

Towards Information Literacy training for teachers in rural South African communities: research in progress

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Abstract: Information communication technology (ICT) and information literacy (IL) training of teachers in developing communities are expected to pose special challenges in terms of sustainability, contextualisation, life-long learning and empowerment. In addition, very little has been reported on such training in developing countries and rural areas. A review of the literature on ICT and IL training for teachers and Internet usage by teachers shows that there are valuable information on combining ICT and IL training and how the training can be conducted on a practical level. Although, with good reference to the use of the models and standards for IL, there still remains an insufficient theoretical base and methodological depth to support sustainable IL training initiatives in developing contexts such as rural areas and townships. A review of leading sources on Information Community Technology for Development (ICT4D) points to the value of a Critical Approach to using and researching ICT in developing contexts, especially since it empowers the researcher to take up a position of enquiry that questions the value of ICT and the underlying assumptions embedded in the ways ICT are often introduced to developing communities. It is assumed that this would also apply to IL.

In this research in progress the authors report on the initial phases of an IL and ICT training partnership between the Department of Informatics and the Department of Information Science from the University of Pretoria and UNESCO, for teachers from a rural community in South Africa. The findings from the literature review presented in this paper not only offer practical advice on computer and IL training for teachers in a rural South African context, but also address issues such as contextualisation of training, sustainability, life-long learning and ongoing empowerment to the explicit benefit of the community and according to their understanding of development, empowerment and emancipation. Some suggestions are offered on the latter.

Keywords: Computer literacy, information literacy, Internet searching, developing communities, information communication technology for development, teachers

1 Introduction

According to the Alexandria Proclamation of 2005 (cited in UNESCO, 2008), Information Literacy (IL) is recognised as: “a basic human right in the digital world” since it empowers individuals “in all walks of life to seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals”. This is in line with calls for IL skills in academic and workplace, civil society, and health contexts (Cheuk, 1998; McMahon & Bruce, 2002; Craig, 2009), and for evidence-based research practices (Emmons et al., 2009). According to Usluel (2007:93) and supported by Kim, Jung and Lee

(2008:1683), “Information literacy skills are among the key skills required for success in information-based societies. Consequently, teachers who undertake the responsibility of teaching and leading others should possess these skills. Developing a high level of efficacy in these skills will also affect the success of teacher work performance and personal success in an increasingly information-based society”.

According to Idiodi (2005:223), IL is of equal importance in any state or society the world over. This would include developing countries where unique challenges exist (Donner & Gorman, 2006) as they include deep and isolated rural areas. Idiodi (2005) also suggests the need for each country to evolve its own national IL policy that takes into account international IL standards and indicators in order to “make it its own in some form or another, so that it becomes implemented successfully at the level of practice.” Similarly to the suggestions of Idiodi (2005), one can say that the implementation of international IL guidelines and standards will have to be aligned and interpreted for the specific issues and concerns of rural communities in South Africa (SA). There are numerous such guidelines and standards that may influence the design of IL training programmes for teachers e.g. the Big6, ALA guidelines in various contexts, SCONUL pillars of IL, Association of College and Research Libraries (ACRL) and the IFLA guidelines on IL and life-long learning (see Appendix A).

Acknowledging the value of information literacy and the existence of standards and guidelines, it however, became clear from a literature search that very little is known about the real challenge, namely the contextualisation and alignment of training programmes with the needs, experiences, expectations and realities faced by information mediators such as teachers in developing and rural communities in SA. To address this, the first step in this paper is to assess the existing body of literature on issues relevant to information literacy training for teachers, and then to address issues of contextualisation, sustainability, life-long learning and ongoing empowerment in ICT and IL for developing contexts. These pointed to the fact that the literature on Information Technology for Development (ICT4D) may offer guidance, and thus these will be used to suggest a model that is sensitive to the needs of developing countries as well as the existing literature and epistemologies and that can guide future work.

2 Scope of the paper

This paper reports on the groundwork literature review for an IL teacher training partnership between two departments from the School of Information Technology at the University of Pretoria (i.e. the Department of Informatics and the Department of Information Science) and UNESCO (providing funding and other support). Accepting the uniqueness of training in townships, rural areas and developing countries, the paper covers the groundwork for the research in progress to ensure that more than practical training in ICT and information skills is offered. The paper

- gives background to the project and the challenges faced by schoolteachers in the specific community,
- briefly refers to the scope of the two training courses in computer skills and IL for teachers in a developing country with specific reference to townships and rural areas,

- contextualises teacher training in IL skills in rural SA against a theoretical literature review on ICT training and IL training for teachers and Internet usage,
- explores literature on ICT4D for guidelines on addressing the issues of sustainability, contextualisation, life-long learning and empowering teachers as information mediators in SA, as well as the subsequent choices for implementing ICT and IL training programmes for teachers in developing communities, and
- presents a methodological approach and position of enquiry for investigating and implementing IL training for empowering teachers as information mediators with specific reference to developing and rural communities in SA.

3 Background to the teacher training project

The engagement between the University of Pretoria and Valley of Hope¹ Primary School in the Valley of Hope community started late in 2008 through a friendship relationship between one of the Department of Informatics' staff members and the headmistress of the school. As a result of this contact and knowledge about the school and community, the Department of Informatics subsequently donated ten computers to the teachers of the school. During this engagement and as a result of a number of follow-up visits to the school where relationships were strengthened and ideas communicated, the teacher community expressed the need for skills to effectively use the computers donated to them. Learning from prior community engagement initiatives and having collaborated with UNESCO in an ICT training project in 2009 (see Krauss et al., 2009), the authors approached UNESCO for funding and participation. In reaction to an expression of needs by the school and aligning with UNESCO's request to test their draft Media and Information Literacy (MIL) curriculum, a project proposal was formulated. In February 2010, UNESCO agreed to offer a grant. Two training courses for teachers were designed and registered through Continuing Education at UP (www.ceatup.co.za) and a detailed work plan was prepared.

May 2010 marked the start of a partnership between two departments from the School of Information Technology and UNESCO that involves a fifty-hour intensive teacher IL training program over nine Saturdays. Forty-three teachers from the Valley of Hope community were trained, firstly, in ICT literacy and then in IL. The training builds on UNESCO's draft MIL curriculum. In November 2009 the UNESCO draft MIL curriculum for teachers was discussed in meetings with various stakeholders in Southern Africa, and is not yet available in the public domain (One of the authors were involved in this process). Although the curriculum and the standards on which it builds are certainly relevant for teachers in training (i.e. students), the training of teachers who are already in practice and with limited time and opportunity, and situated in developing and rural areas may offer additional challenges and issues of relevance – as will be pointed out in the following sections.

Valley of Hope Primary School is situated in the Valley of Hope community approximately 70 kilometres from Pretoria, SA. The school has an enrolment of 1215 pupils, 27 teachers, and 8 administrative staff. The Valley of Hope community are disadvantaged in terms of social and economic life. Most people stay in informal settlements and are mostly unemployed, making it difficult for parents to pay school fees. There is a high level of illiteracy within the

¹ In order to honour confidentiality and due to the sensitivity of the issues in the community, fictional names will be used for people and places.

community. This makes it difficult for parents to engage themselves in economic and academic matters of their children. The school has programs on HIV/AIDS and holds regular awareness activities. They try to make their learners and communities aware of the plight of this epidemic. The school is challenged by the high rate of learners who are orphans. At the time of writing there were 41 orphans at the school.

The above is similar to reports on the socio-cultural conditions faced by teachers in rural contexts in SA by Mokgalabone (1999), Chikoko (2008) on developing teachers for rural education in KwaZulu-Natal, SA and an article by an anonymous author on young rural teachers being most at risk for HIV infection (Anonymous, 2005). A search on three SA databases available through Sabinet (<http://www.sabinet.co.za>) namely SACat, SAePublication and ISAP for the words “teacher/teachers” and “rural” appearing in the title retrieved only a few references. This points to a dire need to deepen understanding of teacher IL and ICT training in rural South Africa – an issue to be addressed by the current project.

Against the educational context sketched, the teacher training at Valley of Hope Primary School was initiated bearing the potential advantages of ICT and Internet skills for teachers in a rural community in mind, and also acknowledging the challenges and barriers they may face. Advantages of such a project include access to vast resources of information they can tailor to their circumstances, enhancing the quality of teaching, and learning from international expertise. A number of challenges and barriers were noted in previous ICT training initiatives in another rural community in SA reported on by Krauss et al. (2009) and Krauss (2009b). Although it falls outside the scope of this paper to dwell on these, this prior training project especially sensitised the researchers to the difficulties and realities of ICT training initiatives in rural communities and therefore assisted in preparing for this initiative (more detail in Section 4.4).

Considering the potential advantages and barriers as well as arguments for IL to build on ICT skills, two courses were suggested:

- *The Basic Applied Computer Literacy Course* addressing computer skills as a requirement for information literacy, and
- *Information Literacy for Teachers.*

The rationale for building the IL training on ICT skills is supported by Idiodi (2005), Usluel (2007) and Hincliff (2003:7) who argue that “...the impact of technology on the conceptualization of information is two-fold: technology serves as a catalyst for developing a rationale for the importance of the concept and as a mechanism for focusing attention on specific issues within the broader concept of information literacy”.

In planning the research project and the two courses, the existing literature concerning various relevant facets had to be noted. There were very few explicit guidelines on planning for teachers in rural SA considering their specific contexts and ensuring sustainability. Neither is there a strong theoretical base or methodological depth. The emphasis is mostly on issues such as accessing attitudes, barriers and self-efficacy and practical applications. Critical reflection on the needs of rural areas and developing countries feature very scantily. Following the literature review in this section, we will therefore continue to focus on identifying suitable research approaches to guide future research, expansion of the project and data collection from participants for the current training.

The following two sections briefly report on the two courses.

3.1 The Basic Applied Computer Literacy course

The *Basic Applied Computer Literacy Course* mainly attempts to introduce teachers to the basics of computing. It is a 25 hour training course where we focused on the training of teachers in using the popular Microsoft Office suite, because it is the office automation application of choice by the school and in most organisations worldwide. The course was, therefore, relevant in the work place. Although this is an instructor led course, every teacher used a computer individually and our key strategy was to individualize the training for each participant, hence motivating them to focus on how computing can have a positive and significant impact on the way they carry out their particular work, teaching and administrative tasks.

Course content focused primarily on the basic concepts of computing (using Microsoft Windows XP) and productivity applications software (Microsoft Word and Microsoft Excel). Based on UNESCO's ICT competency standards for teachers policy framework (UNESCO, 2008), the overarching objectives of the course were to 1) describe and demonstrate the use of common hardware technologies, 2) describe and demonstrate the basic tasks and uses of word processors, such as text entry, editing text, formatting text, and printing and 3) use record keeping software to take attendance, submit grades, and maintain student records.

To achieve more specific and secondary training objectives, the applied computer literacy course was planned based on lessons learnt from previous UNESCO funded ICT training (see Krauss et al., 2009; Krauss, 2009b) as well as considering the following two aspects. Firstly, through our requirements discovery, we tried to measure the level of knowledge and education the course participants have (for appropriate knowledge transfer) and secondly, to attain the continuous use of the knowledge (to conduct knowledge deepening) (UNESCO, 2008), we tried to elicit the job description and functions of the teachers in their school work and community. Based on the findings, the team formulated the learning materials and assessment. Our rationale was that in any tailored computer literacy program for rural communities, a needs assessment and requirements analysis should be an essential part of the pre-planning process contributing to a positive outcome (Krauss et al., 2009; Krauss, 2009b).

3.2 The Information Literacy for Teachers course

The IL course builds on the UNESCO draft Media and Information Literacy (MIL) curriculum, the literature as set out in Section 4.2, and a selection of existing textbooks on teaching IL (e.g. Cox, 2008; Eisenberg, Lowe & Spitzer, 2004; Grassian & Kaplowitz, 2009; Torras & Saetre, 2009), and the IL models and standards mentioned in the introduction.

The focus of the IL course was on Internet search skills within the wider context of available information sources. The use of websites, search engines and other search tools, as well as social networking tools were contextualized against the need to also consider print-based and other resources, and to use the best available sources for specific situations. It was also assumed that a course on the use of information and the Internet should not only enable teachers to make effective use of the Internet to find information related to their teaching tasks, but should also allow them to see the full potential of information available on the Internet for dealing with non-teaching tasks faced in their daily work environment (e.g. offering support to children affected by HIV/AIDS, sharing information on HIV/AIDS, and

social issues such as environmental protection). Teachers were also sensitised to critical media literacy and the need to help students and their parents to become media-literate as stressed in the UNESCO curriculum and a call by Torres and Mercado (2006).

The course addressed issues such as recognizing an information need, translating an information need into search terms and search strategies, effective use of search tools such as Google (a popular search engine), as well as raising awareness of a selection of other useful search tools e.g. searching for images and videos. Exercises, examples, and assessment were contextualized in the daily tasks of teachers as well as the context they face. Considering the definition accepted for IL in a developing country (see Section 4), the content, learning experiences and assessment were, however, aligned to the context of the participants, and in alliance with lessons learned from earlier ICT projects (mentioned in the introduction to Section 3).

Further detail on the scope, structure and presentation of the two courses will not be covered in this paper since the focus here is on preparing for ongoing research to enhance contextualisation of the courses, sustainability, life-long learning and ongoing empowerment as explained earlier.

4 Contextualising teacher training in IL in rural SA against a literature review

Various types of literacy are mentioned in the subject literature. These include ICT literacy, media literacy, IL, media and information literacy (see for example UNESCO, 2008), and even information fluency (Zhang, 2002). Since IL is the key focus, only this term will be clarified for purposes of this paper.

According to Behrens (1994) the term IL was first coined in 1974. Many definitions have since then been noted, the most popular being the Association of College and Research Libraries and the American Library Association's definition. The Council of Australian University Librarians' reference to personal issues, the broader society and life-long learning especially seems useful in the rural education context portrayed in Section 2. They define IL as "the ability to define, locate, access, evaluate and use information to help resolve personal, job-related or broader social issues and problems, as part of a life-long learning strategy" (Council of Australian University Librarians as cited by Aharony, 2010:261).

Donner and Gorman (2006) offer the only definition allowing for developing countries. Using their definition and the Council of Australian University Librarians' definition the following operational definition is suggested for this paper.

Information literacy is the "ability of individuals or groups;

- to be aware of why, how and by whom information is created, communicated and controlled, and how it contributes to the construction of knowledge,
- to understand when information can be used to improve their daily living or to contribute to the resolution of needs related to specific situations, such as work or school,

- to know how to locate information and to critique its relevance and appropriateness to their context,
- to understand how to integrate relevant and appropriate information with what they already know to construct knowledge that increases their capacity to improve their daily living or to resolve needs related to specific situations that have arisen” (Donner & Gorman, 2006: 284).
- to resolve personal, job-related or broader social issues and problems, as part of a life-long learning strategy, following the Council of Australian University Librarians’ definition, and
- to enhance the ability of teachers to both achieve on a personal level (or to achieve personal well-being) as well as to pursue dreams such as to help others to achieve (or to achieve agency), based on Sen’s capability approach discussed in Zheng (2009) and Chigona and Chigona (2010).

The above definition guided the training and subsequent literature groundwork and research for the case study. The literature review is reported in the sections to follow. There is an extensive body of literature available on IL skills, standards and guidelines for IL and training (e.g. Johnston & Webber, 2003; Rader, 2002). Searching *ISI Web of Science*, *ERIC* and *Library and Information Science Abstracts* for the words “teacher/teachers” and “ICT”, “information literacy” and “Internet” appearing in the title, showed that actually very little has, however, been published on ICT training for teachers, their perception of ICT use in schools, the advantages, and the barriers and challenges that they are facing. The same applies to IL training and information skills, as well as using and searching the Internet. A search on these databases for the words “teacher/teachers” and “ICT”, “rural areas” and “developing countries” appearing in the title also retrieved a limited number of references (Although it is noted that “developing countries” can be replaced with the names of specific countries, an extension of the literature survey will not be done for purposes of this paper.)

The few research reports specifically commenting on IL and ICT in rural areas and developing countries include Mutula and Van Brakel (2007) on small businesses, Donner and Gorman (2006) on IL education in Asian developing countries, Ashcroft and Watts (2005) on information professionals, Chikoko (2008) on developing teachers for rural education in KwaZulu-Natal (a South African province), Ogunsola (2009) on health IL in developing countries and then September (1993) on IL in SA as a developing country. (There are other reports on IL in SA, but not aimed at teachers or explicitly stressing developing and rural contexts; for the moment these will not be considered.) The most important guidelines that could be identified regarding IL and developing countries are from the work of Donner and Gorman (2006) on Asian developing countries; their suggestions would still need considerable adaptation and expansion for the South African township and rural context, as will be pointed out in Sections 5 to 7.

Although fairly extensive, the literature review presented in the following sub-sections is not presented as exhaustive; the intention is merely to reflect the scope of current lines of thinking and focus, as well as gaps in issues related to IL training of teachers in rural areas. Although a literature review is mostly used to offer stepping stones for arguments, the reviews will mostly only cite studies and their foci with the intention to draw attention to what

has been noted in the field, and especially to the gap between the nature of current reports on IL, ICT and Internet training for teachers and the issues that need to be noted in developing contexts to face the real challenges.

4.1 ICT skills, teachers and developing/rural contexts

The importance of ICT skills for teachers is widely noted (Davis, Preston & Sahin, 2009), with many countries showing increasing awareness of this. Kao and Tsai (2009:66) argue that “In an era of educational reform, teachers’ professional development in the use and application of technology is the key determining factor for improved student performance”.

Most of the research reports focus on developing countries such as the report by Larose et al. (2009) on the impact of pre-service field training sessions on the probability of future teachers using ICT in school. They found that ICT penetration in the teaching of teachers is still lagging behind, and that support is necessary to maintain it in schools. If this is the case in a developed country, what would it be in a rural area in a developing country? James (2010:370) reporting on mechanisms of access to the Internet in rural areas of developing countries notes that “Because of severe affordability and skills constraints it is especially difficult to bring the Internet to rural areas of developing countries”. He proposes a simple tree-diagrammatic framework to consider the use of different methods to enhance access e.g. through rural Internet kiosks, free access in schools and technical sharing devices. Gulbahar and Guven (2008) report on teachers in primary schools and on teaching in social studies. Relying strongly on Fonty’s work programme, Van den Dool and Kirschner (2003) reflect on pedagogical benchmarks for ICT integration in teacher education.

Usluel (2007) argues that ICT usage can make a difference on student teachers’ IL self-efficacy, and that it is important to ensure a learning environment where they can use ICT and be guided to cite information sources. Reporting on IL acquisition in Nigeria at university level, Idiodi, however, stresses that ICT skills do not imply information skills: “In fact, such technical attainment is only the starting point for the true acquisition of information literacy” (Idiodi, 2005:224). Such arguments, that gaining and sustaining ICT skills is an important pre-requisite for IL skills, especially regarding the use of the Internet, were accepted as a rationale to offering the two courses in the case study initiative reported in this paper: ICT as pre-requisite for IL, and IL.

When planning ICT training, the readiness of a community and the participants need to be considered. Considering the importance of ICT skills, such “readiness” often needs to be gauged in a pre-training situation analysis (Krauss, 2009b). With regard to ICT readiness and use by small business in Botswana, Mutula and Van Brakel (2007) recommend: “Enhancing education with effective application of ICT, both as a classroom tool and a subject in its own right, needs to be considered as one of the priorities of the government of Botswana”. Kim, Jung and Lee (2008) report on the design of contents for ICT literacy in-service training of teachers in Korea, and Reabdakolaei and Amuei (2008) on the evaluation of ICT literacy differences in trainee student teachers from their view of sexuality. Assessing readiness as well as the outcome and success seem essential.

Attitude and self-efficacy (in-line with the work of Bandura, 1996, 1997) are very important in teaching ICT skills. Self-efficacy refers to an individual’s beliefs and expectations in his/her capability to perform a task. Kao and Tsai (2009:66) report on the attitude and self-efficacy of teachers to ICT and the Internet, with Usluel (2007) linking ICT usage to student teachers’

IL self-efficacy. In exploring the structure of trainee teachers' ICT literacy, Markauskaite (2007) also focuses strongly on social-cognitive theory and the theory of self-efficacy.

Even with positive attitudes, the use of ICT in classrooms also depends on having the time to master and practice the ICT skills (Haydn & Barton, 2008). Accessibility to ICT resources and lack of in-service training opportunities have also been noted as barriers (Gulbahar & Guven, 2008). A study from The Netherlands by Drent and Meelissen (2008) is especially useful on insight in the barriers to teachers' innovative use of ICT. Student teachers' thinking processes and providing them with adequate preparation are also very important for ICT integration. Sang et al. (2010) found in their study at four universities in China, that cultural and gender issues, teacher thinking process, teacher self-efficacy, teacher efficiency with computers, and computer attitudes can be potential predictors of prospective teaching behaviours with educational technology. The importance of beliefs and attitudes is also stressed by Chai, Hong and Teo (2009), with Schibeci et al. (2008) reporting on teachers' critical use of ICT and gaining confidence and competence. In a Canadian context Coupal (2004) takes an interesting slant commenting on politics and changes in government and teaching theories and approaches for educational frameworks for teachers' ICT professional development, and the potential impact this may have.

It thus seems that in educational contexts, the current focus is on the raising awareness of the importance of ICT skills for teachers, the importance and value of ICT skills e.g. for professional development, student performance and reform, the assessment of the impact of ICT, the penetration of ICT, access to ICT and support in gaining ICT skills, integration of ICT in specific contexts (e.g. according to pedagogical approaches), the usage of ICT, attitudes, beliefs, self-efficacy, readiness, design and content, evaluation and barriers such as lack of time and opportunity. Although very important, these, however, do not offer sufficient guidelines to address issues of sustainability, contextualisation, life-long learning and empowerment in a rural educational context – which are the real challenges faced in the case study.

4.2 IL skills, teachers and developing communities

The importance of IL in various contexts (as also pointed out in the introduction), is frequently stressed. According to Aharony (2010:261), "Information literacy is a necessary skill that is useful in every aspect of life, especially in the twenty-first century where we are inundated with vast amounts of information". Ogunsola (2009) argue that health IL can help in dealing with poverty alleviation in the developing countries. Despite of such expressions, various concerns have, however, been expressed about the inadequacy of the inclusion of school library programs and services in the preparation of pre-service teachers – also in developed countries such as Canada (Asselin & Doiren, 2003). As will be shown in the review to follow a number of studies on IL can be cited – but with very limited guidelines on developing contexts, and none on taking a deeper look at the community.

Reports on IL skills for teachers mostly reflect experiences in Canada, Asia, Turkey, Taiwan, United Kingdom, and New Zealand. Donner and Gorman (2006), Ogunsola (2009), Floyd, Colvin and Bodur (2008) and September (1993) are amongst the few to report on IL training in developing countries. Donner and Gorman's (2006) report certainly need to be noted for the research project under discussion. Reporting on IL education in Asian developing countries, they argue for cultural awareness and moving away from IL embedded in Western social and intellectual structures in curriculum development and programme delivery. They

also express concern for adapting the definition accepted for IL (mentioned in Section 4), the use of group work, the context in which training is embedded, etc. In their arguments Donner and Gorman (2006) strongly rely on the work of Cutler and his cultural “onion” model and also the work of Geert Hofstede and his Five Dimensions of Culture, making this one of few reports to take a more theoretical and methodological stance.

Wong and Shih (2008) argue that IL standards should be regularly updated. They focus on knowledge, skills and attitude. In research on how teachers in the United Kingdom engage with research evidence, Williams and Coles (2007) found that although they were mostly positive towards the use of research evidence, they felt that time and access to sources were a problem. According to them “It is likely to be a limiting factor in terms of the development of teacher confidence in finding, evaluating and using the kinds of information sources which are increasingly available..” (Williams & Coles, 2007:186).

Collaboration with academic libraries in preparing teachers to be information literate is important to Emmons et al. (2009), Floyd, Colvin and Bodur (2008) and Crouse and Kasbohm (2004), with Probert (2009) reporting on the importance of teacher understanding and practice. Such a balance between theory and practice is also important to Davis-Kahl and Payne (2003).

Duke and Ward (2009) offer a metasynthesis on preparing information literate teachers. They stress the importance of IL pedagogy and authentic learning assignments that realise real-world information resources. Wen and Shih (2008) explore IL competence standards for elementary and high school teachers, with Merchant and Hepworth (2002) reporting on IL of teachers and pupils in secondary schools and Johnson and O’English (2004) on IL in pre-service teacher education. Kong (2007) reports on a conceptual framework for IL in Hong Kong. In reporting on a comprehensive programme for pre-service education students at the University of Wollongong, Lipu (2004:71) concludes: “In the case of pre-service education students, a program such as this one that facilitates IL developments among our future teachers who will, in turn foster such capacities in the next generation, is a challenging yet worthwhile venture”.

Walter and Shinew (2004) as well as Branch (2004) report on pre-service teachers. One of the participants in Branch’s (2004) study explained that IL will become part of her life in the sense that she will always be looking for updated information and for the best method to teach a particular subject (Branch 2004:41).

It thus seems as if the current focus is on the importance of IL in educational contexts, concerns for inadequate integration of IL in teacher training, updating IL standards in terms of knowledge, skills and attitude, the use of research evidence, collaboration with academic libraries, IL pedagogy, and authentic learning environments. Although important, it is only Donner and Gorman’s (2006) arguments for cultural awareness that can help to address the challenges unique to this research project.

4.3 Internet usage, search skills, teachers and developmental contexts

Although there are many other useful and important sources of information, the Internet seems like a resource that may hold much potential in the future of teachers as well as schoolchildren. Meneses and Mominó (2010) found that school children gain much of their digital skills outside the school context and therefore stress the need for schools and

teachers to consider what is offered in schools – especially regarding Internet access and support. This implies information literate teachers with Internet search skills. Reports on the use of the Internet in teaching include Sorensen et al. (2007) on the use of the Internet in science teaching, and Teale et al. (2002) on how new ways of technology can help educate tomorrow's reading teachers, and Lovell (2000) on Biology where the Internet can be used as a research, communication and instructional tool.

As with research reports on ICT skills, beliefs, attitudes, and self-efficacy seem important to the effective use of the Internet in educational contexts. Açıkalın (2009) reports on pre-service elementary teachers' beliefs about the use of the Internet in social studies teaching; they are mostly positive about advantages such as finding images and visuals, written information, easy and fast access and opportunities for in-depth research. Although for many the Internet is a useful and vital source of information, they are also concerned about the lack of accurate information, unreliability of sources, dependence on prepared information and the often time-consuming nature of Internet searches; this and the fact that Internet information is often not available in the language of preference must be noted (Açıkalın, 2009).

In teaching Internet search skills, anxiety needs to be monitored. Chou (2003) found in a study in Taiwan on Internet anxiety among high school teachers that various anxieties may manifest and need to be catered for in training. Citing Presno, Chou (2003) argues for providing ample practice time, welcoming spontaneous questions, encouraging peer help, allowing play on the Internet and modelling non-anxious behaviour.

Kao and Tsai (2009) report on teachers' attitude toward web-based professional development, Internet self-efficacy and beliefs about web-based learning, while Irvine and Williams (2002) report on the experiences, abilities and attitudes of teachers and pupils in junior schools. Asselin and Lee (2002) focus on IL pedagogy with Embrey (2002) exploring the use of blogs for teacher-librarians. Rekrut's (1999) article on using the Internet in classroom instruction covers examples of courses and opinions of students on the Internet. Madden et al. (2005) report on the views of practitioners in the United Kingdom on using the Internet in teaching. They conclude that "The picture that emerges of the teachers' opinions of the Internet in late 2002 could be summarised as 'cautious but favourable'". The most likely to use it are young teachers of technical subjects. Oral (2008) reports on the evaluation of the student teachers' attitudes toward Internet and democracy.

It thus seems as if the focus in the use of the Internet and training to use the Internet regarding teachers currently focuses on its importance, use of the Internet in specific contexts, attitudes, beliefs, self-efficacy, anxiety and IL pedagogy. Again, although very useful, there are no guidelines on dealing with townships, rural contexts and developing countries.

4.4 Lessons from ICT for development literature

In order to understand IL training in developing contexts, one could turn to lessons learned from ICT4D in the broader sense. With regard to using ICT in developing contexts, literature shows that ICT has the potential to contribute to socio-economic development and quality of life, highlighting issues such as social exclusion, the digital divide, poverty and lack of access to resources for basic human needs (Avgerou, 2009; Avgerou & Walsham, 2000; Chigona et al., 2009; Fong, 2009; Krishna & Madon, 2003). ICT4D literature also shows that

ICT failures in developing countries continue to outnumber successes (Avgerou & Walsham, 2000; Lunat, 2008) and that ICT alone does not guarantee success or development (Lewis, 1994; Chigona et al., 2009). Information Systems (IS) theories, strategies and technologies established in developed countries cannot necessarily be transferred to developing contexts (Avgerou, 2009; Avgerou & Walsham, 2000; Lee et al., 2008). Ongoing cultural sensitivity, context specific technology rollouts and community participation are therefore necessary to ensure sustainability and success (Krishna & Madon, 2003; Heeks, 2005; Avgerou & Walsham, 2000; Mukerji, 2008; Lewis, 1994). In rural and developing communities, poverty, social development (specifically health and education), the importance of socio-cultural context, intercultural communication and community empowerment are noted as pressing concerns in ICT4D research (Phahlamohlaka & Lotriet, 2003; Krauss, 2009a; Krauss, 2009b; Krishna & Madon, 2003; Heeks, 2005; Avgerou & Walsham, 2000; Mukerji, 2008; Lewis, 1994).

In considering IL training for teachers as an aspect of ICT4D, one should also assume that international IL guidelines cannot necessarily be transferred and implemented in developing contexts without proper contextualisation and understanding of the realities that face these developing communities. Some reference in this regard has already been made in Donner and Gorman's (2006) plea for adapting the definition of IL for developing countries. There therefore seems to be a need to carefully study ICT and IS theories including IL guidelines and findings from research on ICT and IL training and Internet use and searching, in parallel with the realities that face developing communities in order to understand how ICT and IL can be used both successfully and ethically for development. Krauss (2009b) in his paper on international ICT policy and deep rural South African communities specifically advocates for the need "to contextualise ICT4D, to test the impact of ICT implementation and to question the assumptions and value of ICT policy and guidelines in the specific cultural-context of individual developing communities". This therefore, necessitates the ICT4D researcher and practitioner to also take a position of enquiry where he or she will be able to question the underlying assumptions and perceived value of ICT and proposed IL guidelines and the implementation thereof in developing contexts (Krauss, 2009a; Krauss, 2009b) - an issue that will be addressed in the ongoing research project.

In order to create awareness of ICT4D themes that might emerge from doing IL research in developing situations, the following important theoretical issues are put forward for the planning of the IL training and research project:

- Krishna and Madon (2003) have identified community ownership and identifying local strengths and capabilities as central to successful ICT4D endeavours while Weyers (2001) cited in Prinsloo (2009), Krauss (2009b) and Phahlamohlaka and Lotriet (2003) have highlighted appropriate community entry practices, and alignment with local pioneers as central to sustainable empowerment and development.
- Lewis (1994), Heeks (2005), Fong (2009), Lee et al. (2008), and Westrup et al. (2003) highlight the importance of context and culturally sensitive technology rollouts.

- Parpart (1995) discusses a post-modernist stance to studies of African communities acknowledging the importance of subjective experiences and the construction of social phenomena through interpretive efforts. Parpart (1995) also emphasises the need for local, specific and historically informed analysis that is carefully grounded in cultural context.
- Lee et al. (2008) warn of the difficulties of technologically-deterministic assumptions in developing contexts.
- The limited validity of neo-liberal thinking and standardised modernist approaches to ICT in developing contexts are explained by a number of authors (Lee et al., 2008; Avgerou & Walsham, 2000; Heeks, 2005; Krishna & Madon, 2003).
- Participatory collaborative approaches seem to frequently appear in ICT4D and social research (Krishna & Madon, 2003; Lee et al., 2008; Avgerou & Walsham, 2000; Bless & Higson-Smith, 1995).
- The issue of encouraging hope of new opportunities in communities before technology rollouts as well as motivating communities to take hold of opportunities presented is often not given enough thought in development projects (Krishna & Madon, 2003; Lewis, 1994). According to Lewis (1994), a major challenge is to help the local people to see hope. After hope there is the need for communities to become motivated to contribute to their own development and adequately assess their own talents abilities and resources (Lewis, 1994).
- A number of authors discuss the importance of understanding Afrocentricity in intercultural communication in Africa (Ndegwa, 1992; Asante, 1983; Lewis, 1994). Asante (1983) for example describes Afrocentricity as the frame of reference in which African social phenomena should be viewed in order to understand the perspectives of the African community.
- Relating somewhat to understanding Afrocentricity Čečez-Kecmanović (2001) discusses the Habermasian approach as a way to understand power relations in intercultural communication, which we believe is central to a critical approach to development projects.
- Zheng (2009) suggests that Sen's Capability Approach (CA) provides a "conceptual basis on which many critical issues and embedded relationships are sensitized for investigation." For example, the CA sensitises the researcher to issues such as the meaning of development, poverty, emancipation, achievement, freedom, deprivation, participation, sustainability, compatibility of ICT, and so forth (Zheng, 2009). The CA enables the critical social theorist to question issues such as the link between ICT and economic growth, technocratic assumptions, universal modernist criteria and the simplistic correlation between ICT and human well-being and capability to pursue dreams or agency.

These prominent concerns highlighted in ICT4D literature may assist in contextualising IL training (building on ICT training) for rural communities. An important lesson to learn from this brief summary is that all of these ICT4D concerns relate in some way to a critical position of enquiry and may therefore be encompassed in the position that Critical Social

Theory (CST) enables one to take. A critical position allows the researcher and practitioner to question underlying assumptions and motives embedded in ICT4D initiatives, including those of researchers and research participants. It also allows one to question how and whether ICT initiatives are really important, right, good and ethical for community development.

5 Suggestions for methodological approaches

Considering the before-mentioned findings from the literature a critical-interpretive position of enquiry is suggested in order to enable the researchers to not only establish in-depth understanding of complex multivariate social phenomena, which is the area of interpretive research (Baskerville & Pries-Heje, 1999; Chen & Hirschheim, 2004; Baskerville & Wood-Harper, 1998), but also to question assumptions and theories established in developed and industrialised situations in order to address the emancipatory interests of research participants (Adam, 2001; Ngwenyama & Lee, 1997; Neuman, 1997; Kvasny & Richardson, 2006). A critical position of enquiry allows the researcher to not only address mutual understanding but also the emancipation from “false and unwarranted beliefs, assumptions and constraints” that may be embedded in the thinking of both the researcher and research participants (McGrath, 2005; Krauss & Turpin, 2010). It is from this position of enquiry that the researchers present the review of the literature on ICT and IL training, Internet searching and ICT usage in teaching and developing contexts, the methodological approach for pursuing the research and ultimately an epistemology for building knowledge that will facilitate the understanding of the realities that face deep rural communities in SA. This position enables one to explicitly address the issues of sustainability, contextualisation, life-long learning and empowerment.

In the following section, the CA and the constructs of well-being and agency will be discussed, as it can specifically assist the researchers in understanding issues of meaning and the real value of ICT4D initiatives.

5.1 The Capability Approach

Zheng (2009) highlights several difficulties associated with ICT4D. These include the need to understand the “meaning of development” and the role of ICT, the difficulties of standardised modernist approaches, the difficulties of importing Western values and advice wholesale in developing contexts, the need for local innovation with ICT, and so forth. Zheng (2009) consequently proposes the Capability Approach developed by Sen as a mode of thinking or a conceptual foundation for understanding the real “effective opportunities people have to achieve what they consider to be valuable in life” (Zheng, 2009). Investigating the educational context in SA, Chigona and Chigona (2010) propose the CA for understanding that which may hinder teachers in developing country contexts from effectively using ICT for curriculum delivery.

Zheng (2009) and Sen (1999) explain that the major constituents of the CA are “functionings” and “capabilities”. “Functionings are considered constitutive of well-being” while capabilities relate to the ability to achieve or freedom to achieve well-being. The CA is “directly concerned with what people are effectively able to do and to be, taking into account the resources which they have access to. In other words, the approach focuses on individuals’ capabilities and freedom” (Chigona & Chigona, 2010). Inability to achieve or non-

freedom to achieve is put forward as deprivation of capabilities (Zheng, 2009; Chigona & Chigona, 2010; Sen, 1999).

According to Zheng (2009), a person's capability set represents his freedom to achieve both well-being freedom and agency freedom. Well-being in context of the CA relates specifically to one's personal gratification or personal situation and is different from fulfilling one's commitments and ideals (Chigona & Chigona, 2010). Agency on the other hand relates to pursuing what one values and that which one attempts to produce (Zheng, 2009). These two types of freedoms are interrelated and may have a causal impact on each other (Zheng, 2009). Zheng (2009) suggests that by putting agency as an explicit component of a person's capability set, any development policy or evaluation method informed by the CA should take into account the aspirations and needs of the people affected. Zheng (2009) continues to explain that most development approaches have focussed on the well-being aspect of the CA, while the agency aspect has been much less appreciated.

In the educational context it is especially important to investigate the interrelatedness of well-being and agency, mainly because teachers together with social workers and nurses are typically portrayed as caregivers or "development agents" in a community (De Vos et al., 2007). Agency freedom is therefore central to their commitments and ideals. Therefore, having to fulfil an important role of "caring for" or improving the well-being of their learners, the understanding of both well-being and agency and the interrelatedness thereof are central to what this research project addresses. More specifically, one needs to consider how the IL training project may enhance both personal well-being of teachers (e.g. the ability of a teacher to get promotion after the IL training initiative) and agency (e.g. the ability of a teacher to guide learners to well-being through the training initiative). The proposed methodology therefore attempts to address both these concerns.

To address the issues identified during the literature reviews and adopting the CA, the authors propose an eclectic model to support IL training of teachers in developing South African communities, and research thereof.

6 Eclectic model for understanding IL for teachers in rural communities

Although the authors can at this stage not offer any specific answers to the issues of contextualisation, sustainability, life-long learning and empowerment in teaching IL to teachers in townships, rural areas and developing contexts (which also was not the intention of this paper), we can, however, suggest the model in Figure 1 as a way to proceed in developing the courses mentioned in Sections 3.1 and 3.2 as well as for doing empirical research in this context. The empirical component can include for example a pre-assessment of the needs and contexts (e.g. job descriptions) of the teachers, brief questionnaires to collect demographic data (such as age, years of experience in teaching in rural contexts), focus group interviews (recorded and transcribed with consent) to address issues such as the value of ICT and IL training for teachers in rural communities, and the capability set and understandings of freedoms (both well-being and agency) that are expected to emerge. Observation can also be used. Such methods and especially focus group interviews could address individual as well as collective views of participating teachers (Myers, 2009). Based on the findings (to be reported at a later stage), the model might need to be adapted or further enhanced as lessons are learnt.

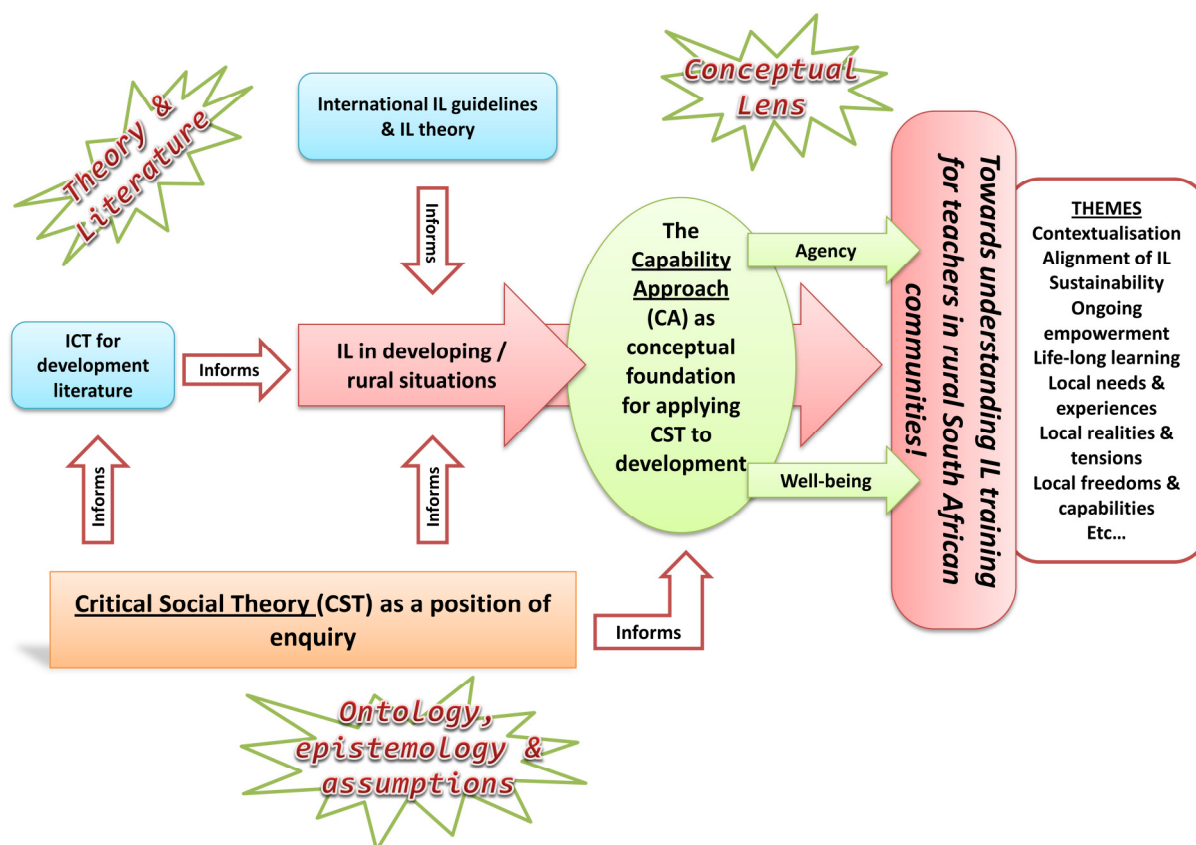


Figure 1: Eclectic model to understanding IL for teachers in rural communities

Figure 1 visualises that in order to understand IL for teachers in developing contexts in SA, theory should be drawn from both ICT4D literature and international IL guidelines and theory. The figure also puts forward CST as a position of enquiry as it informs both the way in which literature is scrutinised and how the realities of developing contexts may be understood. The CA is put forward as a conceptual lens that will enable the Critical Social Theorist to apply a critical approach to IL in developing situations. Well-being and agency are specifically foregrounded as they enable the researcher and practitioner to understand and scrutinise the interrelatedness of these two constructs in the caring nature of the teaching profession in developing contexts. Finally, a number of themes are put forward to illustrate the expected value and results of combining IL theory and ICT4D literature with a critical position of enquiry. These themes include issues related to sustainability, empowerment, understanding the local realities, needs, perceptions and context and ultimately what constitute capabilities and freedom according to local view of reality.

7 Conclusion

There seems to be a dire need for IL training, building on ICT training for teachers in all countries and contexts. Developing countries and rural areas pose unique challenges in terms of sustainability, contextualisation, life-long learning and empowerment. Answers to these would also hold value for developed contexts. Currently such answers do not exist as became clear from the reviews of literature concerning IL and ICT for teachers and Internet searching and use for teachers. Although the literature from ICT4D offers useful insight it is not yet fully aligned with IL training for teachers. Following the CA approach, with special

emphasis on well-being and agency, especially seems promising for IL training and research as it may assist in finding answers to the issues of sustainability, contextualisation, life-long learning and empowerment, as well as the alignment of literature on ICT4D with IL training for teachers. IL literature, therefore, needs to align with contributions from ICT4D and the CA approach.

To enhance research on IL training for teachers in rural SA that may contribute to global perspectives on the issue, it is therefore suggested that the model proposed in Figure 1 is applied in the planning of IL courses for teachers in townships and rural areas in SA and subsequent empirical research. It is unrealistic to expect to find all answers to such a complex and important issue in the first round of research. Following the critique and assessment of data collected according to the CA approach with special attention to well-being and agency, findings and interpretations again need to be aligned with an extended literature survey to get to the heart of the problem of offering training in ICT and IL to teachers in rural communities in SA. This would probably lead to an adaptation of the proposed model, and new attempts for data collection.

8 References

- Açikalin, M. 2009. Pre-service elementary teachers' beliefs about use of the Internet in the social studies classroom. *European Journal of Teacher Education*, 32(3): 305-320.
- Adam, A. 2001. Gender, emancipation and critical information systems. Global Co-Operation in the New Millennium, *The 9th European Conference on Information Systems*, Bled, Slovenia, June 27-29.
- Aharony, N. 2010. Information literacy in the professional literature: an exploratory analysis. *Aslib Proceedings: New Information Perspectives*, 62(3): 260-282.
- Anon. 2005. Young rural teachers most at risk: education. *Leadership in HIV/AIDS*, 33(7): 72-74, 76.
- Asante, M.K. 1983. The ideological significance of Afrocentricity in intercultural communication. *Journal of Black Studies*, 14(1): 3-19.
- Ashcroft, L. & Watts, C. 2005. ICT skills for information professionals in developing countries: perspectives from a study of the electronic information environment in Nigeria. *IFLA Journal*, 31(6): 6-12.
- Asselin, M. & Doiron, R. 2003. Whither they go: an analysis of the inclusion of school library programs and services in the preparation of pre-service teachers in Canadian universities. *Behavioral & Social Sciences Librarian*, 22(1): 19-32.
- Asselin, M.M. & Lee, E.A. 2002. "I wish someone had taught me": information literacy in a teacher education program. *Teacher Librarian*, 30(2): 10-17.
- Avgerou, C. 2009. Discourses on innovation and development in information systems in developing countries' research. *Proceedings of the 2009 IFIP WG 9.4 Conference*.
- Avgerou, C. & Walsham, G. (Eds). 2000. *Information Technology in Context: Studies from the perspective of developing countries*. Burlington: Ashgate.
- Bandura, A. 1996. Multifaceted impact of self-efficacy beliefs on academic functioning. *Child Development*, 67: 1206-1222.
- Bandura, A. 1997. *Social learning theory*. New York: General Learning Press.
- Baskerville, R. & Pries-Heje, J. 1999. Grounded action research: a method for understanding IT in practice. *Accounting, Management and Information Technology*, 9: 1-23.
- Baskerville, R. & Wood-Harper, A.T. 1998. Diversity in information systems action research methods. *European Journal of Information Systems*, 7: 90-107.
- Behrens, S.J. 1994. A conceptual analysis and historical review of information literacy. *College and Research Libraries*, 55(4): 309-322.
- Bless, C. & Higson-Smith, C. 1995. *Fundamentals of social research methods: an African perspective*. 2nd ed. South Africa: Juta.

- Branch, J.L. 2004. Teaching, learning and information literacy. *Behavioral & Social Sciences Librarian*, 22(1): 33-36.
- Čečez-Kecmanović, D. 2001. Critical information systems research: a Habermasian approach. *Global Co-Operation in the New Millennium, Proceedings of the 9th European Conference on Information Systems*, Bled, Slovenia, June 27-29.
- Chai, C.S., Hong, H-Y. & Teo, T. 2009. Singaporean and Taiwanese pre-service teachers' beliefs and their attitude towards ICT use: a comparative study. *The Asia-Pacific Education Researcher*, 18(1): 117-128.
- Chen, W-S.C & Hirschheim, R. 2004. A paradigmatic and methodological examination of information systems research from 1991 to 2001. *Information Systems Journal*, 14: 197-235.
- Cheuk, B. 1998. An information seeking and using process model in the workplace: a constructivist approach. *Asian Libraries*, 7(12): 375-390.
- Chigona, W., Beukes, D., Vally, J. & Tanner, M. 2009. Can mobile internet help alleviate social exclusion in developing countries? *Electronic Journal for Information Systems in Developing Countries*, 36(7): 1-16.
- Chigona, A. & Chigona, W. 2010. An investigation of factors affecting the use of ICT for teaching in the Western Cape schools. *Proceedings of the 18th European Conference on Information Systems*, Pretoria, South Africa, June 7-9.
- Chikoko, V. 2008. Developing teachers for rural education? Reflecting on the 2nd KwaZulu-Natal Department of Education teacher development conference: research article. *Perspectives in Education*, 26(4): 74-85.
- Chou, C. 2003. Incidences and correlates of Internet anxiety among high school teachers in Taiwan. *Computers in Human Behavior*, 19: 731-749.
- Coupal, L.V. 2004. Constructivist learning theory and human capital theory: shifting political and educational frameworks for teachers' ICT professional development. *British Journal of Educational Technology*, 35(5): 587-596.
- Cox, C.N. ed. 2008. *Information literacy instruction handbook*. Chicago: Association of College and Research Libraries.
- Craig, E. 2009. Better informed for better health and better care: an information literacy framework to support health care in Scotland. *Health Information & Libraries Journal*, 26(1): 77-80.
- Crouse, W.F. & Kasbohm, K.E. 2004. Information literacy in teacher education: a collaborative model. *The Educational Forum*, 69(1): 44-52.
- Davis, N., Preston, C. & Sahin, I. 2009. ICT teacher training: evidence for multilevel evaluation from a national initiative. *British Journal of Educational Technology*, 40(1): 135-148.
- Davis-Kahl, S. & Payne, L. 2003. Teaching, learning and research: linking high school teachers to information literacy. *Reference Services Review*, 31(4): 313-319.
- De Vos, A.S., Strydom, H., Fouche, C.B. & Delport, C.S.L. 2007. *Research at grass roots: for the social sciences and human service professions*, 3rd edition. Pretoria: Van Schaik.
- Donner, G.D. & Gorman, G.E. 2006. Information literacy education in Asian developing countries: cultural factors affecting curriculum development and programme delivery. *IFLA Journal*, 32: 281-293.
- Drent, M. & Meelissen, M. 2008. Which factors obstruct or stimulate teacher educators to use ICT innovatively. *Computers & Education*, 51: 187-199.
- Duke, T.S. & Ward, J.D. 2009. Preparing information literate teachers: a metasynthesis. *Library & Information Science Research*, 31(4): 247-256.
- Embrey, T.R. 2002. You blog, we blog: a guide to how teacher-librarians can use weblogs to build communication and research skills. *Teacher Librarian*, 30(2): 7-9.
- Emmons, M., Keefe, E.B., Moore, V.M., Sánchez, R.M., Mals, M.M. & Neely, T.Y. 2009. Teaching information literacy skills to prepare teachers who can bridge the research-to-practice gap. *Reference & User Services Quarterly*, 49(2): 140-150.
- Eisenberg, M.B., Lowe, C.A. & Spitzer, K.L. 2004. *Information literacy: essential skills for the information age*. 2nd edition. Westport, Conn.: Libraries Unlimited.

- Floyd, D.M., Colvin, G. & Bodur, Y. 2008. A faculty-librarian collaboration for developing information literacy skills among preservice teachers. *Teaching and Teacher Education*, 24: 368-376.
- Fong, M.W.L. 2009. Digital divide between urban and rural regions in China. *Electronic Journal for Information Systems in Developing Countries*, 36(6):1-12.
- Grassian, E.S. & Kaplowitz, J.R. 2009. *Information literacy instruction: theory and practice*. 2nd edition. New York: Neal-Schuman Publishers.
- Gulbahar, Y. & Guven, I. 2008. A survey on ICT usage and the perceptions of social teachers in Turkey. *Educational Technology & Society*, 11(3): 37-51.
- Haydn, T. & Barton, R. 2008. "First do no harm": factors influencing teachers' ability and willingness to use ICT in their subject teaching. *Computers & Education*, 51: 439-447.
- Haydn, T. & Barton, R. 2007. Common needs and different agendas: how trainee teachers make progress in their ability to use ICT in subject teaching: some lessons from the UK. *Computers & Education*, 49: 1018-1036.
- Heeks, R. 2005. ICTs and the MDGs: on the Wrong Track? 14d, February, <http://www.i4donline.net/feb05/perspective.asp>.
- Hincliffe, L.J. 2003. Technology and the concept of information literacy for pre-service teachers. *Behavioral & Social Sciences Librarian*, 22(1): 7-18.
- Idiodi, E.A. 2005. Approaches to information literacy acquisition in Nigeria. *Library Review*, 54(4): 223-230.
- Irvine, H. & Williams, P. 2002. Internet use in schools: an investigation into the experiences, abilities and attitudes of teachers and pupils in junior schools. *Aslib Proceedings*, 54(5): 317-325.
- Johnson, C.M. & O'English, L. 2004. Information literacy in pre-service teacher education. *Behavioral & Social Sciences Librarian*, 22(1): 129-139.
- James, J. 2010. Mechanisms of access to the Internet in rural areas of developing countries. *Telematics and Informatics*, 27: 370-376.
- Johnston, B. & Webber, S. 2003. Information literacy in higher education: a review and case study. *Studies in Higher Education*, 28(3): 335-352.
- Kao, C-P. & Tsai, C-C. 2009. Teachers' attitude toward web-based professional development, with relation to Internet self-efficacy and beliefs about web-based learning. *Computers & Education*, 53: 66-73.
- Kim, J.H., Jung, S.Y. & Lee, W.G. 2008. Design of contents for ICT literacy in-service training of teachers in Korea. *Computers & Education*, 51: 1683-1706.
- Kong, S.C. 2007. The development and validation of an information literacy model for Hong Kong students: key issues in the professional development of teachers for capacity building. *Technology, Pedagogy and Education*, 16(1): 57-75.
- Krauss, K. 2009a. Ethical research practice for community entry: using ICT4D in a deep rural context. *Proceedings of the 3rd International IDIA Development Informatics Conference*, Kruger National Park, South Africa, October 28-29.
- Krauss, K. 2009b. The Collision between International ICT Policy and a Deep Rural Community in South Africa: Interpretation, Implementation and Reality. *Proceedings from the 2nd Annual SIG GlobDev Workshop*, 14 December 2009, Phoenix AZ.
- Krauss, K. & Turpin, M. 2010. Towards the emancipation of the ICT4D researcher: reflecting on a case study in deep rural South Africa. *Proceedings of the Research Voices from Africa Workshop*, Makerere University, Kampala, Uganda, March 22-23.
- Krauss, K., Turpin, M., Asmelash, D., Jere, J. & Gebregziabher, S. 2009. Informatics Outreach Initiative: Final workplan and feedback on teacher training in Tugela Ferry. Project report for UNESCO. Available online at http://portal.unesco.org/en/ev.php-URL_ID=47762&URL_DO=DO_TOPIC&URL_SECTION=201.html.
- Krishna, S. & Madon, S. (Eds) 2003. *The digital challenge: Information Technology in the development context*. Burlington: Ashgate.
- Kvasny, L. & Richardson, H. 2006. Critical research in information systems: looking forward, looking back. *Information Technology & People*, 19(3): 196-202.

- Larose, F., Grenon, V., Morin, M-P. & Hasni, A. 2009. The impact of pre-service field training sessions on the probability of future teachers using ICT in school. *European Journal of Teacher Education*, 32(3): 289-303.
- Lee, H., Jang, S., Ko, K. & Heeks, R. 2008. Analysing South Korea's ICT for development aid programme. *Electronic Journal for Information Systems in Developing Countries*, 35(2): 1-15.
- Lewis, J. (Ed). 1994. *World Mission: an analysis of the world Christian movement*. 2nd ed. Pasadena, California: William Carey Library.
- Lipu, S. 2004. A flying start for our future teachers. *Behavioral & Social Sciences Librarian*, 22(1): 47-73.
- Lovell, J.A. 2000. Using the Internet as a supplemental instructional tool for biology teachers. *The American Biology Teachers*, 62(3): 171-176.
- Lunat, Z. 2008. The Internet and the public sphere: evidence from civil society in developing countries. *Electronic Journal for Information Systems in Developing Countries*, 35(3): 1-12.
- Madden, A., Ford, N., Miller, D. & Levy, P. 2005. Using the Internet in teaching: the views of practitioners (A survey of the views of secondary school teachers in Sheffield, UK). *British Journal of Educational Technology*, 36(2): 255-280.
- Markauskaite, L. 2007. Exploring the structure of trainee teachers' ICT literacy: the main components of, and relationships between, general cognitive and technical capabilities. *Education Technical Research Development*, 55: 547-572.
- McGrath, K. 2005. Doing critical research in information systems: a case of theory and practice not informing each other. *Information Systems Journal*, 15: 85-101.
- McMahon, C. & Bruce, C. 2002. Information literacy needs of local staff in cross-cultural development. *Journal of International Development*, 14 (1): 113-127.
- Meneses, J. & Mominó, J.M. 2010. Putting digital literacy in practice: how schools contribute to digital inclusion on the network society. *The Information Society*, 26(3): 197-208.
- Merchant, L. & Hepworth, M. 2002. Information literacy of teachers and pupils in secondary schools. *Journal of Librarianship and Information Science*, 34(2): 81-89.
- Mokgalabone, M.B. 1999. Socio-cultural conditions, teenage pregnancy and schooling disruption : themes from teachers and teenage mothers in poor rural schools. *South African Journal of Education*, 19(1): 55-66.
- Mukerji, M. 2008. Telecentres in rural India: emergence and a typology. *Electronic Journal for Information Systems in Developing Countries*, 35(5): 1-13.
- Mutula, S.M. & Van Brakel, P. 2007. ICT skills readiness for the emerging global digital economy among small businesses in developing countries. *Library Hi Tech*, 25(2): 231-245.
- Myers, M.D. 2009. *Qualitative research in business and management*. London: Sage Publications.
- Ndegwa, S.N. 1992. The Struggle for Relevance in African Studies: An African Student's Perspective. *Issue: a Journal of Opinion*, 20(2): 42-45.
- Neuman, W.L. 1997. *Social research methods: qualitative and quantitative methods*. 3rd ed. Massachussetts: Allyn & Bacon.
- Ngwenyama, O.K. & Lee, A.S. 1997. Communication richness in electronic mail: critical social theory and the contextuality of meaning. *MIS Quarterly Journal*, 21(2): 145-167.
- Ogunsola, L.A. 2009. Health information literacy: a road map for poverty alleviation in the developing countries. *Journal of Hospital Librarianship*, 9(1): 59-72.
- Oral, B. 2008. The evaluation of the student teachers' attitudes toward Internet and democracy. *Computers & Education*, 50: 437-445.
- Parpart, J.L. 1995. Is Africa a Post-modern Invention? *Issue: a Journal of Opinion*, 23(1): 16-18.
- Phahlamohlaka, J. & Lotriet, H. 2003. An investigation into community development imperatives at a rural South African Community Education Center, in Krishna, S. & Madon, S. (Eds). *The digital challenge: Information Technology in development context*. Burlington: Ashgate.

- Prinsloo, C.E. 2010. Cattle and grassroots: the voice of the community in the Phabeni Gate project in the Kruger National Park. Unpublished research.
- Probert, E. 2009. Information literacy skills: teacher understanding and practice. *Computers & Education*, 53: 24-33.
- Rader, H.B. 2002. Information literacy 1973-2002: A selected literature review. *Library Trends*, 51(2): 242-259.
- Rekabdakolaei, S.M. & Amuei, F. 2008. Evaluation of ICT literacy differences in trainee student teachers from the view of sexuality. *Campus Wide Information Systems*, 25(3): 176-188.
- Rekrut, M.D. 1999. Using the Internet in classroom instruction: a primer for teachers. *Journal of Adolescent & Adult Literacy*, 42(7): 546-557.
- Sang, G., Valcke, M., van Braak, J. & Tondeur, J. 2010. Student teachers' thinking processes and ICT integration: predictors of prospective teaching behaviours with educational technology. *Computers & Education*, 54: 103-113.
- Schibeci, R., MacCallum, J., Cumming-Potvin, W., Durrant, C., Kissane, B. & Miller, E-J. 2008. Teachers' journeys towards critical use of ICT. *Learning, Media and Technology*, 33(4): 313-327.
- Sen, A.K. 1999. *Development as Freedom*. Oxford: Oxford University Press.
- September, P.E. 1993. Promoting information literacy in developing countries: the case of South Africa. *African Journal of Library & Information Science*, 3(1): 11-22.
- Sorensen, P., Twilde, J., Childs, A. & Godwin, J. 2007. The use of the Internet in science teaching: a longitudinal study of developments in use by student-teachers in England. *International Journal of Science Education*, 29(13): 1605-1627.
- Teale, W.H., Leu, D.J.(Jr.), Labbo, L.D. & Kinzer, C. 2002. Exploring literacy on the Internet; the CTELL project: new ways of technology can help educate tomorrow's reading teachers. *The Reading Teacher*, 55(7): 654-659.
- Torres, M. & Mercado, M. 2006. The need for critical media literacy in teacher education core curricula. *Educational Studies*, 39(3): 260-282.
- Torras, M-C. & Saetre, T.P. 2009. *Information literacy education: a process approach: professionalising the pedagogical role of academic libraries*. Oxford: Chandos.
- UNESCO. 2008. ICT-CST policy framework. Available online at http://portal.unesco.org/ci/en/ev.php-URL_ID=25740&URL_DO=DO_TOPIC&URL_SECTION=201.html.
- Usluel, Y.K. 2007. Can ICT usage make a difference on student teachers' information literacy self-efficacy. *Library & Information Science Research*, 29: 92-102.
- Van den Dool, P. & Kirschner, P. 2003. Integrating the educative functions of information and communications technology (ICT) in teachers' and learners' toolboxes: a reflection on pedagogical benchmarks for ICT in teacher education. *Technology, Pedagogy and Education*, 12(1): 161-179.
- Walter, S. & Shiness, D.M. 2004. Information literacy instruction for education. *Behavioural & Social Sciences Librarian*, 22(1): 1-5.
- Wen, J.R. & Shih, W.L. 2008. Exploring the information literacy competence standards for elementary and high school teachers. *Computers & Education*, 50: 787-806.
- Westrup, C., Al Jaghoub, S., El Sayed, H. & Liu, W. 2003. Taking culture seriously: ICTs culture and development, in Krishna, S. & Madon, S. (Eds). *The digital challenge: Information Technology in development context*. Burlington: Ashgate.
- Williams, D. & Coles, L. 2007. Teachers' approaches to finding and using research evidence: an information literacy perspective. *Educational Research*, 49(2): 185-206.
- Wong, J.R. & Shih, W.L. 2008. Exploring the information literacy competence standards for elementary and high school teachers. *Computers & Education*, 50: 787-806.
- Zhang, W. 2002. Developing Web-Enhanced Learning for Information Fluency: A Liberal Arts College. *Reference & User Services Quarterly*, 41(4): 356-363.
- Zheng, Y. 2009. Different Spaces for e-Development: What Can We Learn from the Capability Approach? *Information Technology for Development*, 15(2): 66-82.

Appendix A: Examples of guidelines and standards that may influence the design of IL training programmes for teachers

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| Big6 | http://www.big6.com/ |
| ALA guidelines in various contexts | http://www.ala.org/ala/mgrps/divs/aasl/aaslproftools/informationpower/informationpower.cfm |
| SCONUL pillars of IL | http://www.sconul.ac.uk/groups/information_literacy/seven_pillars.html |
| Association of College and Research Libraries (ACRL) | http://www.ala.org/ala/mgrps/divs/acrl/standards/informationliteracycompetency.cfm |
| IFLA guidelines on IL and life-long learning | http://www.ifla.org/en/publications/guidelines-on-information-literacy-for-lifelong-learning |