CHAPTER 2: LITERATURE REVIEW

The purpose of this chapter is to put the research questions of this study into a national and international perspective. A review of literature and recent research was done to explore issues regarding information resources, the Internet as information resource and teachers' perceptions of and utilisation of web-based information resources. This chapter will offer a critical synthesis of what has been written on these matters. The findings of the literature survey will be incorporated into the research project to serve as a frame of reference for the findings.

2.1 Information resources

As this research deals with the role of information resources in the professional lives of teachers, the first section of this chapter will investigate the nature of information resources, the importance of information resources and factors to take into consideration when implementing an information resource.

2.1.1 Functions of an information resource

Arnold (1990:1) and Du Toit (1986:161) state that the prime function of an information resource is to offer a service that assists the goals and objectives of the institution it serves. Khosrowpour and Yaverbaum (1989) consider an information resource to be a resource consisting of various forms of data (text, image, voice) that can be disseminated through different systems, i.e. communication systems like the Internet. It should offer a wide range of information for a specific group of users in a given content area and assist the intended target group in the performance of their duties.

Perhaps the most important aspect of an information resource is what Kaniki (1995:16) calls the "**empowering** (of) people through information dissemination, production, skills and resource sharing" [my emphasis].

All of these functions of an information resource are strengthened if the resource complies with the following prerequisites:

- ***Knowledge of target group***

  A thorough understanding and knowledge of the intended user group or organisation should drive the resource (Long 1995). Thus the provider(s) of an information resource must understand the target group's preferences, duties, tasks, and the demands of the profession.

- ***Easy access***

  The resource must not only be easily accessible to a wide range of people, but also at hours that suit the users (Line 1998:229).

- ***Friendly atmosphere***

  It is important that the service is 'attractive' to the users – users should feel welcome (Line 1998:224). This also implies that the service should offer friendly and efficient help to the users, encouraging them to return to the resource.

- ***Easy to use***

  It should be simple and straightforward for a user to find the relevant information (Line 1998:226). Users should have clear instructions on how and where to find the information they need. The ease of use applies especially to electronic information resources. First-time users should be able to master the technology involved quickly.

- ***Speedy access***

  The resource or service should actually save the users time. Queuing and waiting must be kept to a minimum. Access to the resource must be cheap or at least affordable (Line 1998:224,226).

- ***Quality information***

  The information offered must be correct, relevant, of a good variety (Line 1998:229) and show evidence of current awareness (Orna 1992:305). There is a saying - 'content is king' – and that is what information resources are all about. The more useful and interesting the information, the more successful an information resource will be (AKA Marketing 2002).

But why are information resources important? What role do they play in society, in organisations, businesses, or in the lives of individuals?

2.1.2 The importance of information resources

On the Briggs Library Research Guide (available online) the following statement appears: *"Information is power".* Long (1995) is convinced that information is one of the "linchpins that holds our organizations together" and Laribee (1992) considers information as an asset that should be managed rigorously. These sources and authors emphasise the role and power of information.

The demands on most professions are ever increasing and the ability to access information quickly gives a company or an individual a competitive advantage (Nelson 2000; Nicholas & Martin 1997; Long 1995). The success of many companies and individuals "hinges upon their ability to locate, analyse and use information skilfully and appropriately" (Nelson 2000).

Information resources seek to harness information for the benefit of the organisation as a whole by exploiting, developing and optimising information (Laribee 1992). An information resource centralises useful information. It brings together all (or ideally, most) of the information needed to make decisions, solve problems or do a job better.

The Information Age has arrived. The increase of information produced in all fields worldwide makes it difficult for professionals and individuals to keep track of new developments, research findings and information in their field of specialisation. The dangers of information overload make information management in the form of user-specific information resources a necessity to prevent "drowning" in information (Nelson 2000; Bundy 2000).

The central function of any information resource is to offer a service that "assists the goals and objectives of the institution it serves" (Arnold 1990:1). It can contribute to the success of a business and improve operational efficiency and productivity (Laribee 1992). For this to be feasible, the resource needs to be developed from

knowledge of the intended users and the nature of the information they need or would like to have. This brings us to the steps that should be taken when an information resource is planned.

2.1.3 A framework for the implementation of an information resource

It would be a waste of time, energy and money to create an information resource, launch it and then find out that it is not being utilised. The goal of an information resource is to assist a company, professionals and individuals in their tasks. According to Kaniki (1995:9) the best way to achieve this is to provide information and resources on the basis of current and ongoing needs assessments of the intended user group. This is part of the initial stage when starting a new information service.

Various sources (Orna 1992; Line 1998; Du Toit 1986) agree on the following steps when implementing an information resource:

i. Identification of the target group

The starting point for the implementation of any information resource is to know and understand the target group. Different professions need different information – the information needs of doctors, engineers, journalists, mathematics teachers and language teachers will not be the same. It is necessary therefore to do a needs-analysis of the information needs of the intended target group.

ii. User needs analysis

According to Nicholas (1996:12) the identification of information needs:

- monitors and evaluates the effectiveness and appropriateness of existing information systems from the user's perspective;
- detects gaps in information provision and helps to remain vigilant to changes in need; and
- assists with the design of an ongoing information support system.

Information needs can be determined by means of questionnaires, interviews, observations, focus-group discussions or by merely talking to people. The user need

analysis provides vital information regarding the type, amount and extent of information the group need.

iii. Establish aim and function of resource

It is important to decide on the nature of the product and what benefits it intends to offer (Orna 1992:306). An information resource's intentions should be to provide an information service to support a certain target group to fulfill their duties (Du Toit 1986:164). Not all information can ever be provided in a single resource. Thus it is necessary to determine beforehand what the parameters of the new resource will be.

iv. Compare resources

A good point of reference is to compare existing information resources and any new resources similar to the intended one. Valuable lessons can be learned from similar services and a study of existing resources can identify their shortcomings and pitfalls. This can help to avoid the same mistakes and give direction to the planned resource.

v. Design new information service

The new information service should be planned carefully. Different strategies will be necessary for different types of information resources. The design of web-based information resources will be discussed in more detail in Section 2.4.2. Decisions on the kind of information, the format, the volume, how and where it will be stored, must be made. The kind of information and the nature of the users' needs direct this design process to a large extent.

vi. Collect data needed/ content development

Once the type of data or information needed has been identified, it must be acquired, bought or developed. This will have time and cost implications. Issues on content development – especially for web-based information resources – will be discussed later in this chapter.

vii. Employ necessary staff

It must be established how many people are needed to run the intended service and they should be employed, trained and remunerated to run the service efficiently.

viii. Start service

The service must get off the ground and the potential users must be informed of the service or resource. This can be done by way of advertising, workshops and presentations.

An information resource must be planned with the guidance of empirical research in order to ensure that it will be utilised by the intended target group. A resource service or centre cannot continue to attract users (old and new) without "tailoring information and resources to meet the 'new needs' of the community" (Kaniki 1995:9). Therefore it will be necessary to review the content often, analyse the user behaviour and stay in touch with new user needs and developments in the specific field.

The conclusions reached from the above discussion are that the establishment of new information resources must be guided by empirical research. It will entail a dynamic and reiterative process because societies change and information production will never cease. New technologies will also alter the shape and size of information resources. Libraries were traditionally the most important information resource centres, but the arrival of the Internet has brought with it new opportunities for information delivery.

2.2 Web-based information resources

One of the biggest technological developments of the last decade is the arrival of the Internet with its possibilities. Ford and Dixon (1996:6) are amongst those who believe that the Internet is the answer to information provision: "in principle, (the Web) could encompass the sum of all human knowledge, complete with indexes and cross-references".

This section will look critically at the features of the Internet as a tool for information delivery and investigate whether it has advantages over traditional information resources, particularly for teachers.

2.2.1 Characteristics of web-based information resources

The Internet is a global network of LANs (Local Area Networks) and WANs (Wide Area Networks) connected to a so-called 'backbone' in order to communicate via different user platforms via standardised protocols (Schneider 1995:2). This technical definition is complemented by the following descriptions of the Internet from literature:

The Internet is –

- a large-scale system of interconnected hypermedia resources accessible from any computer connected to it. It facilitates access to stored text, hypertext, images, sound and video for reference, perusal or downloading (Clarke 1998:8);
- the largest global collection of information stored in network-accessible databases (Haughey & Anderson 1998:3);
- a dynamic body of information, distributed around the world by computers communicating via standardised protocols (Ford & Dixon 1996:6); and
- a publicly accessible global information system (Summerley 1996).

From a study of definitions and descriptions of the Internet, it appears that it is an electronic, computerised, networked platform for access to a multitude of sources of information accessible from anywhere in the world. The Internet is then an information resource that hosts, amongst others, many information resources.

A web-based information resource would then be an **online, Internet-based information resource for a specific user group.** Milheim & Harvey (1998:53) refer to a web-based resource site as an information resource on the Internet with specific information for a certain target audience, various Web links and access to software. Web sites like these are generally designed to provide support for a specific group of users in a given content area.

The latest estimate of the number of web pages on the Internet is 968 million (Notess 2002). This World Wide Web is still increasing and confirms the popularity of the

medium. What are the features of the Internet that make it such a popular tool for information delivery?

Kahn (1998:64) lists the following features of the Internet:

> *Key features:*
> Interactive; multi-medial; open system; on-line search; device-distance-time independent; globally accessible; electronic publishing; on-line resources; distributed; cross-cultural interaction; multiple expertise; industry supported.
>
> *Additional features:*
> Convenient; self-contained; ease of use; on-line support; authentic; non-discriminatory; cost effective; ease of coursework maintenance; collaborative learning; formal and informal environments; on-line evaluation; virtual cultures.

These features of the Internet add to its popularity. The Internet is close to an all-in-one-resource. What are the benefits of web-based information resources, especially when compared to other information resources?

2.2.2 The benefits of web-based information resources

Establishing a web site inevitably centralises access to information (Ford & Dixon 1996:17). A user can sit in one place, and have access to an abundance of information. The person need not travel, but can gain access to information on any topic from different parts of the world. Instant communication is possible via chat rooms and e-mail. These communication tools give the Internet an advantage over many other information resources.

Traditional information resources can be any of the following:

- Libraries
- Magazines
- Museums
- Newspapers
- Textbooks
- Encyclopaedias
- Journals
- CD-ROMs
- Universities
- Research centres
- Catalogues
- Specialists
- Resource centres, for example teacher centres
- Multi-media like films, cassettes, videos.

All of the above-mentioned information resources have their benefits, but a list of disadvantages can also be drawn up. For instance, libraries are not open at all hours and are not available to people who do not live nearby or have transport. Newspapers are dated on the day they are printed and paper is expensive. Textbooks become outdated with curriculum changes and the information on CD-ROMs cannot be updated easily.

Table 2.1 presents an overview of the advantages of web-based information resources:

Table 2.1: Advantages of web-based information resources

Ease of use	With its graphic user interface the Internet's resources are both easy and attractive to use. The point-and-click technique is not intimidating and it is easy to master. Web browsers are easy to install and technical support quickly available. Most interfaces are user-friendly, with online help-menus. Search engines will dig around and retrieve whatever information the user seeks, even if the user does not know where that information may be located on the Internet (Harasim et al 1995:22).
Convenience	The Internet's convenience lies in what Kahn (1998:64) calls "device-distance-time independent". Users can work on the Internet any place in the world in their own time, even after hours.
Global availability	A big advantage of web-based information resources is its global availability (Kumari 2000). From anywhere in the world information from any other part of the world can be retrieved and sent. The Internet makes national and global collaboration possible for anyone in any profession.
Relatively cheap	The Internet offers relatively cheap access to sources of information located anywhere in the world. At the mere cost of a local call users can communicate with colleagues at the other end of the world. They can participate in conferences, live chats, discussion groups, forums, and can subscribe to electronic journals or publish their own work at little cost.
Hypertext	Web pages are based on a **hypertext design**, which means that information at one Internet address can be linked to information at another Internet address. *Hypertext Mark up Language* (HTML) means that keywords or graphics in documents are linked to other relevant and

	supporting information – even on other computers at different locations. It can lead to new web sites with additional or complementing content. This information is accessible by merely clicking on a highlighted item, which makes it very easy even for inexperienced Internet users. A user can literally jump from one web page to another. Thus the Internet provides a vehicle through which images, text, video clips, music and sound can be exchanged without too much delay.
Interactive	It is also possible to design interactive materials for the Internet. Users can browse through information, not in a linear fashion as with textbooks, but by participating in the process of finding knowledge.
Downloads	Downloading is the act of copying a computer file from a server to your own computer. Users can download information, graphics and even video-clips onto their own computer for later viewing. Relevant material can be printed out, presentations can be compiled and used when necessary.
Access to a variety of information sources	The Internet offers access to a wide variety of sources of information, such as databases, policy documents, homepages of universities/ schools/ individuals, newspapers, journals, encyclopaedias, newsrooms, lesson plans, library catalogues, dictionaries and maps.
Research tool	With the help of the several free search engines on the Internet users can perform extensive searches to find information on various topics. Up-to-date data can be uploaded quickly to be published immediately at a much lower cost than in textbooks or journals. There is help available for new users to master the search skills quickly. Searches can be conducted by using keyword-searches or by category. After searching the whole database (which takes only a moment or two), the search tool displays a list of links to all the pages it determined as matches. This list is called a 'hit list' and the best hits are usually at the top of the list.
Communication	Communication via e-mail is easy and effective. Information can be requested from companies, experts and colleagues in other parts of the world at the cost of a local telephone call.
Publishing	Most Internet servers and easy-to-use software provide all that is necessary for users to publish their own work on the Internet without having to master complex new programming skills.
Adaptable/ dynamic medium	It is much easier and cheaper to change information on a web page than in published textbooks, newspapers or journals. Policy changes and research findings can be incorporated in existing documents without too much effort.

The descriptions above make it clear that the Internet has unprecedented possibilities for information delivery. Yet, despite these positive features of the Internet, there also are some constraints. Jackson, Bartle & Walton (1999:323) identify several barriers to the effective use of the Internet as an electronic information resource:

- Limitations in hardware, software and networking
- Insufficient access to network
- Limited awareness of resources
- Negative perceptions
- Ever-changing new skills needed
- Technical support needed

Additional to their list, the following constraints can be added:

- **The cost of technology**

  Although the Internet is not expensive to use, the initial costs of a computer, modem and software could be high.

- **Infrastructures**

  A variety of infrastructures is necessary for a business, library or school to provide Internet access for its staff. Security measures must be taken, appropriate space, lighting and ventilation must be provided. Cables, hardware and software must be installed and technical support must be readily available. Even more basic than of all of these, is the availability of electricity and telephone lines to connect to the Internet.

- **Lack of skills/ training**

  A huge barrier to access to the network and its resources may be the potential network user's lack of understanding of the medium. Knowing what is available in the network and how to navigate within the network are important, thus training of staff is of utmost importance if the Internet's benefits are to be maximised (McKenzie 1999a).

- **Information overload**

  More information has been produced within the last three decades, than in the last five millennia (Nelson 2000). Much of this is being published on the Internet. It would take more than a lifetime to read everything published on even one topic. The volume of information on the Internet has "exceeded the ability of most people to find the information they need" (Nelson 2000), creating an information overload. Nelson defines information overload as "the inability to extract needed knowledge from an immense quantity of information for one of many reasons" (Nelson 2000).

  The Internet may be the largest global collection of information, but "this collection of information is not as well organised as it should or will be" (Haughey & Anderson 1998:3). There is no one system that classifies and organises all the information on the Internet. Often users have to sort through large quantities of information on the Internet just to find the information needed. They could feel quite overwhelmed by the amount of available information (McKenzie 2000).

- **The Internet is still under construction**

  Everyday web pages are added to or removed from the Internet. Unknown to the potential users new information arrives daily. As servers expand and more and more servers are set up, the Internet addresses of web sites (URLs) change sometimes. This can create confusion among users. Authors like Sano (1996) and Schulze (2000:248) are of the opinion that the Internet will always be under construction.

- **Time consuming**

  The biggest frustration for the average user is the time it takes to locate information. It can also take long for a web page to "open" if there are many graphics on it. The downloading of documents may take very long as well. To use the Internet effectively, can be quite time-consuming (Jackson, Bartle & Walton 1999:323; Schulze 2000:248).

- **Quality control**

  The biggest criticism levelled at the Internet is the lack of quality control (Briggs 2002; Tillman 2000). Many portals try to link everything within their domain of interest, without screening for quality. The task of managing a web site is usually that of a web master – someone with technical skills but not necessarily with any subject knowledge. This results in the publication of masses of information, not all of it of good quality (McKenzie 1999b:44).

  The Internet offers access to documents typified as 'grey literature' (documents produced at "all levels of government, academics, business and industry, but which is not controlled by commercial publishers" - GL '99) and 'vanity publishing' (Tillman 2000). The latter are documents that have information of great value, but that have not been through peer review processes or the scrutiny of a publisher.

  With all the advertising and obscure publications on the Internet, it remains up to the Internet user to determine the reliability of information on web pages.

- **Lack of relevant material**

  As the global availability of the Internet has removed the traditional barriers between countries, it is understandable that information on the Internet is culturally diverse and in many different languages. Relevant material for a certain country, society, culture and language must be developed locally before it can really address the information needs of the intended user group (Czerniewicz, Murray & Probyn 2000:v).

Most of the problems with the Internet as information resource can be solved with careful planning, training and appropriate support structures in place. However, when the constraints of the Internet as an information resource are compared with the possibilities of the medium, the positive aspects far outweigh the negative aspects. In general, authors feel that the Internet offers more opportunities than drawbacks.

2.3 The Internet as an information resource for teachers

This section deals firstly with the information teachers need and the potential the Internet offers as an information resource for teachers. It then explores whether there is an expressed need for web-based resources for teachers, and the extent to which teachers utilise web-based information resources for professional purposes.

2.3.1 Teachers and information

Teachers form a professional group who are heavily involved in information provision. For them to provide the necessary information, they themselves must have effective access to the information. "If the teachers know how, why, where and when to find information and use it, these skills will not only enhance their teaching and prepare them for the new curriculum, but will filter through to the pupils and the community" (Oosthuizen 1997:233).

For the purposes of this study with its focus on Afrikaans First Language teachers, it is necessary to investigate the information needs of language teachers. Fillmore & Snow (2000) discuss the information needs of elementary school language teachers. They discern the following categories of information needed by language teachers:

- Content-area curriculum
- Pedagogical knowledge
- Knowledge of language teaching methodologies
- Educational linguistics (language acquisition, development of literacy)
- Language structures (grammar, semantics, lexicon, spelling)
- Strategies in reading, writing and speaking.

The duty of language teachers entails teaching the learners to become skilled users of language (reading, writing, listening and speaking). They must also be capable of teaching literature, i.e. the conventions of the genres of poetry, novels, short stories and drama. It becomes a daunting task when the language teacher is also expected to keep up with the latest developments in classroom practice, assessment strategies, children's literature, language debates as well as research findings in all the categories of information mentioned.

ERIC – the Educational Resources Information Center in the USA – has done much research to identify the types of information that teachers would find valuable (Clay 1985). The twelve top priority documents identified by teachers were:

- Promising practices
- Learning activities
- Units of study
- Resource and background materials
- Compilation of ideas from journal articles
- Brief research summaries
- Curriculum guides
- Lesson plans
- Fact sheets or ready reference materials
- Games/puzzles
- Annotated bibliographies
- Worksheets

These documents encompass the anticipated information needs of teachers. Clay (1985) reports that the top ten types of material requested by teachers from the resource are ranked as follows:

- Research summaries & syntheses
- Curriculum guides
- Resource materials
- Learning activities
- Annotated bibliographies
- Promising practices
- Units of study
- Lesson plans
- Textbooks.

Both the above mentioned lists give an indication of not only what teachers think they need, but also reflect to a great extent the type of information teachers do need and

seek in practice. It is clear that teachers – and language teachers in particular – need a variety of information on a continual basis.

There are information resources of various kinds to assist teachers. Many schools have well-equipped libraries, and many school districts host teacher centres with information resources for teachers. In Section 2.2.2 the discussion dealt with drawbacks of traditional information resources such as libraries. The next section explores the benefits web-based information resources have over existing resources for teachers.

2.3.2 The potential of web-based information resources for teachers

Most authors feel positive about the Internet's possibilities for information delivery to teachers. According to Quinlan (1997:16) the Web's versatility and interconnectedness makes it a prime platform to address curriculum concerns. It is this feature of the Internet that gives it its advantage over other types of information resources. All other resources are static, in most cases in printed format (textbooks, newspapers, journals, encyclopaedias), confined between the walls of libraries and only accessible during certain hours. Web-based documents can be updated much more easily and quickly than printed materials. Czerniewicz, Murray & Probyn (2000:38) mention that technology is also considered as a potential way of reducing the costs of learning support materials.

Other advantages of web-based information resources listed by Jackson, Bartle & Walton (1999:320) are:

- The Internet provides access to information not available in libraries;
- Faster and easier access to information resources;
- Access to up-to-date information;
- Access to specialist and unpublished information.

Jackson (2000) lists several ways in which the Internet can be used to support teachers, including:

i. *Assistance with day-to-day teaching*: The Web offers a vast array of information on various matters which teachers may need in their challenging profession. Textbooks may become outdated and curriculum matters can be addressed more quickly via the Internet.

ii. *Policies and procedures*: These can be posted on the Web for easy access by teachers. The Internet also allows for revision of documents to be made rather inexpensively. These document can be accessed immediately by all with Internet access.

iii. *Resource teachers*: Experts can be assigned full-time or part-time to advise teachers on problems and best practices. They can also prepare and provide supplemental lesson plans where textbooks and traditional resources are unavailable or outdated.

iv. *Collegial sharing*: Internet lists and bulletin boards allow a large number of people to participate in discussions on lesson plans, pedagogical issues, teaching strategies and shared interests.

v. *Portals*: A portal site links related web sites, providing teachers with an easy way of finding web sites that specialise in their field with lesson plans, teacher guides and student exercises.

From the literature it can be established that a web-based information resource holds many benefits for teachers. It can provide a single point of entry to find lesson ideas, curriculum statements, relevant information and help in a way that saves precious time and provides valuable support. Web-based information resources have the potential to be an adaptable, cost-effective way to deliver up-to-date material to teachers.

2.3.3 The need for web-based information resources

Jackson (2000) argues for the development of web-based information resources for teachers:

"Teaching is a tough job and teachers deserve support. Technologies can help provide such support. There are new possibilities for new technologies such as the Internet and the Web, which incorporate and extend the scope of older technologies. Taken together, these technologies can help motivate and empower teachers, assist them with day-to-day situations, provide avenues for lifelong professional development, and in short, can enrich teachers' work lives and enhance their effectiveness."

Trilling & Hood's ten top challenges for Educational Technology (1999:17) relate directly to the development of web-based information resources for educational purposes, among others:

- a need for better **Web-based multimedia reference sites** for learning, with simple interfaces and search engines, interactive simulations, comprehensive and updated guides to related Web sites [my emphasis];
- a quantum leap in ease of use and useful results in information searching, organising, and reporting tools, especially for the Web, and for databases of content knowledge and learning activities; and
- uncomplicated processes to make database development and web maintenance much simpler in order to create useful online knowledge bases, dynamic database-driven Web sites, and large-scale education information systems.

In the South African educational context, there have also been calls for online initiatives and support for teachers. In November 2001 the joint policy document of the Departments of Education and Communications was published. The document clearly gives notice of the intentions of these Ministries to drive ICT capacity-building in the South African educational context. The document envisions Internet connectivity for all schools, basic competencies in ICT skills by learners and educators alike and an educational portal, *Thutong*, to provide access to a host of curriculum and support material (Department of Education and Communications 2001:15-16).

From this document Paterson & Lundall (2001) identified key development intentions to:

- harness the Internet to meet the need for in-service training of teachers;
- ensure that teachers know how to incorporate and use ICT in their school teaching;
- enrich the curriculum with ICT components in all learning areas; and
- implement and support educator networks.

All three these priorities are motivations for the development of web-based resources for South African teachers. Paterson & Lundall (2001) express the opinion that the development of an educational portal "will be a **critical intervention**" [my emphasis]. A general portal for all teachers will contribute much to provide support for teachers, but the question of specialisation remains. There are many areas of specialisation in the South African teaching and training context, for instance Early Childhood Development, Learners with Special Needs, Intermediate Phase and Senior Phase Teaching and Training, Further Education and Training, learning areas and subjects. The ideal would be to provide local content and learning support materials for all fields of specialisation.

The need to connect yet smaller communities of teachers was voiced by Bob Sherman. In 1995 Jewish educators called for an information clearinghouse. They motivated their call with the fact that many good ideas never reach other teachers working in isolation. They voiced their opinion that a devoted online service for Jewish educators would have the potential of bringing opportunities to all teachers, alleviate feelings of isolation and be an important tool to disseminate information throughout their community. Bob Sherman concluded: "Jewish education is a small world, and we need to connect it" (Pearl 1995).

The same could be true for all smaller communities of teachers with their special interests and specific needs in South Africa. The ideal would be to provide them all with the information they need on user-specific web sites.

It is evident from the literature that there is a definite need for web-based information resources. But while it has been established that the Internet offers tremendous

opportunities for effective delivery of information to teachers, it is necessary to ask whether teachers are aware of this opportunity and if they utilise the Internet for professional purposes.

2.3.4 Utilisation of web-based information resources by teachers

Gray 1998, Kumari 2000, Quinlan 1997 and Woodall 2001 claim that teachers are increasingly using the Internet for professional purposes. This section investigates certain aspects of utilisation of web-based information resources by teachers, for instance when, how, how often and why teachers use web-based information resources. It also investigates teachers' attitudes towards the Internet as information resource and whether teachers really benefit from web-based information resources.

2.3.4. Frequency of use

The web based information service for American teachers, *ERIC* (http://ericir.syr.edu*)*, receives approximately six million hits per week, which amounts to about 24 million per month (Ask Eric 2001). This web-based information resource provides a central point in the U.S. where all educational research information, lesson plans, a library, expert advice and much more, are available.

In 1998 the *SchoolNet Canada* web site (www.schoolnet.ca) recorded more than 2.5 million hits per month. Elise Boisjoly, Director of SchoolNet Canada, says their web site is "an exciting resource that provides learners and educators alike with an easy-to-use single platform from which to reach the power of the Information Highway" (quoted by Haughey & Anderson 1998:75).

The *EdNA Online* or *Educator Network Australia* (http://www.edna.edu.au) receives approximately two million hits per month (Smith 2002). An information web site for Dutch teachers in the Netherlands, *Ondewijspagina* (http://onderwijs.pagina.nl) received 240 6188 visitors from 21 March 1999 up until 13 March 2002 (statistics retrieved on 24/04/2002 from the site http://v1.nedstatbasic.net/s?tab=1&link=1&id=780981). On the single busiest day this site received 6031 visits which amounts to 180 000 hits per month. A comprehensive resource for language teachers in the UK, *The Subject Centre for Languages, Linguistics and Area Studies* (www.lang.ltsn.ac.uk) receives an estimated 4000 hits a week (Riley 2002). A

Belgium site for Biology teachers (www.vob-ond.be) indicated a visitor total of 10 289 on 1 July 2002.

Hit counters on web sites do not give an indication of the utilisation of these resources specifically by teachers. Yet the statistics of the use of international resources are overwhelming. Teachers do not only utilise the resources extensively, they also contribute their own lesson plans, ideas and learning support material.

It was very difficult to establish the extent of utilisation of web-based resources by teachers in South Africa. No literature on the subject could be found. E-mails were sent to South African educational resources. Very few replied with information. One can ask whether these resources do give high priority to serving the information needs of customers.

The following indication of utilisation of online South African resources for teachers was either from feedback on e-mails or some indication of visits to the websites themselves. It is certainly not an accurate indication of how teachers utilise these resources, but to a certain extent it gives an indication of activities on South African resources.

Easymaths (www.easymaths.org) is a South African resource with curriculum-based information, lesson ideas, games and many more for mathematics teachers, learners and parents. According to the webmaster, Maggie Verster, the site gets about 8000 visits per month, but only 25% of these are from South Africa, which means a total of about 2000 South African visits to the site per month (Verster 2002).

The *English Teachers' Online Network of South Africa* (www.etonsa.cjb.net) is a web-based initiative that provides information for English Language teachers. Contributions in the guest book of this site reveal a minimum input of twenty-five contributions since 1999. No feedback was received from the information desk of this site.

SASchools (www.saschools.co.za) offers links to all South African schools with web sites, curriculum information and, amongst others, links to educational resources.

The guest book on the site revealed 3 433 'shows'. No replies to e-mails were received.

There is at this stage still a marked lack of local subject-specific resources on the Internet. New initiatives of the Western Cape Education Department such as *Edumedia* (www.edumedia.wcape.school.za/catalog/welcome_w.html) and *e-Curriculum* (www.wcape.school.za/curriculum) can contribute much in future.

The Sunday *Times* (http://www.sundaytimes.co.za/education), *SABC-Education* (http://www.sabceducation.co.za) and *Learning Channel* (http://www.learn.co.za), *M-Web Learning's* extensive online learning service *(http://www.mweb.co.za/learning)*, all provide valuable assistance for learners. But there are still huge gaps in user-specific information provision, learning support materials and virtual teacher communities on the Internet.

All indications from the web-activities on the above-mentioned resources indicate very low levels of Internet use by South African teachers. Stefanie Hefer, the director of *M-Web Learning* mentioned the following in an e-mail on South African teachers' utilisation of online resources (Hefer 2002):

> *It is a fact that teachers in our country are still very wary of and uninterested in the Internet. Its worth as a medium for exchanging knowledge, help and ideas has not yet been discovered and the Internet is still under-utilised.*[1]

It is evident from the information mentioned above that South African teachers do not utilise the Internet for professional purposes. It is necessary to explore the factors that contribute to Internet use by teachers. These can lead to interesting insights for the planning and implementation of a web-based information resource in the South African context.

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[1] *Basies is dit eenvoudig 'n feit dat onderwysers in ons land nog ontsettend skrikkerig en onbelangstellend oor die internet is. Die waarde van die medium as tydbesparende uitruilplek vir kennis, hulp, wenke, noem op is nog absoluut onontdek en word heeltemal onderbenut.*

2.3.4.2 Prerequisites for effective utilisation of web-based resources

According to the literature available teachers use the Internet and its resources when and where there are support structures in place. The following prerequisites for Internet utilisation by teachers were identified in the literature:

- **Connectivity**

Becker identified connectivity in the classroom as an important factor that enhances the utilisation of web-based resources by teachers. In 1999 more than 90% of U.S. schools had some sort of Internet access and more than one-third of U.S. teachers had Internet access in their own classrooms (Becker 1999). Becker's research results also revealed that a majority of teachers (59%) had Internet access at home with only one-quarter (27%) having no access at home or at school. Becker (1999)declares: "These statistics suggest that, as with other knowledge-oriented professionals, the Internet has begun to be established as an information and communications resource in the working and home environments of most teachers."

Nine out of ten EU schools have been reported connected to the Internet by 2001 (Joyce 2001). The SITES[2] survey revealed that more that nine out of ten Canadian students attended a school that had Internet access by 1999 (Drouin 2000).

As far as connectivity is concerned, the South African situation looks bleak compared with first world countries like the USA. Denis Brandjes (2000) mentioned in the opening address at the *Millennium Minds-2000 Conference* in Pretoria that only 250 out of over 28 000 schools in South Africa were connected to the Internet in 1996. The figure rose to more than 2000 connected schools in the year 2000, still only about 14% of all South African schools (Lundall & Howell 2000).

The level of connectivity is currently a priority for South African schools. According to the latest policy document regarding ICTs in education, all South African schools will have at least one computer connected to the Internet by 2010 (Departments of Education & Communication 2001). While it will still take many years before the

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South African situation may change for the better, it is necessary to explore other factors that contribute to Internet use.

- **Training**

The second prerequisite identified in the literature for sustainable Internet utilisation by teachers is the training of teachers to use ICTs effectively in their professional lives. International reviews have shown that educator development is one of the most critical factors in building and sustaining ICT capability in schools (Gray 1998; McKenzie 1999a; Paterson & Lundall 2001).

Low levels of ICT skills impact negatively on ICT use in schools. Both internationally and locally there are clearly expressed needs for the training of teachers in the use of ICTs. In his critique on Educational Technology, Greg Kearsley (1998:47) states that teachers are ill prepared to use educational technology and pleads that training should also be done in content areas.

Urgent attention should be given to the training of teachers in South Africa. Paterson & Lundall (2001) are of the opinion that large-scale interventions from the state, private sector and other agencies will be necessary to remedy the lack of ICT skills of teachers. This calls for systematic planning, detailed co-ordination and an ongoing evaluation of the progress in this regard.

- **Other factors**

A certain level of **computer expertise** is required for teachers to utilise the Internet for professional purposes (Becker 1999). Positive attitudes, curriculum guidelines for ICT use and technical support (Woodall 2000, McKenzie 2000) are amongst the factors that contribute towards high levels of ICT adoption and integration by teachers.

2.3.4.3 Teachers' attitudes towards the Internet as information resource

As a rule teachers have positive attitudes regarding the Internet as an information resource (Woodall 2001; Becker 1999). Of the 600 American teachers interviewed by NetDay, 84% indicated that they think the Internet can improve the quality of education (Woodall 2001). Seventy-five percent of the interviewed teachers are of

the opinion that the Internet is an important tool for finding new resources and meeting educational standards.

Lundall & Howell (2000:98) also found that teachers in South Africa in general feel positive towards the use of computers in education. It is very interesting to note that 77% teachers at schools **without** computers rated the value of the computer as an information resource much higher than 66% teachers from schools **with** computers (Lundall & Howell 2000:116). Perhaps they see computers as an important source of information to access resources not available to them in schools.

Research has revealed that teachers are becoming more and more aware of the Internet as an educational resource. Where there are web-based resources available and support structures in place, they are utilised with positive results. There are, however, still negative feelings towards the Internet and many teachers who do not use it for professional purposes.

2.3.4.4 Reasons why teachers do not utilise the Internet as an information resource

Willis, Thompson & Sadera (1999:36) mention that surveys on the current status of ICT integration in schools reveal that teachers may have positive attitudes about the use of technology in schools, "but that teachers are not confident of their ability to use technology in the classroom". Jamie McKenzie (1999b:44) mentions that teachers do use the Internet, but that many express disillusionment: "They seek guidance and mediation. They cannot afford to wade through thousands of 'hits' and hundreds of Web pages, most of which are irrelevant, highly commercial or untrustworthy."

Factors that deter teachers from using the Internet include lack of time, lack of equipment and a lack of technical support at schools (Woodall 2001; Summerley 1996). McKenzie (2000) comments: "...there never seems to be enough time... not enough time to invent great lessons, to convert the often disorganised Net into a benefit". He claims that some teachers' dissatisfaction with electronic resources comes from the lack of structure and the extensive effort required from them in order to make valuable use of it.

The low levels of skills continue to impact negatively on ICT use in schools. According to the September 1999 report of *Market Data Retrieval,* more than 60% of the teachers replying to a survey indicated that they were not well prepared to use technologies in their classrooms (quoted by McKenzie 1999a).

Both internationally and locally there are clearly expressed needs for the training of teachers in the use of ICTs. In his critique on Educational Technology, Greg Kearsley (1998:47) states that teachers are ill prepared to use educational technology. He pleads that training should also be done in content areas: "…what teachers want to know most, is how to teach their chosen subject domain more effectively" (Kearsley 1998:50).

Trilling and Hood (1999:15) mention that billions of dollars are being spent world wide on connecting schools, libraries, and homes to the ever-expanding information infrastructure, "while comparatively little is being invested in the learning content and support that will actually appear on our computer screens once they're connected". This is also the case in South African schools (Lundall & Howell 2000:104,105).

As early as 1996 South African teachers indicated the following reasons for not utilising the Internet (Summerley 1996): a lack of time, suitable equipment, know-how, interest and a lack of relevant South African material on the Web. Summerley's early findings are reiterated in other more recent South African studies. Czerniewicz, Murray & Probyn (2000:v & 41) and Lundall & Howell (2000) also mention lack of training and a lack of local content as main reasons why ICTs are not exploited effectively in South Africa.

The available information indicates that South African educators in general do not and cannot benefit from web-based information resources, primarily because of the low level of Internet connectivity in schools. There is a strong correlation between low ICT use in South African schools and the absence of Internet access (Lundall & Howell 2000:138; Brandjies 2000).

The lack of local content as a reason why teachers do not utilise the Internet, supports the idea of providing a web-based information resource for Afrikaans language teachers. The next step would be to establish a framework for implementing a web-based information resource for teachers.

2.4 A framework for implementing a web-based information resource for teachers

It is evident from the literature that web-based information resources can definitely add to teacher productivity and development. It is now necessary to ask how the development of a subject-specific information resource should be tackled.

Section 2.1.1 dealt with the criteria for quality information resources and the process to follow when an information resource is started. The same criteria are applicable to the development of information resources for the Internet. Design issues of web pages will not be discussed in detail here, but rather the criteria for quality web-based information resources, summarised from available literature. The various stages in the development process will also be discussed.

2.4.1 Stages in the development process

- Firstly a **set of goals** should be defined for the resource, including a statement of purpose and main objectives (Milheim & Harvey 1998:53; Ruffini 2001:64). This sets the stage for long-term development and defines the parameters within which the service will operate.

- Secondly an **analysis of the potential users** should be done so that the site can meet their needs and expectations (Milheim & Harvey 1998:53; Maddux & Johnson 1997:7; Ruffini 2001:64). This will help determine the content of the resource site and help to stay focused. "It is only through an understanding of what information people need and how they set about finding it that information professionals can ensure that suitable information systems are provided" (Nicholas 1996:5).

- After a study of the potential user group is done, the site must be **designed and built** to allow users to visit the site, find the information they want easily, and then

print or save it as needed (Milheim & Harvey1998:54). Ruffini (2001) mentions that most resources agree that there are four main design principles namely, simplicity, balance, emphasis and unity. Section 2.4.2 will deal further with the design issues.

- Webb (1996:17) mentioned that it is important to **get the information service off the ground** – "Gaining the confidence of users is most important at this stage. They do not want to have to wait too long for the new service: their expectations have been set." According to Webb the service should be started and tested. The initial procedures should be kept simple and flexible to allow for the development of the service.

- After designing a web-based information resource, the next step is to involve a small, representative group typical of the target audience to **evaluate** the system (Milheim & Harvey1998:54; Corry, Frick & Hansen 1997:66). This contributes to, for example, the identification and correction of gaps, mistakes, inactive links and language errors.

- Once the information resource has been established, an **adoption process** should be implemented. Morrell (1997:30) emphasises the fact that technology will only gain wide acceptance when it is easy to use. Involvement right from the start by the intended user group will contribute much to the success of the project. It is necessary to tell users of the resource.

- Finally, the **management and maintenance** of the site is an ongoing process. The site should be regularly scanned for 'dead' links. Outdated information must be removed, new developments, links and pages added or integrated (Milheim & Harvey 1998:55; Maddux & Johnson 1997:11).

2.4.2 Design principles

Wilkinson, Bennett & Oliver (1997) identified eleven criteria for designing a quality Internet resource. They will not be discussed in depth, as web design issues are not the focus of this study. Wilkinson, Bennett and Oliver's (1997) criteria are presented

in Table 2.2. The second column of Table 2.2 indicates other sources that confirm their criteria.

Table 2.2: Criteria for quality web-based information resources

Aspect	Reference
i) Site access & usability	
▪ Permanent, easy URL; reliable server	▪ Milheim & Harvey 1998:54
▪ The site should open / download fast	▪ Jackson 2000
▪ The site should have a distinctive name	▪ Thompson, Simonson & Hargrave 1996: 4
▪ Screen should have an orderly, clutter-free appearance	▪ Milheim & Harvey 1998:54; Maddux & Johnson 1997
▪ Compatible with different browsers	
ii) Resource identification and documentation	
▪ The intended audience must be mentioned	
▪ The mission, purpose and scope of the site should be clear	▪ Maddux & Johnson 1997:7
▪ Documents should be regularly updated	
▪ All the documents should have clear URLs	
iii) Author identification	
▪ The name, qualifications, position and contact details of the author(s) must be clear	▪ Maddux & Johnson 1997:8
iv) Authority of author	
▪ The author must be a recognised authority on the subject	▪ Maddux & Johnson 1997:8
▪ Involvement of educational institutions related to the topic adds credibility to the site	
v) Information structure and design	
▪ The titles of documents should be clear and descriptive	
▪ The content must fit the stated scope, purpose and audience	▪ Maddux & Johnson 1997:10
▪ Use of graphics and icons must contribute to the clarity and usability of the information	
▪ The site should offer a variety of features	▪ Ohl & Gates:1997:26
▪ A metaphorical interface design can enhance the usability of a web site by foreshadowing for the user what will happen	

vi) Relevance and scope of content ▪ The content must be related to the intended user's needs ▪ Currency of content should be of utmost importance ▪ The content must meet the curriculum standards of the country ▪ Documents should provide new information on the topic ▪ Obvious gaps or omissions in the coverage of the topic must be avoided	▪ Jackson 2000 ▪ Jackson 2000
vii) Validity of the content ▪ Bibliographies or cite references should confirm the accuracy of the information ▪ A reputable organisation should maintain the site	
viii) Accuracy and balance of content ▪ Documents must be free of errors or misleading omissions ▪ Language and grammar must be correct and appropriate ▪ Information must be of consistent quality	▪ Maddux & Johnson 1997:10
ix) Navigation within the document ▪ There must be an index/ table of contents that can be used to navigate within the document ▪ Users must have a way to get back to the home page ▪ Help should be available	▪ Corry, Frick & Hansen 1997:73
x) Quality of the links ▪ Links must be clearly visible and understandable ▪ Instructions should appear before links ▪ Links should be annotated ▪ Are users informed of the type of information they are linking to? ▪ Links must be reliable, relevant and appropriate ▪ Minimum mouse clicks required to bring relevant information to the user	▪ Sano 1996:8
xi) Aesthetic and affective aspects ▪ The documents should follow accepted graphic design principles (e.g. balance, unity, proportion, simplicity)	

▪ Graphics should be used wisely ▪ Documents should follow accepted text design principles (headers, limited mix of style and sizes) ▪ Readability and legibility guidelines should be followed (sufficient colour and tone contrast, font size) ▪ The document should show evidence of originality and creativity in the visual design and layout ▪ The interface must make use of consistent menu conventions from screen to screen ▪ The source must attract and maintain the user's attention	▪ Ford & Dixon 1996:21

According to Sano (1996:8) the design activity never ends, "for the web is a living, evolving entity, open to change, improvement, and technological innovation". In most instances a web-based information resource will entail a reiterative process. Action research will be a valuable instrument to guide this process (Carter 1998).

To ensure user satisfaction and utilisation of the resource, valuable lessons can be learned from similar projects. The next section deals with this aspect of information resources.

2.4.3 Ensuring participation and utilisation of the information resource by the intended target population

A very important aspect is to ensure that the information resource is utilised by the people for whom it was created. It is no use to invest in time, money and effort to start an information resource that will not be utilised sufficiently. Therefore, it is of utmost importance that strategies should be implemented to ensure that the intended target group will use the resource.

It is important to give users a sense of ownership (Kumari 2000; McKenzie 2000). Training them to use the Internet, convincing them of the relevance of the resource, and giving them the opportunity to contribute to the resource can do this.

It is also important to extend on initial successes: "One of the greatest challenges in maintaining a first class Internet site is maintaining what has been built and

expanding upon it ... The key is to provide a common ground for educators and learners and then empower them to generate and share quality instructional materials" (Haughey & Anderson 1998:76).

Once the web site meets the criteria for a quality resource, attention must be given to the promotion of the resource. It is essential that a web resource intended for a specific target group should be advertised. Opportunities for the intended audience to learn more and participate in the development of the resource would further ensure its utilisation.

Jamie McKenzie has much experience in the training teachers in the USA to use ICT. He is of the opinion that teachers are most likely to embrace technologies "…if they can see the connection between their work (covering and exploring the curriculum) and the tools" (McKenzie 1999b:3).

Kumari (1997) says teachers should be taught the skills necessary to navigate the Internet and understand its functioning. Their skill level must be increased for them to be able to contribute to the resource, "which gives them an immense sense of responsibility, ownership and motivation to be continually involved".

Teachers want to see results, not promises of content support on a web-based information resource (McKenzie 1999b:130-132). McKenzie supports Kumari's view that teachers must be trained in the use of ICTs and that their competence should be developed through workshops and training.

The culmination of the above-mentioned factors, will contribute to the utilisation of web-based information resources for teachers. It will have to be a dynamic and ongoing process requiring good planning and effective marketing strategies.

Research into the subject has provided valuable insights into understanding how to provide a professional group with a needs-driven online information resource.

2.5 CONCLUSIONS

The purpose of the literature review was to probe the trends and issues raised by the study's research questions. Here are some conclusive remarks regarding the questions posed:

Information resources should be needs-driven, reliable and provide relevant and quality information to support the intended target audience. With increasing demands on all professions to be competitive and survive in the Information Age, information resources can do much to save valuable time and add to productivity.

New technologies, such as the Internet, provide new possibilities for speedy, cheap and convenient information delivery. There is an optimistic view in the literature reviewed of the possibilities of the Internet to serve as a tool for information delivery to teachers. Its positive features far outweigh the negative aspects. Web-based information resources are far more versatile than traditional information resources. The Internet can support teachers in various ways and offer them tremendous opportunities for effective delivery of information.

Worldwide teachers are increasingly using the Internet for professional purposes. In general they have a positive attitude towards the Internet as an information resource. In instances where the necessary resources are available online, it has led to higher productivity, effectiveness and job satisfaction (Ely 1997:107).

For teachers to utilise the Internet effectively, there are certain prerequisites that should be in place, e.g. technical support, training and relevant content. The South African situation regarding the utilisation of web-based information resources by teachers differs much from that of countries like the U.S. and Canada. This is mainly because of very low levels of Internet connectivity in South African schools and lack of training in ICT skills.

Information resources are only well utilised if they are needs driven, well planned and designed, maintained effectively and if the content is relevant and of good quality. Means to ensure participation and utilisation of the intended target group include participation, skills training and advertising.

Girod and Cavanaugh (2001:46) say: " Technology is not the key to radical change – teachers are the key". Therefore it is a wonderful opportunity to be able to utilise technology to benefit and support teachers: to provide them with quality resources for capacity building, professional support and for the enhancement of their teaching.

The purpose of the research for this study, is to justify and guide the development of a web-based information resource for Afrikaans language teachers. Research findings support the notion for such an initiative. From the literature reviewed clear guidelines were identified to start such a process. The empirical research aspect for the development of a web-based information research will be dealt with in the next chapter.