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Designing and Implementing an Information Service Model for Geography Teachers in a Developing Country: The Case for Lesotho

Abstract: This paper outlines the approaches that can be used in the deployment of an information service for geography teachers in a developing country in Africa. The paper is based on a study of Lesotho geography teachers' information behaviour that aimed to guide the design of information service for these teachers. It enumerates the process of designing an information service for these teachers including a user needs assessment. The study used triangulation by using multiple data collection methods on three sets of participants. Data were collected from in-service geography teachers using focus group discussions, from prospective geography teachers with a questionnaire and from stakeholders involved in geography education in Lesotho through interviews. The Statistical Package for Social Sciences (SPSS) and content analysis were used to analyse the data. The paper presents the working context of the geography teachers, their information needs and preference for information sources and communication channels. It also proposes a collaborative information service model for the geography teachers. This includes an implementation agency involving the information specialists, subject specialists and stakeholders working together to assist teachers with information. The paper outlines modalities for the implementation of the information service. It ends with possible strategies for evaluating the impact of the information service to check the achievements against the set objectives. It concludes that the information service model can be adapted as a prototype for other teachers across the curriculum as well as in other developing countries in a setting similar to that of Lesotho.

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Introduction

Information services are important for teachers not only because their work intensely involves information (Taylor 1991) but also because they structure social practices associated with information such as information literacy, information seeking and information use that they induct in their students (Normore 2011). Consequently, developing information services for teachers, particularly in developing countries such as Lesotho where resources are scarce, is very crucial. Lesotho is a developing country in Southern Africa facing challenges such as high HIV and AIDS prevalence, unemployment, and poverty. There is a shortage of information services and information infrastructure, as indicated in the *IFLA World Report on Lesotho* (2010).

Several institutions in Lesotho provide a range of information to teachers pertaining to various aspects of teaching and learning such as curriculum development, in-service training, teacher advisory services, testing and evaluation through examinations and induction programmes for beginning teachers. The instrumental support institution is the Ministry of Education and Training through its various constituencies, namely the National Curriculum Development Centre, Education Resource Centres, Central Inspectorate, Teaching Service Department and other affiliated para-statal institutions such as the Examination Council of Lesotho, Lesotho College of Education and National University of Lesotho, Faculty of Education and Institute of Education during its existence. The Lesotho National Library Services is another institution that teachers may utilize for information. Other instrumental organisations supporting teachers in Lesotho and possibly providing teachers with pertinent information are associations such as the Lesotho Math and Science Teachers Association, Lesotho Headmasters/Mistress Association, Lesotho Association of Teachers and Lesotho Teachers Trade Union. Geography teachers have separate associations operating in the Berea, Leribe, Butha-Buthe and Mphahlele districts. Although the geography teachers' associations are active, they are not legally regis-

tered. Moreover, they only operate at district level and are not united to form one big national geography teachers' association that could have a stronger impact.

Public information services stem from the Ministry of Tourism, Environment and Culture that oversees the Lesotho National Library Services (LNLS). LNLS serves the functions of both a national library and a public library and has branches in the ten districts of Lesotho. It also runs a school library outreach program that loans boxes of books to various schools for extended periods. Various Lesotho government ministries and departments have small specialized libraries open to the public for in-house research and information. Some of the specialized libraries in the Ministry of Education and Training are at the Lesotho Distance Teaching Centre and National Curriculum Development Centre.

School libraries also provide information services to teachers even though their situation is gloomy given that only a few schools in Lesotho have school libraries. Where there are school libraries, they are not sufficiently equipped and there is no indication that these libraries are treated as a significant component of the school curriculum, as they are often staffed by unqualified library assistants or professional teachers with no librarianship qualification (Kakoma 1999, 121). In-service geography teachers indicated that their school libraries have outdated material with minute applicability to geography (Bitso 2011). Mafube (2005) also pointed out a lack of school libraries and information resources at the secondary education level, while Kakoma and Mariti (2008) highlighted lack of information materials at the tertiary education level. Therefore, one concludes that access to information at various education levels in Lesotho is a challenge. This is possibly because of a lack of funding and infrastructure noted in Lesotho ICT Policy (Lesotho Government 2005). Another factor could be a shortage of library and information science human resources owing to a lack of Library and Information Science schools in Lesotho. This is coupled with an inflexible information service model that is not open to resource sharing in spite of collaborative structures such as the Lesotho Libraries Consortium. The current information services for teachers in Lesotho come from various institutions and sectors which are located in sites away from the teachers. They seem to happen by chance in a random manner. Therefore, it is envisaged that developing a prototype information service model with some form of coordination would help to provide a systematic information service that could make information more readily available.

The Need for Information in Teaching

Teachers need information to increase their knowledge and perform their duties. Hence they are described as “the population group that is active, experienced and critical users of information” (Taylor 1991, 219). In most developing countries teachers suffer from inadequacies in the provision of information hence information access remains a challenge. Teachers in Lesotho are in a situation marked by scarcity of adequate library and information services (as pointed out earlier) while they have a high influx of learners in their schools as a result of free primary education which started in 2000. There is an increasing load of responsibilities on high school teachers who have to prepare learners with knowledge and skills not only for employment, but also for tertiary education. Another responsibility is sourcing of information for orphans and vulnerable children as the number of orphans in schools is increasing as a result of the HIV and AIDS pandemic in Lesotho (Bitso 2011). Mnubi-Mchombu, Mostert, and Ocholla (2009) found teachers as the main source of information for orphans and vulnerable children in Namibia. Teachers were found to be a primary source of information for learners during political mayhems in Kwazulu-Natal, South Africa (Stilwell and Bell 2003).

Geography Teaching in Lesotho

In Lesotho, geography starts at the primary education level as part of social studies and becomes an independent subject at the secondary level. There is no subject specialization for primary level teachers because their training entails all the subjects for basic primary education. Subject specialization starts at the secondary level; thus the geography teachers in this study are secondary level geography teachers. Geography teachers were chosen because the researcher is a former geography teacher in Lesotho and has endured the challenges of teaching geography with inadequate information resources. It was envisaged that studying a teaching cadre that is familiar could be done faster and it would be easier to develop a prototype information service model that could be transformed for use across the curriculum. In addition, Lesotho geography teachers are highly challenged because their subject includes both human and physical geography spheres, which are difficult to teach in a situation of meagre teaching resources. Yet there is a need to cover both the local junior geography syllabus and the international Univer-

Table 1: Data collection and analysis (adapted from Bitso 2011)

Population	Participants	Data collection	Data analysis
In-service geography teachers	82 out of 138	28 focus groups of 2-6 teachers in schools using a voice recorder	Content analysis
Prospective geography teachers	46 out of 62	Questionnaire distributed on paper	SPSS and content analysis for an open-ended question
Stakeholders in geography education	8 out of 12	Interviews using a voice recorder	Content analysis
Schools whose in-service participated in the study	28 out of 51	Participation through focus groups with in-service geography teachers	

sity of Cambridge senior geography syllabus (Bitso 2011). Furthermore, most geography teachers in Lesotho graduated from the National University of Lesotho (NUL) with a BA Ed, B Ed or BSc Ed degree. While BSc Ed teachers study mostly physical geography, BA Ed and B Ed teachers study mostly human geography and this result in knowledge disproportion, although in the schools teachers have to teach both human and physical geography (Bitso 2011; Bitso and Fourie 2011; Bitso and Fourie 2012). This was depicted in an interview with the geography educator lecturer at the National University of Lesotho:

The students that graduate at NUL do not have balanced content of physical geography and human geography. Our system is still creating that disparity. Science education students have more physical geography content and lack human geography content. In addition, the physical geography content that they have is too academic; it is not school focused. The BA Ed/B Ed students have more human geography content than physical geography. We have introduced a course at the third year level, Geography for the high school teacher, which tries to address these content disparities. However, at the moment, the science education students are not taking this course due to the high course load they have at third year.

Users' Needs Assessment

A study on information behaviour of geography teachers in Lesotho embracing the information behaviour notion that incorporates information needs, information-seeking processes, and preferences for information sources (Case 2007; Fisher and Julien 2009; Ingwersen and Järvelin 2005) was conducted. It aimed to guide the design and implementation of an information service for geography teachers in Lesotho. The rationale of the study was that one of the concerns for information science is to investigate information behaviour of various user groups (Wilson 2000), mainly because effective information service for users depends largely on understanding their informa-

tion behaviour (Wilson 2006; Hepworth 2007).

According to Wilson (1995), information services should not happen by chance, or be put together in a haphazard fashion; they must be planned and designed around the needs of the users including their information-seeking behaviour. Hence most studies, e.g. Tarby and Hogan (1997) and Chiware (2007), of information service design begin with users' needs assessment. The process reported in this paper also started with a needs assessment which investigated the information needs and information-seeking behaviour of Lesotho geography teachers. The investigation was conducted on in-service geography teachers through focus group discussions; among prospective geography teachers through a questionnaire; and with key stakeholders in geography education in Lesotho through interviews. In-service geography teachers were in schools that offer geography at both junior and senior secondary level which were already participating in national examinations in 2008. Prospective geography teachers were final year students in the Faculty of Education, National University of Lesotho training to be geography teachers. The stakeholders in the context of this study were officials in institutions involved in secondary geography education through schools inspection, curriculum development, national examinations; teacher education and professional development. Bitso (2011) provides the rationale for the choice of population, data collection and analysis methods and also reports the results of the investigation. Some preliminary results are also reported by Bitso and Fourie (2011, 2012). This paper elaborates further on the design and implementation of information services to geography teachers in Lesotho. Table 1 provides information about the empirical component of the needs assessment in 2010 when the study was conducted.

In order to make this paper meaningful, a summary of the results of the needs assessment covering the work situation of Lesotho geography teachers, their information needs, and preferences for information sources and communication channels is outlined.

The Work Setting of Lesotho Geography Teachers

The needs assessment revealed the following setting for Lesotho geography teachers:

- The geography teachers work in schools located in different geographical areas of Lesotho. Fourteen out of 51 schools are in remote rural areas with limited or no infrastructure such as electricity, telephone and fax lines, photocopiers, and Internet for access to information. Others are in urban areas with electricity, better roads, photocopiers, telephone and fax lines, Internet cafes, etc. for better access to information.
- Lesotho geography teachers have several work roles such as administrator, committee member, educator, resource provider, information disseminator, service provider, caregiver, student, and researcher. These work roles have associated tasks such as decision-making, report writing, fact-finding, reading, preparing lesson plans, testing and evaluating, etc. that all require information. These are discussed in more detail by Bitso and Fourie (2012).
- The teachers face inconsistent availability of resources and facilities in schools, given that very few schools have access to the Internet and many do not have it. This is because schools charge different amounts for school fees. As a result, they have different resources such that some schools have better facilities and resources than others. Nonetheless, these teachers experience constraints such as a shortage of information sources and a lack of libraries. Where libraries exist, they have irrelevant information because it is not related to geography and they are staffed by unqualified librarians incapable of providing meaningful information service.
- Geography teachers have a large number of learners in their classrooms (40-70) and many lessons per week (26-30). A lesson is 40 minutes in most Lesotho secondary schools. This is considered as a high workload given that the Lesotho Teaching Regulations of 1986 stipulate a maximum of 25 lessons per week. In this situation, time for information-seeking is limited.
- Lesotho geography teachers have formed associations and they indicated that they hold meetings, conduct workshops and seminars, plan work together, set common internal examinations, and prepare marking schemes. However, the proceedings of all these crucial collaborative work are not recorded into documented reports that could service as information sources for future reference.

- Many geography teachers need skills to use the Internet and modern multimedia resources, especially older and more experienced teachers, because they reported that they use other people to search for information from the Internet on their behalf. The following statement bears testimony:

We often ask our children, nephews, nieces, etc. they are helpful in guiding us about the Internet and generally how to use the computers to acquire computer literacy.

- Although the younger teachers reported that they use the Internet, they might be lacking Internet search skills as they indicate that they have never had guidance or training on how to use the Internet. They often battle to find sites that are relevant to their lesson plans. This might require training on Internet searching and information literacy, as discussed by Fourie and Krauss (2010). Evidence from the data collected includes,

We keep on interacting with the Internet and learn as we go along. Of course we ask colleagues here and there, but often I am frustrated when I don't get what I want especially when I am at Internet café because I pay. ...so training will make things better.

According to Fourie and Krauss (2010, 109), the value of information literacy and especially Internet search skills for teachers is that they increase their access to a vast array of information resources, especially those freely available through Internet search facilities. It enables teachers to tailor information according to their own circumstances (for example, for lesson plans and assessment) and improves the quality of learning material. Information literacy can also support teachers in coping with everyday life problems such as HIV and AIDS, children exposed to domestic violence, and issues of environmental protection which are salient in Lesotho. In the case of Lesotho teachers, information literacy may support them to cope with everyday problems of adolescents and orphans.

The Information Needs

The needs assessment process revealed that Lesotho geography teachers need current and accurate content to deliver in class, especially physical geography content. They also need audio-visual material such as videos, charts, maps and models for teaching abstract geographical features. In addition, these teachers need information about education policies, legislation and regulations, pedagogy,

classroom management, and learners' assessment. Furthermore, the needs assessment revealed that these teachers need information on adolescent social problems and orphans social assistance. Considering the teaching load as well as various teaching roles and tasks, easy access to relevant and reliable information is vital.

Preferences for Information Sources and Communication Channels

The results of the needs assessment study reveal the following factors about the preferences of information sources and communication channels:

- Lesotho geography teachers prefer more traditional information sources such as personal knowledge and experience, syllabus documents, media (TV, radio and newspapers) and books and magazines. There was high preference for books such as textbooks and books the teachers purchased during their teacher training.
- These teachers expressed a dire need for journals as another source of current information, but they indicated that journals are not available in their schools.
- Colleagues are predominantly consulted for information especially geography teachers in their schools, neighbouring schools and professional associations. Agriculture, Development Studies and Science teachers are also consulted for information from time to time on geography topics related to these topics.
- Internet is used mostly by younger teachers in urban schools.
- Miners and farmers are consulted for information on related topics by teachers in rural schools.
- Geography education specialists at the National Curriculum Development Centre, Central Inspectorate, Examinations Council of Lesotho and lectures at the Lesotho College of Education and National University of Lesotho are consulted for information from time to time. This shows a working relationship between the geography specialists and the geography teachers.
- For exchanging and accessing information, Lesotho geography teachers prefer face-to-face communication and predominantly use phone calls and SMS. The channel of communication used depends of the urgency of information, the amount of information to be exchanged and the distance of the person to whom the information is being communicated.

After the needs assessment, one had to decide on the feasible approach for the information service considering

the geography teachers' work context, their information needs and preferences for information sources and communication channels as well as structures in place.

Collaborative Information Service Approach

The needs assessment revealed that geography teachers work closely with their communities (farmers and miners) and geography specialists in various institutions which shows that some form of collaboration exist between geography teachers and their community (Bitso 2011). Therefore, a collaborative approach seemed ideal in the design of the information service for Lesotho geography teachers. Although a collaborative approach is feasible, it is important that the process is led by an information specialist who is skilled and knowledgeable to spearhead the process for implementation and maintenance. There are efforts by the Lesotho Library Association, such as training of school librarians, automation of school libraries, and compilation of a directory for Lesotho libraries and information centres (Lesotho Library Association 2008). However, these efforts are progressing very slowly and their ultimate goals are not reached as there are no people specifically employed for these tasks. Chattopadhyay *et al.* (2006) mention hiring an information specialist to lead the design and implementation of an information service. Relevant experience, knowledge and understanding of information behaviour and information service design are some of the factors to consider when appointing an information specialist to spearhead the design and implementation of an information service for geography teachers in Lesotho. In addition, the information specialist has to be based in a library or information centre that has the resources to execute the process serving as an implementation agency for the execution of the information service.

Bitso (2011) suggested the Information and Documentation Centre of the Institute of Education, National University of Lesotho (NUL) as the implementation agency in view of the overall mandate of the Institute of Education. However, because of the restructuring at NUL, the Institute of Education has been dissolved, and its Information and Documentation Centre is part of the NUL Thomas Mofolo Library. Thomas Mofolo Library may find it befitting to serve as an implementation agency for the information service proposed in this paper given that it is a founder member of the Lesotho Libraries Consortium (LELICO). In addition, it is relatively better resourced in terms of information specialists and infrastructure to spearhead devel-

opment of information services in Lesotho. An alternative implementation agency is the Lesotho National Library Services because it has been operating a school library outreach programme, therefore executing an information service for teachers might fall within its mandate.

Partnership and collaboration between schools, university departments and libraries suggested in this paper is also discussed by Gresham and Van Tassel (2000). They suggest partnerships could be in the form of circulation and borrowing of material by school students and teachers; librarian reference services, workshops for secondary school librarians and teachers, pre-visit orientations and instruction sessions for high school students. Gresham and Van Tassel (2000) report a secondary school outreach programme at the University of Colorado at Boulder Libraries as an information literacy programme for 25 partner schools. Through the programme, secondary schools' students and their teachers discovered the value of information technologies. They also had a chance to access material and services provided by the University of Colorado. If developed countries, such as the United States, with better resources are forming partnerships between their universities and schools, then it is inevitable as well for developing countries such as Lesotho. The most important thing is to develop strategies that will make the information service safe, easy and manageable.

Other important factors from the user needs assessment and the literature that have to be considered for the design of an information service for geography teachers in Lesotho as explained below.

Factors Guiding Design of an Information Service for Geography Teachers in Lesotho

Designing an information service needs to take into account the information needs of the users, their preferences for information sources and the resources around them, including the prevailing conditions in their country (Wilson 2006; Hepworth 2007; Chiware 2008). There is a scarcity of resources in Lesotho, and this may require resource-sharing as well as efforts to provide affordable services to both the service provider and the targeted users in order for such an information service to be sustainable; hence the suggestion for a collaborative approach. In view of coming up with a realistic and achievable information service for geography teachers in Lesotho, it is necessary to consider the following factors:

- Resources within the implementing agency as well as the resources of the geography teachers (service users). These resources are human resources, time, information and information sources, technology and existing networks.
- The geography teachers' information needs, information-seeking behaviour and preferred information communication channels.

It is equally important to define the goals and objectives of the information service which follow below.

Objectives of the Information Service for Lesotho Geography Teachers

It is significant that the overall goals and objectives of the information service must be defined at the design stage. Considering pointers from Cloutier (2005), Nzimande and Stilwell (2008), and the Reference and User Services Association (2000), the objectives of the information service for Lesotho geography teachers were identified and reported by Bitso (2011) and Bitso and Fourie (2012). For the purposes of making this paper meaningful, these objectives include:

- Collection and repackaging of relevant physical geography information needed by geography teachers.
- Provision of information sources in multimedia formats relevant to Lesotho geography curriculum.
- Promotion of information resource-sharing among geography teachers in Lesotho and to schools at large to address the shortage of information sources.
- Provision of alerting services for newly released publications.

It is equally important to outline the services that constitute the information service for Lesotho geography teachers.

Services Constituting the Information Service for Lesotho Geography Teachers

According to Rowley (2006, 20), information services support access to information, typically relying upon information goods, such as documents and Web sources, as a

key element to service provision. “A typical information service is engaged in making available, controlling access to information, retrieving, selecting, organizing, presenting, interpreting, tailoring, personalizing, and targeting information resources to support user activities” (Rowley 2006, 20). Resources are needed for the delivery of an information service. In order for this information service to be sustainable, fundraising and lobbying for resources is vital. This is because the implementation agency and many other information centres in Lesotho are already operating with very limited budgets and should therefore strive to offer good services with very little expense. Offering services with limited budgets is highlighted in view of the prevailing poverty in Lesotho and the global economic crisis. This is because budget increases and sponsorships are highly unlikely in these circumstances.

Kaur and Rani’s (2008) study on information services and products in India reveals services such as literature searches that could be utilized in this instance. Considering lack of information resources in schools and the geography teachers’ heavy teaching load as well as the need for easy reliable, current and accurate information, it is imperative for the implementation agency to do literature searches for these teachers. This may be based on the geography teachers’ information needs and syllabus demands. The sought literature may be compiled into tailor-made information packages for ease of use by geography teachers. The emphasis should be more on physical geography topics such as geology and geomorphology, plate tectonics, marine erosion, etc. that are more complex to teach without audio-visual teaching materials such as charts, models, maps and videos. Bitso (2011) found that some teachers avoid teaching these topics because of lack of audio-visual material and their complexity as they are abstract and foreign to learners. Therefore, developing audio-visual information materials pertaining to physical geography is essential. Ideally these audio-visual information materials should be available in all schools for easy access. Given that some schools and teachers might afford to buy material, the implementation agency might develop and acquire audio-visual information material both for loan and sale depending on the need. In addition, clippings of relevant geography information from magazines, newspapers and other publications may be compiled for the teachers. Constantly keeping abreast with geography information for teaching and learning is imperative because any information found has to be disseminated to the teachers.

According to Cloutier (2005), information services may include research services and document delivery services. The research services involve the mediated use of

information resources by the information professionals to respond to the information requested by clients. The document delivery services concern the delivery of information sources such as books, reports, articles, etc. to the clients (Cloutier 2005). The information service for geography teachers in Lesotho may include both research services and document delivery services that will be carried out by the implementation agency.

A document delivery information service may be rendered electronically or physically, depending on the format preferred by geography teachers. Physical delivery of documents might be slower and more costly, since it requires transport and courier services. Nonetheless, the teachers’ preference for printed information due to lack of resources in their schools requires physical document delivery. It is suggested that physical document delivery be done through professional associations, formation of cluster schools, Education Resource Centres, and teachers who come to the implementation agency to collect such information. This is because the implementation agency might not have money to transport and/or post the documents physically to every teacher. The teachers also have limited time and money to travel to various places to obtain information.

Alternatively, electronic information delivery may be done through posting information on the implementation agency website for free and easy access by geography teachers. This is because electronic information is becoming prevalent worldwide, and its use is growing exponentially because more users are recognising the potential that it offers in terms of access and retrieval (Boumarafi 2010, 350), even though some teachers who participated in this study still do not use the Internet and lack the skills to use it.

Considering the preference for books among the participants in this study and recognising that books can be purchased and/or borrowed, it is essential to provide teachers with information about various books that can be purchased or borrowed. It is equally important for the implementation agency to keep track of newly published books on geography education so that it offers an alerting service to the teachers and work closely with publishers and book shops for information on book releases. Various strategies for current awareness services pointed out by Fourie (1999, 2003) have to be considered for Lesotho geography teachers. Alerts on new book releases could also be posted on the implementation agency website and also sent to the teachers, their associations as well as Education Resource Centres.

Collecting and providing access to information that is generated through the relevant workshops, particularly

workshop reports for the geography teachers' associations, is also significant. It was evident that the teachers do not compile any reports for the workshops that they hold in their associations. Where reports are compiled, they do not cover all the salient details owing to lack of documentation and report-writing skills. Workshop reports are vital sources of information that can help geography teachers in many ways. For instance, beginning teachers may find the reports a good point of reference. The information literacy training suggested earlier has to include the training of secretaries for different geography teachers' associations on report writing.

Given that not all schools have libraries and where libraries exist, they are generally run by unqualified people, training of these unqualified librarians to collect, organise and disseminate relevant information is important. In addition, where there are no school libraries, geography teachers may be guided and assisted to collect and store their own information through information literacy training. It is envisaged that training these teachers might improve their information-seeking and development of personal notes.

One may find the suggestion for electronic service inappropriate given the shortage of information infrastructure in most Lesotho schools. However, electronic services have to be considered for an information service for geography teachers, even though their work context is characterised by a shortage of information infrastructure with little or no access to the Internet as an effort to close the digital divide. One of the stakeholders interviewed revealed that:

A lot of teachers have computers and laptops, and often they use them only for word processing. They have not yet explored the full capacity of their computers to acquire information from CDs, and using the 3Gs and the EVDOs. These things are actually affordable. I also think that schools can afford to connect to the Internet through ADSL. It is just that some of the schools are headed by older people who do not appreciate the technological advancements of the twenty-first century.

Moreover, the Lesotho ICT policy shows the commitment of the government towards the development of enabling infrastructure as well as investing in ICT education and human resource development through ICT literacy and training programmes in the education system and within the public at large (Lesotho Government 2005).

In addition, electronic resources are cheaper and faster to get to users and do not take too much physical space for storage (Wu and Chen 2008). Some teachers appreciate that ICT such as the Internet are here to stay and are advancing at a high pace, such that people who are not

using them will be left behind. The geography teachers' associations indicated that they encourage their members to use the Internet, to the extent that during some of their workshops they refer them to some relevant websites. The use of the Internet has been recommended by all sets of participants in this study. Consequently, designing and implementing information services that are Internet-based may be a step in the right direction because "if teachers receive adequate training and have ready access to an Internet connection, then they would be eager to use computers and link to the Internet" (Wu and Chen 2008, 835). It is evident that the services outlined above need technology to operate efficiently. Hence technology requirements are outlined below. Furthermore, in order for the objectives of the information services to be achievable there is a need for financial resources to cover the operational costs, equipment purchases as well as remuneration of the human resource that is capable to implement the services.

Technology Requirements

Information services are a combination of information, technology and people, as well as the activities that provide these people with relatively easy access to information (Woodsworth and Williams 1993). In this instance, the information service may be perceived as those efforts taken to incorporate the information, technology and the people that help geography teachers in Lesotho to have a relatively easy access to information. Bryson (2006, 7) advocates optimum use of technologies, emphasises full exploitation of technology, and indicates that it is fundamental to be able to use computers, as well as handheld and wireless devices, and to have knowledge of sources of information. This compels information service providers and their target users to strive for full exploitation of the technology that is available. Then it becomes important to support Lesotho geography teachers in taking full advantage of all the technologies around and use them optimally as well as lobby for more information and communication technologies. Cell-phone penetration in Lesotho is increasing even among teachers. It is therefore suggested that cell-phones should be used not only for phone calls and SMS, but also for Internet or mobile access to information resources (Banks 2010; Chigona, Kamkwenda, and Manjoo 2008). It is therefore relevant to consider cell-phone technology when designing an information service for geography teachers in Lesotho for information access and delivery.

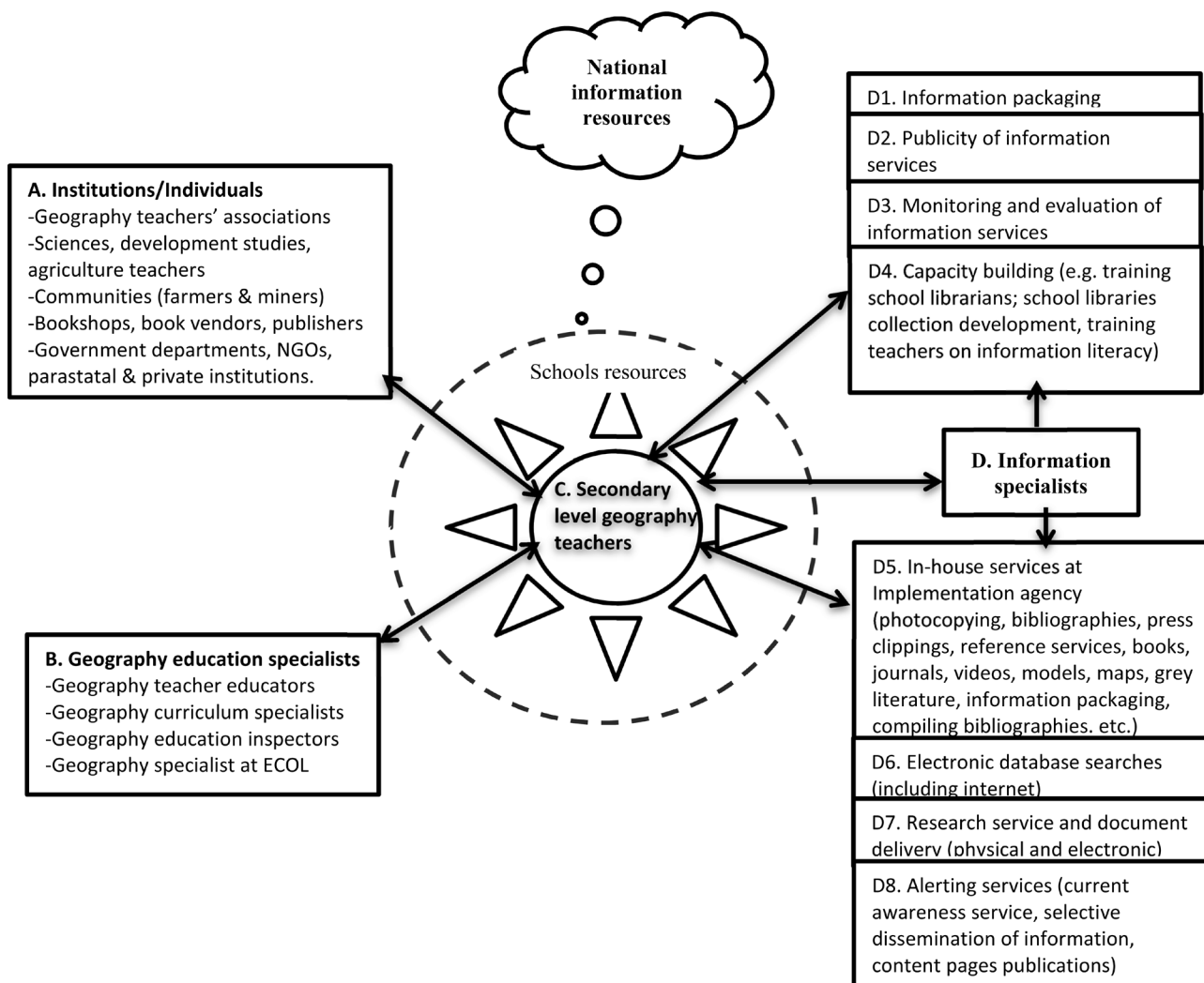


Figure 1: Proposed information service model for geography teachers in Lesotho (Bitso 2011, 240)

According to Nwezeh (2010, 689) the Internet has broken down barriers of communication access from anywhere in the world. It is fast, reliable, does not have many restrictions and has a limitless range of facilities which assist users to access vast amounts of information. It also offers an opportunity to access up-to-date research reports and knowledge in diverse fields, areas and subjects. The value and benefits of the Internet are also acknowledged by Chigona and Mbhele (2008), Fourie and Krauss (2010) and Parent and Cruickshank (2009). The Internet is core to most of the proposed services for geography teachers in Lesotho. It is envisaged that the Internet will make the delivery of an information service versatile, easier and faster.

Perrault (2007) points out that the Internet has the potential to offer resources teachers seek which is also

supported by Hsu, Cheng, and Chiou (2003). Considering that most of these teachers do not have access to journals, connecting to the Internet may help them to access free journals on the Web through resources such as Directory of Open Access Journals (DOAJ) and the International Network for the Availability of Scientific Publications (IN-ASP). Accessing journals is important, given that they are some of the information sources that provide current information that teachers need because issues are published regularly. They may also need to access magazines such as *National Geographic* and journals such as the *Journal of Geography*, *Journal of Geography in Higher Education*, etc. In addition, this study found that the schools already have technologies such as telephone lines, photocopiers, computers and printers in the offices and laboratories where computer studies are offered. A few schools also have fax lines and Internet access as well. These technologies are

already in place and should be considered in the design of the teachers' information service.

After the needs assessment, outlining the information service, its objectives and technology requirements, an information service model was proposed for the Lesotho geography teachers. The model incorporates the geography teachers, collaborative partners, the information specialists and the implementation agency. It also considers the national resources and schools' resources.

The Proposed Information Service for Lesotho Geography Teachers

Figure 1 is the proposed information model for geography teachers in Lesotho. It depicts that these teachers are central to the proposed information service. It is their information needs, preferences and expectations emanating from the needs assessment. All the components of the model have been given codes A-D. D1-D8 present services proposed to be rendered by the information specialists and the implementation agency. These services can be directly accessed by the teachers. The aim of the proposed information service model for geography teachers is to assist the implementing agency to conceptualise, plan and manage the entire process of developing and deploying information services for these teachers. The model involves institutions/individuals, teachers and geography education specialists who are perceived to have relevant information and interest in geography education in Lesotho, such that they may be referred to as stakeholders in the proposed model.

The overall goal is to have an interactive model to represent a two-way communication between the geography teachers and the various institutions/individuals. Geography teachers are still using their schools resources and national resources, but they also interact with the information specialists, geography education specialists and institutions and individuals who are often consulted for information. The geography education specialists are officials from institutions directly involved in geography education in Lesotho who participated in the study.

The needs assessment revealed that from time to time, geography teachers solicit information from colleagues (in the professional associations, neighbouring schools, science, development studies, and agriculture fields), communities (e.g. farmers and miners), institutions/individuals, geography education specialists, and other sources of information. It is envisaged that these might help the information specialists to package information in order to

deliver tailor-made information packages. The information specialists at the implementation agency will collect information from individuals, institutions and geography subject specialists and package it into tailor-made packages for teachers.

Open communication between the information specialists and geography teachers is important because it will help to acquire more detail on the information needs of these teachers and to send information to the teachers. Considering the results of this study and the implementation agency resources, it is recommended that a website, email, SMS, telephone and fax facilities and opportunities for visits to the implementation agency for in-house services be available for the delivery of the information service.

Bearing in mind that there is no single information centre that can meet all the needs of its users owing to limited resources, capacity building is significant if this information service is to be effective and sustainable. Capacity building is viewed as a long-term phenomenon that may be achieved in phases through training of school librarians, secretaries of the geography teachers' associations and possibly Ministry of Education and Training resource centre personnel. Capacity building may also be achieved by introducing school information resource-sharing. This could be done through establishing a school libraries consortium as part of Lesotho Libraries Consortium, developing a common school library system and clustering schools and forming schools' hubs. Capacity-building is also required for the information literacy and Internet training for teachers in order to use modern e-resources effectively.

Effecting Information Service for Geography Teachers in Lesotho

This section explains the protocols for deploying the proposed information service, bearing in mind all parties concerned by the model, herein referred to as stakeholders. Since the information service model involves not only the implementation agency and its information specialists, but also other stakeholders, it is imperative to offer such stakeholders an opportunity to scrutinise the model further, bearing in mind their institutional goals and resources. Therefore, the implementation process should permit the parties concerned in the model (stakeholders) to scrutinise the resources (time, money, information and human), facilities, technologies and services that will be needed for the effective delivery of the ideal information service. Although

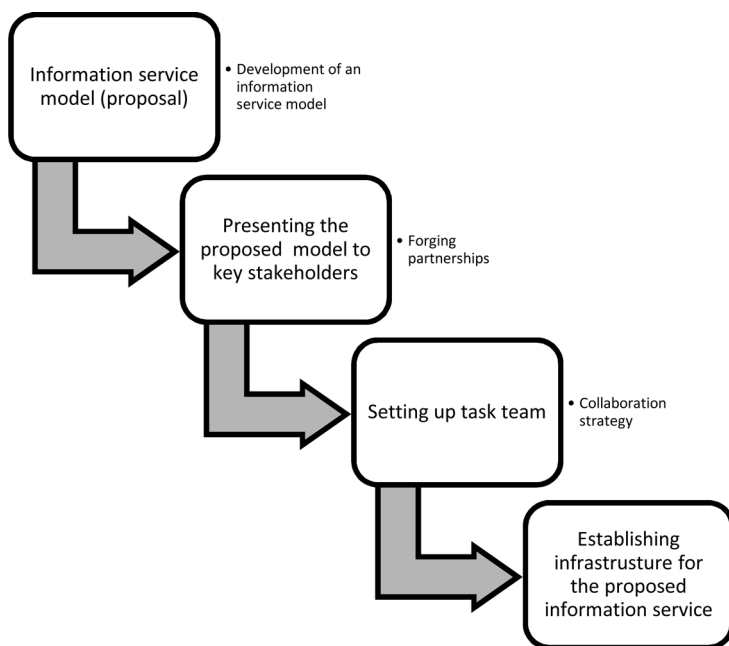


Figure 2: Protocols for deploying the proposed information service (Bitso 2011, 247)

it may seem like repeating the efforts of Bitso (2011) study, this may help to critique the model further; in the process, any unforeseen omissions may be addressed.

It is envisaged that the specific implementation activities for the proposed model will include the following steps:

- Presenting the proposed model to the key stakeholders.
- Setting up the information services task team.
- Establishing the infrastructure for the proposed information service.

These will be discussed in the subsequent sections. Figure 2 depicts the modalities for the implementation of the information service for geography teachers in Lesotho.

Presenting the Proposed Model to Stakeholders

In order for the proposed model to be thoroughly reviewed, it needs to be presented and known to the key stakeholders as well as the targeted users of the proposed information service. At this juncture, the key stakeholders in the provision of the information service for geography teachers in Lesotho are viewed as:

- The Ministry of Education and Training, Principal Secretary and Chief Education Officer for secondary education. These are the officials who gave permis-

sion to carry out this study with the geography teachers. They are responsible for secondary education in Lesotho and whatever is being proposed here needs their support. This might open doors for financial support and policy developments by the Ministry of Education and Training.

- The National Curriculum Development Centre (NCDC) is responsible for developing and reviewing the curriculum and syllabi outlines. This body will be able to indicate if the information that is passed to the teachers and the learners will help to address the demands of the syllabus and the nationally set standards for teaching and learning.
- The Ministry of Education and Training Central Inspectorate is responsible for inspecting and ascertaining that teaching and learning take place appropriately in schools. Similar to the NCDC, it will help to review the information that will be passed to the teachers and learners through the website.
- In addition, the Ministry of Education and Training Resource Centres and the Examination Council of Lesotho are important stakeholders because the model suggests that the implementing agency should collaborate with the resource centres in the delivery of the information service. They need to be made aware of the proposed model so that they can indicate their interest and commitment and also how they envisage they will help.
- The committees of the geography teachers' associations are also key stakeholders. They will not only be

representing their associations, but also the rest of the teachers who participated in this study. They will be in a position to indicate if their views were presented correctly and also review the proposed model to see if it will actually serve their needs.

- The principals of the schools that offer geography as a subject will have to be involved.
- The Lesotho National Library Services is also a key stakeholder because it is envisaged that its services will be required when training school librarians. This is because it already has a programme that assists school libraries with training and book loans in bulk for extended periods. The Lesotho Libraries Consortium is another important body to assist with information specialists for capacity building.
- The lecturers for the geography educators at the Lesotho College of Education and the National University of Lesotho (NUL) will play a part.
- The NUL authorities, in particular the University Librarian, and the Pro-Vice Chancellor are important people who should know about the proposed information service and soliciting their inputs and approval is crucial.

Setting up the Information Service Task Team

Through this study, a lot of fundamental work has been done such as the needs assessment, proposal for the information service, its technological requirements and modalities for implementing the information service. Although the paper suggests hiring an information specialist and the implementation agency, considering the collaborative approach for the delivery of the information service in light of meagre information resources in Lesotho, it is envisaged that setting up a task team would be beneficial to all parties concerned. Such a task team may be effective if it is made up of most of the key stakeholders, or at least their representatives. The main reason for bringing together various stakeholders in the task team is to ensure that their interests are also represented. It is assumed that the various stakeholders on the task team will contribute more expertise, knowledge and experiences essential for the delivery of an appropriate information service. The most important function of the task team will be to guide the implementation agency in policy development with more strategies and guidelines on how the information service will be managed and developed over time so that it is sustainable. The task team will also assist in taking

the full stock of all the existing information resources in Lesotho, which this study did not do.

Evaluation of Information Service for Geography Teachers in Lesotho

Evaluation is only briefly mentioned with emphasis on the actual scope of the information service needed to be offered to reflect the users' needs. It has been established that after designing and implementing the information service, its impact, value and relevance need to be determined from time to time (Kaur and Rani 2008). Therefore, it is important at the design stage to have an idea of how the information service may be evaluated. The evaluation may be done at certain intervals after the successful implementation of the service, or it may become an ongoing exercise. The evaluation will help the implementation agency to learn from past experiences to improve service delivery as well as better planning and allocation of resources. Such evaluation might include assessment of user information needs and satisfaction with the service. While defining objectives and goals is one way of aiding the evaluation process, regular user surveys may also be used for evaluation of the information service to determine whether the service should be continued, modified or withdrawn (Kaur and Rani 2008). The evaluation process may be undertaken in collaboration with the proposed task team. It should include a comparison of achievements against the set objectives to check if:

- Information was collected and repackaged for geography teachers
- Information was provided to the teachers in multimedia formats
- There is any information resource sharing among the teachers
- Alerting services were set and used by the teachers.

Conclusion

This paper focused on designing an information service for geography teachers in Lesotho. It has contributed knowledge on the information behaviour of teachers in a developing country in Southern Africa where there is a dearth of such studies. In addition, the paper proposes an information service model that could serve as an exemplar to teachers across the curriculum because they are also experiencing shortages of information and con-

straints such as high workload. The model can be adapted to teachers in other countries with a situation and background similar to Lesotho.

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