments and their implications."

On the other hand, they also added:

> "For all parties, the rapid changes associated with the rise of LTED also present us with a responsibility. As traditional roles and practices evolve in interaction with the demands and affordances of their new institutional environments, shortcomings and inequalities in current and emerging practices, and in the distribution of power and knowledge in the language education community are open to challenge and re-negotiation. The changes in LTED challenge educators, administrators, and researchers to include people and perspectives once excluded, and to embrace people and perspectives once distanced. It is an opportunity not to be missed."

Again both sets of comments apply to a broader audience than the particular field under discussion.

The same is true for distance learning for vocational teachers. In describing a programme for Australian vocational teachers via ODL from the three perspectives of planning, technology and teaching practice, based on UNESCO's (2002) *Teacher Education Guidelines*, Harreveld and Danaher (2004) acknowledged the enduring resilience of two unhelpful binaries: the one between initial teacher education for prospective teachers and professional development for existing teachers; and the one between vocational and academic knowledge. At the same time, they concluded: "Through our analysis of the program's planning, technology and teaching practice framework, we have shown that it is possible to educate teachers for the profession using this conceptual basis and the [distance] program delivery mode" (p. 11).

This overview of the growing literature on teacher education and ODL in combination highlights several potential synergies between these two domains. These synergies cluster around efforts to find innovative and sustainable solutions to longstanding problems of policy-making and provision, as well as to deploy relationships and technologies as effectively as possible to create new opportunities for learners who might otherwise be overlooked. However, there are also significant divergences between these domains, including an ongoing assumption that teacher education must be enacted via face-to-face learning, and concerns about programme quality and the credibility of particular qualifications. The juxtaposition and interdependence of these synergies and divergences must be kept firmly in mind for those committed to embracing ODL in teacher education.

Conclusion

We have sought in this chapter to focus on research directed at the two fields of teacher education and ODL, and then at those fields in combination. We have referred to several empirical examples, as well as to associated analyses of what works and why in bringing these domains together. We have also identified a number of theoretical assumptions underlying those analyses that reflect multiple understandings of teacher education, ODL and, more broadly, education and social life. These examples, analyses and assumptions establish a framework

against which to read the subsequent chapters. They also reinforce the rationale for the book's publication at this time.

This latter point is the one with which we close this chapter. Beyond the important matters of design principles, policies and technologies raised here, it is vital for all of us concerned about the intersection between ODL and teacher education to understand the wider links between that intersection and enduringly significant socio-cultural issues framing contemporary manifestations of the human condition. In particular, the crucial questions of national development, social justice and global transformation highlighted in the preceding discussion are inextricably bound up with the debates about educational policy-making and practice in specific countries and contexts.

If we and the other scholars cited here – policy-makers, practitioners and researchers – are indeed to use ODL in teacher education to facilitate the education of large numbers of effective and efficient teachers, we will all need to engage wholeheartedly with these questions.

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CHAPTER

3

Educational Principles and Policies Framing Teacher Education through Open and Distance Learning

Mary Simpson and Benjamin Kehrwald

Abstract

Distance delivery of teacher education is not a new phenomenon but it is one that is rapidly changing. A number of forces are driving that change, including: moves toward greater professionalism in teaching and demands for standards-based competency in the teaching profession; changes in the demographics of student populations; the demands of teaching in increasingly diverse societies; and the continuing evolution of networked computing and communications technologies and their use in education.

In particular, learning technologies are transforming distance-delivered teacher education through the addition of rich media resources, interactive and collaborative learning designs and more personalised learning experiences. The richer learning experiences made possible by the application of learning technologies have enhanced the appeal and uptake of teacher education at a distance and opened up new possibilities for reimagining, redesigning and redeveloping delivery plans as part of transformative approaches to education. However, networked and communications technologies are not universally available and, in some contexts, change from traditional print-based delivery may be gradual rather than immediate. Context, history and experience in any particular setting influence the pace of change as does the nature of the student group and the policies and infrastructure in place.

This chapter explores the interplay between *educational principles* and *policies* and the way in which open and distance learning (ODL) interacts with those principles and policies in a dynamic and rapidly changing education environment. Understanding the environment and the forces at play helps to ensure that planning and developing open and distance-delivered teacher education remain innovative and responsive. Such understanding is critical if we are to serve new

generations of teachers, teacher educators and students well. It also highlights the importance of being just as aware of new trends and developments as of past achievements and educational principles.

Introduction

This chapter begins with a brief review of examples of open and distance-delivered teacher education from Africa and Australia/New Zealand. Together these two areas illustrate the diversity of developments in open and distance education, the range of challenges that open and distance-delivered teacher education can address, and the evolution of delivery from print-based correspondence to fully networked online learning. This background provides a context for discussion of the four following key aspects that underpin an understanding of open and distance delivery of teacher education:

- Why has open and distance learning (ODL) been used in teacher education?
- How has educational policy framed and shaped open and distance teacher education, and what policy trends are evident at present?
- What values are at the core of teacher education? How are they manifest in contemporary technology-enhanced distance education?
- What principles guide open and distance delivery of teacher education?

The chapter then focuses on the tensions that exist between *educational principles* associated with teacher education and the *policies* that drive the operation of teacher education programmes. It is our contention that, while both must be understood, it is the education principles – and, in particular, the core values of teacher education – that must drive the design and delivery of distance teacher education programmes. Without these core values as the basis for developing coherent, integrated, effective teacher education programmes, such programmes can become a collection of incohesive courses that lack meaning for students and fail to develop a deep understanding of what a teacher is and what a teacher does.

The Use of Open and Distance Education in Teacher Education

Open and distance delivery of teacher education has been used for about 40 years (Commonwealth of Learning 2000; Perraton 2000). The number of distance-delivered teacher education programmes continues to grow (Moon and Robinson 2003) and the early 21st century is seen as a time of exciting possibilities for distance-delivered teacher education (Moon 1997). Those possibilities are often linked to the use of networked computing and communications technologies (Eastmond 1995; Cahoon 1998).

Demand for qualified teachers has been high and will continue to be so as countries around the world work to ensure that all their citizens can access education through to high school level as a minimum, and beyond – a highly desirable goal (UNESCO 2007). This demand is illustrated in several African countries where the need for qualified secondary teachers will be unable to be met through current teacher education provisions (DeJaeghere et al. 2006). In

developing countries, there has been an imperative to provide universal basic education for citizens. Meeting this objective requires qualified teachers. In countries such as Australia and New Zealand, where the teacher workforces often have substantial numbers of teachers nearing retirement, a high demand for teachers is expected in the near future (New Zealand Educational Institute 2008; Australian Education Union [n.d.]).

Examples of teacher education being delivered through ODL in Africa, Australia and New Zealand show that there is a strong foundation on which to build.

Africa

In Africa, a wealth of open and distance-delivered teacher education programmes exists, using a variety of approaches. The legacy of colonialism, racism and poverty has resulted in large sections of the population being poorly served by past education policies and practices (Zindi and Aucoin 1995). Efforts to address these shortcomings are reflected in several African teacher education programmes.

In Kenya, for example, radio broadcasts have been used to support print-based open and distance delivery of teacher education for basic teacher qualifications. More recently, teacher education degree-level programmes have been developed (Aderinoye 1995).

In Tanzania, a commitment to universal education has motivated the development of a qualified teaching workforce through a combination of co-operative education, rural newspaper-based materials, village libraries, remote study groups and radio broadcasts (Chale 1993). Now the Open University of Tanzania offers both undergraduate and postgraduate teacher education programmes.

Uganda and Zimbabwe have both had large print-based distance-delivered teacher education programmes in, respectively, the Northern Integrated Teacher Education Project (NITEP) and Zimbabwe Integrated Teacher Education Course (ZINTEC).

In South Africa, 23 higher education institutions that offer teacher education have replaced the 150 apartheid era institutions that offered teacher education and a national policy framework for teacher education has been developed (UNESCO 2007). The University of South Africa (UNISA) has played a major role in developing distance-delivered teacher education programmes. Nationally there has been a focus on information gathering to inform policy and address issues such as subject area shortages, uneven distribution of qualified teachers, upgrading qualifications for current teachers, use of contract teachers and lack of female teachers.

Ethiopia and Zambia have also developed teacher education policy frameworks.

A major pan-African initiative, launched in 2006, is the Teacher Education in Sub-Saharan Africa (TESSA) project, which is a UNESCO initiative designed to improve national teacher education policies and strengthen provision of programmes (UNESCO 2007). Delivery is evolving, with more countries adopting learning technologies as a key feature of their open and distance delivery.

Australia and New Zealand

Australia and New Zealand are Pacific nations with long histories of distance delivery and considerable experience with distance delivery of teacher education. Examples include Australia's Remote Area Teacher Education Programme (RATEP) and New Zealand's External Delivery Option (EDO) from Massey University, the Mixed Mode Delivery Programme (MMP) from the University of Waikato and the Primary Open Learning Option (POLO) from the University of Canterbury. All of these programmes developed as equity-focused initiatives designed to provide the opportunity to gain a teaching qualification for students unable to access traditional campus-based programmes. All are now mainstream programmes subject to all the policy forces that impact on the universities and shape teacher education. The New Zealand situation provides a case study of the impact of market policies on distance-delivered teacher education where the historically dominant distance provider (Massey University) has faced competition from the other providers and all three of the New Zealand programmes identified here now have further competition from several institutions that offer flexible teacher education options (Simpson 2003).

Policy and Open and Distance Education in Teacher Education

The record of open and distance delivery of teacher education is good, as noted above, and there continue to be exciting possibilities that allow for an enhanced student experience and a means of meeting national and international development goals. However, teacher education always sits within national and international policy frameworks and is subject to the vagaries often associated with policy.

While the cases of distance-delivered teacher education discussed above are varied, two sets of policy-focused factors have long driven the use of such education:

- In earlier times, and in the African examples, a development imperative was the driving force behind distance-delivered teacher education. Many countries, in responding to government policy, have used distance delivery options as a way of increasing teacher numbers and helping to build a qualified teaching workforce.
- In more recent times, and mainly in developed countries and as illustrated by the Australian and New Zealand examples above, an equity imperative allied with the continuing development of educational technologies has underpinned the use of distance delivery for teacher education.

Meanwhile, our reading of policy and experience in our context indicates the policy picture has become more complex in four notable ways:

- While recent policy developments have promoted greater access to tertiary level education, this has also spurred student demand for greater flexibility. As the forces of globalisation affect societies by promoting global migration, the rise of the global economy, imperatives for lifelong learning and the reach of global communications, the type of student entering teacher education has changed. The "traditional" young, full-time teacher

education student is no longer the norm. A greater number of older, part-time students are now found in teacher education programmes (Simpson and Anderson 2009). ODL is particularly attractive to these students who often seek to balance their desire to obtain a teaching qualification with their need to meet family and work commitments. However, increased access to tertiary education and greater flexibility has often been linked with policies that promote competition. Unfortunately, this competition has affected, and undermined, the equity imperative that drove many early open and distance-delivered teacher education initiatives. Illustrating this are the New Zealand examples, where the specific focus on a target group has been replaced by opening the options to all students.

- Recent years have seen teacher education become a more credentialed profession. In most developed countries, teacher education has moved into the tertiary education sector and teaching has become a profession that requires a degree. This trend to formal credentialing is sure to continue along with the need for the lifelong learning associated with participation in knowledge societies. A likely result is formal continuing professional development programmes for teachers as the need for career-long professional development is recognised more and more.
- The tertiary education sector is also increasingly controlled by policies relating to funding. Many governments have developed policies that have encouraged a greater range of providers to establish programmes. However, the result is greater competition among them for students. In particular, changed funding streams for universities have seen these institutions compete for control of teacher education. With funding have also come requirements related to reporting, completion and quality.
- Policy-makers have become increasingly concerned with quality issues in teaching and teacher education. Governments are the major funders of teacher education and funding for education is usually a significant percentage of any country's budget. Governments set education goals, develop legislation and then usually charge their ministries of education to enact the goals, provide advice to the government and develop the frameworks to implement the government policy. In this context, funding and quality often become interwoven. The result is calls for "value for money" and notions of quality often linked to efficiency as opposed to effectiveness.

For distance-delivered teacher education, the most significant policy-related impacts have come from policies relating to funding and quality. One aim of this approach seems to be to put space between funders and providers. Thus, we see devolution of responsibilities to teacher education institutions and more decentralised systems of provision being encouraged alongside tighter control of funding and accountability. An outcome of this, for teacher education, has been: the development of teacher standards (for graduating and experienced teachers); increased accreditation requirements; more compliance requirements; and a focus on completion within set time frames. These expectations are explicitly linked to funding for teacher education and create tensions between the needs of local constituencies and national imperatives.

Although the motivations and the policy detail may vary, teacher education is a priority in most countries regardless of the development stage of the country. Despite this, a number of tensions arise among the principles of open and distance delivery, core components of teacher education and the policy frameworks.

Tensions between Drivers of Distance Education and Quality Concerns

The principles that underpin open delivery, particularly those of flexible entry and student-controlled time for completion, do not always sit comfortably with funding regimes linked to quality issues in teacher education. For example, the standardisation of a traditional academic year, as well as timetabling designed to move students through a programme to completion within set time frames, works against the principles of flexibility that drive open and distance education.

Accreditation agencies often do not recognise teaching qualifications that have been achieved over extended periods or in a somewhat piecemeal manner. Distance delivery can address many challenges because it provides flexibility of access, but when the access is to institutions bound by the type of policies we refer to above, then flexibility of access comes at the expense of openness and flexibility of time and overall pace. One response to this is the development of a series of qualifications that build on one another. Another response is serious attention to the concept of lifelong professional development. These two responses might go some way toward addressing the inevitable tension that arises between student demand for flexibility and the constraints that come with funding.

Setting teacher standards is an increasingly common practice and a reflection of increasing professionalism in teacher education. In some cases, the profession has moved to set standards as a response to criticisms of quality. In other cases it has been a government requirement. In both cases, monitoring standards are usually enacted through some type of agency, with accompanying requirements for reporting. This situation creates tensions between the beneficial drives toward quality and benchmarking and the negative effect of prescriptive standards. Standards are generally a national issue, but teachers belong to a mobile workforce and it is possible that some internationally agreed standards might emerge and aid the development of the teaching profession. Compliance related to accreditation and teacher standards relates to trust and quality. Most teacher education programmes must attain some form of accreditation if their graduates are to gain teacher registration. Accreditation is usually for a set time. The accreditation process can involve accreditation at the institution level or accreditation at the programme level. Ongoing monitoring is often another requirement. Distance delivery is frequently not well understood by accreditation panel members, who seldom have expertise in open and distance education. This lack of expert knowledge is especially concerning for distance-only institutions such as open universities.

A focus on completion raises another key issue associated with quality. Many traditional teacher education providers, and teachers themselves, query whether a distance-educated teacher can be as competent as one who graduated from an on-campus-educated teacher in a face-to-face programme. There is evidence that delivery mode makes no difference. Perraton (1993) examined a number

of distance-delivered teacher education programmes and concluded that they compared well with face-to-face programmes. The programmes he examined did not use networked computing and communications technologies. However, a study by Simpson (2003) did look at completion rates and quality in such programmes and, like Perraton, found no significant difference between them and face-to-face programmes. Moreover, the computer technology based programmes that Simpson examined also took responsibility for the practicum component of the programmes, thus addressing another criticism: that in distance-delivered teacher education, control over the quality of the schools used for practicum is rarely possible.

All of the issues discussed here have the potential to both hinder and promote open and distance teacher education. However, handled well, they can be part of the excitement that can accompany this evolutionary stage of open and distance-delivered teacher education.

Core Values of Teacher Education and the Use of Networked Computing and Communications Technologies

All teacher education programmes tend to have as core values *integration*, *coherence* and *connectedness*. Initial teacher education programmes need to develop the content, context and practice knowledge that underpin teaching (Simpson 2003), particularly knowledge of children, society, learning and classroom contexts (Darling-Hammond 2006). Ideally these elements are integrated and interwoven in programmes that are coherent and connected. *Interaction and inquiry* are also generally valued, as is the habit of *reflection*. Teachers can expect to work with a diverse range of children and to interact with other teachers and with the community. Given the complex mix of knowledge, skills and strategies a person needs to successfully teach, it is clear that teachers need to be able to reflect deeply on their practice. Programmes often aim to foster a *disposition to lifelong learning* and to *working with others* (Simpson 2008).

Where teacher education resides within a university context, there is a high level of congruence between the core values of teacher education and the long-cherished values of debate and critique that are ever present in universities (Owston et al. 2006).

Research and experience with distance, online and teacher education provide a basis for matching the values of teacher education with the affordances of networked computing and communication technologies. For example, the technology used in some open and distance teacher education programmes provides an infrastructure that can foster interactions between distant teachers and students and between the students themselves (Hillman et al. 1994) in order to enrich learning experiences. The connectivity provided by networked learning technologies creates the potential for socially driven inquiry processes. Asynchronous discussions can foster deep reflective processes. Online learning environments provide venues for highly coherent integrated learning activities and complex social systems that include learning communities (Bonk et al. 1998; Preece 2000; Barab et al. 2004). Such programmes can build depth into reflection (Rovai 2002).

Despite the challenges associated with working in open and distance education environments, the quality of open and distance teacher education programmes has been shown to equal or surpass place-based programmes. For example, Anderson and Simpson (2004) found that distance teacher education students in a teacher education programme with online discussion groups built a strong sense of community and had no greater dropout rate or difference in achievement than did face-to-face students. Working in learning-focused communities helps to set up beginning teachers for a career in teaching that has a strong focus on ongoing professional development and a team approach to working.

Nevertheless, despite the comfortable match between the core values of teacher education and the use of networked computing and communication technologies, the experiences of open and distance educators and learners in teacher education programmes indicate that we are at an important crossroads in the delivery of open and distance teacher education. Two main factors affect delivery decisions:

- First, the unique local context and local conditions that exist must be acknowledged. The mode of delivery has to be matched to the technologies available and costs must always be taken into account. Each context may be quite different.
- Second, the policy environment is not static and this reality must also be acknowledged. Social, economic and political events can impact on teacher education in many ways. There may be less funding available if the economy changes or a social issue may develop to a point where it has an impact on schools.

Thus, although common core content elements and core values exist at the heart of all teacher education programmes, it must be recognised that every country is unique. Teacher education programmes must reflect local societal values and cultural differences, and there must be content within each programme that acknowledges and celebrates those differences. Delivery mode must be carefully considered as well. We may have the means to deliver across great distances, but doing so may not necessarily be desirable. Better, perhaps, would be to encourage the international community of teacher educators to share information on open and distance delivery, and to take to their contexts that which can be used and modified. Many of the more traditional means of delivery – print and radio for example – will continue to be important.

Principles That Guide Distance Delivery of Teacher Education

Given the complexities of distance delivery of teacher education described above, it is challenging to know what the guiding principles should be, especially to ensure that the focus on teacher education does not become lost among the exciting possibilities that networked computing and communications technologies present. While many of the tools that learning management systems provide are being used and open source resources are being brought into distance education material, it is easy to become enchanted with the technology and forget the prime focus. The following principles, we believe, will go some way to ensuring that teacher education remains the focus.

Design must be driven by teacher education components. The design and development of teacher education programmes must be grounded in the growing body of knowledge that informs teacher education and teaching practices. In addition to immediate stakeholder needs and institutional concerns, consideration must also be given to the wider issues of what and how to teach effectively in context.

Teaching needs must drive technology choice. Given the persistent "buzz" associated with learning technologies, there is some danger that particular technologies will be implemented in teacher education as part of motives to establish currency, create competitive advantage or simply realise efficiencies in delivery. The ideal implementation of learning technologies involves an explicit rationale and conscious choices that link the needs of teaching and learning through the teacher education programme with the purposeful use of particular learning technologies.

Materials development must draw on experience and research from both open and distance education and teacher education. It is important to remember that learners in teacher education programmes are adults. Therefore, teacher education programmes should be informed not only by the practice of teaching in schools, but also by adult education theory and practice. For open and distance teacher education programmes, the theory base of open and distance education is also an essential informant to good practice in the design, development and delivery of such programmes.

All the discrete elements of a programme of teacher education need to be integrated into a coherent programme. Integration is a key challenge in teacher education. The needs of stakeholders are disparate and sometimes sit in opposition to one another. Moreover, the diverse needs of school students define a complex and demanding set of knowledge and skills for teachers. The result is a situation in which teacher educators are required to add more and more to teacher education programmes in order to satisfy stakeholders and prepare teachers for the realities of contemporary schools. Integration offers teacher education programmes a powerful means to avoid additive approaches to programme development.

The habit of reflective practice needs to be an integral part of the learning activity within teacher education programmes. Teacher education graduates leave structured programmes and move into the world of teaching. The programmes we provide for them must work to make that transition smooth and provide a foundation for the ongoing reflection and professional development that should be at the heart of every teacher's practice.

Practicums need to be fully incorporated into programmes and their enactment supported and linked to all programme elements. To help students earn professional qualifications, teacher education programmes are practice-oriented and must teach not only

domain-specific content knowledge but also particular instructional skills. Given that "good practice" is context-dependent, the development of teaching skills is inherently linked to authentic practical activity.

A teaching qualification gained through open and distance delivery must be accorded equivalence with other modes of delivery. In keeping with the rationale for professional standards for teachers, it must be recognised that teachers who have achieved standards of professional practice must be acknowledged regardless of how their teacher education programme was delivered.

Conclusion

Clearly we are in a time of significant change with respect to the delivery of teacher education. While our focus in this chapter has been on open and distance delivered teacher education, the changes are not limited to the distance mode. Networked computing and communications technologies open up new delivery possibilities for both distance and face-to-face delivery of teacher education. Blended (or hybrid) learning which combines not only modes of delivery but also approaches to teaching and learning has emerged as a powerful option for teacher education providers wishing to tailor their programmes to suit increasingly diverse and disperse cohorts of learners. Blended approaches are increasingly being used to cater to a combination of place-based (face-to-face) learners and distance learners in ways that blur the distinction between on-campus and distance learning. Improvements in telecommunications networks, the decreasing cost of access, and the ubiquity of mobile phones as potential tools for mobile learning represent areas for further development in online, blended and mobile learning as tools of teacher education.

These developments also foreshadow changes coming in course and programme development. Although some distance institutions – particularly the large open universities – have worked in course teams, the author–editor model has been widely used in smaller institutions and small programmes. New networked computing and communications technologies offer the potential for new development models. Teams with expertise in teacher education, the pedagogy of online teaching and technology will be needed to develop courses and programmes that maximise the potential benefits of networked open and distance teacher education. While this may result in increased development costs for education providers, new development models are emerging that focus on the creation of open educational resources, open content, and open source design and authoring tools – all of which allow development costs to be shared across groups of institutions through the promotion of open approaches to intellectual property and creative production.

Important to realising all of this is an understanding of both open and distance education and teacher education. The intersection of these two fields is at the heart of quality issues in open and distance teacher education. Successful open and distance delivered teacher education requires more than just understanding delivery modes of ODL. It requires understanding the basic educational principles (core content areas and the values of teacher education) and the policies that affect a country's particular political, social, economic and educational environment.

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CHAPTER

4

Open and Distance Learning for Initial Teacher Education

Ann Shelton Mayes and Hilary Burgess

Abstract

Open and distance learning (ODL) has played an important role in initial teacher education and training since the United Nations Relief and Works Agency (UNRWA)/UNESCO Institute of Education was set up in the 1960s. Early programmes addressed crisis situations by, for example, providing qualified teachers for Palestinian refugee children. The first decade of the 21st century has seen ODL emerge as an established and embedded part of national initial teacher education and training provision in both developing and developed countries. ODL has been adopted worldwide as the potential solution to a range of teacher education issues, from cost and supply to access, diversity and quality. In particular, it has been promoted as a key strategy to achieve the World Forum's Education for All and the United Nation's Millennium Development Goals. As stated by the World Forum on Education in 2000, ODL offers a means of:

> "ensuring that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality."

In this chapter, the authors discuss a number of questions: Why is ODL used in initial teacher education? Does the use of ODL serve the same purposes in developing and developed countries? What is the impact of information and communication technologies on ODL? What are the key quality challenges for ODL in initial teacher education? Finally, the authors consider whether ODL's potential to achieve the Education for All commitment has been realised.

What Is Initial Teacher Education?

Initial teacher education (ITE) refers to that part of a teacher's education, preparation and training that leads to fully qualified, licensed or credentialed teacher status within a national or state/provincial system. It is the stage prior to *in-service teacher education,* which seeks to enhance teacher quality and performance beyond the professional entry level. Inevitably, there is overlap between these two stages in teacher education, particularly in relation to the unqualified serving teacher.

A conventional *pre-service* approach to becoming a qualified teacher, operating in developing and developed countries, might be described in the following way: a period of discrete higher education study based in a teaching college or university. The programme aims to develop the general education, subject and pedagogical knowledge and understanding required for teaching a particular age range or subject. This occurs alongside periods of supervised practicum or placement in one or more designated schools. Assessment, based on national or state/provincial professional standards or competences, of subject-specific and pedagogic knowledge, skills and understanding is also required to confirm the qualified teacher status *prior* to the individual entering the profession. The period of pre-service education may vary depending on the prior educational achievement of the individual at entry (for example, a three-year undergraduate degree programme or a one-year graduate entry programme) and is usually full-time in nature. The length and number of placements are highly variable and, depending on the national or state/provincial system's cultural view of its importance, may be marginalised or may take up the majority of time on the ITE programme.

The in-service approach is used where unqualified serving teachers require ITE to achieve qualified status. For these teachers – predominantly primary teachers in developing countries – the upgrading to qualified teacher status is a lengthy process. It involves the individual upgrading his or her personal educational qualifications, alongside teacher professional development, while continuing to work as a teacher. The process is part-time and primarily "on-the-job."

Between these two models lie many variations in programme design to meet local and national educational and economic priorities and cultural perspectives on what constitutes appropriate ITE (UNESCO 2001). What is important to recognise is that each of the four elements of ITE – general education, subject knowledge, pedagogy and practical teaching – can be successfully delivered using open and distance learning (ODL) (UNESCO 2002).

Why Is ODL Used in ITE?

ODL approaches to ITE have been identified as having major advantages over conventional programmes that require residency in terms of cost, scale and access. Moon and Robinson (2003) conclude that there are three areas of advantage: first, *resource efficiency* (buildings, teaching staff and funds), by reducing the overall cost of producing a qualified teacher; second, *supply,* in drawing in new constituencies of teachers and producing more trained teachers in a shorter amount of time; and third, *curriculum and training,* through offering greater opportunities to strengthen the relationship between theory and classroom practice (e.g., using real-life teaching on video; having teachers discuss their experiences on radio; and assessing classroom-focused activities, such as requiring trainees to integrate their

learning from ODL materials with specific activities undertaken on placement (Moon and Shelton Mayes 1995; UNESCO 2002).

ODL is able to make a substantial contribution to the cost (Perraton and Potashnik 1997), the numbers of trained teachers and the access or reach in relation to geographically isolated and marginalised communities (UNESCO 2002). These advantages have been promoted at the international level for their potential for developing teacher expansion within national systems in line with the Education for All commitment. This is not surprising given the success of a number of high-volume ITE programmes that have made considerable, sustained numerical contributions to teacher supply at an affordable cost and have been successfully integrated into established national teacher education systems. For example, more than 717,300 unqualified primary teachers and 552,000 unqualified secondary teachers qualified through the China Television Teachers College ODL programme between 1987 and 1999 (UNESCO 2002). Similarly, Allama Iqbal Open University enrolled close to 165,000 teachers for its 1995/6 pre-service primary teacher training programme, which has been particularly successful in reaching women and those from rural communities (YesPakistan 2002).

The rationale for using ODL methods in response to the crisis of qualified teacher shortages is evident when the numbers of teachers required exceeds the number of qualified teachers available. Failing to address the lack of qualifications, training and certification of these teachers is like condoning a lower quality of education for children. Pulling these unqualified teachers out to undertake ITE is too expensive in terms of the cost of replacing them, in addition to the cost of putting them through conventional ITE. Furthermore, there is insufficient capacity in conventional ITE to deliver ITE on a large scale. Therefore, resolving the teacher shortage crisis that way is a prohibitively long process. The solution is to use on-the-job training through ODL methods. This rationale was used to establish the United Nations Relief and Works Agency (UNRWA)/UNESCO Institute of Education to train extensive numbers of teachers working with refugee children from 1964 to the present (UNRWA/UNESCO 2005). And it continues to be a powerful argument for using ODL to achieve the Millennium Development Goals (United Nations 2000).

It is often the case that ITE programmes delivered through ODL – particularly those that receive international funding – are designed to have an impact on *access* and *equality*. For example, the ODL teacher education programmes in Eritrea were aimed at creating opportunities for females who, because of cultural or religious reasons, were unable to move away from their home and families, and for those people in remote rural communities whose economic and domestic difficulties prevent them from leaving their localities (Rena 2007).

Arguments for the importance of other factors in designing ODL approaches to ITE, such as *quality*, *flexibility* for individual teachers and the integration of *school-focused activities,* have also been made (Moon and Shelton Mayes 1995; UNESCO 2002; Moon et al. 2007). However, these features incur substantial additional costs because they generally require a move to a hybrid model of face-to-face and ODL, particularly where the completion of a range of supported one-to-one practicum experiences is required to secure high quality individual teaching performance. The Fort Hare University Primary B.Ed. project in South Africa (Moon et al. 2007) is typical of those innovative ODL teacher upgrading in-service projects that

have focused on improving teacher quality through a *school-focused* approach. This model requires that theory and practice be brought together in the design of specific classroom-based activities to improve teacher practice and thereby children's learning and achievement as well. There is also a strong emphasis on individual support by trained school-based staff.

ODL approaches are particularly appropriate for some elements of ITE (UNESCO 2002). An example is the development of general education or subject and professional knowledge, where ITE can deliver low-cost, high-volume delivery. However, other elements (such as individual placement supervision required for the development of teaching practice) require close contact between students and tutors and cannot be delivered where low cost is driving a mass market approach to ITE.

Does ODL in ITE Serve the Same Purposes in Developing and Developed Countries?

Teacher shortage, access and diversity have been key factors in driving ODL approaches in ITE in both developing and developed countries. In the United States, for example, the number of new teachers required is projected to rise by 18% from 2005 to 2017 (NCES 2008), leading to greater numbers of unqualified teachers, particularly in key shortage areas such as mathematics and science. But the underlying factors that create teacher shortages are different. In developed countries, teacher shortages are linked to the relative unattractiveness of the profession in relation to salary competitiveness and professional parity and esteem (Shelton Mayes and Young 1999). Tied to this is a high turnover and poor retention rates because of job dissatisfaction (Ingersoll and Perda 2007).

The success in providing high-volume instruction is most commonly cited in support of using ODL approaches to ITE, but Mashile (2008) argues for a more sophisticated approach to teacher supply. In South Africa, for example, successful low-volume ITE ODL programmes have been used for specialist fields such as teachers of the hearing impaired and teachers of technology. In a context where low student numbers are threatening the teaching of specialist subjects such as art and music, then an ODL ITE model is thought to be a solution (Mashile 2008). This line of reasoning also underpins the development of the United Kingdom's Open University ITE programme which was funded by government in relation to the supply of teachers in shortage subjects in secondary schools in 1992 (Moon and Shelton Mayes 1995).

Geographical isolation, leading to access challenges, is also a shared problem for developed countries with small isolated rural communities. In Scotland, the training of Gaelic-medium teachers for Gaelic communities has been supported through an ODL ITE programme that uses videoconferencing (Gillies 2008).

ODL programmes in developed countries have also been used to improve equality and diversity by providing training opportunities for those groups who are underrepresented in the profession at entry level on the basis, for example, of gender, age, disability or ethnicity. There is growing evidence that ODL ITE programmes both in developing and in developed countries are able to make a contribution to teacher diversity (UNESCO 2001).

However, one emerging difference between developing and developed countries is in the area of *personalisation*. The need for substantial flexibility in order to address the individual needs of teacher trainees and produce a personalised route through an ITE programme is well developed on the United Kingdom's Open University programme (Hutchinson 2006). The programme aims to fast-track trainee teachers to completion by "accreditation of prior experience and learning" (APL). The rationale is that an ITE programme should not be the same for all, but based on an individual needs analysis undertaken at the start of the programme. An Individual Training Plan sets out the amount and type of training to be completed for assessment at the end of the individual's personalised course. There is also a strong quality argument for personalisation within a fixed-length ITE programme, in that differentiation of materials and support matched to need will lead to higher levels of individual teaching performance.

Accreditation of prior learning used in this way has real potential for reducing the cost and time for completion in ITE programmes (Moon et al. 2007). It has also been identified as an important issue in South Africa where a model for "recognition of prior learning" (RPL) in relation to the National Professional Diploma has been developed (Moll and Welch 2004; Welch 2008). However, Moll and Welch also contend that while RPL models may help to develop the student, they can remain flawed if they do not engage the institution in the need to transform its academic programmes and curricula. In other words, the RPL model gives programmes the potential to generate teacher quality, but not if the model is used only as a mechanism to provide mass access to these programmes.

The other area of major difference in developing and developed countries is in the use of information and communication technology (ICT), e-learning and technology-enhanced learning.

What Is the Impact of Information and Communication Technologies?

The UNESCO (2002) report identifies four different functions of information and communication technologies (ICT) in ODL teacher education:

- as an aid to distribution of materials;
- as a means of affording two-way electronic communication;
- through networked computers which allow access to the Internet and multi-way communication; and
- as a means of diversifying into resource-based, self-accessed teacher education.

Nevertheless, the use of ICT also presents a number of problems that have to be addressed if ICT is to be successfully applied to training teachers. These problems, which are often significant for developing countries, include attaining appropriate technical infrastructure and funding to support ICT, gaining recognition from policy-makers and curriculum developers that ICT should be embedded in both ITE and ongoing professional development, and addressing the skills and needs of teacher educators themselves. Wright et al. (2009) argue that there must be a sound rationale for employing any form of ICT. They raise a range of issues that need to be addressed, such as the lack of infrastructure and Internet bandwidth

and the challenge of countering the cultural impact of using courseware from Western countries, managing limited educational resources and implementing mobile learning

Hoppe et al. (2003) argue that m-learning (e-learning supported by mobile devices and wireless transmission) represents a paradigm shift in the use of ICT. The authors suggest that hand-held mobile devices are emerging as a promising technological tool for learning in place of the fixed computer. Challenges in adopting and using m-learning remain, however, and what is possible in developed countries is very different compared with developing countries. Some developing countries have areas that lack access to electricity, and this to date has prevented the use of mobile technology. However, a solar-powered phone went into production in April 2009 (Anderson 2009), which raises the potential of teacher training and professional development through mobile technology worldwide.

Research by Leach et al. (2005) in Egypt and South Africa, Seppala and Alamaki (2003) in Finland, and Pouezevara and Khan (2007) in Bangladesh illustrates the benefits and difficulties of using mobile technologies in developed and developing countries. Though all reported some successes, particularly in relation to the sharing of visual images of teaching, key disadvantages also emerged. These included lack of proficiency in the use of the English language for software use (a particular problem for the Egyptian teachers who worked in Arabic), and limited technical and infrastructure support.

ICT has had a significant impact on models of learning, particularly in relation to personalisation. For example, the Open University Postgraduate Certificate in Education (PGCE) e-coaching and support model for individual primary trainees integrated the development of mathematics subject knowledge with pedagogy in order to demonstrate national teacher professional standards (Burgess and Shelton Mayes 2008). In developed countries, ODL methodology is now established within more traditional modes of ITE through widespread use of e-learning. The advantages are linked to personalisation, fast-tracking of trainees through to completion and enhanced three-way communication (among school-based mentors, ITE tutors and trainee teachers). All of this can lead to opportunities for greater integration of theory and practice, stronger coherence between placement and university-based elements, and enhanced monitoring of individual progress – in short, improved quality of learning.

The use of ODL integrated within conventional ITE programmes is also a modelling issue, linked to increasing professional requirements for teachers to use technology-enhanced learning in national curricula. This produces greater blurring between ODL and conventional teacher education, particularly in relation to the practicum. It also reinforces the conclusions of the UNESCO report (2002) that "programmes that combine conventional and distance methods are likely to be better than those that rely on a single approach" (UNESCO 2002, p. 19).

While the rationale for using ODL in ITE is comparable in developing and developed countries, the establishment of embedded ICTs in these programmes is emerging as a key difference. For example, Mashile (2008) argues that the lack of programmes using advanced technologies in South Africa is further entrenching the digital divide and "robs South Africans of participating in the knowledge

society" (p. 356). Differences are seen between the low level models that rely on transmission of knowledge through packaged material and high level models that use a range of strategies, such as distributed problem-based learning (Barrows 2002) and communities of learning and community-centred projects (Van Niekerk 2004).

Thus, this so-called digital divide must be acknowledged by ODL programme designers if they are to create viable pedagogies that take into account ICTs but are not driven by them.

What Are the Key Challenges for ODL in ITE?

The primary task of ODL in ITE is to train well-qualified and highly skilled teachers.

The UNESCO report (2002) asks the important question: Does ODL work for teachers? It considers the evidence in relation to student numbers, examination results or learning gains, and performance in the classroom. Enrolment was judged to be successful but completion rates were variable, with the highest completion rates linked to programmes where there was a clear reward for the individual at the end of the programme in terms of status or pay. In terms of examination outcomes, ODL programmes were judged to be "reasonable" with pass rates ranging from 50 to 90% across a range of case studies. Projects in Indonesia and Sri Lanka (Nielson and Tatto 1993, reported in UNESCO 2002) have shown a correlation between teacher learner gains and examination results, suggesting that ODL can deliver secure teacher learner gains. The evidence on trainee teacher performance was judged to be "reassuring" based on large-scale projects in Tanzania and Zimbabwe (Chale 1993; Chivore 1993; Mählck and Temu 1989, reported in UNESCO 2002). More recently, the United Kingdom's Open University PGCE programme achieved the highest grades for Training and Quality Assurance and Management in the national inspection process, which includes teacher performance outcomes as one of the inspection measures (Ofsted 2008).

Tutor Effectiveness

Much of the evidence presented so far in this chapter indicates that achieving high quality outcomes is likely to be difficult in those models of training where the importance of low cost drives a mass market rather than an individualised approach to ITE. The issue of high quality for all ITE programmes, whether ODL or conventional, is ultimately about the effectiveness of the teacher in the classroom. Success requires close contact between trainees and tutors (or school mentors) in order to provide focused observation and coaching to improve teaching. This shifts the ODL model toward face-to-face school-based support models or to enhanced ICT models of support with consequences for cost.

A critical point identified by Wright et al. (2009) is for a country to determine what its rationale is for developing ITE and what its future vision is: both need to match the funds available and the sustainability of the programme. The authors argue that in all contexts it is the effectiveness of the tutors that matters and not whether they meet trainees face-to-face or through videoconferencing or develop online materials. Tutors are the key ingredient for any successful educational system.

Technology Effectiveness

Technology is only one component within ODL, but it is also an aspect of curriculum learning that both trainees and trainers need to address. The challenge presented where programmes and training already exist is one of integration of ICT into training in order to improve teachers' qualifications and performance. An example of this is provided by the case of Jiangsu Radio and Television University (JRTVU) in China (Zhang and Hung 2007) where the importance of ensuring that the professional development needs of the trainer/tutor are met emerged as a key issue. This same issue was noted by Pouezevara and Khan (2007) in Bangladesh and Gillies (2008) in Scotland. All of these studies indicated that students do not use ICT unless it is integrated into assessed activities and that trainers may find the new technologies not only difficult but sometimes at odds with their own personal styles of teaching, compromising the trainers' previous effectiveness.

Effective trainee support in classroom-based activities is a particular concern where trainees have little experience of ODL learning and effective communication from tutors is essential whether it is in written form or through electronic communication. Integration in terms of training for all partners is important for successful outcomes.

Embedded within all teacher training programmes, but particularly within ODL programmes, is the approach taken to help trainee teachers develop their pedagogic knowledge and then put this into practice in school-based settings. What remains a major challenge, however, is the way in which ODL ITE programmes can use the potential of teaching and learning in school-based situations alongside the assimilation of ideas presented in programme materials to develop trainees' professional thinking, skills and practice. Indeed, the development of school-focused activities for ODL programmes that integrate university and school-based activity are seen as central to improving teacher quality (Moon and Shelton Mayes 1995; Moon et al. 2007). The importance of training also applies to school-based mentors. School-based activities are both a potential strength and a weakness in ODL ITE, as assessing how far teachers are applying what they have learned in the practical context is one of the most difficult problems for trainers to assess at a distance. It is therefore essential that any ODL programme has at its heart a model for training the trainers and school-based mentors as well as the teacher trainees.

Learning Opportunity Effectiveness

Understanding how learning opportunities are presented to trainees, particularly in ODL programmes, is also a challenge. The development of a trainee's learning and practice is highly influenced by the school-based context. Welch (2008) suggests that a particular challenge for ODL is designing courses that will nurture dialogue and integrate learner support. Hutchinson (2009) believes that opportunities for expansive and systematic learning are restricted when activities are discussed only in the school context between school-based mentors and trainees. He argues for a "learning partnership" that involves tutors and school-based mentors trained to focus on discussing learning.

Is ODL the Solution to the Education for All Commitment?

The scale of the demand for teacher expansion to deliver universal primary education by 2015 (United Nations 2000; World Forum on Education 2000) is unprecedented, particularly in the developing countries of South Asia and Sub-Saharan Africa. This demand has been exacerbated by the HIV/AIDS crisis in Sub-Saharan Africa and its impact on existing teacher numbers. The demand for teachers has led to many high-volume projects using ODL. For example, the teacher education programmes of the Open University of Sudan are targeted at upgrading the qualifications of more than 100,000 primary school teachers (Moon et al. 2007). Nevertheless, there is confidence that the Millennium Development Goal is likely to be met, with all but two of the 10 regions identified having achieved at least 90% enrolment by 2006 (United Nations 2008). The UN's *Millennium Development Goals Report 2008* shows that the number of children of primary school age who were out of school fell from 103 million in 1999 to 73 million in 2006, despite an overall increase in the number of children in this age group.

This success masks continuing inequalities for the most vulnerable groups. Sub-Saharan Africa, for example, has reached 71% enrolment from a millennium baseline of 58%, but surveys identify that it is the poor, the rural and girls who remain marginalised. It is estimated that more than 56 million primary age children are still out of school in Sub-Saharan Africa and South Asia (United Nations 2008). The other marginalised group of children identified in the *Millennium Goals Development Report 2008* is those affected by conflict and political unrest worldwide, who are commonly denied access to education. Data for 114 refugee camps in 27 countries show that at least one in five refugee children are not involved in formal education. Equality remains a key issue, particularly where gender and nomadic peoples are concerned. Kwapong (2007) identifies an imbalance in the gender ratio of teachers in Ghana and under-enrolment in female institutions. The issue of access to and participation in secondary schooling has also yet to be addressed. For example, only one-third of eligible children attend secondary school in Oceania and only one-quarter in Sub-Saharan Africa (United Nations 2008).

The major rise in the number of ODL programmes in the 21st century can therefore be viewed as a response to the success of ODL approaches in relation to teacher supply. However, it is important to remember that the Education for All commitment is to *quality* and a *completed* educational experience. Research has consistently shown that fully prepared and certified teachers are more successful and better rated than untrained teachers (Darling-Hammond 2000). Achieving universal primary education inevitably involves using unqualified teachers. Therefore, the transformation to a universal quality education will require a major expansion of *in-service* ITE to address the teacher quality dimension.

The evidence is strong that ODL approaches are making a major contribution to the Education for All commitment in terms of teacher numbers to ensure an entitlement to education. What remains to be seen is whether the next stage to a high quality universal education will be achieved.

The cases drawn upon in this chapter indicate that ODL ITE requires a mixed mode of training if it is to be successful in terms of raising teacher quality. Although

ICTs have real potential to enhance quality when embedded into the programme, this brings added costs and challenges. The school-based focus on practice within settings remains a key strength of using ODL for ITE. However, its full power as a tool for teaching and learning is not yet fully realised. Underpinning all these elements is the importance of effective training for tutors and school-based mentors as well as trainees. Nevertheless, the evidence leads to optimism about the positive contribution that ODL can make to initial teacher education.

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CHAPTER

5

A Capability Approach to Open and Distance Learning for In-Service Teacher Education

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Abstract

Throughout the world, open and distance learning (ODL) has been used for in-service teacher education (INSET) over many years, in different education systems and in diverse social and cultural contexts. While ODL provides wider access to INSET, it is not without its challenges in terms of its effectiveness of impact and efficiency in delivery. In this chapter, Amartya Sen's (1999) concept of capabilities generates both a theoretical framework and an interpretive lens through which to explore the complexities of ODL design and delivery for INSET. Methodologically, the chapter uses a case study approach with evidence sourced from research literature, policy and programme-specific documents of the developed and developing world to identify emerging trends in the use of ODL for INSET. The proposition that a capability approach has much to offer both the design and delivery of ODL for INSET is examined through analysis of a programme for generalist primary, special education and discipline-specific teachers who are transitioning into the teaching of industrial technology and design in secondary schooling in regional, rural and remote communities of Queensland, Australia. Findings are speculative and aimed to provoke ongoing consideration of the capability approach as a potentially powerful paradigm for interrogating ODL for INSET.

Introduction

Open and distance learning (ODL) contributes substantively to the provision of in-service teacher education (INSET) that is responsive to social, cultural and economic forces affecting employment, community development and citizenship. Global economic discourses, changing socio-political milieus and emerging technologies and their innovative uses continue to influence ODL

(Spronk 2008). Debates about the impact of national curriculum and redrafted educational goals for all (OECD 2005; MCEETYA 2008; UNESCO 2009) reflect concern that education for the common good, the common wealth, may be diminished as competitive individualism is championed (McMaugh et al. 2009). The contentiousness of ODL as a Westernised developed world concept remains significant as its technologies and pedagogies are deployed among diverse social, cultural, political and economic frameworks of the developing world (Runfang 2008).

In response to the challenges posed by what appears to be a now unattainable goal of Education for All by 2015, this chapter proposes both conceptual and contextual engagement with the "wider disparities in the distribution of power, wealth and opportunity" that reflect policy-driven "unfair distribution of life chances" (UNESCO 2009, p. 6). Amartya Sen's (1992, 1999, 2006) premise that we are "diversely different" (2006, p. xiv) advances the argument that "the role of reasoning and choice in the determination of priorities need not take that either-or form" (2006, p. 182). Precisely because we are diverse in our differences, developing accessible, equitable and efficient INSET does not mean that choices are confined by constructions of either face-to-face or distance learning options, or that meeting the needs of education systems must be at the expense of individual teachers. A capability approach provokes an examination of ways to achieve teachers' freedom to achieve diversely different work/lifestyles and make different choices throughout their professional lives (Sen 1999).

This argument extends Craig and Perraton's (2003) earlier work in the field to a proposed new theoretical resource in the field of ODL for INSET. First, the ways in which ODL for INSET is used in the developed and the developing world are examined through analysis of the emerging trends of ODL for INSET among diverse, nationally framed contexts. A critical viewpoint is developed in the second section through conceptualising a capability approach (Sen 1992, 1999, 2006) to ODL for INSET. The chapter then engages with issues of ODL for INSET beyond that of the primary school. It moves into the technical and vocational education (TVE) of teachers in secondary schools as a problematical case for the provision of ODL. In what ways can ODL facilitate innovative and potentially transformative in-service professional development for TVE teachers in secondary schools? This contextual question is significant because the latest report monitoring progress toward the Dakar Framework of Action and the Millennium Development Goals finds that while enrolment in secondary education is rising, inter- and intra-regional enrolment ratios and attainment rates vary markedly. Furthermore, the curriculum in "post-primary education is often too academic and removed from social and economic realities" (UNESCO 2009, p. 84). The chapter concludes with a synthesis of achievements and challenges highlighted.

Open and Distance Learning for In-Service Teacher Education (ODL for INSET)

In the developing world, national governments actively drive in-service education for teachers through ODL courses and programmes because it is perceived to be a cost-effective solution to address problems of up-skilling scarce

teacher resources – especially in regional, rural and remote communities. In the developed world, similar reasoning underpins decisions around the use of a range of ODL options for INSET. In both contexts, ODL enables large numbers of teachers to participate in specifically targeted in-service professional education within relatively short periods of time (Sikwibele and Mungoo 2009).

Present and emerging trends of ODL suggest that the many social networking tools (such as Facebook, blogs, wikis and Second Life virtual realities), e-mail, web-conferencing and mobile phone technologies are complementary to earlier modes of instructional delivery such as CDs and print media (Sikwibele and Mungoo 2009). Fundamentally though, ODL for INSET continues to be challenged by the need for education workplaces (such as schools, colleges and universities) to support ongoing teacher learning via the timely management of appropriate information and communication technologies (ICTs) that are modelled *in situ* by qualified staff such that participatory and collaborative approaches to INSET overcome the problems of: access to the technologies; time constraints on their use together; and socio-cultural structures and processes of the dominant teaching-learning models that are not always reflective of policy intentions (Boitshwarelo 2009). This means that previous curriculum design and teaching strategies using ODL for INSET may be challenged by the potential for the enhanced personalisation of lifelong learning, as well as for collaborative learning that provides opportunities for teachers to transform their perspectives of themselves as learners through recognising and respecting one another's differences.

INSET is often used synonymously with the notion of professional development. Craig and Perraton (2003) differentiated between two types of professional development:

1. Structured – formal enrolment in a course with expected progression to an outcome that (a) may or may not award a formal qualification, (b) may be both supply- and demand-driven, and (c) may use a variety of different technologies.
2. Unstructured – in this type, (a) there is no formal course to be followed, (b) resources are made available via diverse technologies, and (c) demand is driven by teachers choosing from resources to suit individual professional learning needs.

Supply-driven professional development is constructed as employer-mandated participation in learning that is intended to meet the system's strategic goals. Diverse combinations of both structured and unstructured approaches provide learning opportunities for individual teachers, collegial communities and employer groups. Significantly, "effective open and distance learning often demands cooperation between a number of different institutional actors and stakeholders" (Craig and Perraton 2003, p. 99).

For ODL programme design and delivery, effective co-operation among partners requires negotiated decision-making in relation to:

- purpose of programme, its consequent participation and delivery modes;
- organisation and infrastructure needed to make it work (e.g., location of learning sites, communications, transport, consumables and library resources);

- funding arrangements (e.g., sources of funding, numbers of students, effort and time to be expended, human and physical resourcing costs);
- technology choices (i.e., availability, sustainability, acceptability and cost);
- curriculum and pedagogical choices related to content, learning and teaching methods, assessment activities and criteria;
- in-built evaluation framework for ongoing individual and collective decision-making; and
- management of strategic partnerships among all stakeholders.

(Adapted from Craig and Perraton 2003; OECD 2005)

Of the formal types of professional development, there are notionally four categories of ODL for INSET available:

1. certification programmes for unqualified teachers that lead to registration with a professional authorising body;
2. programmes that upgrade teachers' qualifications (e.g., from a Certificate to Diploma or Diploma to Bachelor degree or specialised postgraduate level qualifications);
3. programmes that prepare teachers for promotion to new roles such as principal, head of department, regional director or policy-maker; and
4. curriculum-specific programmes addressing systems' mandated curriculum changes or targets to be met (e.g., Universal Primary Education [UPE]; literacy and numeracy results) or shortfalls in curriculum specialists.

Bayrakci's (2009) distinction between "*teacher training* and *teacher development*" (p. 10, italics in original) is instructive. It reminds programme planners to include training aimed at building specific technical skill sets, and thus confidence to teach in a particular vocationally oriented subject, as well as at encouraging teachers for futures-oriented professional growth as educators. In a comparative analysis of INSET in Japan and Turkey, Bayrakci (2009) concluded that providing professional staff who could respond systematically to, and collegially with, teachers as their peers to co-design specific professional learning opportunities is essential in all countries. Accordingly, so long as INSET is used to deliver national and regional education policies within a conceptual framework determined solely by economic imperatives, its effectiveness for long-term benefit to teachers, their students and their communities will be diminished unless that conceptual framework facilitates practices that *include*:

- both on- and off-site school dimensions;
- active engagement of teachers in design and delivery;
- teacher peers as facilitators, team leaders or direct trainers;
- collaborative, interactive learning techniques;
- outcomes-oriented project work to motivate both field and desk research; and
- development and adaptation of assessment and teaching materials for local learners and conditions.

(Adapted from OECD 2005)

ODL for INSET becomes even more problematic at the secondary school level because "there is little likelihood that governments facing the challenges of meeting the UPE target will be able to meet a further challenge of providing vastly increased access to opportunities for secondary education" (Rumble and Koul 2007, p. 1). One means of furthering access has been the use of mobile telephones and digitised global networks. These have found particular favour in Asia and Africa where they are "more affordable" and learners are familiar with them. Says Motlik (2008, p. 1) of such access: "[W]ith proper instructional design it promises educational opportunities with an increased flexibility for learners."

Traxler and Dearden (2005) examined the potential for using "mobile learning" (or m-learning) as part of INSET in Sub-Saharan Africa. They identified four key areas for future work into the use of mobile technologies integrated into ODL:

- *Inclusion* – enhanced inclusivity for teachers in rural and remote areas, across diverse cultures, gendered and tribal differences;
- *New paradigm for development* – disruption to power of centralised static and expensive technologies and infrastructures;
- *Pedagogy* – blended and multi-modal learning and teaching strategies that using m-learning will continue to influence; and
- *Evaluation* – ongoing development of efficient, appropriate, authentic and effective evaluation frameworks.

Unfortunately, there is a dearth of large scale, empirical studies into the efficacy of mobile cellphone technologies for INSET even though communities in both the developed and the developing world are embracing wireless, mobile electronic technologies (Zawacki-Richter et al. 2009).

Over the last decade, curriculum design and delivery of INSET using 21st century communication technologies continue to be problematic. Contrarily, in the transfer of Internet-mediated ODL from developed to developing countries and among those countries themselves, "the multifaceted, globalised tapestry of educational choices and consequences can rapidly unravel" if not accompanied by an educational paradigm shift (Carter 2009, pp. 2–3). Such a shift would accommodate social, economic, cultural and political differences among diverse communities of learners while at the same time recognising our common humanity.

A Capability Approach to ODL for INSET

Economist and philosopher Amartya Sen's concerns with inequality (1992), freedom (1999) and identity (2006) provide fresh insights into conceptualising relations between INSET's policy-driven system-level reform on the one hand and socio-economic processes implicated in individuals' utilisation of ODL to further their professional development on the other. His work is especially relevant in this context, given that "education is one of the critical dimensions through which public policies for economic growth and human development can be assessed and analysed" (Lanzi 2007, p. 424).

Sen's capability approach provides fresh perspectives to debates about equality in education, educational choice and education reform (Reid 2005; Flores-Crespo 2007). In moving beyond a consideration of inputs and outputs that positions

education as a commodity and educated people as resources, Sen (1999) argues for an understanding of human capabilities that takes into account their direct relevance to the well-being and freedom of people, and their indirect role in influencing social change and economic production.

A capability approach focuses on people's well-being, taking people to be "reasoning agents with the right to make choices" (Gasper 2007, p. 337). In this reasoning, economic and social policies should focus on what people are able to do and be in life, and those policies should be judged according to the individual advantages they make possible (Sen 1999). In the case of INSET, this means realising the potential that ODL may provide for removing obstacles in teachers' lives so that they can engage in professional development that is meaningful and valuable to them.

A capability approach is variously defined as "a broad normative framework for the evaluation and assessment of individual well-being and social arrangements, the design of policies and proposals about social change in society" (Robeyns 2005, p. 94). As such, a capability approach provides a theoretical tool for conceptualising and evaluating phenomena such as poverty, inequality and/or well-being (Robeyns 2005). Thus, in its focus on valued actions and ways of being in the world, a capability approach incorporates both what individuals actually manage to achieve *and* the conditions of choice in which they make their decisions (Gasper 2007).

When considering in-service teachers' opportunities for gaining an additional income, establishing and maintaining social relations with professional peer groups, and having the ability to exercise freedom of choice regarding future work/life options, a capability approach challenges the notion that "opportunities of choice" can be constructed "only as means to acquiring preferred bundles of commodities" (Sen 1992, p. 35). Because of pre-existing conditions over which they may have little control, some teachers may lack the capacity (economic and/or social) to gain access to appropriate professional development opportunities. In these instances, their professional and personal well-being is "influenced by not only economic inputs (money and things directly obtainable with money), but also 'non-economic' factors such as family relations, friendships, beliefs, purposeful activity, exercise and health and so on" (Gasper 2007, p. 338).

Accordingly, for individual teachers, using ODL for in-service professional development depends not only on economic factors, but also on social relations and freedom of choice that enables people to exercise their capabilities for knowledge and skill generation and regeneration. For policy-makers and those charged with its implementation, considering in-service initiatives from a capability perspective would obviate short-term, potentially ill-considered reactions to longer term, systemic problems.

Nonetheless, Sen's (1999) capability approach can be problematic when used in the field of education (Flores-Crespo 2007; Gasper 2007). Its practical possibilities require further exploration. Sen (1999) leaves such operational considerations to others, arguing that capability is the freedom people have to achieve different lifestyles and make different choices throughout their lives. Whether it is necessary to name and operationalise capabilities or not is a contested issue.

Nussbaum (2003) views it as fundamental to protecting a pluralism of rights, freedoms and responsibilities. However, Robeyns (2003) is content with the "under-specified nature of the capability approach, because it is a framework of thought, a normative tool" (p. 64). For Qizilbash (2007), naming specific capabilities would facilitate the use of this approach in education, creating new possibilities for responding to the narrow constructions of human capital and singular claims about economics that drive education. Alkire (2005), however, is confident that "operational specifications are both possible and vital to the further development of the approach" (p. 115).

It is timely to examine the potential freedom that teachers have for forming and reforming their capabilities – that is, their valued ways of *doing* professional development and of *being* 21st century learners and knowledge workers. The freedom that teachers have to convert their aspirations into valued achievements is central to Sen's (1999) capability approach, which does not value education just because it is instrumental for achieving some socio-economic good but also because normatively it is important for humans to flourish. Such reasoning demands a richer means of evaluation and accountability for INSET via ODL than human capital theory does (Saito 2003). With its emphasis on the development of teachers' reasoned choices and a return to the centrality of people, a capability approach recognises "plural identities" (Sen 2006, p. 17).

For teachers currently working in education systems, their sense of identity is already characterised according to level (e.g., early childhood, primary, lower or upper secondary, tertiary); location (e.g., urban, rural, remote); subject or discipline expertise (e.g., Special Education, History, Mathematics, Science, Music, Mechanical, Construction); and employer (e.g., grammar, public, denominational, private, community). In both their professional and their personal lives, these people have diversity in the different categories to which they belong, reflecting their cultural histories, backgrounds and affiliations.

In his thinking on *Identity and Violence*, Sen (2006, p. 19) identifies two distinct issues of importance in this regard: (1) identities are "robustly plural" and can accommodate simultaneous importance; and (2) people make choices, either explicitly or implicitly, "about what relative importance to attach, in a particular context to the divergent loyalties and priorities that may compete for precedence." Sen is concerned that silences and implicit assumptions in the texts of both social and economic analyses regarding these issues lead to "two different types of reductionism" (Sen 2006, p. 20). First, identity is disregarded as an influence on people's values, beliefs and behaviours. Second, in contrast, a singular affiliation with one identity reduces the plurality of group memberships and multiple loyalties such that people are situated in only one collective identity. Consequently, flawed socio-economic analyses and decisions flow from this reductionism of identity (Sen 2006).

In the field of concern in this chapter – ODL for INSET – such a reconceptualisation of programme design and delivery would have much to offer countries seeking to attain Education for All goals through enhanced quality teacher supply. Despite advances in the spread of mobile and electronic learning and the growth of open courseware and open education resources (OERs), ICTs remain but one part of the equation. It is with and through teachers that progress will be made at community and country levels.

The Role of ODL for Teachers in Transition

Of the four types of INSET already identified, a combination of two is now chosen for closer study because it illustrates both conceptually and contextually some very real challenges that are faced in both developed and developing countries. A case of teachers in transition in Australia extends understandings of the use of INSET to provide a postgraduate level qualification and to prepare teachers for new roles – not just as principals or heads of departments, but also as different types of teachers. During 2007 and 2008, a cohort of teachers in Queensland accepted employer-funded scholarships to undertake a university Graduate Diploma programme that would accredit them to teach junior and senior secondary TVE subjects. The employer's workforce planning team had identified a major shortage of TVE teachers throughout the state. Of the 17 teachers who began the programme, 15 continued on toward completion at the end of 2009.

While the full findings of this case are yet to be analysed, at this stage of implementation some challenges and opportunities are emerging. These teachers are transitioning from being generalist primary teachers to special education and secondary English, History, Geography, Science and Mathematics teachers. For some, teaching TVE will give them a third or fourth secondary teaching area; for others, it is their first foray into secondary school teaching. Teaching experience varies from 5 to 30 years. Ages range from mid-20s to late 40s. Gender balance shows 4 women to 11 men. Geographically, they are teaching in small remote schools, medium-sized rural schools and large urban centres. Culturally and linguistically, schools range from Indigenous communities to mining towns, agricultural districts and regional centres with mixed industries. Participation is voluntary, with the employer funding all programme-related costs. Table 5.1 illustrates some initial strengths and weaknesses distilled from a preliminary content analysis of programme documents, including course websites, enrolment data (including that for retention and progression), assessment tasks and assignments, timetables and publicly available school details.

Implications for ODL

- *Mentoring*

  The literature is replete with examples of good practices for beginning primary and secondary teachers (Jonson 2008), but there is little research into mentoring for INSET via ODL (Lai 2006). There is no evidence to date of systematic, sustainable mentoring programmes for teachers transitioning from one level or type of teaching to another. For teachers in smaller rural or remote schools, access to mentoring from an experienced, empathic head of department is essential. A mentor training programme could also be beneficial for the teachers delivering the six residential workshop sessions to their INSET and PRESET colleagues. These teachers were provided with rudimentary on-the-job experiences of adults as learners and university procedures. However, they had not participated in an INSET programme for teaching teachers their professional knowledge and skill sets in

Table 5.1: Strengths and weaknesses of an ODL model for INSET.

Delivery model	Strengths (S) and weaknesses (W)
Multi-model ODL: 1. on-the-job (i.e., at school); 2. off-the-job (i.e., residential workshops); 3. university external (own study and research via e-learning) work-integrated learning	**S**: direct, immediate relevance to new teaching area; interdisciplinary teams of practitioners, university lecturers and employer representatives **W**: in small schools, teacher is only TVE teacher with full teaching load; intensive programme management
On-site mentors in larger schools and "roving" mentors to cover schools in particular district or region. Mentors to be at head of department (HOD) level with experience in this teaching area	**S**: HODs in larger schools can make time to mentor; incidental mentoring from other staff **W**: funding for roving mentors not always forthcoming at local level; mentor training not provided beforehand
Residential workshops (off-the-job; six workshops, each of five days' duration) provide hand skills, safety knowledge, technical expertise with plant and equipment; undertaken with pre-service teachers (PRESET); taught and assessed by practising secondary school teachers in actual school workshops	**S**: immediate membership of discipline-specific community; location in different types of schools provides knowledge of diverse workshop layouts, resources and teaching practices; mix of experienced and new teachers **W**: workshops timetabled for school holidays; effects on family time; employer costs higher to cover travel and accommodation
Project-based curriculum around three study areas: Junior (Years 8–10) Senior (Years 11–12) Self-study in area of interest	**S**: content immediately relevant to syllabus and studies authority requirements; assessment practical and directly applicable to teaching; opportunity to develop knowledge in areas of interest **W**: so much to learn and so little time to spend doing it when carrying a teaching load as well
Assessment tasks directly related to teaching and learning issues in this subject area	**S**: development of unit plans, assessment criteria for teaching subjects; self-study in areas of own interest **W**: still have to meet university grading requirements
Time frame for completion over two years, with assignment submission dates negotiable	**S**: qualified for teaching all junior and some senior subjects; experience with different workshops, school procedures; opportunity to establish professional relationships **W**: too long when having duties as staff member (e.g., sporting teams); personal life affected; some community commitments affected; too costly for employer; university procedures and timelines different.

particular subjects. Future development of this specialised INSET area using ODL could perhaps emerge from work already underway for tutors of learning centres in open schools, especially vocational education through ODL (e.g., Rumble and Koul 2007; Mitra 2008).

- *Relationships and resilience*

  When teachers are employed in large bureaucracies, ongoing effective communication between local schools and regional and central offices is always going to be an issue. In addition, if the employer is funding either fully or partially the programme costs for staff participation in INSET, then cost-benefit analysis in both economic and social terms should inform evaluation outcomes. Relationships among all stakeholders require ongoing maintenance for programme stability and sustainability throughout the funding period. Here the responsiveness of employers and university staff is integral to teachers' resilience in managing the complexities of their plural identities among the multiple groups in their personal and professional lives.

Contribution of a Capability Approach to ODL for INSET

A capability approach could identify inequities in resources across the cohort's teaching sites – inequities in both infrastructure and staffing mix, inclusive of university resources and residential schools' workshops. Parallel to this process could be a profiling of individual participants' previous work histories to: (1) elicit what they are able to do and wish to be in their professional lives; and (2) identify, and then ameliorate, the potential obstacles that would prevent them engaging in learning options that are meaningful and valuable to them. A capability approach would consider in-service teachers' opportunities for gaining an additional income or promotion or transfer, establishing and maintaining social relations with new professional peer groups, and having the ability to exercise freedom of choice regarding future work/life options.

If a capability approach was to be operationalised in contexts such as this, then another conceptual issue remains to be considered: the relationship between notions of "functionings" and capabilities. This relationship is fundamental to the notion of capability. Conceptually, functionings are "the various things a person may value doing or being" while "a person's capability refers to the alternative combinations of functionings that are feasible for her to achieve" (Sen 1999, p. 75). Now, while functionings include the basics of life such as being nourished, healthy and literate, they also include more complex aspects of human well-being and fulfilment such as being respected, being able to work and being part of a community (Robeyns 2005). Sen (1999) reasons that "capability is thus a kind of freedom: the substantive freedom to achieve alternative functioning combinations" (p. 75).

If various combinations of functionings are used to develop the capability to achieve valued ways of being in the world (e.g., as a TVE teacher in a secondary school), then the educational focus would initially be on functionings. For, without functionings – that is, both the basic and the more complex aspects of human well-being – these teachers would not be physically, socially, emotionally

or intellectually able to learn. Nor would they have the resilience to make decisions about their learning journeys now and in the future.

Conclusion

ODL models for INSET emerged in an era in which university–accredited professional development programmes were in their infancy. Moreover, ODL for INSET at that time in the mid- to late 20th century did not have access to individualised Internet-mediated social networking technologies accessed via computers and mobile telephones. Twenty-first century ODL presents both challenges and opportunities for INSET, several of which have been identified in this chapter. However, there remains a need for experimentation with ODL practices that provide for teachers' learning to develop their capabilities to consolidate current knowledge and develop new discipline-specific and trans-disciplinary curriculum knowledge and pedagogical strategies. Technologies will continue to evolve.

Increasing access to those best suited to achieving improved learning outcomes for teachers is but one part of the challenge. Consistent, timely research is required to provide empirical data on the ways in which the developing world may "leapfrog" or transcend current practices of ODL that are at risk of technological seduction by the developed world's infrastructures and delivery models.

Throughout all cultures, ODL for INSET is on the threshold of addressing such challenges to engage innovative ways of knowledge-production so as to recognise a cosmopolitan world that "tempers a respect for difference with a respect for actual human beings" (Appiah 2006, p. 113). Sen's (1999) thinking adds weight to conceptual and practical considerations of the use of ODL to enhance teachers' capabilities. In terms of policy development, a capability approach would be "not only job-oriented, but also life-oriented" (Lanzi 2007, p. 424). All teachers have the potential to develop capabilities and they have the right to in-service education that fosters positively their abilities to do so. Effective ODL requires communication and co-operation among all participants with a stake in equitable outcomes for teachers and, by implication, their students.

In proposing a conceptual framework for generating in-service teachers' capabilities, the value of Sen's (1999) capability approach has been explored, followed by an account of its complexities when used in ODL. There is still conceptual and contextual work to be done. Individually, committed teachers can use ODL to seek out opportunities for professional development as they respond to the changing needs of their students, economic and socio-cultural changes in their local communities, knowledge developments in their respective teaching areas, and the ways in which they are continually challenged to stay up-to-date with pedagogical skills and technological developments. Collectively, they continue to participate in employer-mandated INSET as a consequence of government policy initiatives or organisational restructuring. However, as Aderinoye et al. (2009, p. 2) put it:

> "[P]rogress is being made and will continue to be made as long as leaders and educators can envision a better future for their people, educational resources are provided from limited national and international development budgets, and educators are willing to break

away from ineffective instructional methods and embrace methods and technology that can address the real needs and aspirations of their learners."

The capability approach is a potentially powerful paradigm for breaking new ground in the field of ODL for INSET. It provides an alternative theoretical framework for thinking about and engaging with the contribution that ODL can make to INSET throughout the world.

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CHAPTER

6

Learning and Teaching Strategies and Practices in Teacher Education through Open and Distance Learning

Glen Postle and Mark A. Tyler

One of the most powerful motivations for change is looking in the mirror.

– Lee S. Shulman

Abstract

Early online approaches to teaching and learning were limited by the level and quality of interaction available between teacher and student and between student and student. Fourth-generation technologies (e-learning or Internet-based learning) have made it possible for learners at a distance to communicate and interact effectively with their teachers and other students. Initial adoption of e-learning in higher education has not resulted in significant intrusions into the field of teacher education. Location-based approaches are still preferred over online approaches even though there continues to be emerging and compelling evidence that online approaches might offer a capacity to manage quality at scale, share resources across networks and, importantly, provide greater flexibility of provision in time and place. Recent work in the area of e-learning has begun to challenge the dominance of classroom-based models as the benchmark for judging the adequacy of online approaches to deliver quality teaching and learning. The work of several researchers has provided much needed evidence to suggest that online approaches can provide alternative educational experiences that challenge the legitimacy of location-based models to represent the best way to deliver quality education.

This chapter first provides a brief historical perspective of the development of technologies in educational settings to demonstrate that the emergence of fourth-generation technologies marked a watershed for an increasing acceptance of delivering quality education at a distance. Second, the authors argue that for e-learning to realise the potential that online interactivity provides, it must promote transformation in learning and teaching. Finally, the authors offer a learning framework for the deployment of e-learning within teacher education settings. They also contend that the framework presented is robust and captures the essence of post-industrial thinking about education in a knowledge economy.

Background

Many tertiary education and training organisations in Australia and overseas tended to see "flexible delivery" as a panacea for the issues facing higher education in the late 1990s. Interpretations of flexible delivery were mixed and varied with proponents referring to it as distance education, open learning, resource-based learning, "technology-enhanced" learning and, more recently, "networked learning" (Steeples and Jones 2002). There are many explanations given for its recent rise to prominence in higher education. Some say it was a response to mass education and the need to cater for more diverse student groups, particularly those who, because of situation and circumstance, are labelled as isolated. Others argue it was a response to industry needs for on-the-job training, while still others championed its value in promoting lifelong learning.

In a sense, all of these issues have had some influence on the emergence of flexible delivery initiatives at all levels of education, particularly in tertiary contexts such as universities, technical and further education institutions, and industry training.

There is little doubt that few if any universities in Australia have escaped the influences and pressures on higher education unleashed in the Dawkins era[1] and pursued by successive federal governments. Influences of particular relevance for this chapter, which are largely responsible for significant change in the culture of higher education, are:

- the growing legitimacy of flexible pathways for university entry;
- the expansion of teaching strategies available, particularly through flexible delivery initiatives; and
- the shrinking financial support from government and increasing trends toward "user pays."

Flexible Pathways

In just over two decades, beginning in the Labor Government's Whitlam era in Australia, there was a substantial increase in the number of students accessing university education and a substantial change in the student profile of those entering universities. Supported by such changes as those contained in *A Fair Chance for All* (DEET 1990), a government initiative to increase access, participation, retention and success in university programmes for a number of targeted disadvantaged groups, universities opened their doors to a more diverse student group. Such widening of access resulted in universities themselves legitimating flexible pathways for university entry. The emergence of student diversity placed increasing demands on the university sector to find ways to address the equity issues that arose from having to meet the educational needs of a more diverse student body. In many universities, particularly the "new ones," this focus positioned equity as a central and strategic concern for teaching and learning within the institutions. Such strategic concerns in some institutions have resulted in the adoption of teaching–learning models such as those based on distance education.

[1] A reference to John Dawkins, the Australian politician who brought about reforms in tertiary education in the early 1990s.

Expansion of Teaching Strategies

Taylor (1996) provides a useful framework for understanding the rationale behind the expansion of teaching strategies available through distance education initiatives, particularly those involving technology.

The evolution of these new media is shown in Table 6.1. The table traces the changes to distance education though four generations, identifying the different technologies and the characteristics central to their interactivity with students.

Table 6.1: Models of distance education: a conceptual framework (Taylor 2001, p. 3).

Models of distance education and associated delivery technologies	Characteristics of delivery technologies					
	Flexibility			Highly refined materials	Advanced interactive delivery	Institutional variable costs approaching zero
	Time	Place	Pace			
First generation: The Correspondence Model						
Print	Yes	Yes	Yes	Yes	No	No
Second generation: The Multimedia Model						
Print	Yes	Yes	Yes	Yes	No	No
Audiotape	Yes	Yes	Yes	Yes	No	No
Videotape	Yes	Yes	Yes	Yes	No	No
Computer-based learning (e.g., CML/CAL/IMM)	Yes	Yes	Yes	Yes	Yes	No
Interactive video (disk and tape)	Yes	Yes	Yes	Yes	Yes	No
Third generation: The Telelearning Model						
Audioteleconferencing	No	No	No	No	Yes	No
Videoconferencing	No	No	No	No	Yes	No
Audiographic communication	No	No	No	Yes	Yes	No
Broadcast TV/Radio and audioteleconferencing	No	No	No	Yes	Yes	No
Fourth generation: The Flexible Learning Model						
Interactive multimedia online	Yes	Yes	Yes	Yes	Yes	Yes
Internet-based access to Wold Wide Web resources	Yes	Yes	Yes	Yes	Yes	Yes
Computer-mediated communication	Yes	Yes	Yes	Yes	Yes	No

Taylor's (1992) flexible technologies, allow the student to turn the teacher on or off at will as lifestyle permits. Such flexibility has a major pedagogical benefit: it allows students flexibility in terms of place, time and pace. Thus, varying rates of individual progression can be accommodated, unlike typical conventional educational practices where the whole class tends to progress at the same pace in synchronisation with the delivery of information through mass lectures and tutorials.

The learner is provided with opportunities to interact with the course content (readings and other resources), the teacher, other learners and external experts. Learners have, therefore, access to a rich socio-cultural context. The initial learning management systems such as Blackboard and WebCt (and more recently open source systems) provide an environment that on the surface at least promotes a broad concept of interaction – learner–teacher, learner–learner and learner–content. The environment has the capacity to cater for a diverse range of learner requests and learner initiatives.

Shrinking Financial Support

In Australia during the late 1980s and early 1990s, higher education came under increasing pressure to contribute more explicitly to the economic development of the nation (Jakupec 1996). The Hawke Labor Government's embracing of the competitive market discourse sought changes to the way higher education did business. Efficiency and economic rationalist agendas were rolled out (Marginson 1993). Pressure was applied to universities to weed out those areas of higher education that were considered no longer profitable. The priority for government funding was shifted away from arts, education and humanities toward the more profitable knowledge areas such as engineering, management and technology, and the Higher Education Contribution Scheme (HECS) introduced a compulsory financial contribution from students to fund their higher education. Generally, faculties within Australian universities experienced greater pressure to do more with less. As a result, Distance Education Centres (DECs) within universities became more prominent because of the greater economies of scale that it was thought might be achieved (Jakupec 1996). This time also coincided with advances in computer technologies, particularly communication technologies (Peters 2003). The digital world was embraced as one way to leverage the efficiency of higher education.

Paradigm Change or Status Quo?

These "fourth generation technologies" (Taylor 1992) increase the potential for rich and rapid interactions between members of a learning community, but there is little real evidence to suggest that this is related to university renewal, particularly in teacher education.

Wenger (1998) refers to five types of relationship to define the acceptance that an institution might have in moving toward adopting the concept of "learning community":

- *unrecognised*, where there is a lack of awareness of the value of the concept;
- *bootlegged*, where the concept is visible informally to a circle of people;

- *legitimised*, where the concept is officially sanctioned but may be over-managed and under scrutiny;
- *strategic*, where the concept is widely recognised as central to the organisation's success; and
- *transformative*, where the concept is able to be redefined.

At the very best, online approaches in teacher education could be said to be bootlegged. The use of online approaches in teaching and learning in higher education has, in some instances, achieved strategic standing. For example, at the University of Southern Queensland (USQ) – our higher education "space" – the Faculties of Business and Engineering and Surveying use online approaches strategically. Yet, for the training of undergraduate and postgraduate teachers at USQ, the uptake of "technology-mediated" teacher education at a distance has been slow to gather momentum. Recent moves have produced a more flexible approach to delivering a teacher education curriculum at an undergraduate level with the inclusion of web-based technologies to enhance access to, and the variety of, course materials, as well as with the variety and choice of student/lecturer connectivity. Although this is at the early stages of implementation, it appears that these advances are allowing for various courses to be taken either on campus or off campus. Formal evaluation has not yet begun, but one among the many challenges appears to lie in producing a lecturer-agreed assessment that can be used for either mode of delivery and that will complement the peculiar learning outcomes of the particular courses.

This is but one example of the type of paradigm challenges that Laurillard articulates. According to Laurillard (2006, p. 2):

> "E-learning could be a highly disruptive technology for education – if we allow it to be. We should do, because it serves the very paradigm shift that educators have been arguing for throughout the last century. Whatever their original discipline, the most eminent writers on learning have emphasised the importance of active learning. The choice of language may vary:
>
> Dewey's inquiry-based education,
> Piaget's constructivism,
> Vygotsky's social constructivism,
> Bruner's discovery learning,
> Pask's conversation theory,
> Schank's problem-based learning,
> Marton's deep learning,
> Lave's socio-cultural learning."

This reluctance to adopt online approaches for teacher education is difficult to understand when writers such as Laurillard argue the case for adoption so strongly. Perhaps such reluctance has something to do with the belief that face-to-face interactions represent the one "true way" to preserve the humanness of teaching and learning. Perhaps it has something to do with the belief that fieldwork (teaching experience) cannot be provided in any way other than placing teacher education students in teaching/learning settings perceived to be superior to what online settings might offer. However, Laurillard also points

to the reluctance of universities to take up the challenge and to the fact that the potential of e-learning has much to do with current management models. She suggests (2006, p. 3) that:

> "[I]f universities are to rethink their methods of teaching, they need a management structure that is capable of supporting innovation ... a top down management structure is inimical to successful innovation precisely because management does not have the knowledge necessary."

E-learning poses a threat to the knowledge that managers use to structure traditional learning. It does not fit with policies and procedures that are primarily designed to bring a "model of order" to teaching and learning. Many years ago, Russell (1949, p. 87) spoke of the "administrator's fallacy" and it would appear that this is relevant here:

> *"*People do not always remember that politics, economics, and social organisations generally, belong in the realm of means, not ends. Our political and social thinking is prone to what may be called the *'*administrator*'*s fallacy*'*, by which I mean the habit of looking upon a society as a systematic whole, of a sort that is thought good if it is pleasant to contemplate as a model of order, a planned organism with parts neatly dovetailed into each other. But a society does not, or at least should not, exist to satisfy an external survey, but to bring a good life to the individuals who compose it. It is in the individuals, not in the whole, that ultimate value is to be sought. A good society is a means to a good life for those who compose it, not something having a separate excellence on its own account.*"*

E-learning is not something that can be merely reinterpreted to fit the classroom model. The environment is a virtual space where learners and teachers cannot "see" one another, at least not in a physical sense. To now, communication has been predominantly text-based, which means that the tone and pitch we associate with oral communication are absent just as non-verbal cues like facial expressions and gestures are absent. This "body-less realm" of communication has huge implications for the way we communicate in online settings. For example, written communication that is asynchronous tends to be more reflective and precise, quite different from the spontaneous and less structured nature of oral discourse (Garrison 1997). The learners are usually located in a range of settings, which means that social and cultural differences are accentuated. Much of the textual communication can be archived or stored so that discussion and dialogue can be added to and revisited for reflective purposes while the processes used to arrive at conclusions and points of view can be analysed and used vicariously. Teachers can also gain better insights into student progress because student participation and contributions are more visible and transparent and teachers can contact students quickly using e-mail. This applies to teaching as well, because the teacher's contribution to and management of learning are more visible. Learners also (potentially at least) have access to a huge range of resources. It is now possible to locate references on almost any topic through electronic journals and publications, webliographies (electronic databases) and a range of other sites.

Notwithstanding the obvious advantages of learning in face-to-face settings, there is increasing evidence that open and distance education models, particularly those associated with fourth-generation technologies as defined by Taylor (1995), are beginning to challenge the claim that face-to-face teaching is superior. Kimball (1998, p. 3) argues that it is now not a question of how we can engage learners via distance education technology but rather a question of how we can engage learners in more meaningful learning activities. For example, she argues that "[d]ifferent kinds of environments can support high quality learning.... [U]sing distance learning technology in a people-oriented way is possible and desirable.... [L]earning to manage distance learning is about understanding more about the learning process."

This last point is central to our argument. Understanding the nature of learning and the assumptions underlying learning in the post-industrial era is at the heart of this issue. For example, Garrison (1997, p. 9) makes a critical observation when he says:

> "Generations of technological hardware provide order to and understanding of communication characteristics while descriptions of industrial and post-industrial eras reflect more fundamental educational assumptions that are guiding the practice of (distance) education."

This represents an important difference from the message we get from Taylor's (2001) "generations." Taylor's description of the generations helps us understand the nature of the emerging technologies, but the focus is on providing order to, and understanding of, communication characteristics. There is nothing in this description that links the technologies to fundamental educational assumptions. It is almost inevitable that these emerging technologies classified under generations are viewed as ways to enhance the current approaches to teaching and learning. Thus, a natural consequence is for those charged with using the technologies to try to change teaching and learning by adapting them to fit existing models. In some instances they might be reinterpreting existing models. At the very best, such adoption of these technologies equates to Wenger's (1998) legitimised and strategic levels of acceptance. Unfortunately, it is more about technology driving the changes in teaching and learning than about finding out what technology can do to help us achieve our educational ideals. For example, says Wenger, the "independent learning ideals of the industrial era are very different from the collaborative learning ideals of the post-industrial era" and recent developments in technology can open the door to the new world view offered by post-industrial ideas of teaching and learning, particularly in terms of what we might now mean by what constitutes an educational transaction (learner–content, teacher–learner and learner–learner).

The adoption of e-learning at present is more about preservation of the status quo than about any paradigm shift. As we have said, reinterpretation of the current paradigm may be the extent of adoption.

Laurillard (2006) has indicated e-learning has the potential to be disruptive by providing us with opportunities to promote the very paradigm shift that some of our leading educators have been arguing for throughout the last century. Ideas such as personalised (individualised) learning, situated (authentic) learning and

problem-based learning have been educational ideals for years. Unfortunately, the dominance of the transmission model (reinforced by widespread use of instructivist teaching approaches and top-down management structures) has prevailed. Instructivism has its place, but its dominance has inappropriately installed location-based education as exemplary. Laurillard has indicated that e-learning has the potential to challenge that idea. Additionally, educational imperatives arising out of the influence of post-industrial thinking are making Laurillard's claim quite persuasive.

Teacher education should be leading the charge, but in recent times the field of education seems to have become preoccupied with doctrinaire positions. One school of thought believes in interdisciplinary approaches while the next argues that it constitutes a degradation of education. Issues of the day seem to dominate discussion and debate, such as globalisation and education (Thomas 2005) and best practice in education (Christie 2005). E-learning has been viewed by some as a fad or issue of the day. E-learning has the potential to support and promote a transformative view of learning. E-learning should not be viewed as just another "swing of the pendulum" but more as a way to achieve the educational ideals of a post-industrial society.

E-Learning: A Proposed Framework for Teacher Education

A number of principles can be distilled from what we have argued so far:

- e-learning approaches should be used to support and promote a transformative view of learning and teaching; and
- e-learning environments should be based around a different infrastructure to that which is used in location-based environments.

A useful framework to track the progress of these principles comes from Mayes and de Freitas (2004). They have provided an overview of learning theory, capturing the work of significant contributions to educational theory over a considerable period of time, and have used three perspectives to argue their case. Such an overview also captures the essence of post-industrial thinking about education in a knowledge economy. Those authors maintain that (2004, pp. 5–7):

> "[T]he task of good pedagogical design [is] one of ensuring that there are absolutely no inconsistencies between the curriculum we teach, the teaching methods we use, the learning environment we choose, and the assessment procedures we adopt. To achieve complete consistency, we need to examine very carefully what assumptions we are making at each stage and to align those.... [T]he alignment process cannot proceed without first examining the underlying assumptions about learning, and then adopting teaching methods that align with those assumptions. We ... [identify] three clusters or broad perspectives, which make fundamentally different assumptions about what is crucial for understanding learning. These are: the associationist/empiricist perspective, the cognitive perspective, and the situative perspective."

Each perspective promotes a different but essential view of learning – that is, "learning as activity ... learning as achieving understanding ... [and] learning as social practice" (Mayes and de Freitas 2004, p. 7).

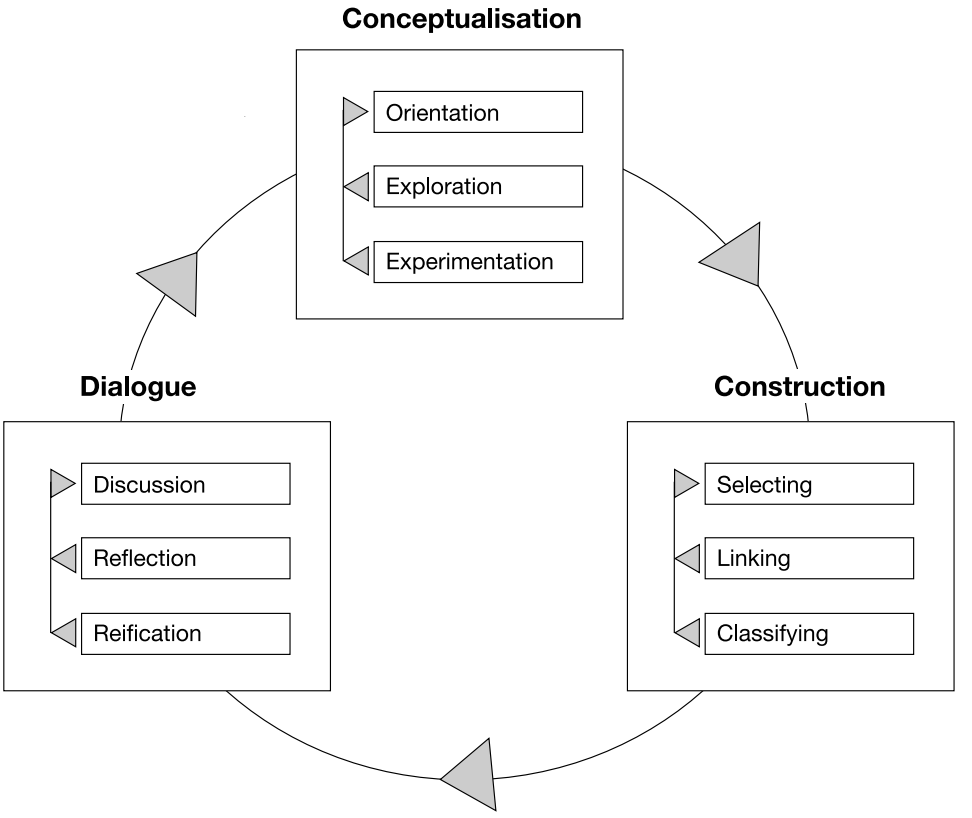
We briefly summarise the perspectives below.

- From the associationist/empiricist perspective, say Mayes and de Freitas, learning is primarily about *doing* through a sequence of activities, but moving from simple to complex to consolidate associations between concepts and performance. It is about developing the "language of the content," the key concepts that underlie the content area. This culminates in patterns of activity or skill. For example, learners involved in learning about two-dimensional space in mathematics would be involved in developing key ideas about area and the language that would accompany this.
- From the cognitive perspective, say Mayes and de Freitas, learning is doing by building information structures to interpret and construct meaning. Understanding is gained through "creating hypotheses and building new forms of understanding throug h activity" (p. 9). So, using the mathematical example above involving two-dimensional space, learners would be led inductively to develop rules and formulas that could be applied to measure two-dimensional space.
- From the situative perspective, learning is the doing within situations. This perspective acknowledges that learning influences the ability of the learner to participate successfully in his or her communities and that this participation shapes the learner's sense of identity. This situated perspective has two "flavours" (Barab and Duffy 1999): situated learning for application in real contexts; and situated learning for individual relationship-building with a group of people, for example, in a community of practice (Wenger 1998). Using the mathematical example again, learners here would be confronted with authentic problems and asked to solve them collaboratively.

The learning cycle presented in Figure 6.1 represents a framework based on these perspectives of learning.

The learning cycle that Mayes and Fowler (1999) articulate moves from conceptualisation, through construction and onto dialogue. *Conceptualisation* involves interacting with the pre-existing frameworks that a learner uses for understanding and exploring new concepts. *Construction* is the building process where concepts are combined to perform meaningful tasks. *Dialogue* is where conceptualisations are tested and further developed in conversation with lecturers, tutors and fellow learners.

Figure 6.1: The learning cycle (adapted from Mayes and Fowler 1999).



The first part of the learning cycle process, conceptualisation (based on the associationist/empiricist perspective), refers to teaching/learning settings in which the learners are involved mainly with declarative knowledge structures – that is, where "instructivist" approaches dominate and where learners are novices guided by teacher-manipulated strategies and methods. The teacher has considerable responsibility for the deconstruction of complex tasks into learning hierarchies, mapping the scope and sequence of the content. This stage involves "orientation" and "experimentation" and suggests the use of learning experiences aimed at helping students make connections with their own experience, arouse interest, provide a preliminary sense of the scope and sequence of the content, and create involvement and motivation.

Conceptualisation is defined by exploration, orientation and experimentation and involves the acquisition of key understandings concerning the learning at the level of novice. Conceptualisation is important, but represents the first step on the pathway to expertise. As Mayes and Fowler (1999, p. 10) indicate:

> "[C]onceptualisation can be thought of as a building block for more complex descriptions. It corresponds to the goal-action-feedback cycle and it captures the dynamic and iterative nature of learning: as understanding grows so knowledge is reconceptualised."

The second phase of the learning cycle, construction (the cognitive perspective), is one where knowledge is based on a "procedural or compiled form" rather than

on a "declarative form." Construction represents the "application and testing of new conceptualisations in the performance of meaningful tasks" (Mayes 2009, p. 26). It represents a task-based approach, and it is here where learners are asked to think strategically about the content (at a conceptual level of expertise). In this part, the learner is concerned with organising, classifying and linking ideas and key concepts.

The final phase, dialogue, involves "reconceptualisation" or "reification," where the focus is on social engagement and where ideas are subjected to scrutiny and are challenged and defended. This is deep learning where learners come to discussion and dialogue having assumed some level of expertise. Dialogue represents the "creation and testing of new conceptualisations during conversation with both tutors and fellow learners, and the reflection on these" (Mayes and Fowler 1999, p. 10). Discussion is fundamental to education – at this level the focus is on deep learning through tutorial and peer-group dialogue.

This framework was offered also as a way to assess the usability of e-courseware. Mayes and Fowler (1999, p. 2) maintain that "the software must make the learner think." They draw the distinction between courseware for *knowledge acquisition*, with its central idea surrounding the presentation of content, "its accessibility, its vividness, the power of its explanation, the appropriateness of its representation" (p. 3); and *knowledge construction* – how the courseware engages the learner in performing tasks in "active problem solving, questioning and conceptual manipulation" (p. 3). Central to this usability is how courseware capitalises on the learner's prior learning. Mayes and Fowler contend that it is reasonable to map courseware to these elements within the learning cycle. What this might look like is detailed in Table 6.2.

Concluding Remarks

The way that Mayes and his colleagues have linked e-learning technologies to an over-arching view of learning demonstrates the potential for e-learning to challenge the dominance of location-based models of teacher education. The nature and quality of interaction now available at all levels of learning through web-based e-learning (learner–content; learner–teacher; learner–learner) is, in many respects, superior to what can be provided in face-to-face situations. The nature of the online interaction now available moves learning away from a transmissive teacher-dominated model to a more interactive form of learning more aligned with learning assumptions underlying post-industrial thinking.

Quality learning can be undertaken independent of time and distance, no longer constrained by administrative requirements surrounding the use of lecture/tutorial structures and their associated timetables. Interactive elements of learning can be recorded (archived in the case of text) and thus revisited, reflected on, modified and challenged. This promotes a view of learning that is non-linear, fluid and more in tune with what is known about learning. More transparent information about the progress of learners is available because it is visible and retrievable.

What teachers do is also more visible. Not only does this provide more opportunities to personalise learning, but it also presents the teacher with grist for critical dialogue with peers and professional colleagues about how to enhance their practice.

Table 6.2: Courseware mapped to elements of Mayes and Fowler's (1999) learning cycle.

Phase	Types of domain-specific knowledge	Levels of expertise	Examples of teaching/learning strategies	Examples of courseware
Conceptualisation	Declarative	Neophyte/ novice/ intermediate	Predominantly teacher-manipulated and focused around the following areas: • Orientation: setting conceptual boundaries, making clear its relevance, relating it to wider knowledge • Exploration: providing familiarity with material • Experimentation: using interactions that involve "what if" questions • Motivation: creating interest and involvement	Webliographies/CDs/iPods to provide learners with access to information (information management systems) PowerPoint with streamed audio/video Online study materials/static content Links to community resources (experts, websites, readings, stories)
Construction	Procedural/ relational/ strategic/ empirical	Novice/ intermediate	Examples of teaching/learning strategies: a combination of teacher-manipulated/learner-generated strategies; these strategies are focused on the following tasks: • Selection: picking out relevant material • Linking: putting the information together in ways that have meaning for the learner • Classifying: making comparisons to relate old and new material into a coherent whole	Concept maps: designed to provide a framework and assist students in structuring knowledge contained in the web environment Graphic organisers: designed to assist learners to navigate around a web environment and around the content provided Databases/spreadsheets Synchronous communication (with whiteboard/ audiographic facilities)
Dialogue	Complex cognitive skills/ strategic/ empirical	Intermediate/ expert	Learner-generated/teacher-generated, such as: • Discussion: "vicarious" experience of observing others (experts and other students) to gradually internalise knowledge and skills • Reflection: time to "digest" material and evaluate it against a growing store of topic information • Reification: process of structuring newly acquired knowledge into a fully fleshed object or schema, well-integrated with other knowledge	Asynchronous communication (discussion board, bulletin board, blogs, wikis) Synchronous communication (chat facilities, conferencing systems) File transfer, shared document spaces

Many of these features of e-learning have the potential to help define those goals that educators have found elusive while operating within the constraints of location-based approaches. We should not forget that it also makes sense for teacher educators to provide opportunities for their students to actually experience what in all probability will be the way future generations learn in a knowledge-based society. The younger generation – or as Prensky (2001) likes to call them, the "digital natives" – will have little patience with learning and teaching that is modelled on location-based approaches.

Much of this highlights the difference between the nature of face-to-face learning communities and web-based e-learning communities and points to the need for a radical transformation in the way we conceptualise teaching and learning in these contexts. Hung and Chen (2001, p. 9) maintain that "we do not need to put old wine [face-to-face practices] in new wine bottles [online communities]." They argue strongly for supporting infrastructures in planning e-learning environments. Their idea of infrastructure in online settings represents a major departure from how teaching and learning is represented in face-to-face settings. It is also a concept that has been relatively unexploited because early attempts at providing online approaches endeavoured to recreate the classroom. Let us, as Laurillard (2006) proposes, dare to be disruptive and challenge the status quo of teacher education.

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CHAPTER

7

Using ICT to Train Teachers in ICT

Colin Latchem

Abstract

While there is encouragingly strong advocacy and increasing provision for information and communication technology (ICT) in the classroom and open schooling, the pre- and in-service teacher training needed for ICT integration is often inadequate. Training tends to be primarily concerned with the technology rather than the pedagogy, too removed from the classroom realities, and lacking in follow-up and support. Moreover, it is not only teachers who need to know how to successfully integrate ICT into teaching and learning. Policy-makers, inspectors, advisors, head teachers, librarians and ICT co-ordinators also need to be enabled to plan, manage and conduct ICT-based change in schools. Otherwise, for all the dramatic advances in technology, the true potential of e-learning in the classroom will never be realised.

This chapter argues both for teaching ICT as a subject and embedding ICT in subject teaching in pre- and in-service teacher education. It suggests how ICT can be used to train teachers in ICT equitably and cost-effectively and identifies some of the useful case studies, lesson plans, multimedia resources, research findings and support materials that can be found on the web and used to support online and blended training. Also described is how SchoolNets, TeacherNets and telecentres enable teachers to form themselves into virtual learning communities and communities of practice and to collaborate online in ICT training, research and development.

Introduction

There is no doubt that a strong case can be made out both for teaching information and communication technology (ICT) as a subject and embedding ICT in subject teaching in pre- and in-service teacher training:

- Today's school children need to learn how to live and work in an ICT-connected world, and to learn what their legal, ethical, health and security responsibilities are both as users and contributors.
- Given the infrastructure and access, ICT can provide any child anywhere with captivating knowledge appropriate to his or her needs.
- With learning objects and open courseware, high quality content can be accessed and used in multiple applications by various age groups in different locations and cultures.
- ICT can support homework and out-of-school hours' tuition, open schooling for remote and socially disadvantaged children, and education for children with special needs.
- ICT can provide continuity of schooling at times of natural or human-made disasters. This was shown in Hong Kong when the SARS and avian flu scares forced pupils to stay at home and schools posted their lessons on their websites without any detrimental effects on the children's learning (Fox and Waugh 2007).
- ICT can revolutionise classroom teaching and learning by supporting moves from rote learning and shallow coverage of content to acquiring higher order learning skills such as problem-setting, questioning, organising, evaluating and generating knowledge.
- ICT enables pupils to quickly access and investigate facts and ideas, solve problems and reach conclusions and, through games, simulations and role plays, learn in stimulating and meaningful ways. It also allows them to create in multimedia, publish on the web, and communicate and collaborate with children in other schools, cultures and countries.
- ICT enables teachers to make their presentations using motivating and informative computer- and web-based text, graphics, sound and moving images. The computer can then take over for the laborious and time-consuming business of drilling and testing. The technology can also be used for administration and for counselling and interacting with parents and the wider community.
- ICT provides entry to all knowledge. There can never be enough outstanding teachers, and the sheer volume and complexity of modern knowledge mean that even the most committed and talented teacher can never be expected to be the source of all knowledge.
- The new tools coming onstream include mobile phones which in many developing countries are more pervasive than PCs. Trials in schools in India reveal that these can play a valuable role in basic learning, calculation, referencing, documentation, recording of visual data, project work, peer-to-peer learning and home-to-school communications.[1]

There is nothing new in such observations, nor in the belief in a nexus between providing children with computers and educational innovation and improvement. However, in many countries it is shown that without appropriate

[1] See www.cks.in/html/cks_pdfs/learninglab_ppt.pdf

pre-service teacher training (PRESET) and *in-service education and training* (INSET), ICT will never play a central role in educational renewal and innovation. Let us consider four cases.

Assessing government-led ICT initiatives in English primary and secondary schools, the Office for Standards in Education, Children's Services and Skills found that ICT had been a catalyst for change and improvement in only a few schools (Ofsted 2002). It was also noted that where schools had failed to develop the teachers' skills in the technology and pedagogy, or where the training and materials had failed to excite the teachers, motivation had waned and ICT development had ground to a halt.

Robertson (2007) reports that inspectors of Scottish and English primary schools have identified the uses of ICT as the weakest aspect of professional practice and that, despite initial optimism, computers are found to remain a marginal force in the education of 5- to 12-year-olds. He concludes that the seemingly rational methodologies proposed by researchers and teacher educators for introducing ICT into the classroom fail to take account of the complex cultural, psychological and political characteristics of schools and educational change.

In 1998–2003, aided by the World Bank, Turkey embarked on a US$11.3 billion Basic Education Programme (BEP) to expand and improve Turkish primary schooling. ICT integration was intended to be a central feature of this programme. Thousands of schools were to be fitted out with ICT classrooms, thousands of teachers were to be trained as ICT co-ordinators, and many more thousands of teachers were to be trained in using ICT for teaching and administration. However, reviewing Phase 1 of the BEP, Akbaba-Altun (2006) and Özdemir and Kılıç (2007) found that despite the generous provision of technology, there were very few signs of educational change or improvement. The ICT co-ordinators' and classroom teachers' training had focused on the technology rather than the pedagogy and had been too brief, too theoretical and too removed from the realities of the classroom. The ICT co-ordinators had not been given any special training for their new roles as change agents and staff developers in schools; and the inspectors and school principals who should have had such a key support role in this programme had been insufficiently familiarised with the rationale and intended methods of ICT integration.

Interviewing first-year teachers in Australian schools, McGregor Tan Research (2009) found that while they were well-versed in using computers for their own professional and personal purposes, their training in classroom applications of ICT had been patchy and inconsistent. The teachers reported that their teacher educators tended to be of an older generation, more set in their ways, and less familiar with innovative ways of using computing in the classroom. Many of the teachers they worked with in the schools were also older and lacking in understanding of, or resistant to, classroom applications of ICT. The young teachers' classroom applications of the technology were also limited by the availability, age and condition of the computers, by network speeds and by restricted access to sites including, in some cases, Google. Surprisingly, few of these young teachers had ever thought of referring to any of the available online resources to help them with their attempts at ICT integration in the classroom.

These and similar findings show that ICT integration is a complex and multidimensional task and that PRESET and INSET must deal not only with the operational skills but with:

- the provision and management of infrastructure and technology in schools and classrooms;
- policies and procedures for curriculum and pedagogical change, staff development, time and task allocations, research and evaluation, and recognition and reward;
- the roles and responsibilities of inspectors and advisors, head teachers, ICT co-ordinators, teachers and learners;
- skills in leadership and innovation;
- the pedagogical, socio-cultural and technological aspects of ICT integration;
- curriculum and pedagogical change;
- quality assurance and evaluation;
- ICT for administration and assessment; and
- the resources available and how to use these.

Pre-Service Teacher Training (PRESET) in ICT

At the PRESET level, teachers clearly need to master the core technical knowledge and skills. According to the International Computer Driving Licence, this means knowledge and skills to:[2]

- use computers and managing files,
- do word processing,
- create spreadsheets,
- use a database,
- create a presentation, and
- understand basic information and communication technology.

This technical training is often provided in PRESET but is not always a requirement for teacher certification. However, even if the teachers do become well versed in these skills, it does not necessarily follow that they will know how to exploit the technology in their teaching and learning. Evidence suggests that failure in ICT adoption in schools is often attributable to the lack of training teachers receive in the associated pedagogical and change management issues.

UNESCO Bangkok's "Preparing the Next Generation of Teachers through ICT" project[3] is concerned with helping post-primary teachers in the Asia-Pacific region enhance and improve teaching and learning through uses of ICT. UNESCO Bangkok observes that technological change and economic development are leading to significant changes in Asia-Pacific societies and labour markets, and that in the future all employees need to be knowledgeable and skilled in ICT. This means that all schools must be able to prepare their pupils for societal

[2] See www.bcs.org/server.php?show=nav.7060

[3] See www.unescobkk.org/.../ict/ict...teachers/next-generation-of-teachers-project/

and workplace applications of ICT, all teachers must acquire the pedagogical and technological abilities to take on their new roles, and all teacher training institutions must revise the ways they train teachers in ICT. UNESCO's observation that teacher education in the Asia-Pacific is failing in this regard applies equally well in other regions.

A study by the OECD Centre for Educational Research and Innovation (CERI) and Sweden's Knowledge Foundation – The New Millennium Learners: ICT Use in Initial Teacher Training[4] – is seeking to determine why, when governments have invested so heavily in ICT in schools, so few teachers actually use it as intended. The interim findings are that ICT integration is not occurring regularly or systematically in the OECD countries reviewed because of the shortcomings in teacher training in ICT.[5] It is recommended that teacher training institutions should: take far greater heed of the technological world into which pupils need to be inducted; be much clearer on the role, aims and outcomes of ICT in education and how to achieve these; and integrate ICT in all subject teaching training. The theory and practice of ICT integration must also be linked so that teacher trainers can make more and better use of ICT in their own teaching, and so that teacher trainers and classroom teachers can collaborate more closely during teaching practice.

Other organisations also indicate the kinds of changes needed in ICT training:

- The International Society for Technology in Education's National Educational Technology Standards for Teachers (NETS•T) are based on the premise that ICT integration should be all about facilitating learning and creativity, providing digital age learning experiences, modelling digital age work practices and promoting digital age citizenship and responsibility.[6]
- The ICT Competency Standards for Teachers developed together by UNESCO, Cisco, Intel, Microsoft, the International Society for Technology in Education, and Virginia Polytechnic Institute and State University are essentially concerned with using ICT for knowledge deepening and knowledge creation – enabling pupils to be better information seekers, analysers, problem-solvers and communicators.[7]
- UNESCO's Preparing the Next Generation of Teachers through ICT project for post-primary teacher training institutions in China, Indonesia, Lao PDR, Malaysia, the Philippines and Thailand focuses on developing teachers' abilities in learner-centred methods and classroom management.[8]

Additional organisations with insight into this matter include: UNESCO,[9] Teacher Education in Sub-Saharan Africa,[10] the Commonwealth of Learning[11] and the Commonwealth Educational Media Centre for Asia.[12]

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4 See www.oecd.org/document/13/0,3343,en_2649_35845581_41676365_1_1_1_1,00.html

5 See www.oecd.org/dataoecd/3/20/42421255.pdf

6 See www.iste.org/AM/Template.cfm?Section=NETS

7 See http://portal.unesco.org/ci/en/ev.php-URL_ID=25740andURL_DO=DO_TOPICandURL_SECTION=201.html

8 See http://portal.unesco.org/ci/en/ev.php-URL_ID=23818andURL_DO=DO_TOPICandURL_SECTION=201.html

9 See http://portal.unesco.org/education/en/ev.phpURL_ID=45563andURL_DO=DO_TOPICandURL_ SECTION=201.html and www.unescobkk.org/index.php?id=787

10 See www.tessaafrica.net

11 See www.col.org

12 See www.cemca.org

Turning to the approaches needed in teacher training in ICT, Steketee (2005) suggests that there are four possibilities:

- *The ICT skills development approach*. By training teachers in using the tools, it is hoped that they will develop competence and confidence in applying these in the classroom.
- *The ICT pedagogy approach*. By showing teachers how ICT-based teaching and learning tools can be applied across the curriculum and involving them in lesson and courseware design, it is hoped that they will appreciate what is involved in ICT integration in the classroom.
- *The subject-specific approach*. By embedding ICT training in specific areas of the curriculum, it is hoped that teachers will develop useful insights and skills in applying ICT in teaching, learning and assessment in their subject specialties.
- *The practice-driven approach*. By providing practicums and follow-up activities, it is hoped that the teachers will be exposed to the problems, means and possibilities of ICT integration.

Steketee goes on to argue that while the first three approaches are important, without the fourth – gaining first-hand experience of putting the ideas into practice – there will never be any significant change.

Dagiene (2003) suggests that once teachers see how ICT improves pupils' learning, they will be far more motivated to gain the necessary technical knowledge and skills.

Surveying research findings on the factors influencing teachers' uptake of ICT, Mumtaz (2000) concludes that they need situated learning, operational illustrations of ICT integration, direct experience of implementing new practices, and collaborative reflection and support, and that without these, even with the most up-to-date technology, the teachers are unlikely to be motivated to use ICT innovatively in the classroom.

Let us consider two examples of teacher training where students were helped to find out how ICT could make their lessons more interesting, enjoyable and beneficial. Paily (n.d.) describes how teachers in training at Goa University in India developed their ICT skills and understanding through the use of action research, e-learning and e-portfolios. First, working in pairs using Moodle, they accessed online resources, undertook online assignments and engaged in forums, chat sessions, quizzes and blogs. They then applied this learning by developing, implementing and evaluating out in schools e-learning programmes in Mathematics, Science, Geography, English and History. This approach was found to improve the new teachers' understanding of collaborative ICT-based learning and action research, as well as their competencies with the various tools and resources. The project and its extended networks also benefited the teacher educators, pupils and school heads.

Wright et al. (2002) describe how students, classroom teachers and faculty members collaborated in the University of Alabama's semester-long Master of Technology Teacher Programme. The aims of this programme are to help the students integrate ICT in secondary school social studies, language arts, maths, science and foreign languages programmes and achieve the International Society

for Technology in Education's National Educational Technology Standards for Students.[13] On the teaching practice, the students and classroom teachers collaborated in assessing the educational needs, determining the most appropriate pedagogical and technological options, and planning and implementing classroom projects involving webquesting, online forums, virtual field trips, and digital scrapbook and website creation. With their more recent and up-to-date training in ICT, the students were often able to help the classroom teachers in technical matters. The teachers in turn were able to help with the student teachers' teaching and assessment. There was also face-to-face and online collaboration between the student teachers, classroom teachers and teacher trainers. The collegiality that developed among these three groups helped to bridge any gaps that might arise between advocacy, training and practice.

In-Service Education and Training (INSET) in ICT

Serving teachers need to be familiarised not only with the technology but with:

- the teaching and instructional design skills that will enable them to help their pupils engage in constructivist thinking, experimentation, problem-solving and learning linked to real life situations;
- the range of computer- and Internet-based sources they can use in teaching and learning;
- how to exploit collaboration tools such as weblogs, wikis, podcasts, Flickr and YouTube so that pupils can create, adapt and share content, discuss issues and support one another's learning;
- the use of e-assessment – that is, not only using ICT for true/false, multiple choice or fill-in-the-blank testing, but also assessing pupils' abilities in self-directed study, information retrieval, analysis, synthesis, problem-solving and creativity; and
- the use of e-portfolios – that is, creating multimedia records of pupils' efforts, achievements and reflections on learning for the purposes of conducting formative assessment, showcasing pupils' best work and conducting summative assessment (Kheng et al. 2005).

All of these activities present new challenges in classroom management. Teachers therefore also need training in how to:

- organise classes where there is only one computer or, where there are more, judge whether the computers are best installed in computer labs or in regular classrooms;
- schedule timetables, pupils and classrooms for individualised and collaborative ICT-based learning; and
- co-develop courses and courseware, team teach and undertake collaborative action research and evaluation.

[13] See www.iste.org/Content/NavigationMenu/NETS/ForStudents/2007Standards/NETS_for_Students_2007_Standards.pdf

None of these can be taught through short, one-off sessions. This is why, for example, INSET for Nepalese teachers in designing and using ICT-based materials in learner-centred, interactive teaching and learning was organised as four inter-related events spread over several days:[14]

- The first: four days' intensive residential, out-of-school, hands-on experience in ICT integration in the classroom
- The second: time and opportunities for the teachers to familiarise themselves with the computers, software and available educational courseware
- The third: teacher meetings with school management committees, parents and guardians and others in their communities to explain the new approaches proposed and gain their support for these (being respected members of their communities, these teachers had far greater credibility than any outside experts)
- The fourth: three days of demonstration lessons and practice teaching in the teachers' regular classrooms which gave them opportunities to consider the needs, address the management issues, apply the lesson plans they had developed during their residential training, and evaluate the results

This multi-strategy, prolonged approach helped the teachers build up their confidence and overcome any concerns they might have had about using computers and applying in the classroom Piaget's theory of cognitive development, Vigotsky's theory of scaffolding, and Papert's ideas on interactivity. The out-of-school courses ran from 8.30 in the morning until 6.00 in the evening and the teachers also had homework to do. Nevertheless, most of them had to be ushered out of the hall at 10.00 at night, much against their will. Once they were assured that there was no threat of their being replaced by the technology, if was found that they were very receptive to all the new ideas (One Laptop per Child 2008).

This case brings out two important points. INSET in ICT needs to take account of the affective as well as the cognitive and skills dimensions of change. And there is great value in forming communities of practice within which all of those trying out the new ideas can call upon one other for advice and support. This is why Gaible and Burns (2005) suggest that INSET needs to involve:

- open-house sessions where teachers can create lessons and invite colleagues and teachers from other schools to observe and provide feedback on the teaching and learning;
- teachers collaboratively planning, developing or improving lessons and field-testing them for their impact;
- study groups in which teachers collaboratively undertake action research, consider case studies, solve common problems and plan toward common goals
- mentoring; and
- the enlisting of parental and community support.

[14] See http://wiki.laptop.org/go/Nepal:_Teacher_Training

Online and Blended Learning PRESET and INSET in ICT

In most countries, PRESET and INSET in ICT are limited by time, money and a shortage of trainers. (There are exceptions. In South Korea, for example, one-third of all teachers are trained annually in ICT through courses of 15–60 hours' duration [Moyle et al. 2006]. And in Singapore, all teachers are entitled to 100 hours of INSET a year, at least 50 hours of which is ICT-related.) However, limitations of time, resources and expertise can be overcome by using ICT to disseminate training information and advice, illustrate best practice and facilitate exchange and collaboration. Using ICT to train teachers in ICT also familiarises them with the delivery systems, develops their abilities to use these tools, and helps them appreciate what is involved in inquiry-based and collaborative learning and in new paradigms of learner-centred pedagogy.

PRESET and INSET in ICT can be provided entirely through online study, but teachers may prefer a blended learning approach in which they are periodically brought together for face-to-face presentations, discussions and practice sessions. Online and blended PRESET and INSET can be provided on-campus or off-campus in schools, teacher centres, district education offices and elsewhere by universities, teachers' colleges, ministries of education and other providers. This range of approaches at both stages can ensure that all teachers, regardless of location and personal circumstances, can experience the same levels of expertise, case studies and examples of best practice.

In the EU-China Gansu Basic Education Project, ICT-linked teachers' centres enabled about 100,000 teachers and head teachers in rural schools to learn about the new national curriculum, teaching methods and uses of ICT by observing and discussing lessons taught live by satellite TV or recorded on CDs and by collaborating with other teachers online. It is difficult to conceive how such a massive programme could have been delivered by any other means. It was both successful and popular with teachers, some of whom received awards for the ICT-based courseware they had developed for low-achieving pupils during the course of their training (Robinson 2008).

Until fairly recently, teacher training in the Maldives was available only in the capital, Malé. Now, thanks to a government fibre, ADSL and satellite network between Malé and newly established teacher resource centres on the 20 main atolls, teachers can access UNICEF/Maldives Ministry of Education teacher training programmes, download syllabuses and course materials, and share their ideas and experiences with colleagues on the other islands. It is envisaged that this development will revolutionise curriculums and teaching, avoid the 80% of teacher training costs that are transport related and, by linking all administrators and teachers through a common network, create a virtual learning community across the islands (Shareef and Kinshuk 2004; UNICEF 2007).

In the Philippines, teachers involved in the iSchool initiative use web boards in their professional development, holding discussions and developing and sharing lesson plans, e-learning resources and best practice (UNDP 2007).[15] With the advent of mobile systems such as wireless, smart phones and PDAs, training, support and follow-up can also be provided through e-mail, voice messaging and text messaging.

[15] See www.cict.gov.ph/index.php?option=com_contentandtask=viewandid=80andItemid=108

Intel, together with Microsoft and Hewlett Packard, is also helping to expand the opportunities for teachers to learn how to best use ICT to improve student learning. Working in partnership with national education authorities, the Intel®Teach Program offers a range of face-to-face and online professional development programmes for classroom teachers, ICT teachers and school administrators.[16] These range from the basics of classroom software productivity tools and student-centred approaches to the more advanced aspects of ICT integration in schools. Intel®Teach uses a train-the-trainer model, working initially with groups of teachers to enable them to become in-service providers and then letting them become responsible for sharing their new skills with other teachers in their region. In the course of their training, the teachers plan and implement ICT-based lessons in accord with local and national education goals and standards and collaborate with other teachers in discussing and applying ICT in the classroom. To date, about 6 million teachers in more than 50 countries have been trained through this system.

The non-profit organisation iEARN offers face-to-face and online professional development workshops and courses for teachers seeking to integrate online global project work into their classrooms.[17] iEARN has trained many thousands of teachers in North and South America, the Caribbean, Europe, the Middle East, Africa and the Asia-Pacific region. Schools that are members of iEARN can also have access to iEARN forums, communicate with teachers and students in more than 100 countries, and take part in the many iEARN projects.

As well as providing increased access, ease of use, flexibility, colleagueship and collaboration, online training may also be more cost-effective than face-to-face provision – an important consideration if all teachers are to receive ongoing training in ICT integration. A South Korean study of online and face-to-face INSET on ICT integration found the online provision to be more cost-effective than the face-to-face equivalent over the same period of time. The study also revealed no significant differences in the teachers' satisfaction levels, grades or pre- and post-course attitudes toward ICT integration. However, in this particular case, the savings were mainly due to the lower opportunity costs of the participants (Jung 2005).

This caveat explains why Rumble (2008) cautions against using analyses in one jurisdiction to draw inferences about costs in another. Distance and technology-based training are generally said to have higher fixed costs (e.g., central administration, production facility, course development and delivery costs) and lower variable costs (student-related costs incurred as the training is delivered). But, for example, staffing costs may be much lower and technology provision and access costs much higher in developing countries than in developed countries. So, as Rosenberg (2001) observes, costing online training needs to take careful account of all of the development, maintenance and delivery costs, the lifespan of the training programmes, the number of learners served, the costs to the learners and the opportunity costs (the value of the next best alternative foregone as a consequence of the training providers and the participants undertaking one activity rather than another).

[16] See www.intel.com/education/teach

[17] See www.iearn.org

SchoolNets, TeacherNets and Telecentres

In its report, "Use of ICT in Rural Education in Mongolia Project", the Asian Development Bank observed that frustration over the lack of access to up-to-date training, ideas and resources is a cause of the "brain drain" of teachers from remote and disadvantaged areas to the more privileged areas.[18] This problem, which is common to many countries, may be addressed by the creation of ICT-based SchoolNets or, as they are sometimes called, TeacherNets. Such networks provide online training, advice, encouragement and support for effective uses of ICT, and facilitate communication and collaboration among schools, teacher training institutions and other providers. Introduced in the mid-1990s, SchoolNets are in operation from Canada to Iran and from the United Kingdom to Uganda. Some are governmental or intergovernmental, while others are private and non-profit. Virtually all have ministry of education inputs.

Some SchoolNets are international. The Japanese Funds-in-Trust SchoolNet has enabled information-rich, well-resourced Association of Southeast Asian Nations (ASEAN) countries to provide INSET and cross-border collaboration for schools in the poorer ASEAN nations.[19] In Africa, support for national SchoolNets is provided by SchoolNet Africa,[20] a partnership of the United Nations Economic Commission for Africa, Open Society Institute for Southern Africa, and Canadian International Development Research Centre. To help establish or strengthen SchoolNets, UNESCO and the Commonwealth of Learning have developed online SchoolNet Toolkits for Southeast Asia and Africa.[21]

The United Kingdom's TeacherNet, which is supported by the Department for Education and Skills and partner organisations, illustrates the services that can be provided through such networks:[22]

- information on ICT as a curriculum subject with links to the national curriculum website and its study requirements;
- a practical support pack for ICT across the primary and secondary curricula, including lesson plans, multimedia resources, video case studies and ICT support materials for everything from preparation and planning to homework and evaluation;
- support materials for teacher assessment in ICT, again linked to the national curriculum, providing guidelines on how to identify, track and enhance pupils' progress;
- information about ICT infrastructure, technology, technical standards, health and safety issues, purchasing, leadership and management, research and professional development;
- information on funding for schools and local education authorities and how this can be used strategically to meet the schools' aims and government's priorities for education;

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[18] See www.cse.iitb.ac.in/~hardeep/portal/mongolia.html

[19] See www2.unescobkk.org/education/ict/v2_2/info.asp?id=10966

[20] See wwew.schoolnetafrica.org

[21] See www.unescobkk.org/index.php?id=1792) and www.col.org/resources/publications/operational/Pages/africanToolkit.aspx

[22] See www.teachernet.gov.uk/teachingandlearning/subjects/ict/

- Teachers TV, a digital TV channel enabling teachers to observe others' classrooms and learn how other schools are managed;
- a site for PRESET and INSET tutors;
- a site for ICT co-ordinators;
- forums and chat rooms; and
- links to useful websites and organisations.

As well, ICT training and resource materials for teachers can be provided through telecentres. Telecentres, which can also operate under other names such as telecottages or community technology centres, are ICT-facilitated community centres established to provide socio-economically and geographically disadvantaged communities with access to ICT, information, education, training and opportunities for local enterprise. In the developed world, they may result from government, NGO and other public or private interventions. In the developing world, they are often supported by such agencies as telecentre.org, UNESCO, the International Telecommunications Union, the Swiss Agency for Development, Microsoft, and the Canadian International Development Research Centre.

In some countries, telecentres are set up in schools so that they can both support classroom teaching and serve local communities. School-based telecentres designed to introduce ICT into schools and communities are used to train principals and teachers in peri-urban and rural Uganda (Mayanja 2002). In Bangladesh, 30 school-based telecentres serve clusters of 5–10 schools with minimal or no access to ICT, enabling almost 100,000 students and community members to use and to learn by using computers and the Internet. During school hours, the centres are time-shared between the host schools and neighbouring schools. After school, they are used for extra-curricular and community activities. The host and partner schools' principals and teachers are trained in ICT basics and every school nominates a staff member as its "technical lead teacher." Because many teachers need to supplement their low wages by out-of-school hours private tutoring, the technical lead teachers receive a small stipend to offset any loss of income. They receive one week's certificated training in planning and implementing ICT-based teaching and learning and meet monthly to exchange ideas and experiences. Regular meetings are also organised for the other teachers to develop, test and exchange ideas. The classroom teachers also learn online, through iEARN and Global SchoolNet (Islam and Welch 2005).

Voluntary Effort and Self-Directed Study

Skills development in ICT can also be provided by voluntary groups. One example of this was the Teachers Talking ICT training programme in rural schools in Nigeria and Uganda. Many of these schools lack electricity, let alone computers, but the teachers can still be expected to know about and teach their students about ICT. To address this problem, a United Kingdom's charity group, Charity for African Welfare and Development, set up a support group and a Yahoo group and invited "virtual colleagues" to join via the Internet. The support group planned the training programmes and placed useful resources and links on a wiki. Participating teachers were contacted through community networks, as were

the local facilitators. Some of the training was provided in schools. Where there were no ICT facilities, use had to be made of whatever materials and means were available. Practice sessions teaching the children were observed by fellow course members. However, wherever possible, the volunteer trainers and teachers logged on at local learning centres, cyber cafés and so on for training and discussions, an experience that gave them a taste of using computers and being part of a virtual learning community (McLean [n.d.]; www.changemakers.com/node/10828).

Teachers can also learn about ICT integration through self-study. Diligent searches can quickly lead to tutorials, articles, forums and advice. For example, to learn about tools and applications, teachers can connect to such websites as:

- Becta Schools (http://schools.becta.org.uk/)
- UNESCO ICT in Education Innovation Awards, 2007–2008 (www.unescobkk.org/education/ict/ict-in-education-projects/innovative-practices/innovative-practices-awards/winning-entries/)
- Second Information in Technology Study (SITESM2) (http://sitesdatabase.cite.hku.hk/online/index.asp)
- OECD national case studies on ICT in schools (www.oecd.org/document/55/0,3343,en_2649_39263301_33932151_1_1_1_1,00.htm)
- Techlink Case Studies of classroom practice using ICT in New Zealand schools (www.techlink.org.nz/case-studies/Classroom-practice/index.htm)
- Exemplar schools using innovative learning technologies in Australia (www.deewr.gov.au/Schooling/DigitalEducationRevolution/Documents/exemplar_schools_report_pdf.pdf)
- ICT Integration Ideas, a New Zealand wiki linking with other wikis on ICT in a wide range of subjects for children aged 5–12 (https://educationalsoftware.wikispaces.com/ICT+Integration+Ideas)

To learn about theory, research and practice, teachers can turn to open access online educational journals such as:

- *AACE Jou*rnal (www.aace.org/pubs/aacej/)
- *Asian Journal of Distance Education* (www.AsianJDE.org)
- *Contemporary Issues in Technology and Teacher Education* (CITE) (www.citejournal.org)
- *Canadian Journal of Learning and Technology/La revue canadienne de l'apprentissage et de la technologie* (www.cjlt.ca)
- *Electronic Journal of E-Learning* (www.ejel.org)
- *Innovate: Journal of Online Education* (http://innovateonline.info/?view=issue)
- *International Journal of Education and Development Using Information and Communication Technology* (http://ijedict.dec.uwi.edu/viewissue.php)
- *Journal of Educational Technology and Society* (www.ifets.info/)
- *The International Review of Research in Open and Distance Learning* (www.irrodl.org/index.php/irrodl)

- *Journal of Distance Education/Revue de l'enseignment a distance* (www.jofde.ca/index.php/jde)
- *Journal of Information Technology Education* (http://jite.org/index.html)
- *Journal of Interactive Media in Education* (www-jime.open.ac.uk/
- *Journal of Interactive Online Learning* (www.ncolr.org/jiol/issues/index.cfm)
- *Journal of Technology, Learning and Assessment* (http://escholarship.bc.edu/jtla/)
- *Kairos: A Journal of Rhetoric, Technology, and Pedagogy* (http://english.ttu.edu/kairos/)
- *Turkish Online Journal of Distance Education* (http://tojde.anadolu.edu.tr/)
- *Turkish Online Journal of Educational Technology* (www.tojet.net/)

There are also online journals on ICT for those involved in special needs education. Examples include: *Information Technology and Disabilities* (http://people.rit.edu/easi/itd.htm) and *Journal of Special Education Technology* (www.tamcec.org/jset/index.htm).

Formal Training

Teachers can also further their ICT knowledge and skills through accredited online study. Here are a few examples:

- The Indira Gandhi National Open University School of Education and Staff Training and Research Institute of Distance Education offer postgraduate diploma courses in educational technology and distance education and a Master's degree in distance education for teachers in India and all other Commonwealth Asian countries (www.ignou.ac.in/schools/soe/courses_offer.htm).
- The University of the Philippines Open University offers a Master's in distance education and e-learning (www.upou.org/academic/programs/mde.html).
- The United Kingdom Open University offers postgraduate certificate, postgraduate diploma and Master-level programmes in online and distance education (www3.open.ac.uk/courses/bin/p12.dll?Q01C23; www3.open.ac.uk/courses/bin/p12.dll?Q01D36; www3.open.ac.uk/courses/bin/p12.dll?Q01F10).
- Canada's Athabasca University provides online Master's and Doctoral programmes in distance education (http://cde.athabascau.ca/programs/doctoral; www.athabascau.ca/course/gr_subject).
- Mexico's Tec de Monterrey offers a Master's in educational technology (www.ruv.itesm.mx/portal/promocion/oe/m/met).

Conclusion

At the time this chapter was being written, the world was experiencing an economic downturn. In many countries such a situation will undoubtedly impact

funding for schools, PRESET and INSET. However, children will still need to learn about and through ICT, and teachers will still need to be prepared for teaching in the Internet-connected world. Given the technology and infrastructure available, ICT-based and blended PRESET and INSET can be used to train all teachers in ICT integration equitably and cost-effectively. This training will be most motivating, illuminating and likely to translate into sound and innovative practice when it deals with the pedagogical as well as the technological issues, involves digital and human interaction, and includes hands-on learning in schools. There are also benefits in forming virtual learning communities or communities of practice in which teacher trainers, teachers in training, serving teachers and others collaborate and mentor one another in their learning and practice.

Successful ICT integration in schools also requires everyone else involved to be similarly trained and enabled to share their experiences: policy-makers, inspectors and advisers, head teachers, teachers, librarians, support staff and, some would argue, parents and the wider community. Governments and other public providers and private organisations can also assist in this work by providing portals through which managers and teachers can access training, materials and case studies, dialogue with one another, publish findings, and showcase achievements. Using ICT in these ways has a great potential for updating and extending teacher training provision, in both developed and developing countries.

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CHAPTER

8

The Use of Media in Teacher Education through Open and Distance Learning

Ken Stevens

Abstract

The structures, organisation and process of teaching and learning have been revolutionised by the Internet, personal computers, information and communication technology (ICT), e-learning, virtual learning networks and the media. These changes have led to a conceptual shift from the traditional perspective of schools as closed, autonomous organisations that served specific communities to open, collaborative sites within teaching and learning networks that cross political and geographical boundaries as well as time zones. The introduction of electronic media to enhance the professional education of teachers has been a response to the development and proliferation of digital structures that support virtual classes within open learning networks. The open, digital educational environment has led to the development of collaborative pedagogy that has recently focused on the integration of on-site and online learning, facilitating new ways of considering the professional education of pre-service and practising teachers. Open and distance learning inherently challenges the professional education of teachers, the nature of their appointments, the notion of classrooms and even the concept of schools.

Introduction

Open and distance learning (ODL) inherently changes and challenges the professional education of teachers, the nature of their appointments, the formation of classrooms and the concept of schools. The introduction of computers, the Internet and an expanding range of teaching and learning software and information and communication technologies (ICTs) have revolutionised schools, particularly those serving rural communities. Technological changes have

led to new relationships between teachers and learners as well as between ODL and traditional education, leading to the question:

> *What theories, concepts and technologies are appropriate in the professional education of teachers using ODL?*

This chapter examines the contribution of ODL in the professional education of teachers, with particular attention to rural community teaching. Two considerations guide the application of ODL in the professional education of teachers preparing to work in traditional rural schools – capacity-building and sustainability – and are based on the following questions:

> *Can teacher education by ODL build rural school capacities to maximise access to education at community, regional and national levels?*
>
> *Can teacher education using ODL sustain schools, particularly those in rural areas?*

Finally, there are global implications of the use of ODL:

> *How does focusing on teacher education through ODL contribute to shared understandings?*
>
> *How does focusing on teacher education through ODL contribute to equity?*

This chapter is organised into three sections: technologies and pedagogy in the professional education of teachers; building capacity and sustaining rural schools; and developing shared understandings.

Technologies and Pedagogy in the Professional Education of Teachers

One of the most significant developments in ODL has been its integration in traditional teacher education programmes. Today many teachers can engage in ODL, but for those employed or seeking employment in rural schools ODL has a special place. As discussed below, Web 2.0 has particular significance in the preparation of contemporary teachers because of its pedagogical implications.

The first generation of Internet software was the read-write web (Web 1.0), where online users could read what other people had written and, if they had the technical knowledge and owned the software, they could develop their own web space to show information. The second generation of Internet software (Web 2.0) allows for interaction between people as well as the formation of online groups so that anyone can share images, stories and ideas. Open source sites, which are free, are platforms that have allowed people with similar interests to interact and connect without requiring technical expertise. These sites have the potential for collaborative knowledge-building and have changed ODL (Starkey and Stevens 2006).

The pedagogy underpinning this type of learning requires the teacher to be a facilitator of learning with a view of the curriculum as something that is flexible. The understandings developed are endless and could include participation in an election, discussion of a recent event or critical analysis of art or literature. The collaboration involved in this type of learning activity includes connections between a group of students, their teacher, experts and interested parties beyond their classroom and even beyond their own country. Participants connect with

one another to construct knowledge through an existing network or via a new network built specifically for their purposes.

As students connect, network and engage with one another through Web 2.0, the experience may mediate their transition into the future world of learning beyond school (Starkey and Stevens 2006). Skills and understanding that students will need to succeed in life after leaving school include: thinking critically, so that they look at information and knowledge creation and make judgements about it; examining information for bias and underpinning values; developing and maintaining learning networks; and developing knowledge within their networks. Students and teachers interacting in networks to build knowledge through digital technologies are likely to function in different ways, which thus requires teacher education, systems and pedagogies to be aligned with a networked, digital society. For some teachers, the use of Web 2.0 has provided access to a community of professional support and learning.

Web 2.0 has particular impact where online communities are developed not through established organisations but through social networking in which people of similar interests connect and interact. Interaction can develop through the use of applications such as blogs (Internet-based journals), podcasts (home-made or organisation-made sound recordings available through the Internet), forums (written asynchronous discussions) and wikis (web pages developed collaboratively, requiring no technical expertise). Some people read what others have written and listen to podcasts of discussions; others may have their own blog or wiki, make comments on blog posts or wikis, join in live chats or webcasts, or aggregate the threads of discussions, synthesising and analysing the various topics.

The way that professional learning takes place using Web 2.0 is changing as educators build global virtual networks with their peers and other experts to share resources and ideas, problem solve and develop knowledge. Educators can opt in and out of networks according to their time and their professional requirements.

Relationships between Teachers and Learners

Through the use of Web 2.0 applications, students are able to network to create knowledge within local, national and even global environments. In classes, schools and homes, students can post ideas for their peers, family and teachers to view and give feedback through blogs, wikis or podcasts individually, in groups or as classes. These uses of digital technology reflect the way that many teachers now teach.

Students can use Web 2.0 applications to connect with their peers beyond the classroom and beyond their schools. Collaboration between schools nationally or internationally is facilitated as students interact with one another. In New Zealand, the Ministry of Education's e-Learning strategy document includes a goal that "students will use ICTs to relate to others, work interactively with local and global learning communities and pursue knowledge" (New Zealand Ministry of Education 2006, p. 5). The following example illustrates how a class might use Web 2.0 tools to network and build knowledge in line with the New Zealand Ministry of Education strategy goal:

> A group of year 12 social studies students wants to examine an issue about to come before a parliamentary select committee such as

whether to legislate for country-of-origin food labelling. The teacher and students work together to find out about the issue, using the Internet to build their knowledge and submission collaboratively. They search through sites that organise and tag websites or URLs to find links and possible networks and to organise the sites they identify as interesting or relevant. They develop a blog that records their progress and a wiki to share their findings. The blog and wiki bring in feedback and perspectives from people in the USA, Australia, India and Switzerland. They contact and connect with global experts and lobbyists to discuss the issue via an online learning environment such as Second Life and e-mail. They record their webcast conversations and make them available through their wiki. Their knowledge develops collaboratively, connecting beyond the group and will continue to develop and change as they follow (and maybe participate in) the select committee hearings, discussing the results through their blog and wiki and modifying their findings based on feedback and additional information. The wiki is developed further by other people online interested in this issue (New Zealand Ministry of Education 2006).

Digital Integration and the Professional Education of Teachers

Web 2.0 and emerging ideas about knowledge creation have the potential to change schooling, but this is unlikely to happen without a change in the pedagogical understandings of teachers. Computers have been in schools for more than 30 years, yet it has been claimed that this technological change has had minimal impact on the way that students are taught (Cuban 2001; Clifford et al. 2005). Nevertheless, the changes made possible by Web 2.0 have implications for the professional education of teachers. Teachers now have choices in the ways they engage students, from face-to-face instruction to teaching at a distance in open learning environments using recent developments based on the Internet.

The professional education of teachers is taking place in environments that are changing. The extent to which contemporary technological developments are embraced by teachers in their pedagogy is likely to be influenced by the extent to which recent organisational changes in schools are recognised.

Building Capacity and Sustaining Open Rural Schools

With the exception of city-states such as Monaco and Singapore, almost all countries have citizens who live beyond major population centres. The education of rural people is therefore of international importance and it is in this sector that significant organisational shifts have taken place in some parts of the world. The changes that have occurred in rural schools in developed societies such as Australia (Richardson 2001), New Zealand (Johnson et al. 2005) and Canada (Information Highway Advisory Council 1997) have influenced the way that teachers are now educated (Stevens 1994; Gonzalez 2004).

It has often been difficult to provide senior students in rural schools with the learning opportunities available to their peers in larger, usually urban, schools. ODL has a long history in the provision of education in remote locations, but, since the arrival of the Internet (Web 1.0), digital structures and processes have

developed that have built teaching capacity in rural schools and thus helped to sustain them. Now, based on the Internet, ODL has facilitated the development of collaborative educational structures in which rural schools academically and administratively open to one another within intranets. In New Zealand (Stevens 1999a, 1999b; Stevens and Moffatt 2003) and Canada (Stevens 2000, 2001, 2003a, 2003b), small schools in rural communities have been sustained by the development of extended learning opportunities for students through the creation of virtual classes that complement on-site instruction. In the Canadian province of Newfoundland and Labrador, for example, most schools are located in rural communities. The changes that have taken place in the organisation and administration of education in rural Newfoundland and Labrador have influenced classroom structures and processes and highlighted the role of ODL.

In 1998 the first intranet was established in Newfoundland and Labrador. Eight schools in the same rural district were academically and administratively integrated through the local school board so that teaching and learning could be shared among the dispersed rural sites. The eight participating schools had to co-ordinate senior classes in those areas of the curriculum that were taught across multiple sites. Some schools received instruction for senior classes from teachers located on other sites (schools) within the network. Collaboration among schools, teachers and students in the initial teaching and learning network was essential. Classrooms that had previously been closed to one another began to open to others located throughout the district network for both teaching and learning.

However, the introduction of such a technological initiative required significant adjustment by students and teachers:

- It challenged the autonomy of teachers within their own classrooms, as well as their isolation from other members of the profession.
- Students struggled with the concept of discussing their work with peers they did not know who participated in shared lessons taught from other locations. The traditional closed, or autonomous, model of the school was challenged by an increasingly open teaching and learning environment. The initial intranet initiative challenged the notion that senior students in small schools have to leave home to complete their education at larger schools in urban areas. By participating in open classes in real (synchronous) time, combined with a measure of independent (asynchronous) learning, senior students were able to interact with one another through audio, video and electronic whiteboards.

The initial electronic linking of eight sites within a school district to collaborate in the teaching of Advanced Placement Biology, Chemistry, Mathematics and Physics initiated a series of open classes in rural Newfoundland and Labrador. The creation of the first intranet was an attempt to use ICT to provide geographically isolated students with extended educational and, indirectly, vocational opportunities. The development of the first intranet within a single school district involved the introduction of an open teaching and learning structure to a closed one. Accordingly, adjustments had to be made in each participating site so that, administratively and academically, Advanced Placement classes could be taught. While technological and administrative changes supported this initiative, adjustments were needed in the professional education of teachers.

The structural changes that have taken place in Newfoundland and Labrador since the inception of the first intranet, within which initial Advanced Placement courses were developed and taught, have advanced to become a system that provides online instruction to almost all schools in the province. The provincial government, after a ministerial inquiry (Government of Newfoundland and Labrador 2000) expanded the linking of schools through the creation of the Centre for Distance Learning and Innovation (CDLI) within the Newfoundland and Labrador Department of Education. Today the CDLI develops and administers online learning that complements traditional classes in schools throughout the province.

There are similar networks in New Zealand, Iceland and other areas of the developed world with rural populations. In these collaborative structures, teaching resources are currently shared through videoconferencing and online learning environments. In New Zealand, a virtual learning network has been supported by the Ministry of Education, which facilitates a brokerage system that connects teachers with students, both within regional networks and beyond. New Zealand students, like their rural Canadian peers, may be physically present at one school but have teachers and classmates from more than the one school. Web 2.0 applications can facilitate the interactions across these networked schools.

The significance of these changes in the organisation and capacity of rural schools in Canada and other places is that ODL has become part of their day-to-day organisation. Schools located in distant sites are increasingly academically and administratively open to one another, encouraging collaboration between and among teachers and learners. The academic and administrative integration of rural school classes to become, in effect, sites within teaching and learning networks challenges traditional ideas of school organisation.

Developing Shared Understandings

Awareness of what is taking place in the delivery of education in rural communities is necessary for pre-service as well as practising teachers who have traditionally been prepared to teach in autonomous, or closed, teaching and learning environments known as classrooms (Boone 1997, 2008; Poole 2000; Brown et al. 2001; Dixon and Crooks 2006). While many members of the profession will continue to provide instruction in traditional closed environments, an increasing number will teach in open, collaborative, Internet-based learning spaces. The contradiction of teaching in closed learning spaces (or traditional classrooms) located in collaborative networks of schools challenges pre-service and practising teachers to re-examine the changed nature of education. Pre-service teachers were asked to consider research on the use of computers in education (Lowther et al. 2003; Mathiasen 2004) and their potential for collaborative teaching as well as shared learning among dispersed sites (Cavanaugh 2001; Hawkes et al. 2002; Ertl and Plante 2004).

Cybercells for the Integration of Virtual and Actual Structures and Processes

Within rural school networks, virtual classes have been developed for teaching an expanding range of subjects at high school level. The development of Internet-based

school networks, facilitating the creation of virtual classes, has implications for the professional education of teachers who will, in North America, Europe and other parts of the world, increasingly be teaching both face-to-face and online, or actually and virtually. "Cybercells" – face-to-face groups whose members extend their discussions to include virtual visitors (Stevens and Stewart 2005) – provide a way of integrating e-learning and traditional face-to-face instruction, thereby challenging educational isolation and promoting learning communities.

In the case of Newfoundland and Labrador, introducing cybercells to pre-service high school teachers involved three key steps:

- The first step was developing awareness of recent changes in school organisation in the province, particularly in the majority of schools that are located beyond major centres of population. Most of these institutions are physically small but networked with other schools both academically and administratively. Teachers in this province are thus increasingly expected to provide instruction between sites as well as in traditional classrooms.
- The second step was demonstrating the potential of professional collaboration for effective integration of actual and virtual instruction in classrooms. Teachers traditionally have been professionally prepared to teach in face-to-face classroom environments that have not been open to other classes. In opening traditional on-site classrooms to other classes for part of the school day using the Internet, collaboration between teachers becomes essential. In Newfoundland and Labrador's networked school environment, on-site and virtual teachers were provided with a structure within which to manage collaboration. At the pre-service teacher level, collaboration is taught through Learning Circles within which students are asked to reflect on and critique one another's recent intern experiences in schools.
- The third step was integrating virtual and actual teaching and learning, based on step one (collaborative teaching and learning structures) and step two (collaborative teaching and learning processes). This involved building shared realities within which mutual understanding could be negotiated.

The development of shared understandings between teachers, based on collaborative knowledge-building, can lead to the development of professional learning communities (Dorniden 2005). To gain an understanding of the potential of Web 2.0 for collaborative knowledge-building, teachers can experience learning in similar ways as their students, particularly those who are educated in the digital environment of some rural schools.

In a collaborative knowledge-building environment, teachers are able to work with colleagues between schools locally, regionally and nationally (Glick 2005). They can even form global learning groups based on what Rowan and Bigum (2005) term "authentic learning" or the development of links beyond the classroom to the wider world of the learner. Professional learning environments based on Web 2.0 could parallel the digital structures that have facilitated collaboration between rural classrooms.

New Professional Roles

The introduction of Web 2.0 technologies, together with the development of new structures such as intranets, has led to the creation of new roles in the teaching profession. These include "electronic teachers" (e-teachers) who teach online and teams of "mentor teams" who mediate between their on-site and online colleagues.

E-teachers – E-teachers are experienced face-to-face teachers from the public school system who have elected to teach online (Schrum 2005). These full-time teachers are subject area specialists with proven records of teaching excellence and curriculum development work. In Newfoundland and Labrador, the CDLI has grouped e-teachers into subject-specific or subject-related "pods" (e.g., mathematics teachers) to encourage collaborative learning and facilitate the virtual school's administrative structure. Class sizes for e-teachers are generally kept to a maximum of 20 students who may be situated throughout the province, or even nationally or internationally depending on individual student circumstances.

Mentor teams – The primary responsibility and ownership of students engaged in virtual learning belong to the actual schools through which these students still acquire the majority of their required courses. In addition to supporting these students in the traditional sense, the schools have formed mentor teams to take on additional roles related to virtual learning (Coffin 2002; Barbour and Mulcahy 2005; Furey and Stevens 2008). The primary member of the mentor team is the mentor teacher, who provides curriculum, resource and social supports for virtual students as well as monitoring student progress. The teacher responsible for the school network is also a member of the mentor team and acts as a technician to attend to minor problems. The school principal is responsible for student registration and for ensuring that a student pursues the appropriate curriculum programming to meet graduation requirements. In Newfoundland and Labrador, the CDLI provides the professional development needed to enable all mentor team members to fulfil their roles through initial training days and ongoing support. However, it is important to realise that schools that avail themselves of distance education have small numbers of students and staff, and that in some instances all of these mentor team roles may have to be assumed by only two or even one individual.

Conclusion

ODL has generated significant educational change in the past 10 years. It has contributed to increased educational access and equity in several ways. The development of collaborative pedagogy within digital networked environments, the integration of virtual and actual teaching and learning, and the creation of cybercells collectively improve access to educational opportunities, particularly for people in rural communities. As schools academically and administratively integrate within intranets, and as students are enabled to learn and build knowledge with their peers from other, sometimes distant, sites, geographic isolation and access to learning opportunities (Healey and Stevens 2002) have to be reconsidered by teachers and education policy-makers.

ODL has reconfigured the organisation of teaching and learning as well as the administration of schools in rural communities in developed countries, and has implications for the professional education of teachers. One implication is the need to find time to learn how to use ICT effectively in classrooms (Jensen and Brushwood Rose 2006). Bereiter (2002) has called for new ways of considering knowledge and the mind, advocating a move away from the idea of the mind as a container to a focus on knowledge creation through collaboration between learners. Gilbert (2005) suggests that knowledge should be considered a verb rather than a noun – something that is active rather than passive. Collaboration is central to these ideas just as ODL is central to the development of new educational structures, such as intranets, that link teachers, learners and schools.

The case study of Newfoundland and Labrador, briefly outlined above, has three implications for teacher educators in other parts of the world:

- First, collaborative pedagogy can be adapted to meet the reality of schools in Internet-linked structures. Rather than preparing teachers for traditional closed, autonomous classrooms, e-teaching and e-learning can extend classrooms in terms of space, time, organisation and capacity as they open to one another to bring teachers and learners into collaborative relationships.
- Second, the introduction of virtual, collaborative teaching and learning presences in traditional school environments challenges traditional concepts of classrooms as schools.
- Third, the introduction of cybercells and the creation of integrated virtual and actual learning communities have policy, pedagogical and organisational implications for enhancing access to both teaching and learning opportunities.

As ICTs continue to evolve over the next 10 years, and as the educational possibilities of media continue to increase, ODL is likely to benefit further both teacher education and student education. In this environment, the use of media is essential to the move from closed to open teaching and learning environments. ODL therefore inherently challenges the professional education of teachers, the nature of their appointments, the notion of classrooms and even the concept of schools.

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CHAPTER

9

Using the New Information and Communication Technologies for the Continuing Professional Development of Teachers through Open and Distance Learning

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Abstract

We live in a time of rapid and profound change during which both needs and opportunities for professional development keep growing as teachers strive to become lifelong learners. In this chapter, the authors explore how continuing education through open and distance learning (ODL) has evolved for the teaching profession with the use of information and communication technology (ICT).[1] The new ICTs are then discussed and how their uses can be theoretically based, and the use of 3D virtual worlds such as Second Life™ is examined. A framework for professional development is introduced and two cases of development using the new ICTs and ODL are presented. Problems and challenges are discussed.

Teachers in Transition: Developing as Professionals

Villegas-Reimers (2003) presented a comprehensive review of the literature regarding teachers' professional development. The report indicated an increasing tendency to view teachers as professionals rather than workers to be trained. According to Villegas-Reimers, a new perspective on professional development had emerged, based on constructivism rather than a "transmission-orientation": a view that professional development was a long-term process taking place within a particular context and often closely linked with school reform. Within this view, a teacher was perceived as a reflective practitioner and professional development as being a collaborative process. Individuals went through stages in their professional development, ranging from novice or intern during their initial preparation to expert or advanced.

[1] The term ICT is widely used but people have a range of understanding of the concept from narrow (e.g., computers, Internet or software) to broad (ways of working with information or communicating, usually via computers/digital devices). See, for example, Loveless and Ellis (2001, p. 2). We use the term ICT here in its broader sense.

Approaches to teacher professional development can be classified as structured or unstructured (Craig and Perraton 2003), ranging from more formal, in-service education, including tertiary study, to personal learning within professional learning communities.[2] Villegas–Reimers (2003) presented two main types of professional development: organisational partnership models versus small group or individual models. Both contain structured and unstructured development. Of the former type were university–school partnerships, schools' networks, teachers' networks and distance education. Some examples of the small group or individual models included workshops/seminars/courses, self-directed development, observation of excellent practice, action research, coaching/mentoring, use of teachers' narratives, teachers' participation in new roles, and portfolios.

In a recent study among 80 Icelandic teachers from three schools at the primary and lower secondary level, more than 80% indicated that coaching/mentoring, self-directed development or project groups were useful for professional development (Bjarnadóttir 2008). At the bottom of the list were courses: only 27% of the teachers agreed they were useful. In the middle were discussion groups (69%) or online networking/distance education (57%).

Studies such as these, however, are difficult to interpret because context, organisation, background and experiences can differ widely. Age, for example, can be an important factor in relation to attitude to online experiences. Older distance learners have been found to prefer more face-to-face experiences blended into their distance programmes compared with younger learners (Jakobsdóttir 2008a).

Collis and Jung (2003) reported widespread use of professional development of teachers and networking facilitated through information and communication technology (ICT) and listed several networks in different continents and countries devoted to that purpose. Villegas-Reimers (2003) found that computers and access to the Internet were having a large impact on the structure of teacher professional development courses and experiences. Advantages included increased accessibility and flexibility in scheduling, facilitation of collaboration, and cost-effectiveness. These advantages can also be linked to ODL, discussed in the next section.

Open and Distance Learning Defined

The term "distance education" (DE) is becoming less well defined as enrolment demographics change at the same time as the tools and processes (Howell et al. 2003). Increasingly students are enrolling in DE programmes not to overcome need (or distance), but for convenience – to fit study in with their work, family or lifestyle commitments (e.g., Jakobsdóttir 2008b). "Open learning" is a common term in many parts of the world that refers to the increased choice of learning paths, modes, media, tools and locations available to learners. The term is also used to encompass admission to programmes with less rigid pre-requisite qualifications than many traditionally delivered education programmes. Tella (1998, pp. 13–14) provided an overview of the meaning of different terms associated with DE. He considered ODL to be the main concept and gave the following reasons:

[2] Much has been written on communities of practice and professional learning communities in general or online (see, for example: Wenger 1998; Bonk et al. 2004; Stoll et al. 2006; Clarke 2009).

> "First, it [ODL] combines the key concept of openness with the traditional idea of overcoming 'distances'. Second, it appears wide enough to embrace most of the present interests and emphases in the field, and third, it is relatively widely used in Europe at the moment. However, it might be so that ODL will change into something else in a few years' time, depending on future developments. Yet it seems probable that the concept of openness will remain as one of the central constructs in educational parlance, and even more if the emerging concept of constructivism continues to gain ground."

Openness has certainly been a key concept in the area of DE. Also, it has been key in the development of open source software, open content or educational resources with open access (e.g., Hall 2008), as well as in the explosion of knowledge construction on a global scale. Networks, movements or organisations involved in education and/or technology have sprung up and promoted this development, which is seen by some to have great potential to decrease the digital divide (Kanwar 2007).

Another strong enabling factor in ODL is the increasing use of online teaching and learning. In fact, online learning is becoming a standard mode of learning for DE. For example, at the tertiary level in the USA, the growth rate for online enrolment was 12.9% compared with an increase of 1.2% in the student population overall (Allen and Seaman 2008).[3] The penetration rate of programmes in the field of education available online was 30%. Increasing exposure to online or DE experiences in initial or graduate programmes may promote the use of the Internet in relation to teachers' professional development.

Social and Self-Directed Learning Models: Emerging Theories

The literature examining the pedagogical models used in ODL (e.g., Garrison 2000; Peters 2000; Howell et al. 2003; Anderson 2007) indicates that the field is in a process of transition from older or traditional models of teaching and learning to newer models. Traditional models were anchored in the correspondence paradigm, based predominantly on a transmission model of teaching and learning and a concomitant "delivery of packages" approach. Newer models, however, are being shaped by constructivist theories of learning (Kanuka and Anderson 1999; Davis and Sumara 2002; Dron and Anderson 2007), the facilitation of ICT (Rumble 2001), and the affordances for learners of social networking software to foster collaborative learning in communities. These learning communities may be local, or they may comprise learners, instructors, mentors and experts distributed around the world. While members may be predominantly interested in their own learning, there is the recognition that learning can be enhanced through sharing with others; and that, through this collaborative process, new understandings can be reached and new ideas generated. There is also the recognition that individuals within the community possess different expertise and experience, and thus the roles of expert and novice can shift dynamically. The term "ecological

[3] The concept of blended learning has evolved to include the combination of face-to-face and online learning. Allen and Seaman (2008, p. 4) classify courses as: online when 80% or more of the content is deliverd online; blended or hybrid when 30–79% is delivered online; web-facilitated when 1–29% is delivered online; and traditional if no material is delivered online.

constructivism" could be applied to this emerging model of learners, instructors, mentors and other resources working to generate meaning in a mutually supportive or symbiotic environment, either locally or distributed geographically and temporally.

Connectivism is an evolving learning theory within this move toward the recognition of the importance of social and collaborative interaction in the construction and creation of knowledge. According to this concept, knowledge development forms a cycle that starts from the individual with personal knowledge, goes through a network to the organisation and arrives back to the person, "allowing learners to remain current in their field through the connections they have formed" (Siemens 2005). Connectivism seems to make provision for a range of learning processes and the new ways in which ICT – and particularly social networking software – can facilitate individual lifelong learning through collaborative construction of knowledge within distributed networked communities (Siemens 2005; Ireland 2007). While connectivism has been criticised as not being a "theory" (Kerr 2007; Verhagen 2007) but rather fitting into existing theories of constructivism and constructionism, it has considerable explanatory power for how social networking and other similar ICT are changing the ways in which learning and teaching are viewed. Given these critiques, ecological constructivism might be a better term to use here, in that the connectivist notion of learning ecologies in combination with the affordances of context-embedded and community-generated knowledge can readily be incorporated into a constructivist paradigm.

Heutagogy, the study of self-determined learning, may be viewed as a natural progression from earlier educational methodologies – in particular from capability development – and may well provide an optimal approach to post-secondary learning in the 21st century (Hase and Kenyon 2000, 2007). Lifelong learning requires learners to develop skills in identifying their own learning needs, sourcing appropriate learning opportunities and applying that learning. Online professional learning communities hosted within social networking platforms have become the sites that support interdependent self-directed learning. Some of those platforms, such as Elgg, for example, have been referred to as personal learning environments. They can serve the needs of individuals and be used for a range of purposes, including to compile digital portfolios and to keep track of users' learning, thinking, creative work and professional development. In contrast, learning management systems such as Blackboard or Moodle are used more to serve the needs of teachers or educational institutions.

New ICTs: A Brave Second World?

The last 30 years have brought major changes to the way people can communicate electronically, from text-based e-mail to the present proliferation of social networking and communication tools capable of varied combinations of text, audio, images and video in both synchronous and asynchronous modes. Often called Web 2.0 or the "Read/WriteWeb" because of the ability of users to both receive and create content as well as to collaborate, share and repurpose content, these tools have provided teachers and learners in ODL programmes with the potential to address some of the perceived social and communication shortcomings of earlier programme models. Their use can reduce isolation and

build a sense of community among learners (Cifuentes and Murphy 2000; Bates 2005; Wheeler 2005; Anderson 2007; Gillies 2008).

These newer forms of ICT also have the potential to support both structured and unstructured teacher professional development. They can, for example, be repurposed to form courses (including course offerings that use Facebook and wikis). Repurposed learning objects ("mash-ups") can be created (e.g., from YouTube videos), and reflective and interactive exchanges can take place synchronously or longitudinally (e.g., through blogs, wikis, e-portfolios, digital storytelling, discussion forums, chat and micro-blogging such as on Twitter).

A great current example of an open course using new ICTs for professional development is an online course called Connectivism and Connective Knowledge. The course, co-facilitated by George Siemens and Stephen Downes, is delivered in partnership with the Extended Education and Learning Technologies Centre, University of Manitoba (see http://ltc.umanitoba.ca/connectivism/).

At the same time, the proliferation of the use of various hand-held wireless mobile devices also supports networking through "on-the-fly" updates and the potential for real-time (or just-in-time) problem-solving and reciprocal peer-to-peer help. This has given rise to the term "m-learning" (or mobile learning; see, for example, Ally 2009), which encompasses mobile access to content-rich websites and social networking professional communities, as well as the contribution of content co-created by teachers in their own professional contexts.

These trends further blur the boundaries between structured and unstructured learning and between consumers and producers of information. Thus the term "blended learning," which previously referred to a combination of face-to-face and online environments, has now been extended to include microblogging through such applications as Twitter (e.g., Galagan 2009), the use of Clickers in face-to-face classes, and access by remote or itinerant students to formal content based on learning management systems and to discussion forums through mobile devices.

The importance of social presence in online environments – that is, the degree of awareness of the other person in a communication interaction – is also now being investigated (e.g., Dron and Anderson 2007; Kehrwald 2008), as is the impact of collaborative, networked knowledge construction on how learning can be enhanced and elaborated through the uses of various social networking applications (Siemens 2005). When examined in combination with the literature relating to ongoing teacher professional development, lifelong learning and learner self-direction (Brockett and Hiemstra 1991; Candy 1991), new patterns of affordances begin to emerge. Anderson (2007), for example, lists five groups of "affordances" for social networking application in education:

1. *acquaintance and connection* (bypassing constraints of course timing, institutional firewalls and, in some cases, privacy laws of particular nations);
2. *reflection* (personal and group, allowing for "social validation of knowledge," mutual support, and self- and peer-regulation of learning (see also Hoven 2007);
3. *discussion in public space* (opening discussion, critique and knowledge validation to the world beyond any specific classroom or course);

4. *co-operative work space and tools* ("for scheduling, co-ordinating, collaboratively creating and editing, storing and augmenting with multiple forms of media" which again supports a constructivist approach to learning); and
5. *sharing and archiving* (occurring online, allowing access from multiple locations by different individuals and community members).

Emerging Roles for Virtual Worlds in Professional Development

Three-dimensional (3D) virtual worlds (VWs) are another rapidly emerging technology providing a rich educational environment for professional development. Rapid uptake with increasingly diverse variety has been afforded by the massive expansion of the games industry and its associated software, access to high bandwidth Internet connections, and affordable computers with powerful processors and graphics cards capable of displaying the 3D landscapes in high resolution. Although mediated by technology, these environments have many of the attributes of the face-to-face world. As such, they provide new territory for research as online learning and face-to-face learning merge into a VW environment, creating new blends of synchronous and asynchronous interaction.

Virtual worlds graphically simulate the real world or create imaginary environments in which the users are represented by moveable characters called avatars. Open 24 hours a day, seven days a week, VWs are persistent environments that continue to exist even when users are not logged in. They create a backdrop for social interaction between avatars using voice and text chat. As well, VWs provide a range of building tools or ready-made objects for creating an enormous diversity of locations and means to meet different learning needs, including meeting spaces, presentation screens, models, animated visualisations, simulated industrial equipment, and scenarios for role-play and performance.

Virtual worlds involve technology similar to that used for computer games and may include the capability to emulate real-world physics. There are various brands of VWs that can be used for distance learning: Second Life™, Open Sim, Wonderland, Fortera and ActiveWorlds. These brands and others like them can be used for everything from informal meet-ups to accredited tertiary courses conducted entirely within the 3D environment. Conferences may also be hosted virtually, either parallel with the physical event or as online-only events.

During research into the affordances of VW technology for the professional development strategy of *action learning,* McKeown (2009) identified a range of roles for VWs for all types of professional development. These roles can be categorised and combined in novel ways (McKeown 2008) including location, context, content and materials, community and combinations (summarised in Table 9.1).

Table 9.1: Roles for virtual worlds in professional development (McKeown 2008).

Role	Description	Examples
Location	Place to learn and meet – distance learning, events, guest speakers, office hours access to staff by students and prospective students	 Mixed-reality event includes video from physical world and virtual participants
Context	Lifelike and virtually real	
Content	See, explore, manipulate, create	 Learning set meeting in action learning programme for teacher professional development
Community	Relationships with teachers, students, alumni, colleagues, experts, practitioners, researchers, business, employers, the public	
Material	Manipulate and create digital materials for creative expression, machinima (film-making) and visualization	 Harvester in farm scene for training video (machinima)
Combinations	Mix and match these roles to create authentic tasks, improve presence for distance learners, improve communication or connect to a wider audience and mixed realities	

Virtual worlds can provide a powerful sense of physical presence (you feel as though you are there) and social presence (you feel as though the other people represented by their avatars are there with you). Both of these advantages exemplify some of the ways in which ICTs are enhancing the move from traditional ODL teaching and learning models to more community-based and transformational models. As such, VWs are becoming a popular outreach location for local, national and international professional associations that hold professional development events and provide information centres for their members.

The International Society for Technology in Education (ISTE) is a rich example of this phenomenon, with full-time staff devoted to the provision of 3D services to members. Virtual meeting areas are provided, ranging from small group spaces to a 200-seat auditorium, as are regular weekly learning events for teachers on a

broad range of topics. Social events are also held in these environments, aimed at encouraging networking and informal learning. The ISTE VWs information centre provides resources in print and video formats and is staffed by members who volunteer as virtual docents to answer visitors' questions and guide them to information or events.

Many other formal and informal communities use VWs to bridge distance and create opportunities to learn and share. These communities include faculty groups, informal groups of colleagues, students in tertiary study, alumni groups, team members, researchers, business people, employers and interest groups of different kinds. In Australia, the University of Southern Queensland uses VWs as venues for role-play in immersion business English courses and as simulations where law students can conduct mock trials.

With the affordances of manipulating and creating digital materials and products for creative expression, VWs can provide opportunities for teachers to develop their knowledge and skills in design without the associated high costs. Such environments also provide enabling solutions in circumstances where safety, cost or size presents problems for learners or researchers in the physical world. High-risk environments can thus be entered safely, machines or organisms can be magnified beyond normal size, or large-scale models and data can be represented visually.

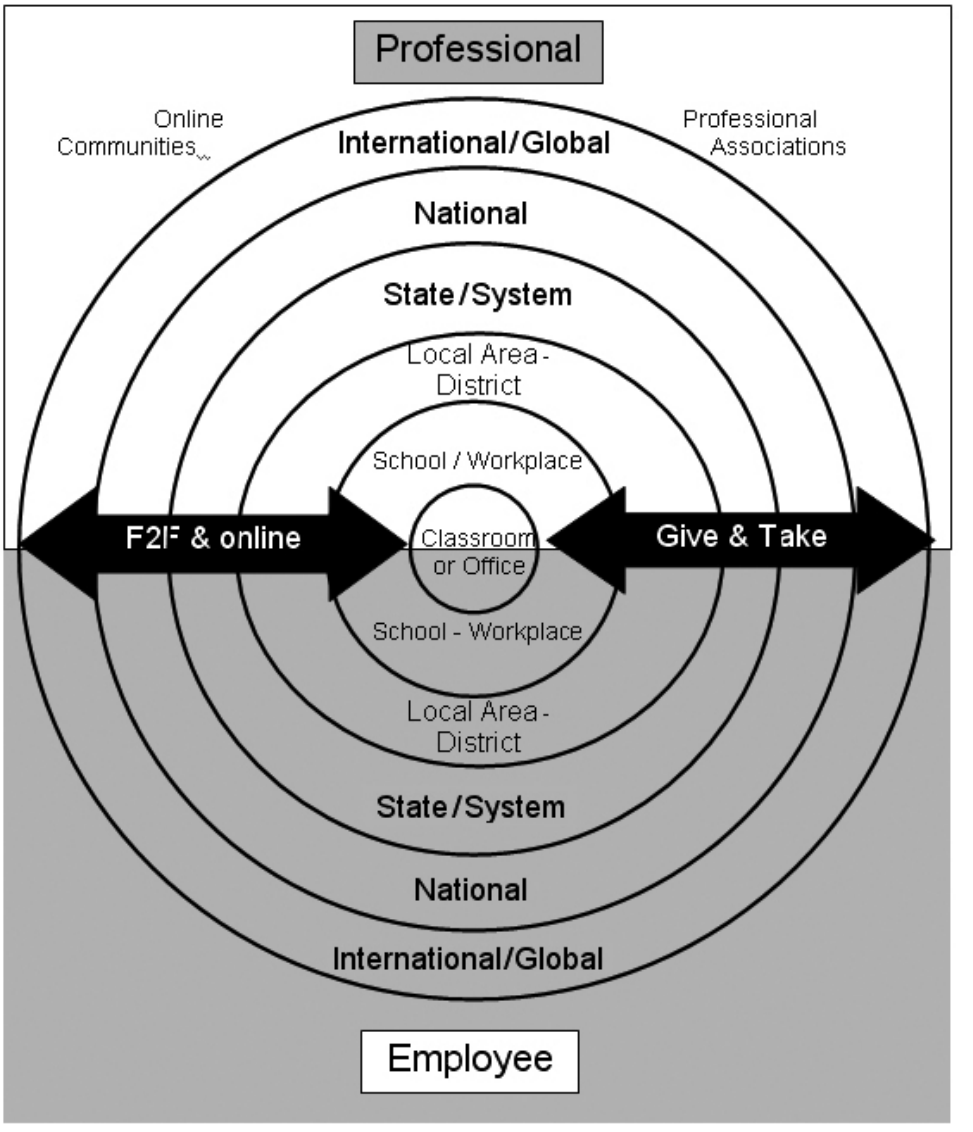
Framing Professional Development: Identities, Roles and Modes of Learning

McKeown (2009) also developed a framework to incorporate professional identity and roles. The two hemispheres shown on the diagram in Figure 9.1 represent two identities of each person, one as an employee, the other as a member of a profession.

Each person may have roles in any of the circles and in either hemisphere at the same time. For example, a person might be a classroom teacher at a local school while also being the president of an international professional association. The framework includes three main dimensions: identity (Professional/Employee), activities/roles (Give and Take [consumer-producer]), and learning mode (Face-to-Face and Online).

Previously, it was unlikely that an employee low in the organisational hierarchy could have a voice, a role or influence at the national or international levels of the organisation or industry other than that of consumer of print, audio or video resources. Participation in national and international events such as conferences was the privilege of those higher in the ranks. At the lower levels, participation was restricted to consumption of information and learning products. Only a select few were able to hold positions and contribute to the outer circles of the professional communities. Participation in or attendance at face-to-face events was often limited by financial capacity. In keeping with older, traditional models of teaching and learning, teachers themselves, as employees, were mainly consumers or recipients of top-down, formal or structured opportunities for professional development delivered face to face.

Figure 9.1: Professional identity: roles and types of activities (McKeown 2009).



That hierarchical structure has been flattened by the development of the World Wide Web, the broad acceptance of e-mail and the more recent flourishing of community and networking tools (Web 2.0) that allow participants in online communities to be both consumers and producers of content in various media. The threshold of participation in either learning- or practice-based communities is mainly determined by Internet access speeds and bandwidth as opposed to rank or financial capacity. Any Internet-connected person now has the capacity to access or deliver extensive learning opportunities, formal or informal, practice-based or theoretical. A practitioner might, for example, be sharing comments or information via micro-blogging that can be read instantly all over the world by the followers of that blog. It should be noted, however, that there are large differences in computer and Internet access between countries and between areas or groups

and within communities. Also, skills and motivation can be important factors for participation. (The access, competence and motivation [ACM] model, developed by Viherä and Nurmela [2001], has been applied in a large-scale international project concerning teachers' use of ICT in school [Empirica 2006]. It is based on the assumption that the three main preconditions that need to be given for a person to start using computers, the Internet and eServices are access, competence and motivation.)

Global Change through Local (Online) Professional Development

Professional identity, roles and activities have changed for many teachers during the past decade because of technological developments and ODL. Two cases are provided here to illustrate some effects of these changes: one focuses on an Icelandic teacher who is a local change agent working in a national and global context; and the other focuses on teachers who studied graduate courses in education at an Australian institution, bridging international communities.

Case 1:

> Fjóla Thorvaldsdóttir became a licensed teacher at the preschool level in Iceland in 1983 after a three-year on-campus programme with a few weeks of school-based practicum per year. Since then, Fjóla has engaged in various types of professional development. In 1995, she devoted a whole year to complete a special education diploma (one-year on-campus study with two-year practicum). She then worked for several years in vocational education, making use of her new expertise in special education. She went back to teaching at the preschool level in 2001, but became increasingly interested in the use of ICT in special education. In 2004 Fjóla signed up for a 30-credit Diploma of Education programme for ICT in education at the Master's level at the Iceland University of Education and completed her diploma two years later. About 25–30 students were in Fjóla's cohort. The programme consisted of online courses (with face-to-face sessions) and emphasised the building of a community of learners, joint knowledge-building (Jakobsdóttir 2002), uses of digital portfolios and the use of open educational resources. Fjóla completed courses, for example, on ICT in education, online teaching and learning, distance education, multimedia design, and ICT and special education.
>
> From the beginning of her professional career in 1983, Fjóla has participated in face-to-face in-service training courses and meetings organised by the school district and attended conferences, increasingly making contributions herself as a teacher, presenter or conference organiser. She has also been active in professional associations related to the three areas of her expertise. However, spiralling layers of professional development activities of different types have been added to her repertoire from the time of her graduation in 2006. She now has her own website (open source) which has been a popular resource for special education teachers across Iceland who are interested in using technology in their work.

She is active in teaching and has started working with young children (5- to 6-year-olds). In the preschool where she works, she conducted a project in which the children explored the neighbourhood forrested area using digital cameras and camcorders. The images and tales of the project were published on a website that Fjóla developed for the preschool using open source software. Videos were put on YouTube and presentations on Slideshare.

Soon most of the other teachers in her school became involved, all learning from Fjóla. Interest spread quickly to other schools in the district, about both the project and the uses of open source software. Fjóla has now helped set up similar websites for other preschools. Her former teachers at the teacher institution learned what she was doing through the professional community (ICT in education) that has been developing for the last decade.[4] As a result, Fjóla has been invited to present at the university to teacher education students at the undergraduate and graduate levels. Many university students have subsequently visited her preschool, interviewed Fjóla or spent time watching or participating in her projects. Fjóla has initiated new projects in collaboration with fellow preschool teachers across Europe to explore the uses of various tools for communicating and presenting information. One such project is an eTwinning project called "One-two, buckle my shoe,"[5] in which 12 European countries are involved. Fjóla has worked most closely with two other teachers: one in Poland and one in Spain. Another European project has since followed, this time funded by the Comenius project, with the aim of educating Eurocitizens of the Future.[6]

Fjóla's case illustrates how teachers can take advantage of ODL and new ICTs to grow in their roles as professionals and not just as employees. An attempt to locate her position on Figure 9.1 would not be worth the effort: her activities and roles are spread all over the map.

Case 2:

In a Master of Education (TESOL) programme in Australia, a group of students took a course in technology for second language learning taught experientially, in which they learnt the applications and uses of various Web 2.0 technologies through using them to develop their own websites. As they developed their own blogs, contributed to their class wiki, created webquests (http://webquest.org/) and other online activities, and learnt how to use video, still images and audio and put these on the web, the class became a community of learners.

The public part of this journey of self-directed and mutually supportive professional development can be found at the teacher's blog: http://lifentheuniverse.blogspot.com/. While this blog is

[4] This is being done in association with the website www.3f.is and a recently formed social network on Ning (http://utmidlun.ning.com).

[5] Project website: http://twinmath.wikispaces.com/. The project received a national eTwinning award in 2008 and a runner-up award as one of the best eTwinning projects in 2008. It was among the finalists in the 2009 competition Global Junior Challenge – Projects to Share the Future (www.gjc.it/2009/en).

[6] Project website: www.eurekology.com/

no longer being updated, and the links to webquests and online activities are no longer accessible, the students' blogs are still active and record the students' development and interactions. Many of the students were not from Australia, and by the end of the course several of them had returned to their home countries but continued to participate in the class interactions, worked on completing their online projects, posted to their blogs and commented on blogs of their fellow students. Some even created post-course blogs to continue and strengthen their connections to the worldwide community of technology-using teachers and to participate in the global TESL/TEFL practitioners' networks (Hoven 2007). As with the Icelandic teacher discussed above in Case 1, the students – through the uses of ICT and continuing online professional development – also blur the boundaries of the circles and categories in Figure 9.1.

Some Challenges and Problems: The Agony of Choice

Professional learning communities have been regarded as having high potential in teacher development in areas such as capacity-building for sustainable educational reform (Stoll et al. 2006). However, some questions and challenges have been raised. De Lima (2008), for example, who proposed a set of key dimensions for analysis of educational networks, questions the type of professional learning that networks are expected to generate and whether much learning necessarily occurs through them. He maintains that the dark side of networks is under-researched, including dysfunctional behaviour, destructive conflicts and convergence toward "groupthink."

Various types of problems associated with Internet addiction have also been identified (Young 2004). When access to games, entertainment, news or friends is always available online with a click or two, people tend to engage in related activities rather than those that would perhaps be more likely to lead to professional development. To what extent these tendencies persist with adults and what effects motivation and group cohesion might have over the longer term are questions still requiring research.

Another dilemma is the proliferation not just of information, but also of various types of online groups and networks. The authors of this chapter, for example, suffer from selection "angst" when barraged with dozens of invitations to become members of different types of networks and causes – some personal, others professionally related, and most apparently worthy. The speed of technological developments pressures people, institutions and countries to keep up. This speed also poses a challenge to researchers in this field because the object of study is a constantly moving target.

Conclusion

In this chapter we have explored how professional development with the use of new ICTs is evolving in combination with ODL for the teaching profession. The profound and rapid changes in ICT seem to parallel developments in our understanding of how learning occurs. The paradigm shift toward networked knowledge construction combined with insights into how adults engage in

and self-direct their learning can now be illustrated, supported and investigated through the implementation of Web 2.0 technologies. Teachers in technology-rich countries are becoming more familiar with the social networking tools and web-based resources that are available and simultaneously becoming more aware of the communities to which they have access and can contribute. Teachers in technology-poor nations or developing countries are increasingly turning to mobile devices to create their own communities and gain access to others, while embracing the connectivity and exchange of ideas, information and knowledge made possible through these means.

Three central issues – knowledge, autonomy and responsibility – have posed challenges to views of teachers as professionals (Furlong et al. 2000). These same issues will continue to challenge teachers who want to take advantage of new ICT and opportunities in ODL to develop as professionals. Some traditional methods remain important in certain circumstances and locations, but new doors are continuously opening.

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CHAPTER 10

Creating New Forms of Teacher Education: Open Educational Resources (OERs) and the Teacher Education in Sub-Saharan Africa (TESSA) Programme

Bob Moon

Abstract

This chapter examines the use of open education resources (OERs) in the Teacher Education in Sub-Saharan Africa (TESSA) initiative by:

- reviewing the contextual factors leading to the establishment of TESSA, in particular the acute challenges facing teacher supply, education and training in Sub-Saharan Africa;
- setting out the way in which the TESSA consortium was established and the OER approach was adopted;
- analysing the technical, research, pedagogic and resource production take-up and evaluation dimensions of the programme; and
- indicating the future direction for TESSA and other similar programmes.

The chapter also describes the successful establishment of the initiative and the positive indications of "change in practice" that early teacher evaluations suggest.

Introduction

Social crises come in varied forms. Natural disasters provoke sudden, sometimes cataclysmic disruptions to human affairs. The spread of disease, HIV/AIDS for example, may be slower, but it is equally devastating. Developing world economies are always more vulnerable and less able to mobilise a defence to the challenge. This is equally true of crises created through human activity, civil conflict being a prime case.

Crises can also slowly creep up on structures and systems. Looked at dispassionately, the causes and characteristics are very clear, but from within the warning signs are ignored. The acute global economic downturn of 2008 onwards

exhibited this form of myopia. In this chapter I argue that a crisis now exists around the supply, retention and training of teachers, particularly in developing world contexts. Such a crisis, although unable to attract the media interest of natural disasters, conflict or economic meltdown, is enormously significant for social stability and well-being. It is especially significant for achieving the quality forms of Education for All (EFA) that is called for unanimously around the world.

The chapter focuses on the "education" perspective of the teacher supply, retention and education triumvirate. My central argument is that the modes of teacher education and training created to meet 20th century needs and contexts are wholly inadequate for the 21st. In some situations, I will argue, old style forms of training actually work negatively on contemporary processes of teacher education.

The chapter falls into three parts. First, I briefly outline the form that the crisis around teachers takes. The figures and analyses are now well known, but the policy response, at national and international levels, seems hardly to acknowledge the scale of the problem. Second, I suggest why existing systems cannot hope to cope. Third, I look in detail at the Teacher Education in Sub-Saharan African (TESSA) programme. This is an open educational resource (OER) initiative that, working at scale, is putting in place one building block of the crucial reforms needed.

The Crisis around Teachers

The number of additional teachers needed to achieve EFA targets is formidable. UNESCO, in its *Global Monitoring Report 2008* and *Global Monitoring Report 2009* (UNESCO 2007, 2008), estimates the figure globally at 18 million teachers. Around 4 million more teachers will be needed in Sub-Saharan Africa and the same in East Asia and the Pacific. And these figures do not assume any improvement in pupil-to-teacher ratios. Sub-Saharan Africa has the biggest ground to make up. As the 2009 UNESCO report makes clear, the increase required represents 145,000 posts annually, a step up of 77% compared with the recruitment achieved between 1999 and 2006. These figures are for the primary sector alone. The expansion plans for post-primary will require parallel increases in the supply of more highly qualified subject teachers.

Recruitment, however, is a problem. While it is a global problem (Moon 2007), it is at its most acute in developing country contexts. The decline in salaries (particularly in comparison with those in newly emergent "knowledge economy" occupations) and in the status of teachers has been well documented (Colclough et al. 2003). The provision of adequate training places – particularly for high-cost, residential campus training – is also problematic. The consequence is that teacher recruitment and training trail massively behind the expanding EFA provision. This shortfall, endemic for many years, has led to the employment of a veritable army of millions of unqualified para-professional teachers across the region. A survey of 11 eastern and southern African countries by UNESCO (2000) indicated that one-third of existing primary teachers were untrained. Lewin (2002) has documented the shortfall in trained teachers that has arisen, and that will become greater if expansion to meet EFA targets continues. Lewin and Stuart (2003), for example, have shown how Ghana has only one-quarter of the teachers it needs and Lesotho only one-fifth.

The Global Campaign for Education (2006) argues that:

> "The education system in West Africa is increasingly the domain of 'para-teachers', with pre-service training of only a few months or even weeks. This is a direct attack on the quality education which all aspire and are entitled to. With the teacher crisis, quality has often been a hostage of quantity. The trend is to recruit as many teachers as possible, even if they do not have the necessary qualifications in order to respond to expanding enrolment."

Teachers are increasingly being seen as the Achilles heel of the push for EFA, not the least following research that clearly links pupil achievement to the level of education and training received by class teachers (e.g., van der Berg and Louw 2007).

The EFA Global Monitoring Report summary document (UNESCO 2005, p. 3) gave prominence to teachers:

> "Achieving UPE [Universal Primary Education] alone calls for more and better trained teachers. Countries that have achieved high learning standards have invested heavily in the teaching profession. But in many countries teachers' salaries relative to those of other professions have declined over the last two decades and are often too low to provide a reasonable standard of living. Training models for teachers should be reconsidered in many countries to strengthen the school-based pre- and in-service training rather than rely on lengthy traditional, institutional pre-service training."

This was also recognised in the position paper produced for the launch of UNESCO's Teacher Training Initiative for Sub-Saharan Africa (UNESCO 2007, p. 2).

> "It is only now that people are starting to listen to those who saw the shortage of qualified teachers as a major impediment to national development and that national and international authorities are beginning to realize that the achievement of the Millennium Development Goals and the Education for All objectives depends on the training of professionals capable of the long-term effort to promote education effectively, in particular through the training of teachers and managerial staff in the education system."

The 2005 report of the Commission for Africa made investment in teacher training a major recommendation and in doing so said (p. 186):

> "[T]he push to achieve EFA will certainly never succeed without substantial investment in teacher recruitment, training, retention and professional development."

The crisis around teachers, however, is more than one of recruitment and training. Working conditions for many teachers are poor. HIV/AIDS, for example, is disrupting schooling across the region. A recent South African report (Education in Labour Relations Council 2005) drew attention to its finding with the eye-catching headline "A teacher dies every two hours." In Kenya where 14,500 teachers are estimated to be HIV-positive, between four and six teachers a day die of AIDS (Bennell 2005). In Mozambique, HIV/AIDS kills more than 1,000 teachers a year (UNESCO 2008). In Zambia, HIV/AIDS claims the lives of 2,000 teachers a

year, again more than the output of the teacher training colleges (McGreal 2005). A study in Namibia (Melaney 2000) has shown that if the supply of new teachers remains constant at 1,000, the shortfall of teachers with the impact of HIV/AIDS taken into account will be 7,161 by 2010. And this statistic, as in many parts of Africa, does not reveal significant in-country regional disparities. In Namibia, for example, particularly high infection rates exist in the northern regions of Odangwa East and Odangwa West. Predictably, these are areas with the largest class sizes and 80% of the total population of Namibia (Melaney 2000).

HIV/AIDS is not only an issue of mortality. The days lost to sickness and the impact of this on other teachers are a major disruptive phenomenon.

Other issues impinge directly on teachers' lives. Corruption, for example, in some countries is a real concern. A report from Transparency International (2006) has shown how bribery around teacher placements and transfers is rampant in Kenya. Conflict situations have also exposed teachers to pressure and even physical risk. O'Malley, for example, has described how attacks on teachers and schools have increased markedly in recent years (O'Malley 2007).

It is perhaps unsurprising, given these sorts of teaching conditions, that absenteeism is a major concern in many education systems. In Uganda, for example, teacher absentee rates in primary schools run at 27% (Chaudhury et al. 2006). The UNESCO EFA *Global Monitoring Report 2009* (UNESCO 2008, p. 21) said that research studies:

> "... suggest that teacher absenteeism is more pronounced in public sector schools, in schools with poorer infrastructures, in rural areas, in poorer states and in schools serving children from lower socio-economic backgrounds."

The report also goes on to say (p. 121), "High levels of teacher absenteeism directly affect learning time and outcomes as well as national education costs and spending."

The crisis around teachers represents a complex interplay of factors and issues. A number of studies provide evidence that many countries face a crisis of teacher morale, with poor salaries and difficult working conditions affecting the recruitment and retention of teachers (Bennell and Akyeampong 2007; DFID and VSO 2008).

The nature and extent of education, training and professional development is also an issue identified not only by teachers but also by increasingly concerned members of local communities (Nelson Mandela Foundation 2004). It is this aspect of the crisis that this chapter addresses. However, as I argue in the next section, the education and training response can be made only on the basis of a full understanding of the crisis affecting all aspects of teachers' lives.

Building an Education and Training Response to the Teacher Crisis

A number of consequences flow from the teacher crisis context:

- The scale of the training need is so great that the "bricks and mortar" institutions created to train teachers in the 20th century will be insufficient to meet the needs of the 21st.

- The majority of training will inevitably be work- and school based.
- Existing course structures and designs need significant alteration to ensure an equitable distribution of training that is practically relevant to contemporary classroom situations.
- Given the urgent need to support teachers working, often in challenging environments, a much bigger commitment to in-service, continuing professional development is essential.

I am not suggesting, in questioning the primacy in policy-making of campus institutions, that colleges and universities will become redundant. Rather, I think there is a need for repositioning and rethinking conventional provision to extend access and to improve quality. More distributed models of teaching and learning still require "hubs" to organise provision and supply the essential support that professional preparation and development require. The need to develop shorter forms of pre-service education and training alongside better organised induction and in-service provision is urgent. Successive UNESCO Global Monitoring Reports have supported this. The report for 2005, for example, suggests that:

> "Training models for teachers should be reconsidered in many countries to strengthen the school-based pre- and in-service training rather than rely on lengthy, institutional pre-service training."

There are a few examples of this thinking in the region. Universities and colleges, sometimes supported by teacher unions, have generally been resistant.

In some countries, therefore, you have a minority of teachers experiencing a "gold standard" two, three or four years of training, with the majority of teachers entering the classroom wholly unqualified. Millions of unqualified teachers are already working in schools. They need training and access to qualifications. Additionally, among those already qualified, there is a pressing need for better organised and more relevant professional support. If that is to be school based, then it follows that some form of supported self-study (on an individual or whole-school staff basis) seems the only feasible and appropriate way forward. Course structures built around campus training models lack the flexibility and modularity necessary in part-time study. Therefore, the curriculum of initial and continuing education and training also needs reviewing. The move toward more practically focused, outcomes-based, school-focused training can be seen in many teacher training systems worldwide (Moon 2003). However, while the Sub-Saharan Africa region (except for South Africa) has, arguably, the greatest need, it has been especially slow to move in this direction.

Training structures and curriculum must be nationally contextualised. Nevertheless, in looking toward new policy approaches, the following seem relevant points to assess in most countries:

1. the balance of resource distribution – for example, between pre-service and in-service professional development training;
2. the extent to which part-time (school-based) study is learner or teacher centred;
3. the relevance of established forms of teacher education curriculum for those already in schools;

4. the appropriateness of traditional forms of assessment, particularly formal examinations, for those undertaking part-time (school-based) study;
5. the "portability" of study in ways that allow teachers to move from one community to another while continuing professional development courses;
6. the advisability of rethinking the role and the training of those who become teacher educators; and
7. the potential for seeing teacher education and training as a holistic part of the economic and social development of local communities.

The thrust of my argument is that we need to think more creatively about the purpose, structures and content of a revitalised teacher education and training system. Although the form this could take must be decided at the national level, there are many ways that co-operative engagement between countries can assist this process. An illustration is presented by the Teacher Education in Sub-Saharan Africa (TESSA) programme, described in the next section.

Harnessing the Power of Co-operation: The TESSA Programme

The foundation and building blocks of the TESSA initiative were established in the early years of the present century. A number of institutions – including the United Kingdom's Open University, the University of Fort Hare in South Africa, the Open University of Tanzania and Nigeria's National Teachers Institute (NTI) – had worked together on a range of projects. Such collaborations showed that some form of consortium co-operation around teacher education and training could have considerable benefits. In particular, the need for a resource centre/a place of expertise to provide advice to the many new projects becoming established in the region was advocated in the early proposals for funding the TESSA initiative.

The original group of African institutions involved expanded to 13 universities across nine countries (see Appendix 10.1). Alongside this group were three organisations with expertise relevant to the particular Sub-Saharan African challenge:

- the United Kingdom's Open University with its strong international record of working to scale, harnessing technologies and resource production and leading international projects, in particular the fund-raising necessary to launch such initiatives;
- the Commonwealth of Learning (COL), with its deep knowledge of open and distance learning (ODL) and a formidable global network of contacts around this theme; and
- the BBC World Service Trust, with its long record of using media, especially radio, to access communities across Africa.

As well, two African-based organisations were involved, both with a long record of involvement with teacher education: the African Virtual University based in Nairobi, and the South African Institute of Distance Education (SAIDE).

These additional members of the consortium brought a range of expertise and experience to the TESSA project. Notably, many of the organisations were working with the Open University to help define and develop the newly emergent idea of open educational resources (OERs). Initially referred to as "open context," OERs drew on the work of the "open source" movement which argued for a more flexible, open and free use of software – and presented a significant challenge to prevailing ideas about intellectual property and rights.

Given initial stimulus through funding from the William and Flora Hewlett Foundation, a range of OER projects primarily in North America was established. Most noteworthy at the time was the initiative by the Massachusetts Institute of Technology (MIT) to place all its faculty lecture resources on a website, freely accessible for anyone to use and adapt.

There is now a significant body of work on the OER movement (see d'Antoni 2009 for an overview). The essential features suggest that much content, in a variety of formats including multimedia, could and should be:

- freely accessible for use by anyone;
- presented in a format that users can adapt for their own context; and
- framed within a licensing system that makes adapters responsible for sharing their use of the resources with the wider community.

Such an approach clearly has significant potential for those working on resource projects in the developing world, and the consortium, with funding from the William and Flora Hewlett Foundation, began to explore the possibilities.

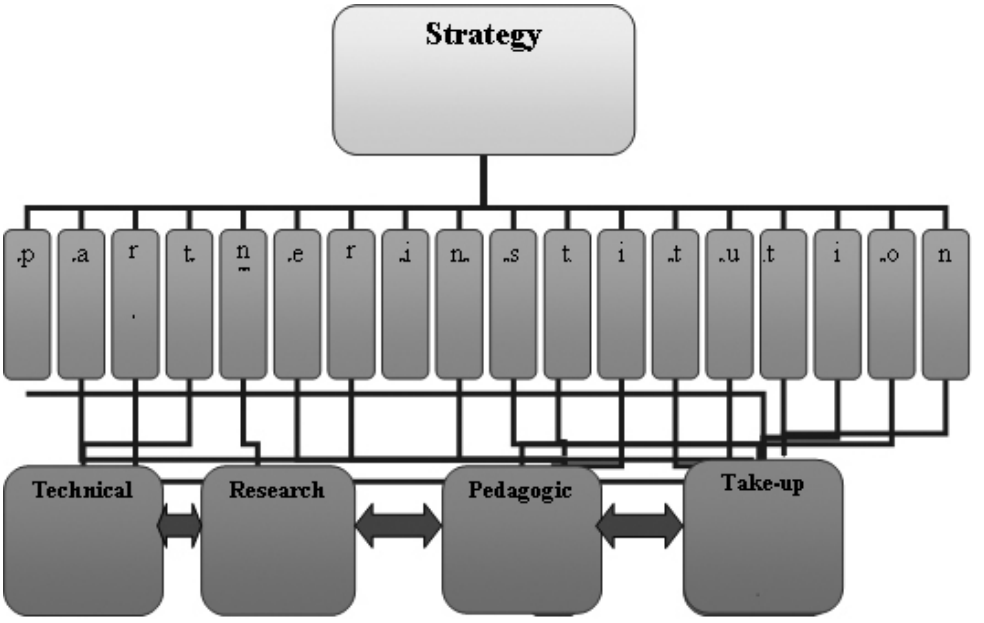
Important to note is that the TESSA consortium does not define itself in terms of north-south, south-north or south-south terms. It is a group of institutions that have come together around a specific task, and to achieve that it has sought out a range of expertise – some locally sourced, some international. The education and training of teachers in Sub-Saharan Africa is currently one of the world's greatest educational problems and challenges. As such, the TESSA consortium believes, it is deserving of international attention. In that sense, the consortium works genuinely collectively. For example, the resource production at the outset is not attributed to any one institution. Rather, in the planning and early stages of formulation, what is produced represents the endeavours of academics across a range of countries. The consortium functions through meetings, workshops and a significant amount of electronic and web activity (see www.tessafrica.net).

TESSA was not set up by governments or international donor agencies, although it retains strong links with both these communities. This positioning of the consortium is seen as a strength, offering a model that others contemplating similar forms of co-operation might consider. TESSA does not seek to provide or accredit courses. It does, however, offer models of use and an extensive range of resources that can be sourced for the development of programmes.

How was this achieved?

Figure 10.1, which has been taken from a recent analysis of the way TESSA functions (Wolfenden 2008), sets out the four main dimensions of the TESSA process: technical, research, pedagogic and take-up.

Figure 10.1: The four dimensions of the TESSA programme.



Technical

From the start, TESSA planned to create a web environment that could be easily accessed by teacher educators across the region. Connectivity and access, despite significant progress, still remains an issue, particularly for teachers. TESSA therefore set out to offer support through the latest technologies, but with a means of publishing resources in traditional formats. All TESSA resources are available online and in downloadable formats. Although the resources in the two forms address common issues, the content of each, given the medium of delivery, is slightly different.

TESSA wholeheartedly embraces the increasingly significant ideas of the OER movement. All resources are freely available for anyone to adapt, whether for profit or not, through the Creative Commons Licencing process. Institutions within the consortium have already carried out significant adaptation and, in the process, created one of the world's largest OER sites dedicated to teacher education and training.

The design of the web environment involved extensive consultation and took place over a two-year period from 2005 to 2007. There were a number of technical problems. One, for example, was designing a site that could adapt to multiple languages, including Arabic, English, French and KiSwahili. The consortium was also committed to creating multimedia resources and these had to be made available in a variety of formats. This process is now complete and www.tessafica.net is open to anyone. Each country has a dedicated place on the site and a variety of forums and idea exchange activities are underway (see Appendix 10.2).

The technical cost represents an investment that can support future development and is also available for replication by similar projects.

Research

In an important sense, TESSA represents a major research and development activity. The whole process has provided a wealth of technical, logistical and developmental

data. The testing of the materials, the evaluations of the website in its early phases and the planning carried out by institutions have all provided a useful basis for reports and publications (see, for example, Anamuah-Mensah et al. 2008). TESSA additionally has two valuable research dimensions.

First, the consortium has raised the funds to support a number of doctoral studentships. Individuals who wish to study topics relevant to TESSA concerns have been selected, by competitive interviews, from participating countries and institutions. In the first phase, these topics have included the role of digital libraries, the relation of information and communication technology (ICT) policy development to practical implementation and the significance of OERs for the expansion of higher education in Africa.

Second, TESSA has established a specific research project exploring teachers' lives. The aim of this is to provide a more finely grained understanding of the professional and personal lives of teachers in forms that might be useful to the designers of new courses and programmes. In the first instance, the focus has been on female teachers working in rural communities, and presentations have been made at a range of seminars and conferences (Buckler 2007).

Pedagogic

The TESSA consortium, through a series of workshops, set out a number of parameters within which it wanted the pedagogic resources to develop. These particularly included:

- a focus on the core teaching tasks of the primary school teacher;
- an emphasis on active learning on the part of the teacher, with plentiful examples of classroom activities;
- a common structure to the study units, to provide users with a familiar teaching and learning approach;
- the need to explicitly define expected learning outcomes; and
- an emphasis on promoting collaborative working between teachers.

It followed, therefore, that the first curriculum areas developed were in Literacy, Numeracy, Science, Life Skills and Social Studies. All the study units incorporated activities that had to be practical and classroom based.

The consortium created a template to guide authors and designers. This served a number of purposes. It provided a structure around which the sharing of ideas and examples could be built. For example, the template (see Appendix 10.3) required a series of activities, with the final activity serving to sum up the learning outcomes for the study unit as a whole (Appendix 10.4). A number of case studies were also required. The template also facilitated OER adaptation and versioning to local contexts. Authors creating the initial study unit were required to ensure that certain parts of the unit were generic and could be used by teachers across the continent (an early TESSA research project had identified the common features of teacher education and school curriculum across a representative range of Sub-Saharan African countries). Other parts of the unit were designated as "needing adaptation and versioning." Thus, some case studies were newly created for each country context, as were some activities. Adaptation could take many forms, ranging from the straightforward need to change names or plant and animal

references, to more substantial versioning to take account of specific national curriculum regulations.

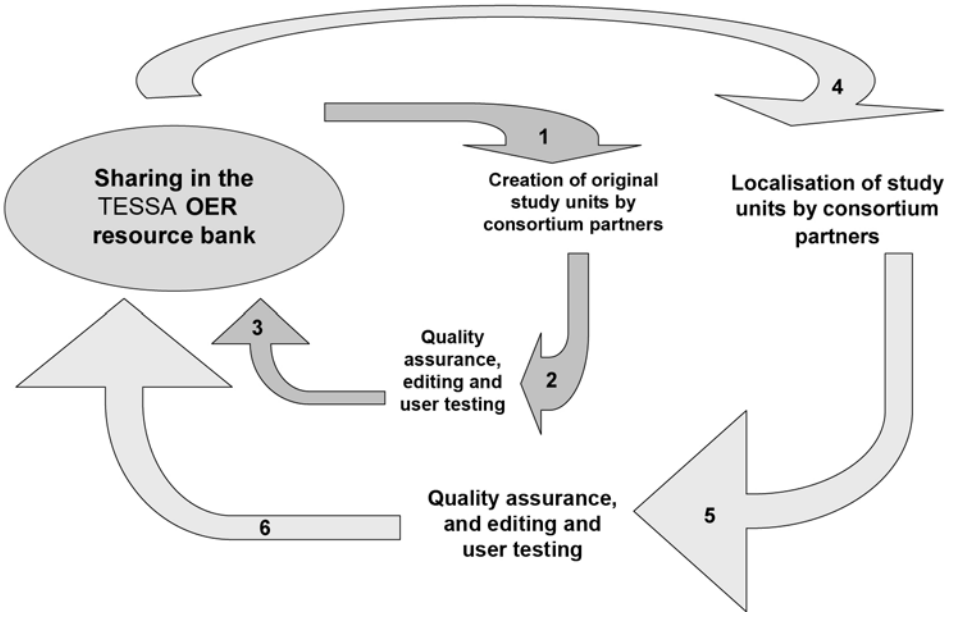
In one sense the template is a simple construction. The use of such a device, however, proved enormously important in facilitating the work of more than 100 African academics across nine countries. It also helped with the sort of questions asked of developmental testers. More than 1,000 teachers tried out the materials in the developmental stage. Particular attention was given to creating the activities that teachers had to work through in the classroom context.

The importance of this process must be stressed. Materials for teachers to use often lack practical applications. The sorts of activities designed by the TESSA consortium are not easy to create. These activities, numbering in the hundreds, had to:

- be realistic for the sorts of situations teachers would be working in;
- allow teachers to demonstrate, across the materials as a whole, the full range of teaching skills; and
- address directly the expected learning outcomes of the unit.

More authoring time was put into the crafting of these activities than any other aspects of materials development. A key point to emphasise is that these resources are for teacher use. They are aimed at professional preparation and development and should not be confused with pupil resources. This is an important distinction. Although some pupil resources may be provided to help carry out activities, the provision of comprehensive pupil resources is not the purpose of the consortium.[1] Figure 10.2 illustrates the TESSA materials creation and adaptation process (Wolfenden 2008).

Figure 10.2: TESSA materials creation and adaptation.



[1] Some members of the consortium have, however, been considering a new project that focused on the provision of highly structured, multimedia pupil resources, particularly aimed at supporting unqualified or under-qualified teachers.

More than 750 study units have been produced in four languages and all can be viewed at www.tessafrica.net. It is important to clarify that the materials do not represent a course. Rather, they are the building blocks through which teacher educators and others create courses relevant to the context in which they are situated. It is not without significance that a recent description of TESSA is illustrated by two brightly coloured LEGO® bricks (Moon 2008). The TESSA resources, therefore, do have an underpinning pedagogic strategy and all have been extensively trialled and tested for academic accuracy. As such, they represent a high quality basis around which course design can proceed.

The TESSA consortium has also produced a number of multimedia resources. The purpose of this activity is to raise the level of interest and motivation of participating teachers. It might be an exaggeration to say that too much teacher education is, frankly, boring, especially when replaced with materials and resources. In some of the preliminary survey work carried out by TESSA, this was the view of a significant number of teachers. Both old and new ICTs can add a spot of creativity to enliven courses and programmes.

So far there have been a number of aspects to the multimedia developments. A series of scripted and acted four- to seven-minute audio clips address the sort of issues and dilemmas that teachers face. These clips are on the website. Additionally, TESSA funded the creation of a number of radio programmes, broadcast across the region, which focused on teachers. One programme, for example, explored the experience of two teachers, one from Ghana and one from Kenya, who did an exchange for a week. These programmes elicited a significant level of interactive response through telephone and e-mail about the teachers' roles and conditions of work. TESSA also embedded a story line about teachers in a highly popular West African "soap" which is set in Nigeria but broadcast across Africa.

This multimedia approach to teacher education can be expanded as connectivity improves and access to new technologies expands. I believe there is enormous potential for this to significantly improve the quality of support for teachers. The TESSA audio clips are also available on Apple iTunes U and in the coming years I anticipate that multimedia social forums such as YouTube and Facebook will have applications relevant to teacher education and training programmes.

Take-up

TESSA, as an extensive OER environment, has another distinctive feature: the emphasis that is placed on take-up and implementation. From the outset the TESSA consortium was determined to avoid the fate of other projects where resource production, rather than use, had dominated programme design. The TESSA consortium has therefore devoted considerable time to workshops, information exchanges, expert visits and a range of other activities to support the varied forms of implementation being adopted by the participating institutions.

At every meeting of the consortium, representatives share the use and implementation experience, revisit progress and contribute strategies for future use. Appendix 10.5 gives a very brief overview of the range of uses made of TESSA across the participating institutions.

The building blocks – study units represented by TESSA's OERs – can be used for many overlapping purposes. Pre-service, upgrading and in-service professional development programmes are all represented in the TESSA implementation programme. National teacher upgrading programmes now implementing TESSA – for example, in countries such as Sudan and Nigeria – extend to hundreds of thousands of teachers. In Nigeria the TESSA resources and approach have been incorporated into the manuals for use by students in all the Colleges of Education (see Appendix 10.6).

The TESSA implementation approach recommends an integrated resource and support approach. The resources provide a trialled and tested explanation and exploration of the basic pedagogic skills and knowledge that all teachers should be able to practise and understand. This allows the supporting individual, tutor or advisor, to concentrate on the interpersonal, professional skills of guidance and encouragement. This is a significant advantage, particularly where the qualifications of those providing the support role may be limited.

The TESSA consortium sees "evaluation of use" as a key determinant of success. A research assistant has been in post from the outset, co-ordinating evaluation data. Every participating institution has an evaluation plan designed to recognise the particular way in which the TESSA resources have been used. The outcomes of evaluations of impact are regularly reported to the consortium's steering group, the Partner Advisory Committee (PAC). Examples include:

- The National Teachers' Institute of Nigeria and the Open University of Sudan jointly conducted a joint survey of 750 students across the two programmes. An evaluation survey showed that 96% of students felt the TESSA resources had brought about changes in their teaching practice. Furthermore, 81% of students could show two or more changes in their practice arising from the use of TESSA resources.
- The University of Pretoria carried out a sample questionnaire survey of 100 student teachers using TESSA resources. In all, 88% reported that the TESSA study units helped them understand the use of a wider range of classroom activities. And 82% thought that pupil engagement and behaviour improved when they were implementing TESSA activities.

Quantitative evaluations are backed up by the collection of questionnaires completed anonymously by students. Examples from the three institutions:

- "I have enjoyed using the materials because they make classroom activities simple and easy. Pupils are now improving in their performance and it has helped me improve my teaching skills." (teacher, Nigeria)
- "Using TESSA resources is the best way to teach Science. I have found myself as a teacher and will adopt it for the rest of my life." (teacher, Sudan)
- "The TESSA materials broadened my way of thinking and teaching. The learners were more focused than usual and asked more questions." (teacher, South Africa)

The consortium decided, starting in February 2009, to carry out interviews with teacher educators who are implementing TESSA resources with student teachers and serving teachers. Examples from the responses of the interviews carried out in Kenya:

- "To use a seed as metaphor, children are coming in with their own knowledge and experiences. This is the seed. TESSA helps teachers to grow what [their pupils] know." (Professor Fred Keraro, Department of Curriculum Instruction and Educational Management, Egerton University, Kenya)
- "So when we are teaching we try and get them to use a TESSA kind of way to teach their primary children; they gave good feedback because the children liked it. They said they participate so much and they attend school more." (Rosemary Lugyani, Lecturer, Egerton University, Kenya)

In Nigeria, the use of the TESSA resources has extended beyond the original participating institutions, with the resources now being incorporated in the curriculum of all 82 Colleges of Education (training more than 400,000 teachers). *The Daily Trust* newspaper published an article on this extension of TESSA on March 5, 2008. Professor Mohammed Ibn Junaid, Executive Secretary of the National Commission controlling the colleges, was quoted as saying that there was an "imbalance between theory and practice in teacher training and that the TESSA consortium works to fill the gap and guide teachers on how to enhance the impact of teaching on the learning process."

Individual participating institutions have developed evaluative strategies that reflect particular concerns. In Kenya, for example, evaluative surveys of the impact of TESSA on the quality of student-assessed assignments are underway. In Sudan, a survey of supervising tutors using TESSA is being carried out.

The Future

There are a number of dimensions to the future plans for TESSA. An African-based executive group is now in place that is planning strategic next steps. An associate structure of participating institutions has been established and nearly 100 teacher education institutions have joined. Core participation is also extending, with institutions in a number of francophone countries becoming involved. The TESSA consortium is now making a major contribution to debate and discussion around OERs, particularly where the organisation of entirely new resources and associated implementation strategies is involved. This includes contributing to the OER Africa project led by the South African Institute of Distance Education (see www.oerafrica.org).

TESSA is also actively associated with initiatives to extend the approach to the health sector in Sub-Saharan Africa. And discussions are also taking place about creating TESSA equivalents to support the needs of teacher education communities in other parts of the world.

This represents significant momentum. However, some important and more tangible developments will be necessary to make TESSA effective over the long term. International co-operation and partnership, although widely advocated, are often difficult to establish. In the first important phases, TESSA membership has remained strong and is growing. For sustained progress, this commitment needs to be extended and deepened within institutions to ensure that the use of TESSA-like resources becomes part of the professional culture of participating teacher educators and the teachers they support. Teacher education institutions, whether universities, colleges or other form of organisation, sometimes find it challenging

to create internal and external modes of co-operation. There is a certain form of individualism that can mitigate against creative use of external supports such as that represented by TESSA. Hence, the leadership of institutions has a crucial role to play.

The challenges for teacher education are formidable. The need to work at scale, the potential to exploit emergent ICTs and the imperative to help improve teacher morale and motivation require a communal rather than individualistic response. It is for this purpose that the TESSA community (or "TESSA family," as consortium members often refer to it) has been created.

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Appendix 10.1: Core participating institutions in the TESSA consortium

TESSA is a consortium of 18 core national and international organisations, including 13 institutions in Sub-Saharan Africa that are using the TESSA materials in a variety of teacher education programmes:

African Virtual University

BBC World Service Trust

The Commonwealth of Learning

Egerton University, Kenya

Kigali Institute of Education, Rwanda

Kyambogo University, Uganda

Makerere University, Uganda

National Teachers' Institute, Nigeria

The Open University of Sudan

The Open University of Tanzania

The Open University, United Kingdom

South African Institute for Distance Education

University of Cape Coast, Ghana

University of Education, Winneba, Ghana

University of Fort Hare, South Africa

University of Pretoria, South Africa

University of South Africa

University of Zambia

Appendix 10.2: TESSA home page

Appendix 10.3: TESSA study unit template

TESSA FILE NAME:
MODULE AREA:
Module Number: (1, 2 or 3)
Module Title: (Maximum 50 characters, including spaces)
Section Number:
Section Title: (Maximum 50 characters, including spaces)
Keywords: (Maximum 6)
Author Signature:
Learning Outcomes (Maximum 3)
Introduction (100 words) **Total Words:**
Webpage 1 (450 words, including case study) **Total Words:**
Case Study 1 (Maximum 200 words) **Total Words:**
Activity 1 Title: (Maximum 50 characters, including spaces) Activity 1 (150 words) **Total Words:**
Webpage 2 (450 words, including case study) **Total Words:**
Case Study 2 (Maximum 200 words) **Total Words:**
Activity 2 Title: (Maximum 50 characters, including spaces) Activity 2 (150 words) **Total Words:**

Webpage 3

(450 words, including case study)

Total Words:

Case Study 3

(Maximum 200 words)

Total Words:

Activity 3 Title – Key Activity: (Maximum 50 characters, including spaces)

Key Activity (150 words)

Total Words:

Learning objects/resources:

(Maximum 6 resources)

Copyright details of all relevant objects/resources:

(For each resource we need TESSA Title of resource; Author of resource; Title of work from which resource taken, including ISBN number and edition; page number or website link or home page)

Resource 1
Resource 2
Resource 3
Resource 4
Resource 5
Resource 6

Key Resources:

Activity 2: *Exploring changing sounds*

- Organise your class into small groups to investigate ways to change the sounds made by a range of objects. Give each group one set of equipment here are some ideas:

  - Use different-sized upturned tin cans as drums.
  - Fill five identical glass containers with different levels of water and tap them with a pencil.
  - Blow air over bottles of four different sizes.
  - Use four identical plastic bottles filled with different amounts of sand as shakers. Pupils could also choose something for themselves.

- Ask your pupils to think about and then carry out investigations to find out:

  - How are you making the sounds?
  - How can you make the sound higher? lower? louder?

- Each group records their results on a poster, including any patterns that they found. They also discuss:

  - how well they have worked together;
  - how they might organise themselves next time;
  - how happy they are with the group ideas on changing sounds.

- Groups could swap equipment if they want to do more experiments, but make sure that they have first recorded their results on the poster or in their book.

You may like to use Resource 3: Ideas pupils may have about working in a group to help your pupils with their discussions at the end of the experiment.

Appendix 10.5: TESSA implementation, 2008 onwards

Country	Partner institution	Programme	Indicative number of teachers
Ghana	University of Cape Coast	B.Ed. (on campus)	4,000
Ghana	University of Education, Winneba	B.Ed. (on campus)	3,200
Kenya	Egerton University	B.Ed. Primary (distance)	2,000
Nigeria	National Teachers' Institute	Nigeria Certificate of Education	55,000
		National Teacher Retraining	145,000
		State Continuing Professional Development	10,000
Nigeria	National Commission for Colleges of Education	Nigeria Certificate of Education	Students of 82 Colleges of Education
Rwanda	Kigali Institute of Education	B.Ed. for Primary Teacher Educators	300
		B.Ed. Internships	1,000
South Africa	University of Fort Hare	Advanced Certificate in Education, National Professional Diploma in Education, B.Ed.	500
South Africa	University of Pretoria	B.Ed. (on campus)	2,000
South Africa	University of South Africa	B.Ed. (distance)	4,500
Sudan	Open University of Sudan	B.Ed. (distance)	90,000
Tanzania	Open University of Tanzania	Diploma in Primary Teacher Education	2,000
Uganda	Kyambogo University	Diploma in Education, Primary External (distance)	1,500
Uganda	Makerere University	B.Ed. (distance)	1,000
Zambia	University of Zambia	B.Ed. Primary (on campus)	300
		Bachelor of Teacher Education	100
		Primary Teachers' Diploma by Distance Learning	4,000
			Total 326,400

Appendix 10.6: TESSA adaptation for Nigeria

Pre-Service Teacher's Manual for Micro-Teaching and Teaching Practice for Basic Education

Mathematics

FOREWORD

The National Commission for Colleges of Education in Collaboration with the Teacher Education in Sub-Sahara Africa (TESSA) consortium developed these Pre-Service Teacher Manuals for Student-teachers preparing for Micro-teaching and teaching practice. The Manuals are part of the effort of the Commission to upgrade the quality of the NCE teachers produced by the various Colleges of Education in Nigeria.

The three-pronged objectives of the manuals are, first of all, to make the pedagogical outfit of the Nine Year Basic Education classrooms more activity-learning based through diverse participatory, interactive, cooperative and collaborative strategies. Secondly, the Manuals are to complement the academic and methodological components of the NCE courses to which the student-teachers are exposed through new learner-friendly techniques and key resources. Thirdly, the Manuals are produced as sort of 'hands-on' and 'minds-on' experiences needed to make classroom management and learning outcomes more effective, enjoyable and rewarding. By going meticulously through the practice activities presented in the Manuals, it is expected that the student-teacher would be able to teach all aspects of the Nine-Year Basic Education Curriculum more competently through the pedagogical in-put derived from the TESSA activities.

It is, indeed, a great privilege for the National Commission for Colleges of Education to present the Pre-Service Teachers' Manuals to all Colleges of Education for their use in all relevant teaching-learning situations, especially during Micro-teaching and teaching practice activities. It is the fervent hope of the Commission that all student-teachers for whom these Manuals are produced would demonstrate commitment, creative and critical ability in using the Manuals.

We sincerely congratulate all those who contributed to the development of these Manuals. Our thanks go most especially to the staff of the National Commission for Colleges of Education and the course developers for a job well done. We also- thank most sincerely the TESSA Consortium of the Open University of the United Kingdom for graciously allowing us to adapt the original materials for use by Pre-service students in the Colleges of Education in Nigeria.

With great expectations for improved NCE graduate output, the Executive Secretary, National Commission for Colleges of Education, heartily recommends these manuals to all Colleges of Education for the purpose of producing the most qualitative Basic Education teachers, the best classroom teacher performance and enriched teaching learning outcomes.

Professor Muhammad Ibn Junaid
Executive Secretary
NCCE, Abuja

CHAPTER 11

The Cost-Effectiveness of Using Open and Distance Learning in Teacher Education

Bruce Thompson

Abstract

There has been an accelerated expansion of school education, especially in developing countries, resulting in serious efforts to mobilise resources toward teacher education. In 2009, Sir John Daniel of the Commonwealth of Learning summarised three outcomes of what both governments and the public want of their education systems as:

- Cost: to be as low as possible
- Quality: to be as high as possible
- Access: to be as wide as possible

From a practitioner's point of view, how can these three outcomes be achieved? This chapter tries to answer that question by examining some measures from the perspectives of: 1) the administrative budgets to set up and run the open and distance learning (ODL) programme; 2) the development of a quality ODL programme; and 3) participant access to an ODL programme. At each point decisions are made that can impact the other two. Determining if undertaking an ODL programme can be cost-effective will be a choice made only by considering all three points of view and the expected outcomes. Planning for all three and the monitoring and management of all three cost aspects of an ODL programme are critical to its success as well as to its cost-effectiveness.

The chapter highlights a few of the many ODL teacher education programmes underway around the globe that are using varying approaches to make their programmes more cost-effective.

Introduction

In 2006 it was estimated that more than 18 million new primary school teachers would be needed worldwide (UNESCO 2006). This demand for new teachers, upgrading the quality of teaching skills, the specialisation of teachers and replacement of retiring teachers are putting strains on many education ministries in both developed and developing countries. Consequently, education funders are looking for ways to measure, manage and control costs of programmes in order to obtain maximum benefits. The movement to exert more cost control and to justify expenditures has led institutions to analyse what their programmes are actually costing and make justifications for their continuation or expansion. Business models have been suggested to understand the line expenditures of a budget for an open and distance learning (ODL) programme. There are numerous methods to construct budgets for the development of learning materials and the delivery of the teaching. These budgets are used to manage and make comparisons between differing programmes and between differing modes of delivery of the same programme.

In a presentation at the recent 2009 Association for the Advancement of Computing in Education E-Learn conference in Vancouver, Canada, the question was posed: "How much did your programme cost to set up the learning environment?" The answer was a straightforward dollar figure, without any explanation, breakdown or analysis of what that represented. Despite this, comments ranged from "Whoa!" to "Reasonable for the product" and "Cheap at that price." Obviously, perceptions vary on what is cost-effective and each person is using a different standard to form that opinion.

Various methods of budgeting leading to a cost-benefit analysis for ODL programmes have been researched (see, for example: Rumble 1997; Moran and Rumble 2004; and Jung 2005). Most researchers end up concluding that making comparisons between programme offerings using differing modes of delivery, or between similar programmes offered in different countries, is complicated if not impossible. Simple differences such as wages, currency valuations and technology costs can skew these comparisons. It is also difficult to be all-encompassing in ensuring every cost is measured. As identified by Moran and Rumble (2004), many costs are hidden or not considered directly related to the ODL programme. So, in the end, one is left feeling that demonstrating cost-effectiveness using a cost-benefit analysis on its own in an ODL programme, whether it is related to teacher education or some other area, is not an easy proposition.

More recently, cost-effectiveness has taken into consideration both the inputs and outputs as a measure of cost-effectiveness. Cost-effective has been defined in terms of both a cost-benefit analysis and a cost-effective analysis (Peterson 1986).

In a speech at the Bangladesh Open University in 2009, Sir John Daniel of the Commonwealth of Learning talked about a triad of outcomes sought by governments:

- they want to widen access so that education and training can be available to all citizens who aspire to it;
- education must be of good quality – there is no point in widening access unless education makes a difference to people's thinking and their lives; and

- the cost must be as low as possible – governments and individuals never have enough money.

It is wrong to make education more expensive than necessary; low cost will enable more people to take advantage of it. Daniel (2009) also summarised three outcomes of what both governments and the public want of their education systems as:

- Cost: to be as low as possible
- Quality: to be as high as possible
- Access: to be as wide as possible

If these three outcomes were achieved, then an educational programme might be considered cost-effective.

One of the most commonly asked questions when considering the undertaking of an ODL programme is "What will it cost?" The answer is never easy or straightforward. Generally the most considerate answer is, "Well, it depends." Trying to take into consideration all that ODL may entail and the associated costs of each aspect is difficult and variable from one situation to another. These costs will also become more variable as programmes become more sophisticated and technologies are introduced. Cost comparisons between programmes with the same expected outcomes have been made (Creed 2001; Bartley and Golek 2004). Perraton et al. (2002) looked at the costs of technology-mediated ODL programmes.

More recently, many papers have discussed the costing of information and communication technologies (ICTs) in teacher education systems from around the world. The UNESCO-APEID International Conferences held in Bangkok in 2006, 2007 and 2008 have had many presentations related to the use of ICT and ODL in the Asia-Pacific region. The website www.unescobkk.org/education/ict provides helpful material about the use of ICT in Asia-Pacific education.

Budgets generally fall under the direction of an administrator who must then decide how to allocate portions of that budget to achieving the goals of the ODL programme. Here are some of the considerations that must be taken into account.

ODL Administration Costs

Let us consider the implication of the first budgets and decisions around cost that will present itself to an administrator about to set up an ODL programme. Initially, an overall budget is proposed that most likely encompasses both the development and delivery of a programme. As many institutions move toward cost recovery (partial or full), there may be a separate budget for revenue generation. Details of the programme are not usually worked out at the initial stages of budget development, so the administrator must allocate on a best guess. Only after detailed planning has happened will that budget be broken into separate allocations that can make the programme operational.

Initial monies are set aside for the administrative costs to run the programme annually and possibly the support costs of that programme. Student costs are considered as an enrolment fee to recover some of or the entire programme costs only if the programme is self-recovery. More likely, student fees will go into general

revenues for the institution. There may be a one-time expenditure budget for the development of the learning materials. The development costs and the student or participant costs are examined later in this chapter.

Given a specific budget, the administrator must now break it down into components for staffing, development, tutoring and student support. Also figuring into these calculations will be expectations of how long the programme will be viable. Many institutions operate on annual budgets, so long-term planning is not always considered.

Because many ODL programmes are associated with traditional education institutions, a built-in infrastructure is accessed. These infrastructure costs may not always be considered when looking at overall costs of an ODL programme. The institution will draw on current staff to supply administrative support, student support, technical support and, in many cases, teaching support without an incremental increase to accommodate a new ODL offering. Workloads of all staff can dramatically increase once the ODL programme is up and running without any consideration of the cost factors.

Adequate staffing should be planned in support of a programme. This means looking at salary and benefits costs prorated for the amount of time associated with the ODL programme (full- or part-time), facilities costs used to run an ODL programme (again prorated) and ancillary contributions to the maintenance of the infrastructure. Many ODL programmes use learning centres, and this incurs additional costs for staff equipment and facilities. Prorating the facilities' costs could be measured as the amount of time that staff (including clerical/administrative and teaching personnel) spend on the ODL programme rather than on other functions. The hidden infrastructure cost contribution is important to consider and should be part of the real cost of producing an ODL programme.

What would a simplified annual balance sheet look like for the above costs? Table 11.1 shows an example.

The better that an analysis of all the real costs associated with the ODL programme can be measured, tracked and detailed, the more easily it allows you to make cost-benefit analysis component comparisons of the cost-effective calculations later on.

The administrative costs will consist of salaries for any new administrative personnel who need to be hired to oversee the programme. Often the overhead costs that come with an existing facility are not included within an administrative budget. Nor are the salaries of current staff who get attached to some function of running the programme, whether it is registering students, providing guidance and ongoing technical support, or carrying out administrative duties such as housing (for on-campus participation).

Should these costs, prorated or in full, be considered as part of the budget for operating an ODL programme? It is becoming more critical to know every cost factor as institutions move more and more into cost recovery of programme offerings.

What happens, then, if decisions are made to change any of the above factors? Reliance on a current infrastructure also often locks in thinking about remuneration based on traditional delivery methods. A key component of an ODL programme is its flexibility. This may translate into flexible hours for student registrations, responses, access to resources, help options to resolve problems, student counselling, and the support of tutors who now also might have to be introduced to a flexible schedule.

Table 11.1: Example of a simplified balance sheet for calculating ODL administrative costs.

Personnel	Expense
Programme Manager	_____
Annual salary	_____
Benefits	_____
% Time spent on programme	_____
Annual cost	_____
Clerical personnel	
Salary	_____
Benefits	_____
% Time spent on programme	_____
Annual cost	_____
Materials (administrative only, non-student materials)	
Consumables	
Duplicating	
Office supplies	_____
Paper	
Non-consumable supplies	
Telephones	
Connection charges	
Computers	_____
Computer software	
Internet charges	
Facilities costs (prorated annually for the programme)	
Heating/cooling	
Lighting	_____
Cleaning	
Maintenance	
Total Cost	

How is flexibility reflected in the costing of the programme? How does providing greater flexibility get measured in looking at outcomes such as student support, completion and satisfaction with the programme? These measures are looked at under the cost-effective analysis component of the overall effectiveness.

There will be costs associated with the tutoring and student support services. Cost-cutting, especially through reduced staffing levels as a means to make programmes more effective, can lead to impossible workloads and soon to unsupportive staff as resentment rises. The resultant lack of productivity can translate into reduced student participation and completion. Planning the programme to ensure that realistic support can accommodate the programme is crucial to success.

How many students can a tutor provide guidance to? How much time and when that time is allocated are critical to tutor services. Again, because ODL programmes

are generally expanded from a traditional institution, many tutorial staff refer to current teaching roles and time spent in that function. ODL requirements will often put strain on tutors who are not prepared to look outside office hours and regular daytime teaching. How they are compensated fairly can be contentious between programme administrators and teaching staff. Not only tutor compensation but tutors' roles change dramatically in an ODL programme, and often new thinking is required to look at compensation for these roles. Again, measuring tutors' acquisition of new skills and participation in their expanded teaching capacity will lead to outcomes much different from what occurs through the face-to-face situation.

As an example of this impact, consider what happened when computers became the mode of student–tutor interaction.

Computers have magnified the flexibility issue. Tutors have moved from running standard contact lecture and office hours to providing guaranteed timely feedback (as in print-based courses) to being available on the Internet for the more demanding "24/7." The contractual basis of remuneration of a classroom tutor was straightforward in terms of a 9-to-5 job. Now the time spent in contact with students has become directly under the tutor's control and an administrator can, at best, set guidelines for that interaction to ensure fairness for both the tutor and the student.

How cost-effective is this flexibility? Can it be measured by student success rates, student participation in online discussions, tutor satisfaction with their own performance, or the quality of interactions? All are measures that do not provide any input to a cost analysis, but are important when considering cost-effectiveness. The one measure that should be considered is the number of student interactions that a tutor can handle and still maintain a quality delivery of service.

Often assumed about an ODL programme is the fact that a single tutor can effectively tutor many more students than is possible in a classroom setting. There have been very few comparisons made in this area. Personal observations of tutor–student interactions at the Open Learning Agency in Vancouver would be that the ratio of students to tutor is increased by about 80–90% over classroom situations. This appeared to happen more easily at higher levels of learning because students depended less on tutors for instructional clarification and were more independent in working through course materials. Thus tutor time was distributed across more students without any deterioration of the programme. Most tutorial time was taken up providing quality feedback to students on the formative evaluations. A peculiar aspect of using online learning is that the immediacy of student–tutor interactions has placed the tutor back into a role of actual teaching, albeit at a distance. This has caused the ratio of students whose learning a tutor can now facilitate to be substantially reduced.

It has been suggested that one cost reduction measure is to separate out responsibilities for higher order tasks and to shift responsibility for lower order tasks to less highly paid staff. Again the true cost of this measure would need to be investigated given the orientation, migration and supervision of added staff to support the programme.

Delivery also includes the infrastructure that is used to get learning materials to the student and their responses back to the tutor. At the simplest level, the

interaction between student and tutor is a posted response via the mail system. Add on telephone contact or computer contact using e-mail systems and another level of costs is incurred. Until this point the costs are generally assumed to be those of the institution. However, when choices are made as to how interactions will be mediated, they can be reflected as a direct cost to the student.

Who will pay for the return postage of assignments or long-distance charge for a phone call or a toll-free number? Computer interaction assumes that the students bear the cost of their side of the interaction and finding the appropriate service provider, and that they have access to a computer with compatible software. Some institutions may offer subsidies for the purchase of such equipment.

Does that mean that these subsidies should be considered as part of the ODL budget? If so, are they one-time expenditures or will they become an ongoing cost to the programme? Some institutions have implemented ICT as a means to reduce the cost of student–institution and student–tutor interactions The Symbiosis Centre for Distance Learning in India has grown from 8,000 students in 2001 to an overwhelming 200,000 students in 2008. The institution has adopted ICT not only as a means of mediating its courses, but also as a way of implementing a paperless office. Student interaction and access are via a portal to a virtual campus. Regular curricula upgrades are carried out to ensure quality learning (Mujumdar 2008).

Some programmes insist on a face-to-face component at some point in the programme. In fact there may be a number of intercessions for these face-to-face interactions. For example, the International Diploma in Guidance and Counseling Program of the National Council for Education, Training and Research (NCERT) in India has a mandatory face-to-face practicum as well as placements within working situations other than a home school. For each addition to the ODL programme, some consideration must be given to (a) the tutors' role and commitment to the programme, and (b) the effect on the student.

Looking back at the tutors' role, is there an expectation that they will be available for student contact outside normal working hours and on weekends? And, if so, how will they be compensated?

Where will such interactions take place: at the institution, at another affiliated institution, at a rented local meeting place or at a high school?

What additional technologies would have to be present to accommodate the face-to-face contact? Also what additional registration and organisational requirements are necessary to provide for the facilities?

The development of quality learning materials forms an integral part of any ODL programme. *At what cost is quality of learning materials achieved?* Clearly the measure of the quality of learning materials cannot lie in the pure aesthetics, but must incorporate quality of teaching and learning. Often there is a divergence in opinion between the creator of the materials and the end users with the creators looking at their materials as a legacy and the end users seeing the materials from a transient perspective. Achieving this balance must be one of the goals of a cost-effective ODL programme.

Materials Development Costs

Others have looked at cost factors associated with development of learning materials extensively. With each new technology introduced into ODL learning, extensive budgets are built to reflect actual expenditures (Hülsmann 2004; Bates 2005). Most often the question "How much does your programme cost?" is a reflection of this particular part of the ODL budget. Also, because it is the one area that can be tracked and managed, it is the one most often studied. The caveat would be that a team that is put together to build an ODL course must be managed not just for the budgetary purposes, but also for ensuring the quality of materials and timely development. Sophisticated developments may even take on the look and feel of managing a major construction project to maintain the schedule for completion. So, the first rule of cost-effective development is to manage all aspects of that development process so that the materials produced are of high quality and are ready in a timely manner. This last aspect will affect the accessibility of the programme. Students organise their lives based on when a programme is to be offered, and therefore timeliness is key to their participation.

Fixed costs and ongoing costs are associated with materials development. Hence, a development budget can range from the very simple (e.g., a contract to write learning materials that are then turned over to a production unit to shape into a suitable ODL package) to the very complex (e.g., a budget that involves internal cost recoveries and internal and external contracts for special services and long-term suppliers of technical support for the development phase of a project).

Both the one-time costs for the initial development and then any ongoing costs to revise and update materials must be considered. The ongoing costs could be those for minor updates and additions to course materials (such as new assignment files and exams and the appropriate marking guidelines) up to major course revisions depending on the volatility of the materials. Part of the planning of an ODL programme should include the expected duration that a particular programme could be offered and the revision process that would need to be undertaken over the lifetime of the course. As a rule of thumb, most well-developed print courses can last five to seven years with only minor revisions. However, courses that are true online offerings (i.e., tutor-led and very interactive) are implemented for a short time, maybe two to three years before they are revised. Many computer-mediated courses have limited lifespans forced by technology upgrades. Consequently decisions made upfront when development is undertaken are reflected later, long after the major development is finished. Even rather mundane considerations such as storage of master copies of materials and in what form must be taken into account if a revision process is certain and the original materials need to be retrieved. Related project documentation, including copyright permissions or renewals, also become important over the course of the offering. Similarly, the personnel associated with the development and their expected link to any further programme developments should be documented and records maintained. A well-managed core development team whose skills and knowledge can be continually employed on further programmes can lead to a more effective development process. This transfer of skills and knowledge is a cost savings just in terms of retraining alone.

Practically speaking, it has become increasingly difficult for a single person to develop an ODL programme on his or her own. The best-developed "learn ware"

is created through a team effort that involves specialists. This becomes even more important when technology is part of the development and the delivery of the programme. A team might involve:

- a project manager to oversee production and to keep the development process on track, as well as to manage the assigned development budget;
- the content specialist/writer;
- a content consultant to vet the content and any bias that may appear; and
- all of the necessary support team of specialists to finalise the materials – Support members can be a limited cast to a host of specialists depending on the chosen materials and delivery. As technology becomes more common as a means of presenting ODL programmes, so too do the number of additional specialists increases, such as programmers, web designers and technical support staff. These specialties are beyond a core of ODL team members such as the content provider, instructional designer, graphics designers and publishing experts.

Some of the cost control factors that have been used to produce high quality learning include templates to standardise modules, guidelines for writing and editing modules, and detailed contracts for production of learning environments. Standardisation at all levels ensures consistency of structure to the learning process and allows measurable results to be recorded. There is often a backlash against standardisation, with the usual argument that it stifles creativity. However, experimentation should be left for small-scale projects to test new approaches. As well, using standards allows a core development staff (instructional designers, technical staff, etc.) to readily deal with issues arising during the development process. It also allows easier training of tutorial and support staff in a common forum that can lead to mutual support groups to deal with issues during the delivery phase of the programme.

Finally and most importantly, one needs to consider the participants in the programme. It would be easy to see them as demanding your programme and therefore willing to pay any cost to access that programme. But students also weigh the cost of entering into their own education and deciding how best to allocate their resources. With the advent of courses online, students have ever greater access to programmes that are in direct competition with one another. Students' decisions to participate in any given programme will be based on the programme's direct cost, accreditation and standards of delivery. So, planning not only to meet students' demand but also to accommodate their limitations is necessary in offering a programme.

Student Costs

The third component of looking at a cost-effective ODL programme is the participant in that programme. What students pay and what their perception of the value of the ODL programme is are relevant to measuring cost-effectiveness.

What a student looks at is his or her return on investment (ROI) to taking a programme. *Will your particular offering gain them employment, entry to a profession, further wage advantages within their profession or upgrading of skills leading to promotion?* With Internet access, students have far more programmes available

to them that may achieve the same results as your own offering. Again the cost-effectiveness will lie in what you can offer that benefits the student more than similar programmes offer. The value relative to the actual fees a student pays may be the student's first consideration. That value is mostly perceived based on prior experience, word of mouth, investigation into accreditation and support offered. Secondarily will be ancillary considerations such as access, time for completion, flexibility in the programme, match with personal goals, and familiarity with programme structure.

Here are a few calculations that the student might envision for his or her own ROI:

Expenditure	**Cost**
Student enrolment fees	_____
Student annual salary × % time spent doing course work	_____
Materials costs	_____
Connection costs	_____
Travel costs	_____
Meals	_____
Hospitality cost for any face-to-face stay	_____
Total cost	_____

Besides actual monetary costs, a student might have to consider time spent away from home to attend face-to-face sessions such as orientations, special lectures, a supervised practicum and on-the-job training sessions. For in-service teachers, time away from regular duties may not be paid leave (hence, lost salary) or may be in the form of vacation leave. For new teachers, time away from the community may be considered a lost opportunity cost to them when they could be working at other jobs or looking for employment.

On the plus side, unmeasured benefits that can be highlighted for prospective students in an ODL programme include changes in improved self-image and self-confidence, and the opportunity to learn new skills where technology is involved. Well documented, for example, are measures of effectiveness of online learning, taken from student outcomes such as grades and test scores, student/instructor attitudes about online learning, and overall student satisfaction (Alexander and McKenzie 1998; Kelly et al. 2004; Stewart et al. 2004).

This raises the secondary issue of promotion of your programme to ensure that access is widely broadcast. *Were promotion and advertising considered as part of the original budget?* This could be a large factor if there is an intention to reach foreign markets. Part of the promotion should be the added benefits of gaining interconnectivity, sharing experiences, learning new skills and developing contacts in other parts of the country or the world.

Should the total cost of participation exceed any expected gain through promotion or salary cost, then students might consider other options for gaining the same credentials while also reducing their own investment. The opportunities for seeking out quality programmes have become far reaching with the increasing linkages to the Internet. One UNESCO study in 2006 looked at the significant migration of African students to study abroad. Sub-Saharan Africa has the highest

outbound mobility ratio (5.9%), which is almost three times greater than the global average. One of every 16 students from the region studies abroad. The number of students abroad exceeds domestic enrolments for Cape Verde, Comoros and Guinea-Bissau and accounts for more than 50% in Botswana, Equatorial Guinea, Gambia, Lesotho and Namibia. Obviously, the value of the overseas education was perceived to be of a higher quality than closer to home.

Unfortunately there are many unscrupulous education providers with the potential to take advantage of those prospects. The quality and support offered to students by reputable institutions should outweigh a cheaper option. Legitimate options that students might look for are programmes that can be stretched out over a longer completion period, or ones that have fewer lost opportunity costs or require students to spend less time away from their homes and work.

The perceived quality of learning materials and the learning itself are often variable. For example, from the developer's point of view, inclusion of colour, unique booklet covers and quality paper are all critical to the quality of print materials. The layout of a screen on a web page with flash insertions and appropriate navigation buttons is critical for a programmer. Students, however, are usually looking at the relative cost of a fancy printed booklet compared with, say, a simple web page that is easy to use and navigate through.

A unique personal experience in Vietnam in 1999 was the production of print ODL materials for a management training programme. Choices on quality, the use of colour for the cover and type of binding were initially made for a very limited offering of several courses. Once produced and available on the street, it was discovered that sales of the course materials were very disappointing and were not in line with the enrolment figures for the courses. Investigation revealed that students banded together to purchase one set of books for their courses and then went to street printers to have multiple copies made at a cheaper price. They were not concerned with the colour or paper quality because, in their view, the books were meant to last only until completion of the course. The price point to get the students to purchase the booklets was a matter of pennies. A revision to the binding process allowed for the cheaper production still using good quality paper and the more attractive colour. It should be noted that copyright infringement had not even been a consideration when students asked street printers to reprint the materials.

Conclusion

Can ODL make a substantial difference to an institution in ensuring that a programme is cost-effective from every aspect?

I think that, given the comparative cost of an ODL programme and considering the time period for using the learning materials, the answer is yes: an ODL programme can be cost-effective for an institution to undertake. By carefully considering price points to the student fees and working to minimise the constrictions to student participation, the cost for ODL can be kept down, making ODL more than accessible to participation than other instructional delivery types. ODL has moved beyond having to compare its costs with those incurred in conventional teacher training. It is more realistic to look at cost-effectiveness and how best to control costs or make the programme yet more effective.

ODL is in constant transition. With each new technology available for delivery of learning, investigation is necessary to track costs and make decisions around widespread feasibility for use in teacher training. Before the development of any programme using ODL methods is undertaken, serious planning must take place with consideration being given to three aspects of the budgets: administrative, development and participant. Each factor influences the other and each must work in harmony to achieve a successful programme offering.

With the numerous organisations and institutions that now use ODL as a strategy to provide greater access to teacher training, it is hard to point to any one clear model that accommodates all challenges. Each institution finds unique ways to serve its students' needs. Here are a few examples of cost-effective teacher education programmes that use ODL, taken mainly from developing countries that have the greatest challenges in reaching out to diverse populations.

- In Papua New Guinea, the University of Papua New Guinea has been offering programmes at a distance for almost a decade. Current teaching staff are relied on as the content providers for the writing and vetting of the ODL materials. They often also become the tutorial staff for the same programme. Previously staff would have to travel to the outer villages of the islands to deliver limited teaching to in-service teachers on very specific topics. For more general upgrading, a teacher was required to spend a semester on campus in Port Moresby. With the advent of print-based ODL programmes, the amount of residency is minimal or not required for most programmes. As the technology infrastructure is enhanced under the influence of international oil exploration, the education systems and connectivity between remote communities are expanding. The university is now looking at transforming its print ODL into online delivery.

  This example is interesting because a well-developed ODL learning print package can be reconfigured into online delivery with relatively few modifications (Vaa 2002). With foresight, planners should be looking at the possibilities of using newer technologies as part of reconfiguring older ODL courses. There are many instructional strategies and designs that work well in that transformation. The cost of repurposed materials should be less than developing an entirely new course.

- In 2004, the NCERT in India had to consider how it would train up to 300 in-service high school teachers per year in Guidance and Counselling Skills, when at the time they trained only 35 teachers on their campus in a face-to-face mode. Demand for the counsellors within the school system came from within the secondary school system as well as from government-mandated changes. Additional salary was expected to accompany any upgrading of skills, so demand was very high across the country. There was also interest from foreign teachers in participating in this programme, as none existed in several South East Asian countries and Africa. It took several years to develop as a mixed print-based ODL programme and face-to-face mentoring programme.

  Interesting to note is that foreign interest in the programme has increased. This raises two aspects of cost-effectiveness. One is that the fees charged foreign students can aid in a cost recovery. The other is that decisions are

needed on how to expand an ODL programme internationally, addressing issues around control, access and the cost of administering such a programme at a distance (Daniel 2009).

- The introduction of a PhD programme at Lancaster University, in Lancashire, UK, has enjoyed great success in expanding its reach (G. Parchoma, personal communication, October 2009). This programme is meeting the demands for higher education that were prompted by changes in policy at the British Open University and changes to the status of community colleges to university colleges. Teaching staff at these institutions formerly were accepted with Master-level credentials and they are now encouraged to upgrade to PhD level in response to the institutions status. ODL was considered the best option that would least interfere with a tutor's ongoing teaching work. In British Columbia, changing the college system to university colleges with degree-granting capability in recent years has many staff seeking higher accreditation to match university-level professorships. There are few ODL PhD-level programmes within the education field available within Canada, so programmes offered by accredited foreign institutions are attractive. Lancaster University operates its programme as a cost recovery and revenue generator to cover overheads and secure a small profit margin back to the university.

There are several examples of consortia formed to share the cost of materials development for ODL as well as the training in the use of those materials. One such example, demonstrating cost-effectiveness through adoption or adaptation by various national governments and local institutions and agencies, is the use of learning materials for both pre-service and in-service teacher education programmes, or the sharing of standard materials by three or four countries within a sub-region (Kinyanjui 1998). The project, supported by COL for the training of science, mathematics and technology teachers in Africa (called STAMP 2000+), has effectively been adopted by six Southern African countries that agreed to collaborate on a five-year distance education project to train upper primary and junior secondary teachers and administrators. The six original signatories – Botswana, Malawi, Namibia, South Africa, Tanzania and Zimbabwe – were later joined by Mozambique and Zambia on the project. All eight countries are also members of the Southern African Development Community (SADC), an organisation for co-operative effort toward common goals. STAMP 2000+ is self-consciously cost-effective: it is an ODL programme, which means that teachers can study while on the job, with minimal disruption to the human resource base. Practical as well as theoretical courses ensure that both the "what" and the "how" are learned. The programme is user-friendly, as the modules contain very little jargon. Self-assessment and evaluative and interactive learning techniques are built in. The specific mode of delivery, however, depends on each country's available infrastructure and training needs (Grace Chin, COL *Clippings* article, November 2000).

Another example of a consortium involved in teacher education in Africa is the African Virtual University (AVU). To meet the demand for higher education and ensure that the education provided is relevant and up-to-date, a number of African universities are working with their counterparts outside the region to deliver international quality education programmes through the use of ICT. The

teacher education programme is part of the AVU Multinational Support Project, an initiative funded by the African Development Bank and the United Nations Development Programme. This project manages and delivers quality ICT-assisted education and training opportunities in the African countries of Ethiopia, Kenya, Madagascar, Mozambique, Senegal, Somalia, Tanzania, Uganda, Zambia and Zimbabwe. External materials are made available and adapted to the language of the institution delivering the teaching. Library resources are shared virtually among all the institutions (see AVU website: www.AVU.org).

Cost-effectiveness of an ODL programme is not easy to ascertain. Using a strict comparison of expenditures for administration, materials development and delivery of an ODL programme versus the traditional face-to-face model would likely result in a lower per-student cost for ODL. This is even further supported when all costs are amortised over the life of the programme. However, if cost-effectiveness is to include outputs such as student satisfaction, completion and teacher quality improvement, measures are harder to quantify. Documenting the end result of increased teacher performance and quality teaching should result in a population of students who complete their schooling, and in decreased dropout rates and higher continuation of their schooling. All of these measures should be part of the planning process at the inception of an ODL programme so that they can be studied over time.

Using various modes of delivery for a programme with technologies does not make that programme more or less cost-effective. Every country has particular barriers to overcome in order to provide access. Their choice on how to overcome those barriers must be considered holistically for the impact it may have on all the stakeholders of the programme. A need for a programme may not translate into access to that programme if new barriers are created.

The best efforts to make ODL programmes more cost-effective have to look at all aspects of expenditures and revenues over the programme lifespan. Taking apart one component of a budget and trying to make comparisons can result in unexpected impacts on a different budget item. Because programmes come with predetermined budget allocations based on a best guess, prior experience and related data, it is reasonable to ask, "What delivery mode is feasible in order to offer a programme that will achieve these specific results within the time allotted and the budget presented?" Shifting the burden of costs from one hand to the other is not the answer to cost-effectiveness in a competitive marketplace. Decreasing development costs and recouping expenses through student fees may result in low participation rates. And looking at target markets outside as a revenue stream will add to the overall development and delivery cost, and that will have its own breakeven point.

Thus, we return to the original question: How much does an ODL programme cost? The full answer, as detailed throughout this chapter, is "It depends." There are a multitude of factors to consider and no easy or satisfactory all-encompassing tools with which to measure ROI, achievement rates and so on. The most cost-effective methods of an ODL programme will result from strong adherence to project management, timely development, collaboration on delivery, and strong promotion of student success.

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CHAPTER 12

Quality Assurance in Distance Teacher Education: The Experience of Universitas Terbuka

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Abstract

Despite the acknowledgement of being successful in increasing access of teachers to further education, the quality of distance teacher education (DTE) should remain the focus of DTE providers. In the context of distance education practice in general, a concern about the quality has also gained serious attention among stakeholders. Subsequently, DTE providers have been incorporating quality assurance (QA) programmes and activities in their operational systems. However, approaches to assure quality seem to vary from one institution to another. This chapter discusses the issue concerning the concept and implementation of a QA system within DTE programmes, with special focus on the teacher education programmes of the Indonesia Open Unversity, or Universitas Terbuka.

Introduction

Despite the rapid development of information and communication technology (ICT) within the era of globalisation, the teacher's role in education has become increasingly important, especially for early childhood, primary and secondary education. In this context, teachers are vital in nurturing the development of young children and in meeting the goals of Education for All as stated in the United Nation Educational, Scientific and Cultural Organization's (UNESCO) Millennium Development Goals. One of the goals is to achieve universal primary education so that, specifically by 2015, "all boys and girls complete a full course of primary schooling" (United Nations 2005, p. 1). However, as stated by Perraton et al. (2002, p. 7), "Unless we can get more teachers, and better teachers, we will not reach the target of making quality education available for all by 2015."

To meet the Millennium Development Goals, every country needs to increase access to education for all children, and at the same time to improve the quality

of education. Thus, the shortage of teachers and lack of qualified teachers can be problematic for both developing and developed countries. To meet the need for teachers, in numbers and in quality (more teachers and better teachers), the education of teachers should not be solely dependent on face-to-face teacher education.

Distance education (DE) has long been acknowledged as an educational system capable of increasing access to the mass population. Many countries have adopted DE to provide access to education as part of their education system. In Asia alone, no fewer than 70 institutions offer some sort of DE programme (Jung 2007) and many mega universities are open universities that offer programmes entirely using a DE system. The characteristics of DE that enable people to get access to quality education without leaving their jobs open the possibility for teachers to enhance their teaching competencies and their academic qualifications. Distance teacher education (DTE) has thus become imperative for preparing new teachers and upgrading in-service teachers. This is reflected in case studies that "follow up recommendations concerning teacher education using distance learning that were made by the World Conference on Higher Education ... and the Seventh Session of the Joint ILO/UNESCO Committee on the Application of the Recommendations concerning the Status of Teachers" (Perraton et al. 2001, p. iv).

The use of DE systems for teacher training has a long history. In fact, in many developing countries such as Indonesia, Bhutan and Nepal, the need to provide in-service teacher training was the main driving factor for adopting DE. In Indonesia, for example, the use of DE for teacher training started in 1955 when the country set up a correspondence diploma programme for upgrading its teachers. This programme was later transformed into two DE projects to provide in-service training to secondary-level teachers in 1981 (Belawati 1998). It was those programmes that formed a part of the Indonesia Open University, known as Universitas Terbuka, founded in 1984. However, it was not until the early 1990s when the university's two-year Diploma Program for primary school teachers (DII-PGSD) was established that DTE was widely accepted and acknowledged as the most important teacher training model in Indonesia. This programme was developed in response to the new legislation requiring elementary school teachers to hold at least a two-year diploma certificate in "classroom teaching" or "physical education teaching." This requirement was further enhanced by legislation in 2005 that requires school teachers to hold a full Bachelor degree (S1). This has significantly increased the number of teachers participating in the Universitas Terbuka's Bachelor Program for Elementary School Teachers (S1-PGSD) – up to more than 450,000 by 2009.

The main goal of teacher education – face-to-face and at a distance – is to educate professional teachers who are capable of demonstrating their teaching competence, reflecting on and learning from their experiences. In the area of learning processes, the biggest challenge for DTE is in providing teaching practicum for student teachers. Therefore, despite the acknowledgement of being successful in increasing access of teachers to further education, the quality of DTE remains questionable to some people. Among other aspects, the capacity of DTE to provide appropriate teaching practicum at a distance is a big concern of teacher educators as well as of teachers' employers.

How can DTE assure the quality of the practicum? Teaching practicum is the core of any DTE programme, since it is the chance where the student teachers apply the knowledge, skills and attitudes they acquired from the programme to real classroom teaching. Thus, teaching practicum should be accurately supervised and evaluated. Failure to ensure the quality of teaching practicum and its evaluation will lead to unqualified graduates.

Based on the above background, the discussion of how to assure the quality of DTE becomes increasingly important. In this chapter, we share the concept of quality assurance (QA) in DE in general. We then describe the experience of Universitas Terbuka, where 90% of almost 600,000 of its students are teachers, in developing and implementing a systematic QA in its programmes including those of DTE.

Key Concept and Areas of Quality Assurance in Distance Education

Quality is a relative concept, and the notion of quality for educational consumers is different from that of other stakeholders and providers. Quality assurance (QA) may be defined as systematic management and assessment procedures in order to monitor performance against objectives, and to ensure achievement of quality outputs and quality improvements (Harman 2000, as cited in Belawati and Zuhairi 2007). Many benefits are offered by QA. It: facilitates recognition of the standards of awards; serves public accountability purposes; helps inform student choice; contributes to improved teaching, learning and administrative processes; and helps disseminate best practices, leading to overall improvement of higher education system.

In the context of DE practice in general, a concern about quality has also gained serious attention among stakeholders, such as employers of DE graduates. The importance of QA has driven DE providers to incorporate QA programmes and activities in their operational systems using various approaches considered suitable to their different situations. Jung (2005) surveyed and compared QA practices in mega universities in Asia and reported that the institutions have different types and levels of organisational structures and policies on QA. Universitas Terbuka of Indonesia, Sukhothai Tammatirat Open University (STOU) of Thailand, Allama Iqbal Open University (AIOU) of Pakistan, and the United Kingdom's Open University (UKOU) are among those that have a centralised QA structure, run by a special unit assigned to co-ordinate and oversee the implementation of QA activities university-wide, based on policies and guidelines formulated by QA-related boards or committees.

Similar to this centralised approach is a collective structure where a QA system is set and run by boards, councils and/or committees rather than an independent QA body. This structure, for example, is practised by the Indira Gandhi National Open University (IGNOU) of India and Anadolu University of Turkey.

The other structure identified is the dispersed structure where QA is an embedded part of the responsibilities of one or more related administration offices. This is the practice in the China Central Radio and Television University (CCRTU), the Korea National Open University (KNOU), and the Shanghai Television University (SHTVU).

Regardless of those differences in QA structure and approaches, DE providers believe that having and implementing a good QA system helps them improve their good practices and address the issue of accountability.

Jung's survey (2005) further showed that different institutions had different methods of assessment, with different QA criteria for different key areas. Table 12.1 shows the key areas of focus for the different mega universities mentioned above.

As an in-depth illustration of how those key areas are addressed in the context of DTE, the following describes how Universitas Terbuka translates the adopted *Asian Association of Open Universities (AAOU) Quality Assurance (QA) Framework* into action. Based on the framework, the university developed QA policies in the form of best-practice statements and collected them into the university's QA Policy Manual.

The manual consists of 107 best practice statements categorised into nine main components:

1. Policy and planning (7 items) – The university determines its own mission and objectives that reflect its academic commitments and the needs of society.
2. Human resource recruitment and development (9 items) – The staff and personnel management system is appropriate for the education and training services provided. The university sets out development programmes that equip staff to perform their tasks effectively.
3. Management and administration (21 items) – The university has clear and effective communication channels and has efficient resource management and administration systems that enable the institution to achieve its objectives. The UT is financially sound and can make reliable educational provision.
4. Learners (10 items) – A system is in place for collecting detailed information about learners and using this information to inform all aspects of policy and planning, programme and course development, support services, and the overall processes of teaching-learning.
5. Programme design and development (6 items) – Programmes are designed and developed with the needs of learners, employers and society in mind. This means that access to quality education is encouraged and assessment methods appropriate to the aims and objectives of the programmes are set in place.
6. Course design and development (14 items) – The course syllabus and content is well researched. The course materials have appropriate objectives and outcomes, content, approaches to teaching and learning, and clearly presented assessment. There is an identified process of development and review of courses.
7. Learning support (18 items) – Learners are supported by the provision of a range of opportunities for real two-way communication through various forms of technology for tutoring at a distance: contact tutoring, assignment tutoring, counselling and stimulating peer support structures. The needs of learners for physical facilities and study resources, and their ability to access these, are also taken into account.

8. Assessment of student learning (15 items) – Assessment as an essential feature of the teaching and learning process is properly managed and reflects external standards.
9. Media for learning (7 items) – The selection and application of media reflect the teaching and learning needs in a course. In particular, the choice of media is based on knowledge of the learners' and educators' backgrounds and abilities, the requirements of the content, learners' access to the associated technology, the pedagogical design for the course and the limitations of the media.

Among these nine components, the last five are those that specifically influence the quality of study programmes. The first three of the university's best-practice statements for each of those five components are listed below. (The entire list of statements of best practice within these five components numbers 61.)

Programme design and development

1. Programmes are developed on the basis of the needs of learners either through market research or consultation with industry and profession.
2. Programmes reflect institutional mission and objectives.
3. Access requirements for the programme are as open as possible with flexible entry and exit points. Due recognition of prior learning and experience is accorded by the institution.

Course design and development

1. The course is designed according to the programme objectives as well as the needs of prospective learners and employers.
2. The content and assessment processes are determined by the learning outcomes.
3. Methods of learner support are built into the design of the course.

Learner support

1. Academic support is considered during programme development and is built into the design of the course materials.
2. Tutors are selected and trained for their role of facilitating learning both before and during the offering of the course.
3. Sufficient group tutoring opportunities are provided to enable learners to investigate and expand their understanding of the content.

Assessment of student learning

1. Assessment is integral to every learning and teaching strategy adopted, and includes formative as well as summative processes.
2. Self-assessment should be extensively used throughout a course to enable independent learners to gauge and adjust their progress.
3. Where appropriate, assessment involves a measurement of the achievement of learning outcomes.

Table 12.1: Key areas of quality assurance (QA) in several mega universities worldwide.

Area	AIOU	IGNOU	CCRTU
Institution level			Policy and planning
Programme		Needs and objectives of the programme Content and level of the programme Duration of the programme	Unified requirements
Course content	Courses and their effectiveness	Language of the course material Presentation of the content	Course design and development
Learner and learning support	Tutorial support system Student problems		Learner support services
Media	Methods of course production	Transforming the content into distance format Delivery of the programme	Media and technology
Student evaluation	Assessment system Outcome of courses and programmes	Assessment of students	Learner assessment
Operation and management	Cost-effectiveness of courses Servicing/operational departments Administration		

KNOU	UKOU	SHTVU	UT
	Institutional management of quality and standards Framework for academic quality and standards Internal review Accountability to stakeholders		Policy and planning
		Teaching	Programme design and development
E-learning Textbook development Broadcasting programme development		Course design and development (texts and books, online courses)	
Learner support services Tutorials	Student support and guidance	Students (learning resources, online courses, digital libraries, telephone, e-mail, Bulletin Board System, i-class teaching platform) Study centres	Learner support
		Media for learning (Internet, VOD, video, audio, telephone, etc.)	Media for learning
	Assessment and awards Collaborative awards		Learner assessment
	Staff	Teaching affairs Academic staff	Human resource provision and development Management and administration

Media for learning

1. The teaching and learning needs for each element of the course should be identified and take account of the new opportunities arising from technological developments, especially for increasing the communication between participants in a course.
2. Educators should be trained on the special features of the different media, the associated costs and their limitations.
3. Suitable and sufficient administrative and technical support must be provided for both educators and learners in their use of any media.

In order for Universitas Terbuka to ensure that all the statements of best practices are being exercised faithfully, it developed job manuals for every aspect of activities related to the statements. The manuals are standards for reference, containing well-defined and clearly stated systems and procedures, records of activities, and work instructions for use by staff in their daily activities and for continuous improvement. Systems and procedures describe detailed workflows and activities, and indicate clearly defined performance standards, time standards, expected outputs, workflows and the needed resources and competencies to perform each job.

The system component of the manuals is analysed in terms of an internal unit performing the tasks and the relationship between that particular unit and other units in performing particular activities. The outcome of the system analysis is presented in the form of mapping of activities and the relations among various activities in terms of visual flowcharts, with a clear description for each of the activities. The procedures in the manuals indicate the different stages of activities organised systematically to accomplish each entire activity. Procedures include objectives, scope, definitions, references, requirements and related units, and a description of performed activities. It is those procedures that are later formatted as the ISO standards[1] for the relevant aspects.

QA in Distance Teacher Education Programme: An Example at Universitas Terbuka

How is the QA system practised by Universitas Terbuka in developing its in-service teacher education programmes? It starts with the university implementing its "statement of best practices" – outlined in its QA Policy Manual.

Universitas Terbuka designs its academic programmes and operational system in accordance with those statements. All programmes are developed based on either thorough need analyses or government's request and appointment. The S1-PGSD programme, for example, was developed in response to the newly launched legislation which requires all primary school teachers to hold at least a Bachelor degree in classroom teaching. This is relevant to the university since one of its main missions is to upgrade the qualification of in-service teachers. The programme was designed to upgrade the qualification of primary school teachers who have only a teacher training certificate (equivalent to high school level) or a two-year diploma level certificate. In this way it became a multi-entry programme to recognise teachers' prior learning and experiences.

[1] ISO Standards are developed and published by the International Organization for Standardization for a wide range of subjects. For detailed information, see http://www.iso.org/iso/home.html.

As for all of Universitas Terbuka's programmes, the DTE programme design is detailed in an academic document that describes the curriculum (e.g., the aims of the programme); the profile of the graduate, portraying his or her expected competence; a comprehensive competency analysis that yields a list of courses, the target group, teaching-learning processes, student assessment schemes, delivery modes, support services; and credit and time requirements. The targeted students are made aware of the details of this design at the outset in clear and comprehensive terms.

Re-evaluating the Curriculum

The curriculum itself is regularly re-evaluated to meet the teachers' characteristics, the needs of the teachers' employers, the rapid development in both school curricula and the national education system, and the changing nature of the society. In its re-evaluation of the curriculum, Universitas Terbuka refers to the Minister of National Education Decree, as well as to the curriculum of the same programme offered by face-to-face teacher education institutions to identify the lack of new competencies to be mastered by the teachers. This results in a list of teacher competencies that need to be enhanced in order to meet the new policy and competencies required by the stakeholders of the programme. The curriculum development and reviews are always conducted by representative stakeholders, curriculum experts and master teachers from reputable schools. As an example, the revision of the DII-PGSD curriculum in 1996 changed the programme's study load from 82 credit semesters to 78 credit semesters, as well as incorporated the teaching experience recognition scheme and the credit waiver (applied only to humanities courses). In addition, the students could apply for credit awards through prior learning assessment.

Offering Teaching Practicum

With regard to teaching practicum, Perraton et al. (2002) have identified five models of organising it: no practicum offered at all, as practised in the Certificate in Guidance, IGNOU (India); college-based micro-teaching, as practised in Belize Teacher Training College; classroom-based practicum, as practised in IGNOU, India, for the Diploma in Education; classroom-based practicum supervised by visiting staff from a college or ministry, as practised in the Zimbabwe ZINTEC Project; and training related to the content of the school curriculum, as practised in the United Kingdom's Open University for the Postgraduate Certificate of Education.

Since the DTE provided by Universitas Terbuka is also aimed at enhancing the competencies and qualifications of in-sevice teachers, the university provides teaching practicum similar to the third and the fourth model identified above. The teachers do the practicum in their own classrooms, supervised by a tutor or the school principal. In this way, the teachers can apply their acquired knowledge, skills and attitudes in their own classrooms. This model is supposed "to ensure an integration of theory and practice" (Perraton et al. 2002, p. 55). At the end of the week, the teachers and their supervisors share their experiences during the tutorial meeting. The meeting can be followed up by micro-teaching to practise certain teaching skills (such as questioning), when needed.

Assessing Learners

With regard to learner assessment, it is important for the DTE to assess both the academic and professional competencies of students. To assess the academic competencies, which are mainly knowledge and understanding, Universitas Terbuka uses written assignment, essays, a course test and an examination as proposed by Perraton et al. (2002).

Asessing Professional Competencies

The challenge arises when it comes to the assessment of professional competencies. During the professional practice (usually called teaching practice), every student teacher should undergo teaching practicum to master the four domains of teaching responsibility: planning and preparation, classroom environment, instruction, and professional responsibility (Danielson 1996). The four domains are interrelated, since the skills in one domain will affect the skills in others. Assessment of skills in planning and preparation can be done through evaluating the documented teaching plan, while assessment of skills in classroom environment and instruction can be done only through observation. The demonstration of those skills must be observed in action, either directly or through videotape. The observation is vital because of the nature of teaching as an art and a profession, which require teachers to demonstrate the capability of inspiring and motivating students as well as adapting the strategies to the changing situation in the classroom (Darling-Hammond and Goodwin 1993). Meanwhile, part of the skills of professional responsibility, such as reflecting on teaching and maintaining accurate records, can be assessed through logs placed in a portfolio. However, the capability of teachers to interact with colleagues, families and other professionals must be observed.

How can the DTE provider assess the four domains of teaching responsibility or professional practice?

Various approaches can be applied, but two key ones include:

- production of a standard grid for assessment of classroom practice by an external supervisor (this is applied at the National Teachers' Institute in Nigeria); and
- assignment of the mentor and school co-ordinator to be responsible for the assessment of teaching practice throughout the course (this is applied at the United Kingdom's Open University, as indicated by Perraton et al. [2002]).

Meanwhile, the university's experiences show that the key factors for implementing sound assessment on professional competencies are, among others, the commitment and integrity of the tutors and master teachers who are assigned to evaluate the performances of the teachers in professional practices. The assessment is conducted through direct observation and report writing. In the professional practice report, the teachers are assigned to reflect on their experiences during the practices, how they learn from their practices and how they improve their teaching. This report writing draws on the principles of action research being applied to issues of relevance to teachers (Pajak 1993). Each teacher is evaluated by two supervisors, both for the report and the classroom observation. It is not surprising that, in some cases, the reports of teachers are alike and the grade of the teachers on professional practice does not reflect their real

performances. This is, to some extent, a result of the commitment and integrity of the evaluator and the attitude of the teachers. Therefore, before the professional practice is started, training for the supervisors is a must. During the training, some aspects of assessment are discussed, followed by the clarification of the assessment manual. It is expected that the training will enable all supervisors to have the same perceptions of the assessment manual, procedures and instruments.

To see whether or not teachers' performances are improving after going through Universitas Terbuka's DTE programme, the university regularly conducts an evaluation of the performance of teachers graduated from it. The last two studies were conducted in 2001/02 and 2008. The 2001/02 study involved 344 elementary school teachers who graduated from the DII-PGSD Program and resided in six provinces. Data was collected through classroom observation, using the Teacher Performance Assessment Instrument, a questionnaire and an interview. It was found that the mean score of the teachers' performance was 3.7 (on a scale of 1 to 5), or 74% of the ideal performance. It was also found that the teachers had the capacity to handle instructional problems in their classrooms (Wardani et al. 2002). The more recent 2008 study involved 200 teachers graduated from the S1-PGSD, the DII Program for Elementary Physical Education and the DII Program for Kindergarten Teacher Education, also from six provinces. Data was collected through classroom observation, a questionnaire and an interview with the stakeholders. In this case, the mean score of teachers' performance was 4.16 (83.2%) for graduates of the S1-PGSD and 4.32 (86.4%) for graduates of the DII Program for Kindergarten Teacher Education.

According to the interviewed stakeholders, the performance of teachers graduated from Universitas Terbuka was comparable with that of teachers graduated from face-to-face teacher education institutions, with the former showing even more independence, more creativity and a greater hard-working ethos. Furthermore, it was found that some of the university's graduates had even received awards such as "Teacher of the Year" from their employers and/or the governments of their regions, some had become pioneers in classroom action research, and some had become part of a teachers' working group (Universitas Terbuka 2008). The results of these two studies support the role of DE in providing continuing professional development programmes, as indicated by Perraton et al. (2001).

External Assessment and Accreditation

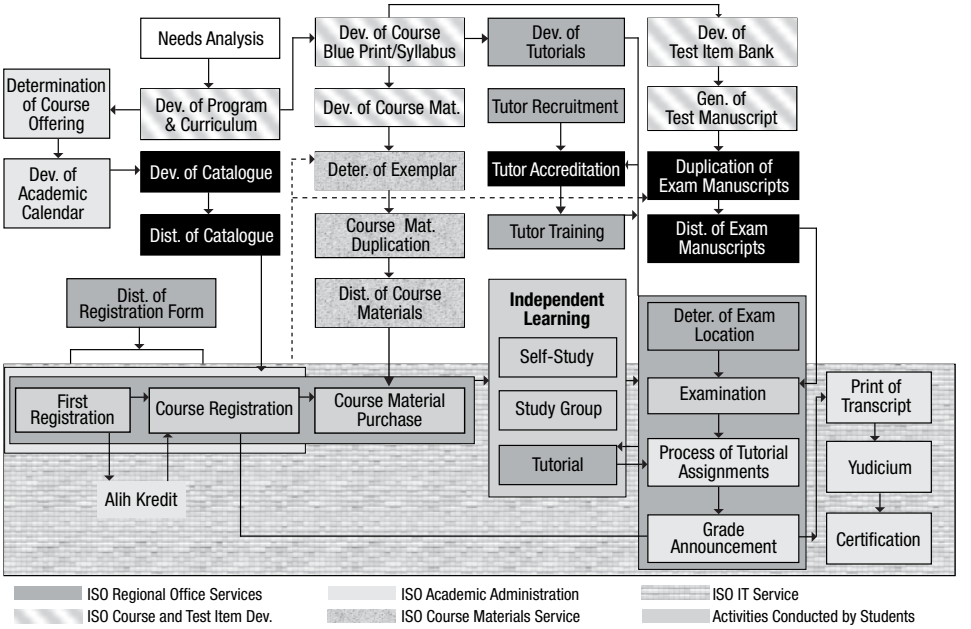
Quality assurance is an internal process based on the willingness to continuously improve the institution's quality. Nevertheless, quality is a perception and thus needs validation from external auditors. This is not only to convince the stakeholders who are not involved in the internal process, but also to provide feedback to the institution about whether the achieved quality has met the recognised quality standards. Moreover, external QA also forces the assessed institution to prove the soundness of its internal QA system.

It is for these reasons that Universitas Terbuka invites different external quality assessors from three different agencies: the International Council for Open and Distance Education (ICDE); International Standard Agency (ISA); the International Organization for Standardisation (ISO) agency; and the National Accreditation Board for Indonesian Higher Education (BAN-PT).

As the largest membership organisation within the online, flexible and blended learning (including e-learning and DE) community, ICDE has actively engaged in the challenging question of the QA and certification of trans-national education, especially of ODL and web-based courses worldwide. As stated in its official publication (see www.idce.org), ICDE's audits are concerned with the quality and standards of services to students at the point of delivery and an institution's responsibility for what is done in its name. At the centre of the audit process is an emphasis on students – in terms of the quality of the information they receive about their programmes of study and the ways in which their learning is facilitated and supported so that they can actually achieve what they reasonably expect to achieve. Therefore, the ICDE's receiving a Certificate of Quality and International Accreditation in September 2005 reassured the university's stakeholders about its strong commitment to providing DE education in Indonesia. This accomplishment also provided the university's management and staff with feedback on what has been achieved and what actions still need to be taken for further and continuous improvement.

The ISO standards are widely respected and accepted by public and private sectors internationally. The effort to get ISO certification is intended to foster Universitas Terbuka's internal transparency on and commitment to the use of previously self-developed standardised procedures. The preparation for obtaining ISO certification started in 2005. By May 2009, the university had already obtained ISO 9001:2000 certificates for several management aspects (see Figure 12.1).

Figure 12.1: Aspects of Universitas Terbuka's management certified by ISO 9001:2000.



The third external auditor body is the National Accreditation Board for Indonesia Higher Education (BAN-PT). This is an accreditation certification that emphasises the quality of inputs, processes and outputs of education at the academic department/study programme level. The assessment is done through desk evaluations of the university's portfolio, the Study Program's Self-Evaluation

Report and completed accreditation instruments, as well as through a site visit that includes observations and interviews with representatives of the university's and the faculty's top management, support staff, tutors and students. The accreditation is granted to an individual Study Program within a university, once the respective Study Program has fulfilled the conditions set by the Board, based on clearly defined performance indicators. The accreditation status is valid for five years and it has to be maintained regularly. In mid-2009, Universitas Terbuka was in the process of renewing its accreditation status.

With the three external quality assessors emphasising slightly different aspects of the university's management, services and products, Universitas Terbuka is confident in moving progressively with its QA system. The university considers the external quality audit to be as important as the internal QA process. The most important part of the accreditation process is not the obtaining of the certificate, but the course of action followed to get it. The process of earning each certification or accreditation has encouraged all parties involved to diligently follow the standard operating procedures and to ensure that all the services and products satisfy the main stakeholders.

Concluding Remarks

Distance education has been playing an important role in teacher education in many countries including developing countries. Despite the success of DTE in increasing access by teachers to further education, the quality of DTE should remain the focus of programme providers. As the demand for interactive communication among students and between students and tutors has grown, QA has become one of the fundamental aspects in planning and managing DTE. It has also forced DTE providers to revisit their missions and strategic visions to incorporate and address quality issues. In response to such development, DTE providers have been incorporating QA programmes and activities in their operational systems.

Even though different institutions have different approaches to assure their quality, there is shared belief that a good QA system will help them improve their good practices and also address the issue of accountability.

As the biggest DTE provider in Indonesia, Universitas Terbuka has developed and implemented a systematic QA system to ensure the quality of its teacher training programmes. Within this system, the university formulates clear QA policies that the QA team then further elaborates in the form of QA manuals. As a result of the consistent and persistent implementation of the manuals, Universitas Terbuka has been able to convince its stakeholders about its commitment to quality as shown by the various external quality certifications and accreditations it has acquired.

More broadly, this chapter has asserted a strong and continuing link among QA, teacher education and ODL. There is a general recognition that assuring the quality of both teacher education programmes and ODL technologies is crucial to ensuring the quality of current and future teachers. Furthermore, as was noted at the beginning of the chapter, that process of QA is critical if UNESCO's Millennium Development Goals related to universal primary education are to be fulfilled. From this perspective, the challenges and tensions that sometimes attend the implementation of QA must be set against the larger goal of achieving quality education.

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CHAPTER 13

Creating New Perspectives on Teacher Education through Open and Distance Learning

Patrick Alan Danaher and Abdurrahman Umar

Abstract

Teacher education through open and distance learning (ODL) is not only crucial to addressing current and future needs of learners around the world; it also encapsulates the possibilities of several much-needed new perspectives on those two fields as well as education more broadly. This chapter demonstrates that proposition by synthesising four selected themes that run across the preceding chapters, and by positing those themes as providing rigorous and sustainable responses to the book's key issues and organising questions as expounded in the first chapter. This chapter then elaborates on five new perspectives drawn from the implications of those themes, and on responses for future policy-making, practice and research in the intersection between teacher education and ODL, as well as in wider contemporary educational debates.

Introduction

We see this book as having traversed a diverse set of terrains. We see the authors of the chapters in the book as having succeeded simultaneously in depicting those terrains as troubling and in "troubling" those same terrains in turn (see also Henderson and Danaher 2008). By this we mean that the individual chapter contributors have identified specific aspects of teacher education through open and distance learning (ODL) that are, in particular ways, challenging and problematic vis-à-vis mainstream provision, and yet at the same time have portrayed provision alternatives that can be important parts of an effective, efficient and equitable approach to teacher education while taking into account current obstacles to implementation.

These twin goals and hoped-for outcomes of the book – articulating and contesting the taken-for-granted assumptions about teacher education and the

extent to which it can be enacted via ODL – are consistent with and also build on the related publications noted in Chapter 1. Similarly, the chapters in this book have helped to illustrate as well as develop the summary by Perraton et al. (2007a, p. 14) of the principal functions of distance learning in teacher education:

> "In general, distance-education programmes have been developed with varied intentions: of widening access to teaching qualifications; of disseminating good practice; of strengthening the education system as a whole by reaching not only teachers but [also] the wider community; in enabling school-based training and professional development and as a means of strengthening the links between theory and practice, focusing on the school as a site of teachers' learning."

Moreover, the orientation of UNESCO's (2002) guidelines for teacher education using ODL – relevance, utility, planning and management, technologies, teachers' practical skills and assessment – accords strongly with the accounts presented here. These accounts also provide necessary details about how those guidelines can and should be implemented and evaluated in a diversity of contexts for multiple purposes.

A noteworthy element of the book that is elaborated in this chapter is its focus on explicating specific links between teacher education through ODL and broader debates about educational policy and practice. This is significant not just in a theoretical and methodological sense, but from considerations of feasibility and sustainability as well. If the needs of teachers and their students canvassed in the book are to be fulfilled, those needs must be understood against the wider backdrop of contemporary education rather than being sidelined as applying only to particular groups of marginalised learners and their educators.

This chapter is organised around the following three sections:

- an overview of selected major themes traversing the preceding chapters;
- an application of those themes as a means of helping to engage with the key issues and organising questions framed in the first chapter; and
- an identification of new perspectives on both teacher education through ODL and education writ large as suggested by that engagement.

These perspectives align with and enlarge the three wider forces that we specified in Chapter 2: national development, social justice and global transformation.

Selected Themes

Several themes could have been selected from the preceding chapters for synthesising the book's major findings and contributions to the continuing debate about ODL in teacher education. We have space to elucidate only four of these:

- an assumption of the appropriateness and necessity of this form of teacher education;
- an articulation of some fundamental principles required for this form of teacher education;
- an understanding of how contextual factors and material conditions frame and constrain the implementation of those principles; and
- an explanation of how that implementation can and should be attained in practice.

Appropriateness and Necessity of Teacher Education through ODL

All the chapters exhibit a high degree of unanimity about the crucial roles played by teacher education through ODL. Simpson and Kehrwald (Chapter 3) state, "The record of open and distance delivery of teacher education is good ... and there continue to be exciting possibilities that allow for an enhanced student experience and a means of meeting national and international development goals," and they link those possibilities with two separate but overlapping drivers of policy initiatives in this area: a way for developing nations, in particular, to increase teacher numbers; and an equity imperative, especially in developed countries.

More specifically, Shelton Mayes and Burgess (Chapter 4) found that "ODL approaches to ITE [initial teacher education] have been identified as having major advantages over conventional programmes that require residency in terms of cost, scale and access." Importantly, while they argue that ITE through ODL is similar in developed and developing nations in most respects, two areas of difference have emerged and are growing: individually personalised routes are easier to enact in developed than in developing nations, and so is the process of embedding information and communication technologies (ICTs) in ITE programmes.

Likewise Harreveld (Chapter 5) maintains that "Open and distance learning (ODL) contributes substantively to the provision of in-service teacher education (INSET) that is responsive to social, cultural and economic forces affecting employment, community development and citizenship" (notwithstanding the significant challenges to that contribution in different regions).

With regard to particular strategies and practices, Postle and Tyler (Chapter 6) contend that "online approaches can provide alternative educational experiences that challenge the legitimacy of location-based models to represent the best way to deliver quality education," although they also note that "early attempts at providing online approaches endeavoured to recreate the classroom," suggesting the resilience of teacher education programmes predicated on face-to-face contact.

Correspondingly, Latchem (Chapter 7) asserts that "As well as providing increased access, ease of use, flexibility, colleagueship and collaboration, online training may also be more cost-effective than face-to-face provision – an important consideration if all teachers are to receive ongoing training in ICT integration." He insists, however, that "Successful ICT integration in schools also requires everyone else involved to be similarly trained and enabled to share their experiences: policy-makers, inspectors and advisers, head teachers, teachers, librarians, support staff and, some would argue, parents and the wider community."

Optimistically, Stevens (Chapter 8) claims, "Open and distance learning therefore inherently challenges the professional education of teachers, the nature of their appointments, the notion of classrooms and even the concept of schools," in particular opening up learning and teaching to increased opportunities for collaboration and networking.

Jakobsdóttir, McKeown and Hoven (Chapter 9) apply this argument to three dimensional virtual worlds (VWs), arguing that "With the affordances of manipulating and creating digital materials and products for creative expression, VWs can provide opportunities for teachers to develop their knowledge and skills in design without the associated high costs." They point to this as part of a broader

trend whereby "professional development with the use of new ICT is evolving in combination with ODL for the teaching profession." Similarly, Moon (Chapter 10) argues that the current "crisis ... around the supply, retention and training of teachers, particularly in developing world contexts ... [is] enormously significant for social stability and well-being," and he positions the open educational resources (OERs) initiative of the Teacher Education in Sub-Saharan Africa (TESSA) programme as enacting several of the necessary ingredients for addressing this crisis, including providing "some form of consortium co-operation around teacher education and training," developing resources that "represent a high quality basis around which course design can proceed," and "making a major contribution to debate and discussion around OERs."

In engaging with the complex issue of the cost-effectiveness of teacher education programmes using ODL, Thompson (Chapter 11) states that "given the comparative cost of an ODL programme and considering the time period of using the learning materials, ... an ODL programme can be cost-effective for an institution to undertake." He also says that "ODL has moved beyond having to compare its costs with those incurred in conventional teacher training."

Finally, Belawati and Wardani (Chapter 12) acknowledge concerns about the quality of distance teacher education, but demonstrate by way of illustration that Universitas Terbuka in Indonesia "has been able to convince its stakeholders about its commitment to quality as shown by the various forms of external quality certifications and accreditations it has acquired."

Clearly, every chapter elaborates on the proposition that teacher education through ODL is both appropriate and necessary in the contemporary world. Within that unanimity, the book's contributors develop that proposition against the backdrop of their respective interests and concerns. At the same time, none of them minimises the obstacles confronting the education of teachers using ODL, and all in different ways highlight the links between those obstacles and the broader issues of access, equity and social justice.

Some Fundamental Principles Required for Teacher Education through ODL

As well as attesting to the enduring importance of teacher education through ODL, the book's contributors identify several fundamental principles that are crucial to the effective enactment of that form of teacher education. Indeed, Simpson and Kehrwald (Chapter 3) enunciate one set of such principles and associated policies, which they base on the various uses of ODL in teacher education, the relationship between policy and such learning, and particular values that range from integration, coherence and connectedness, to interaction and inquiry, to reflection, and to fostering a disposition to lifelong learning and working with others. On that basis they identify seven principles for maximising the effectiveness and sustainability of teacher education through ODL:

- Design must be driven by teacher education components.
- Teaching needs must drive technology choice.
- Materials development must draw on experience and research from both open and distance education and teacher education.

- All the discrete elements of a programme of teacher education need to be integrated into a coherent programme.
- The habit of reflective practice needs to be an integral part of the learning activity within teacher education programmes.
- Practicums need to be fully incorporated into programmes and their enactment supported and linked to all programme elements.
- A teaching qualification gained through open and distance delivery must be accorded equivalence with other modes of delivery.

Several other chapters also articulated to varying degrees specific principles for enhancing the provision of teacher education through ODL. According to Postle and Tyler (Chapter 6), for example:

- e-learning approaches should be used to support and promote a transformative view of learning and teaching; and
- e-learning environments should be based around a different infrastructure from that which is used in location-based environments.

Furthermore, Thompson (Chapter 11) contends that "The most cost-effective methods of an ODL programme will result from strong adherence to project management, timely development, collaboration on delivery, and strong promotion of student success." Harreveld (Chapter 5) frames the requisite "educational paradigm shift" in terms of "accommodat[ing] social, economic, cultural and political differences among diverse communities of learners while at the same time recognising our common humanity."

Latchem (Chapter 7) argues that:

> "INSET [in-service teacher education and training] in ICT needs to take account of the affective as well as the cognitive and skills dimensions of change. And there is great value in forming communities of practice within which all of those trying out the new ideas can call upon one another for advice and support."

All these ideas have considerable merit as potential principles for implementing teacher education through ODL. Equally importantly, each of them has been proposed against the backdrop of the respective international, national, regional and local contexts of the accounts that prompted them. This suggests that it is vital for teacher educators, their students and other stakeholders to exercise critical judgement in deciding which, if any, of these principles are likely to be useful to them in developing and evaluating specific teacher education programmes in particular settings.

How Contextual Factors and Material Conditions Frame and Constrain Teacher Education through ODL

All the book's contributors have certainly recognised the fundamental role of contextual factors and material conditions in simultaneously framing and constraining teacher education through ODL. Simpson and Kehrwald (Chapter 3) state explicitly, "Context, history and experience in any particular setting influence the pace of change as does the nature of the student group and the policies and infrastructure in place." Moreover, "the unique local context and

local conditions that exist must be acknowledged. The mode of delivery has to be matched to the technologies available and costs must always be taken into account. Each context may be quite different."

Similarly, Shelton Mayes and Burgess (Chapter 4) note that "The development of a trainee's learning and practice is highly influenced by the school-based context." Harreveld (Chapter 5) exemplifies this influence by posing the contextual question: "In what ways can ODL facilitate innovative and potentially transformative in-service professional development for TVE [technical and vocational education] teachers in secondary schools?" She also holds that a particular combination of types of in-service teacher education "illustrates both conceptually and contextually some very real challenges that are faced in both developed and developing countries."

In relation to these kinds of contextual conditions framing and constraining ODL in teacher education, Postle and Tyler (Chapter 6) present two instances in which ODL throws off the usual constraints of face-to-face education, namely administrative requirements around the use of lecture/tutorial structures and their timetables, and limits imposed by location-based approaches to educational provision. Likewise, Jakobsdóttir, McKeown and Hoven (Chapter 9) note that one advantage of social networking applications in teacher education is that they bypass the constraints of course timing and institutional firewalls. Thompson (Chapter 11) asserts, "By carefully considering price points to the student fees and and working to minimise the constrictions to student participation, the cost for ODL can be kept down, making ODL more than accessible to participation than other instructional delivery types."

On the other hand, several authors identify particular and diverse obstacles to the enactment of these advantages. For instance, Belawati and Wardani (Chapter 12) state, "In the area of learning processes, the biggest challenge for DTE [distance teacher education] is in providing teaching practicum for student teachers," and also that challenges arise in assessing professional competencies during professional practice. Moon (Chapter 10) observes that although TESSA is predicated on strong links of inter-institutional and international collaboration, "Teacher education institutions, whether universities, colleges or other forms of organisation, sometimes find it challenging to create internal and external modes of co-operation," and that several technical problems exist, such as designing sites that could be adapted to multiple languages. Stevens (Chapter 8) explains how the technological linking of eight schools in rural Newfoundland and Labrador in Canada was accompanied by resistance to change by teachers and students alike:

- "It challenged the autonomy of teachers within their own classrooms, as well as their isolation from other members of the profession."
- "Students struggled with the concept of discussing their work with peers they did not know who participated in shared lessons taught from other locations. The traditional closed, or autonomous, model of the school was challenged by an increasingly open teaching and learning environment."

All of this suggests that, in multiple and varied ways, culturally and geographically specific contexts simultaneously foster and restrict possibilities for change and transformation in teacher education through ODL. While sometimes the obstacles appear insurmountable, and often the inequalities of access and provision among

and within countries are replicated in the outcomes of efforts at reform, there are many examples of success that augur well for future actions.

How Teacher Education through ODL Can and Should Be Attained in Practice

Finally, all the chapters contribute an understanding of how teacher education through ODL can and should be attained in practice. While there is considerable diversity among the chapters about this issue, there is also an underlying convergence about specific elements of such practice.

Shelton Mayes and Burgess (Chapter 4) conclude their chapter with a synthesis of what they perceive to be the three key ingredients of effective pre-service teacher education via ODL: a mixed mode of training; a school-based focus on practice within settings; and effective training for tutors, school-based mentors and trainees. Looking at in-service teacher education, Harreveld (Chapter 5) cautions against "current practices of ODL that are at risk of technological seduction by the developed world's infrastructures and delivery models," and argues strongly in favour of "experimentation with ODL practices that provide for teachers' learning to develop their capabilities to consolidate current knowledge and develop new discipline-specific and transdisciplinary curriculum knowledge and pedagogical strategies." Similarly, Stevens (Chapter 8) points to the important implications of ODL for teacher education at both pre- and in-service levels: "The development of collaborative pedagogy within digital networked environments, the integration of virtual and actual teaching and learning, and the creation of cybercells collectively improve access to educational opportunities, particularly for people in rural communities."

Not surprisingly, the authors who focus on trends in developing countries highlight somewhat different priorities from those articulated by the authors looking at developed nations, yet those trends also contain value for such developed nations. For example, Moon (Chapter 10) contends that, for initatives such as TESSA and its reliance on open educational resources to survive and thrive, "International co-operation and partnership ... [need] to be extended and deepened within institutions to ensure that the use of TESSA-like resources becomes part of the professional culture of participating teacher educators and the teachers they support."

Belawati and Wardani (Chapter 12) focus on how a provider of distance teacher education has effectively incorporated quality assurance (QA) programmes and activities into its operational systems, and conclude that, "Even though different institutions have different approaches to assuring their quality, there is a shared belief that a good QA system will help them improve their good practices and also address the issue of accountability." Latchem (Chapter 7) provides a timely reminder of how several different regions of the world are successfully integrating ICT in schools to promote use of ICT by teachers:

> "Governments and other public providers and private organisations can also assist in this work by providing portals through which managers and teachers can access training, materials and case studies, dialogue with one another, publish findings, and showcase achievements. Using ICT in these ways has a great potential for

updating and extending teacher training provision, both in developed and in developing countries."

Jakobsdóttir, McKeown and Hoven (Chapter 9) identify this same convergence in a different but related way:

> "Teachers in technology-rich countries are becoming more familiar with the social networking tools and web-based resources that are available and simultaneously becoming more aware of the communities to which they have access and can contribute. Teachers in technology-poor nations or developing countries are increasingly turning to mobile devices to create their own communities and gain access to others, while embracing the connectivity and exchange of ideas, information and knowledge made possible through these means."

Responses to the Issues and Questions

Having elicited four major themes from the preceding chapters, we turn now to applying those themes to the key issues and organising questions outlined in the book's first chapter. Those issues are derived from the aspirations of Education for All – as communicated in the Dakar Framework for Action in 2000 (Umar and Tahir 2009) – and that initiative's dependence on a reliable supply of well-qualified and highly motivated teachers in often very challenging settings. The difficulties of achieving such a supply have helped support the rationale for teacher education through ODL and for deploying exciting new technological developments and devising new pedagogical solutions that can contribute to the democratisation of educational provision.

The four themes identified above provide a robust framework for elaborating and taking these issues forward. First, there is unanimity across the chapters that teacher education through ODL is not only an appropriate and viable approach to preparing and "upskilling" teachers, but also the only sustainable approach to this important task in many countries and regions in the world. Second, and by contrast, there is recognition that simply placing materials in distance or online modes is not sufficient to achieve this outcome. On the contrary, it is vital for certain fundamental principles (such as accessibility and low cost) to be identified and implemented if the relevance and quality of the teacher education approach are to be assured. Third, diverse contextual factors and material conditions frame what is possible in specific locations while also constraining such possibilities in particular ways. Fourth, as the chapters show, certain strategies for implementing open and distance teacher education are successful in different contexts and conditions.

These same themes come together again in addressing the book's three organising questions:

- *What are the intentions, forms and effects of current enactments of ODL?*

  The diversity of current enactments of ODL described in the book is shown in TESSA's open educational resources (Moon, Chapter 10), cybercells for pre-service high school teachers in rural Newfoundland and Labrador in Canada (Stevens, Chapter 8) and the case study of one

teacher's encounters with Web 2.0 technologies in Iceland to promote her and other teachers' professional learning (Jakobsdóttir, McKeown and Hoven, Chapter 9). Despite this diversity, the intention of all these approaches to ODL for teacher education is the same: they take advantage of the respective affordances of particular ICTs in order to provide the most effective, efficient and equitable teacher education possible in specific locations. The forms of those enactments have also been shown to vary according to the particular contexts and conditions applicable to them – for example, the similarities and differences evident in approaches to initial teacher education (Shelton Mayes and Burgess, Chapter 4) and in-service teacher education (Harreveld, Chapter 5). The effects of these enactments have been similarly diverse and several of the authors call for further research and evaluation. Overall, however, the results to date have been shown to be promising and worth continuing, even while broad, large-scale challenges and obstacles remain.

- *What are the implications of those enactments for envisaging and implementing effective, efficient and equitable teacher education?*

  All of the book's contributors address the effective, efficient and equitable dimensions of teacher education through ODL. For example, Simpson and Kehrwald (Chapter 3) contend that core principles and values must first be in place in order to develop "coherent, integrated, effective teacher education programmes." They also note that, in some contexts, short-term efficiency can be at the cost of longer-term effectiveness. Similarly, Postle and Tyler (Chapter 6) argue that although ICTs are sometimes deployed because of their presumed greater efficiency, that deployment can also simultaneously enhance effectiveness and equity in teacher education provision. Likewise Latchem (Chapter 7) holds that "ICT can be used to train teachers in ICT equitably and cost-effectively." Thompson (Chapter 11) considers effectiveness in terms of costs, but also implicitly draws on equity in the third of his proposed crucial measures of cost-effectiveness in ODL for teacher education: the administrative budgets to set up and run the programme; the development of a quality ODL programme; and participants' access to an ODL programme.

  Belawati and Wardani (Chapter 12) construct effectiveness in terms of its "communication channels" and efficiency with regard to its "resource management and administration systems."

  This snapshot illustrates the diversity and the complexity of envisaging and implementing teacher education that is effective, efficient and equitable, and shows that those dimensions are sometimes potentially contradictory rather than automatically convergent.

- *What new perspectives on educational provision are created by the contemporary and possible future intersection between teacher education and ODL?*

  All of the contributors highlight several different elements that imply possible new approaches to educational provision. For example,

Simpson and Kehrwald (Chapter 3) point to the new networked computing communication technologies that offer potential for new educational development models, while Harreveld (Chapter 5) emphasises the importance of preparing "teachers for new roles – not just as principals or heads of departments, but as different types of teachers." Postle and Tyler (Chapter 6) argue strongly in favour of "the need for a radical transformation in the way we conceptualise teaching and learning" in these contexts of both face-to-face learning communities and web-based e-learning communities – a challenge taken up by Latchem (Chapter 7) in his claim that "Using ICT to train teachers in ICT also familiarises them with the delivery systems, develops their abilities to use these tools, and helps them appreciate what is involved in inquiry-based and collaborative learning and in new paradigms of learner-centred pedagogy." Likewise Stevens (Chapter 8) has no doubt that "Technological changes have led to new relationships between teachers and learners as well as between ODL and traditional education."

The response to this question is discussed in more detail in the next section below.

Creating New Perspectives

As Blass et al. (2010) observed, "The very notion of researching the future is a paradox." Nevertheless their elaboration of five very different scenarios for possible alternative futures in the higher education sector in the United Kingdom provided a salutary lesson about the need to link sometimes idealised aspirations for the future with carefully thought-through and rigorous analyses of past and current trends.

While not exploring the scenarios option on this occasion, we seek in this section to use the preceding themes and responses to the book's organising questions to suggest five potential new perspectives on the intersection between teacher education and ODL and what that might mean for future policy-making, practice and research in those domains and in education more widely.

- One perspective is centred on the material realities and lived experiences of teachers' and teacher educators' work. Although important aspects of that work vary significantly from one setting to another and certainly between developed and developing nations, other dimensions are emerging across contexts. Gale and Densmore (2003) have suggested two of these: "a substantial body of critical scholarship argues that key elements of teachers' and teacher-educators' experiences include *intensification* of the work process through increased workloads and *regulation* of the work process through closer supervision and tighter structuring" (p. 84; italics in original).
- A second and related perspective in the education research literature is the increased emphasis on teachers' lives (see, for example, Anteliz et al. 2006; Loughran and Kelchtermans 2006). While sometimes this emphasis is individualised and even solipsistic, it can provide poignant and powerful insights into the challenges faced by educators along the continuum of

experience, as well as into the strategies that they deploy to engage with those challenges. This perspective is important for understanding how such teachers approach their professional responsibilities, including their pre- and in-service education, and therefore for evaluating the likely impact of particular approaches to that education using ODL. As Kubler LaBoskey (2006, p. 121) noted:

> "[This approach] puts a human face on the statistics and data trends. It helps us to see whether or not the ideas and systems we have put into place as policy-makers, administrators and teacher educators make the task of ensuring equitable and excellent outcomes for all learners not only more likely but also more satisfying and affirming. The daily lives of teachers and students, their struggles and their triumphs, is [*sic*] and should be our ultimate 'reality check.'"

- A third perspective derives from the proposition of using ICT in pedagogically innovative ways. Such innovation can be theorised from several different viewpoints. Our focus here is on Denning's (2004, p. 1) distinction between "the invention of a new idea of object" and "transformation of practice in a community." The latter definition is the one that accords more strongly with the preceding accounts in this book. Even with relatively new technologies such as wireless hand-held devices and Web 2.0 applications, what decides whether and how they are innovative is their capacity for becoming instantiated in the cultural practices of one or more communities and for then assisting in generating productive change. Or, as Danaher et al. (2007, p. 103) observed: "Technologies featured here include the networks of human and non-human associations connected with the pedagogical practices situated in the lifeworlds of the ... students and their teachers."
- A fourth perspective understands ICTs as parts of complex systems of historically constructed and currently situated interactions involving learners, educators, decision- and policy-makers, and other stakeholders. Those systems are increasingly international – and some even global – in reach, and they frequently spill over into most domains of present-day life. They are also inherently political, in that they are derived from, and often help to replicate, existing inequities of power and access to resources. According to Danaher et al. (2009, p. 73):

  > "Understanding technologies as applied interactions between the self and multiple environments ... thus helps to explain how and why ... communities use such interactions to engage in learning, earning, and living in multiple contexts that are sometimes favorable and sometimes hostile...."

- A fifth perspective is centred on the diversity of forms that can – and perhaps should – be taken by contemporary applications of ODL. The preceding chapters have traversed several such applications, including open educational resources, Web 2.0 software, cybercells, and radio and video transmissions and recordings. Regardless of whether the application occurs in a developed or a developing nation, it is likely to be the particular circumstances of specific learners and educators that will influence decisions

about which technologies to employ in which combinations and for which intended effects. As Kember (2007) pointed out:

> "... [O]pen universities in developing countries should consider adapting the conventional distance education model, which most have adopted, toward more flexible learning. The latter is seen as a judicious blend of distance learning, face-to-face, learning and networked information technology suited to local conditions and students' learning needs and abilities."

We believe that all of these perspectives have important implications for a wide range of stakeholders in teacher education through ODL, from learners, educators, administrators and technicians, to policy-makers at institutional and systems levels and to researchers. We also believe that these perspectives are integrally and intimately associated with broader and continuing debates within education such as who has access to educational provision and who does not, whether such provision replicates or transforms existing socio-economic inequities, and whether the pedagogical and technical elements of ICTs are positioned as complementary or in competition with each other. All of these perspectives do, in our view, contribute to informed and strategic engagements with the wider forces note above: national development, social justice and global transformation.

Conclusion

In their concluding remarks in *International Case Studies of Teacher Education at a Distance,* Perraton et al. (2007b, p. 277) wrote:

> "These eleven case studies provide us with a significant body of data to further our understanding about the use of distance education for teacher education. Although the case studies were limited in their scope and took place in only ten countries, they make it possible to draw some conclusions about the appropriate uses of open and distance learning, its effectiveness and costs. The evidence also provides some guidance on key aspects for planners – on technologies, management and funding structures."

This is also the case with the chapters in this book. On the one hand, the book highlights significant promise for the various initiatives in teacher education through ODL outlined here while also cautioning that such promise cannot be fulfilled without appropriate resourcing and political support and unless the broader contexts and conditions are understood. On the other hand, the book provides detailed information and draws on contemporary scholarship to demonstrate what can be achieved – and what in many cases has already been achieved – in extending the access to and the reach of teacher education more effectively and sustainably than is possible with face-to-face provision alone.

Broade debates in present-day educational provision, policy-making and research have been canvassed and implicated in the accounts presented here – not only those debates related to national development, social justice and global transformation, but also those connected with principles and values, effectiveness and efficiency, access and equity, quality and durability. These, we think, are the enduringly significant new perspectives on teacher education through ODL that all of us can help to create.

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PERSPECTIVES ON DISTANCE EDUCATION

Teacher Education through Open and Distance Learning

The global need for teacher education is greater now in the early 21st century than ever before. According to UNESCO, half of the world's 195 countries will have to expand their stock of teachers significantly – some by tens of thousands – if the goal of universal primary education as articulated in the Dakar Framework for Action in 2000 is to be met by 2015. Socioeconomic inequities, political instability, demographic changes and crises such as the HIV/AIDs epidemic have engendered huge shortfalls in teacher supply and low teacher quality in many developing countries. It is now clear that "bricks and mortar" approaches to expanding teacher education may not be adequate if the current and projected shortfalls in teacher supply and low teacher quality are to be properly addressed.

Today, however, both research and practice are showing the tremendous opportunities in large-scale education provision offered by open and distance learning (ODL). Capitalising on the strengths afforded by innovative information and communication technologies and media, ODL broadens and streamlines access to teacher education in a way that traditional delivery modes cannot. At the same time, adopting ODL requires new thinking about learning and teaching strategies, applications, costs and other practicalities.

The contributors to the 13 chapters in this book are nationally and internationally renowned scholars in teacher education, ODL or both. Collectively, the perspectives and insights they provide – varying in a range of contexts and countries – respond to three key questions:

- What are the intentions, forms and effects of current enactments of ODL?
- What are the implications of those enactments for envisaging and implementing effective, efficient and equitable teacher education?
- What new perspectives on educational provision are created by the contemporary and possible future intersection between teacher education and ODL?

As readers will find, whether they are new to the topics or well familiar with them, the result is an authoritative, contemporary and thoughtful discussion of both the promise and ongoing challenges of mobilising the benefits of teacher education through ODL.

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