Accommodating and promoting multilingualism through blended learning

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Thesis submitted for the degree *Doctor of Philosophy in Education*
at the Vaal Triangle Campus of the North-West University

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Vanderbijlpark

May 2011

ו וַיֹּאמֶר יְהוָה, הֵן עַם אֶחָד וְשָׂפָה אַחַת לְכֻלָּם, וְזֶה, הַחִלָּם לַעֲשׂוֹת; וְעַתָּה לֹא-יִבָּצֵר מֵהֶם, כֹּל אֲשֶׁר יָזְמוּ לַעֲשׂוֹת.

ז הָבָה, נֵרְדָה, וְנָבְלָה שָׁם, שְׂפָתָם--אֲשֶׁר לֹא יִשְׁמְעוּ, אִישׁ שְׂפַת רֵעֵהוּ.

ח וַיָּפֶץ יְהוָה אֹתָם מִשָּׁם, עַל-פְּנֵי כָל-הָאָרֶץ; וַיַּחְדְּלוּ, לִבְנֹת הָעִיר.

ט עַל-כֵּן קָרָא שְׁמָהּ, בָּבֶל, כִּי-שָׁם בָּלַל יְהוָה, שְׂפַת כָּל-הָאָרֶץ; וּמִשָּׁם הֱפִיצָם יְהוָה, עַל-פְּנֵי כָּל-הָאָרֶץ. {פ}

Genesis 11:6-9

ACKNOWLEDGEMENTS

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Abbreviations and acronyms

CAI	-	computer-assisted instruction
CAL	-	computer-aided learning
CAT	-	Computer Applications Technology
CBI	-	computer-based instruction
CBL	-	computer-based learning
CBT	-	computer-based training
CMC	-	computer-mediated communication
CMI	-	computer-managed instruction
DBE	-	Department of Basic Education
DoE	-	Department of Education
FET	-	Further Education and Training
FTP	-	file transfer protocol
HTML	-	hypertext mark-up language
HTTP	-	hypertext transfer protocol
ICT	-	Information Communications Technology
IT	-	Information Technology
LiEP	-	language-in-education policy
LMS	-	learning management systems
LoLT	-	language of learning and teaching
LT	-	learning technologies
MLE	-	managed learning environment
MOO	-	multiple object-orientated environment
MUD	-	multi user dungeon
NCS	-	National Curriculum Statement
NLP	-	National Language Project
OBE	-	Outcomes-Based Education
PanSALB	-	Pan South African Language Board
PLE	-	personal learning environment
RSS	-	really simple syndication
TCP/IP	-	transmission control protocol/internet protocol
VLE	-	virtual learning environment
VoIP	-	voice over IP

WBI	-	web-based instruction
WBT	-	web-based teaching
WWW	-	world wide web
XML	-	extensible markup language
ZPD	-	zone of proximal development

Summary

Key words: multilingualism, multiculturalism, education, South Africa, blended learning, IT, e-learning, Internet, online learning, wiki, Web 2.0.

Multilingualism is a reality in South African classrooms. The *Constitution of South Africa* (Act 108 of 1996) and the national language policy recognize language rights and aims at supporting, promoting and developing the official languages. However, despite the advantages of mother tongue education, English is often chosen as language of learning and teaching at the cost of the African official languages. This study proposes the accommodation and promotion of multilingualism through blended learning.

Blended learning refers to the blending of traditional instruction methods, such as face-to-face instruction, with other forms of instruction such as online learning and teaching. Through a discussion of asynchronous and synchronous learning tools it was established that wikis would be used for this study. In terms of blended learning and learning theories the main emphasis in this study is on socio-constructivism as well as communal constructivism.

The empirical research in this study focused on the establishment and testing of a conceptual model for the accommodation and promotion of multilingualism through blended learning in the subject IT. The research took the form of a sequential embedded mixed methods design. Both quantitative and qualitative approaches were used. A questionnaire was used with IT teachers to investigate the language and blended learning context. This was followed up with qualitative research in the form of interviews aimed at provincial and national experts in terms of the subject IT and e-learning. Based on the literature and these two investigations, a conceptual model was developed. The conceptual model's effectiveness was tested through a quasi-experimental study. A questionnaire was also completed by the respondents at the schools after the completion of the study. Through the testing of the effectiveness of the conceptual model it was found that multilingualism could successfully be accommodated and promoted through this conceptual model.

Opsomming

Sleutelwoorde: meertaligheid, multikulturalisme, onderwys, Suid-Afrika, gemengde leer, IT, e-leer, Internet, aanlyn leer, wiki en Web 2.0.

Meertaligheid is 'n werklikheid in Suid-Afrikaanse klaskamers. Die *Grondwet van Suid-Afrika* (Wet 108 van 1996) en die nasionale taalbeleid erken taalregte en het die ondersteuning, uitbreiding en ontwikkeling van die amptelike tale ten doel. Hierteenoor, ten spyte van die voordele van moedertaalonderwys, word Engels dikwels as taal van onderrig en leer gekies ten koste van die Afrikatale wat amptelike tale is. Hierdie studie stel die akkommodering en uitbreiding van meertaligheid deur gemengde leer voor.

Gemengde leer verwys na die mengsel van tradisionele onderrigmetodes, soos gesig-tot-gesig-onderrig, met ander vorme van onderrig soos aanlynonderrig en -leer. Deur 'n bespreking van asinchrone en sinchrone leertegnologie is bepaal dat wiki's vir hierdie studie gebruik sal word. Met betrekking tot gemengde leer en leerteorieë was die fokus van hierdie studie op sosio-konstruktivisme sowel as gemeenskapskonstruktivisme.

Die empiriese navorsing van hierdie studie het op die daarstelling en toetsing van 'n konseptuele model vir die akkommodering en uitbreiding van meertaligheid deur gemengde leer in die vak IT gefokus. Die navorsing was in die vorm van 'n sekwensiële, insluitende gemengde metode ontwerp. Beide kwantitatiewe en kwalitatiewe benaderings is gevolg. 'n Vraelys is aan IT-onderwysers gestuur om die konteks in terme van taal en gemengde leer te bepaal. Dit is opgevolg deur kwalitatiewe navorsing in die vorm van onderhoude met die provinsiale en nasionele kenners van die vak IT en e-leer. Op grond van die literatuur en die twee ondersoeke is 'n konseptuele model ontwikkel. Die konseptuele model se effektiwiteit is gemeet deur middel van 'n kwasi-eksperimentele studie. 'n Vraelys is ook deur die respondente by die skole voltooi nadat die studie voltooi is. Daar is, na aanleiding van die toetsing van die effektiwiteit van die konseptuele model, bevind dat meertaligheid suksesvol deur die konseptuele model geakkommodeer en uitgebrei kan word.

CHAPTER 1: Introduction and contextualization

1.1 INTRODUCTION AND SUBSTANTIATION

Olshtain and Nissim-Amitai (2004:53) state that the "educational system in a multilingual society needs to reflect the authentic patterns of language use by the individuals in that society". They maintain that multilingual speakers should "be able to make informed decisions about investing future effort in language knowledge and language skills of one or all of the languages they know, in order to promote their aspirations and choices in life" (Olshtain & Nissim-Amitai, 2004:59). Ideally speaking, these authors had autonomous multilingual learners in mind, which relates directly to the premise of a learner-centred approach within the South African school curriculum. Thus the focus is on facilitating learning for individual learners within the context of respecting languages used by learners. Teachers therefore become mediating agents in terms of national and school language policies and the actual multilingual language realities present at South African schools.

For learners to be able to use and develop their home language as well as to be understood and able to understand other languages by also promoting multilingualism, could be problematic. The reason for this is the fact that time constraints and language capabilities of both teachers and learners make the effective accommodation and promotion of a number of languages within a classroom quite difficult.

1.2 CONCEPTUAL FRAMEWORK

The intended study is founded on two distinct concepts: multilingualism and blended learning. In addition, the school subject Information Technology will be used to illustrate the application of blended learning to accommodate and promote multilingualism within the school context.

1.2.1 Multilingualism

The term *multilingualism,* as it will be used in this study, refers to the macro sense of the word where the language diversity of the wider learner community, rather than the multilingual capabilities of individuals, is implied. Edwards (1994:209) notes that "[m]ultilingualism arises and is maintained through necessity, real or perceived".

Multilingualism is therefore a reality and not necessarily a planned policy executed by a government or other regulatory bodies. A crucial question regarding multilingualism is whether a true multilingual language policy should be endorsed by a government or institution or whether to opt for a single language or *lingua franca* as basis of a language policy. Yet language planners are faced with two realities: on the one side multilingual societies exist, while on the other side a language such as English is spreading globally as a distinct *lingua franca* (Cunningham, 2001:202-203; Edwards, 1994:1; Ferguson, 2006:110-148). As a consequence, material in English needs to be translated into other languages in order that the information is understood by greater numbers of people.

Although matters would have been simplified if only one language is being used, such a solution would not be practical or possible in most societies as this implies a negation of individuals' language rights and the fact that many communities are multilingual. As an alternative, Webb (1998:125) suggests multilingualism that should be considered to be an asset for a country and a developmental resource. Some of the main points raised by Webb (1998:131) in terms of South Africa include that social transformations (educational, economic, political and administrative) can only occur in a multilingual manner and that meaningful educational development can, in practice, only occur in languages which learners know well. In contrast to the reality of the existence of multilingualism in South Africa (cf. Du Plessis, 2003:114-115; Murray, 2002:435-436) and the unquestionable protection of language rights in the *Constitution of South Africa* (Act 108 of 1996)[1], it is still evident that English is used and promoted at the cost of the other official languages of South Africa. Although Venter (1998:52) observes that section 6 of the *Constitution* (1996) not only concerns the status of specific languages, but also recognizes and protects multilingualism, English is still promoted by the government (cf. Du Plessis, 2000:106), the public sector (cf. Alexander, 2001:116; Langtag, 1996:156; PanSALB, 2000:4), the legal system (Malan, 1998:696 *et seq.*), the public broadcaster (cf. Alexander, 2001:116; Maake, 2000:10; Kruger & Kruger, 2001:17) as well as the education system (cf. PanSALB, 2000:6-7). Even within school communities it appears as if English is preferred. This is evident from an empirical survey carried out by Verhoef (1998), concluding that "although black teenagers in the North-West

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[1] Referred to as the '*Constitution* (1996)' in the rest of the study.

Province value the official status of indigenous languages, they prefer English (and to a lesser extent Afrikaans) for academic, administrative, and economic purposes" (Verhoef, 1998:193). According to Dalvit (2004:108), it is clear from research done at Rhodes University that students do not want a choice between English or an African language as they fear their proficiency in English would suffer if they were to receive education in isiXhosa[2] only. Dalvit (2004:109) proposes further development of isiXhosa and an approach where material is provided in both isiXhosa and English. Such a multilingual approach satisfies the language concerns students have, but also accommodates their own language abilities.

Despite the dominance of English, the educational system should rather portray the existing multilingual nature of learners in South Africa and thus also promote the language rights of these learners. In order to achieve this, the accommodation and promotion of multilingualism should take place with sensitivity towards language preference of communities, parents and learners, as well as a regard for language abilities of learners and teachers.

1.2.2 Blended Learning

One of the key principles of Outcomes-Based Education as identified by Spady and Marshall (1991:70) is "expanded opportunities and support for learning success". With regard to this principle, developments in education internationally and in South Africa have seen the emergence of alternative teaching and learning strategies such as blended learning, which is viewed as an integration of traditional (e.g. face-to-face teaching) and web-based or online teaching and learning approaches (cf. Bonk & Graham, 2006:4; Crocker, 2006:3; Holmes & Gardner, 2006:110; Nel, 2005:67-68, 109; Oosthuizen, 2004:14).

Blended learning could potentially be a suitable solution to accommodate and promote multilingualism since learners are provided with expanded opportunities to access additional learning material in their home language or language of preference without any stigmatization or inconvenience, and without requiring teachers to have extensive knowledge of the subject matter in a different language (cf. Ross & Gage, 2006:158). Other benefits of blended learning include the accommodation of

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[2] The language names as used in the *Constitution* (1996) will be used throughout this thesis (for example isiXhosa rather than Xhosa).

different learning styles; the provision of additional chances to allow learners to demonstrate or improve on their learning without affecting normal teaching or learning time and the reusability of sources (cf. Holmes & Gardner, 2006:66, 72; Oosthuizen, 2004:123; Ziob & Mosher, 2006:97).

In terms of the accommodation of diversity Jolliffe, Ritter and Stevens (2001:13) make the following statement:

> In a face-to-face environment, an effective learning event is typically conducted in a lock step fashion where learners are considered to be homogeneous and the materials appropriate for all. Using a Web-based system, the diversity of all the learners can be taken into account in terms of experience, skill, reading level, overall ability and attitude by offering different explanations, remediation of various kinds and the opportunity for the learners to proceed at their own pace.

Despite the fact that this statement assumes that no differentiation is necessarily employed in a face-to-face teaching environment, the focus is on the possibilities presented using web-based systems. In addition to differentiation in terms of learner abilities language abilities and knowledge can also be added to this list.

One of the prerequisites for the use of blended learning is that facilities capable of facilitating learning Internet use should be available. Alternatively networked computers can be utilized where information can be shared between computers without the computers actually being connected to the Internet. Since Holmes and Gardner (2006:153) note that many teachers "are content to work as they have always done, unwilling to relinquish older, tried and tested means of learning and teaching", the successful implementation of blended learning also requires that teachers are trained in using computers and the Internet, and that attitudes of teachers and learners are positive towards the technology and the blending thereof with traditional forms of learning (cf. Holmes & Gardner, 2006:32; Nkosi, 2007:34-36; Richardson, 2006:6-7).

In order to rationalize and operationalize the accommodation and promotion of multilingualism through blended learning in the context of schooling, the subject: Information Technology is proposed.

1.2.3 Information Technology (IT)

IT has the potential to be taught with the aid of blended learning as these classes usually take place in computer rooms or laboratories. In terms of its focus on problem-solving and programming (cf. Department of Education, 2003a:9; Goosen, 1999:2), and the fact that its subject matter actually requires Internet use, it will be argued in this study that multilingualism could be accommodated and promoted in the subject Information Technology. Through research done by Mandisa (2007:127), Njobe (2007:1-18) and Dalvit, Murray, Mini, Terzoli and Zhao (2005), it is clear that the use of African languages, specifically in the teaching of IT at tertiary level, has advantages. From research done by Nel (2005:83), it is noted that Sesotho-speaking students spontaneously started using their home language in an electronic discussion board group. Even though some students (who do not speak Sesotho) were left out of this particular group, it is through careful administration of the blended learning environment that the teacher should accommodate and promote multilingualism, but also utilize other strategies and platforms to include a class as a whole. Dalvit *et al.* (2005:124) maintains that "… their stronger language (i.e. their home language) could give students increased and more meaningful access to an educationally and economically empowering field of study". In his study, Mandisa (2007:2) focused on the usage of isiZulu in IT teaching. He has found that almost every research participant in his sample "believed that the language problem could be overcome by introducing isiZulu as the medium of instruction in the IT learning environment" (Mandisa, 2007:137). The study concluded that "[u]sing isiZulu language in the user interface of a program could contribute to a greater understanding of Computer Literacy as a subject and elevates the level of Computer Literacy of English second language learners" (Mandisa, 2007:8).

With regard to the teaching of IT in the school context, The National Curriculum Statement (DoE, 2003a:9) defines the subject as follows:

> Information Technology focuses on activities that deal with the solution of problems through logical thinking, information management and communication. It also focuses on the development of computer applications using current development tools. The subject develops awareness and an understanding of the social, economic and other implications of using computers.

In addition, the subject comprises four learning outcomes:

✤ Learning Outcome 1: Hardware and System Software
  ✤ Learning Outcome 2: e-Communication
  ✤ Learning Outcome 3: Social and Ethical Issues
  ✤ Learning Outcome 4: Programming and Software Development

Although the National Curriculum Statement indicates that the various outcomes support and complement one another, it is also emphasized that "Learning Outcome 4 is a heavily-weighted outcome because it is the crux of the subject" (DoE, 2003a:12). Because computer programming requires adequate language abilities (cf. Powell, Moore, Gray, Finlay & Reaney, 2004:1) and the fact that language ability and socioeconomic background influence effective learning (cf. Casey, 1994; Dalvit *et al.*, 2005; Mandisa, 2007:1), it is imperative that multilingualism should be accommodated and promoted especially with regard to the conceptualization and understanding of basic programming principles and concepts. In this regard, the following areas have been identified from the IT National Curriculum Statement (DoE, 2003a:26, 30, 38) as well as the IT Learning Programme Guidelines (DoE, 2003a:32-40): some decision-making and mainly repetition.

When considering operationalizing a multilingual blended learning approach for IT, the focus of this study will be on the following:
  ✤ Key word and concept lists.
  ✤ Captioned diagrams and sketches.
  ✤ Translated key descriptions.
  ✤ Forums where work can be discussed.
  ✤ Wikis created and edited by learners.
  ✤ Topic related blogs.

Furthermore it is suggested that the study be focused on grade 10 learners as this is the grade in which most IT learners are exposed to programming for the first time.

1.3 CENTRAL PROBLEM

The central problem considered in this study is how multilingualism can be accommodated and promoted through blended learning by using the school subject IT as an example.

Towards addressing this problem, the following research questions can be raised:

- What is multilingualism and how is it realized in South African schools?
- What does blended learning entail?
- Why is blended learning a possible solution for accommodating and promoting blended learning?
- How effective is the conceptual model, proposed in this study, in facilitating the accommodation and promotion of multilingualism in IT through blended learning?

1.4 RESEARCH AIMS AND OBJECTIVES

Derived from the central problem, the aim of the study is to determine how multilingualism can be accommodated and promoted through the implementation of blended learning in the IT school classroom.

From the research questions raised, the following objectives can be constructed:

1.4.1 Multilingualism is a reality in South Africa and in South African school classrooms and it has different implications with regard to teaching and learning. In reviewing information that is evident from relevant literature, the phenomenon of multilingualism will be explained and its realization in the South African school context described.

1.4.2 As blended learning is a rapidly developing field of study, blended learning as teaching and learning approach will be discussed in terms of its origins, related theories, standards within the field of teaching and learning as well as its situation in terms of South African languages. This theoretical overview will be related to multilingualism in the South African context.

1.4.3 Based on the aforementioned literature reviews, preliminary statements can be made in terms of the accommodation and promotion of multilingualism with the use of blended learning in the subject IT. This will form the basis for a conceptual model to be set up to facilitate the accommodation and promotion of multilingualism in IT through blended learning.

1.4.4 The conceptual model produced in 1.4.3 will be tested with the use of an empirical investigation and adapted if required.

1.5 RESEARCH DESIGN AND METHODOLOGY

This study is comprised of a literature and empirical study.

1.5.1 Literature study

As foundation for this study, a literature study of multilingualism as well as blended learning is vital and forms a base from which the two fields can be theoretically approached and efficient empirical investigations done. This will also allow the researcher to develop a conceptual model in order to accommodate and promote multilingualism through blended learning in the school subject IT. The purpose of the literature study is also to develop a theoretical framework and ultimately a conceptual framework that will form the basis of this study (cf. Kumar, 2005:35-37).

National and international literature will be collected using the following databases: ERIC, EBSCOhost, GKPV, MLA, Nexus, Google Scholar, SACat (Sabinet) and SA Media (Sabinet). Furthermore searches will be done on the Internet using the following search engines: Google; AltaVista; Yahoo, Ask and Ananzi.co.za.

The following key words will be used: blended learning, IT teaching, Information Technology, multilingualism, multiculturalism, bilingualism, education, electronic classrooms, information technology, Internet education, South Africa, African languages on computer, computers, hypertext, e-learning, e-teaching, minority languages on the Internet, Information Communications Technology (ICT), World Wide Web (WWW), e-mail/email and teaching, web-based learning/teaching, Outcomes-Based Education (OBE), Web 2.0, online learning/on-line learning, problem-solving, programming.

1.5.2 Empirical investigation

1.5.2.1 Research paradigm

This research is rooted in both the Interpretivist and Positivist paradigms. Interpretivist, since it wants to make meaning of IT teachers' current teaching practices in order to accommodate and promote multilingualism and Positivist, since it will utilize blended learning within an experimental context. Consequently it could be argued that the research is philosophically founded on **Pragmatism**, as it envisages implementing the notion of blended learning in the IT school classroom in

order to determine its application value in terms of the accommodation and promotion of multilingualism.

1.5.2.2 Research approach

The empirical research will be conducted by applying both a qualitative as well as a quantitative approach. This constitutes a typical mixed methods approach. Both quantitative and qualitative methods will be employed to gain an understanding of current teaching practices applied in IT school classrooms and to substantiate the development and implementation of a blended learning conceptual model. By following the quantitative method, the proposed blended learning model will be implemented to establish its effect on the accommodation and promotion of multilingualism. In the final analysis the qualitative method will be used to determine the learners' experiences working with the model. The researcher is of the opinion that the mixed methods approach is the most suitable for this study since it will allow for a proper analysis of the problem at hand and as such it will assist in understanding the research problem more completely (Ivankova, Creswell & Plano Clark, 2007:261).

1.5.2.3 Research design

By following a sequential embedded mixed methods design (Ivankova *et al.*, 2007:267; Creswell, 2009:206-216), the empirical investigation will be done with the primary focus on the collection of quantitative data (cf. Fouché & De Vos, 2002:137). As secondary focus, qualitative data will also be collected to gather substantiated evidence in support of the development and implementation of the envisaged experimental research.

By gaining knowledge about the current use of blended learning in IT school classrooms, as well as if and how multilingualism is accommodated and promoted in these classrooms, descriptive and information-rich data will be drawn from the responses of IT teachers and IT and blended learning experts. Eventually, a conceptual blended learning model for accommodating and promoting multilingualism will be developed, based on information obtained from the literature study and the empirical data. The second part of the investigation will focus on the implementation of the conceptual model by means of a quasi-experimental research design. For the purpose of this study a non-equivalent group pre-test-post-test

control group design will be used (Cohen, Manion & Morrisson, 2000:276). This will be applied at two schools within the Free State province. By focussing on a former Model-C school (School A) as well as a township school from a previously disadvantaged background (School B) this provides a sufficient cross-section of the schools in which IT is presented in the Free State province. The implementation of the conceptual model will involve the following:

FIGURE 1.1 Implementation of the conceptual model

Literature study
↓
Completion of questionnaires (teachers) and interviews (experts)
↓
Data analysis Compilation and interpretation of data received
↓
Presentation and integration of processed data with existing literature study
↓
Development of a blended learning model
↓
Implementation of the blended learning model at two secondary schools (5 lessons)
↓
Pre-test to test knowledge about decision making and looping structures
↓
Observation of execution of model
↓
Post-test to test knowledge about decision making and looping structures
↓
Completion of questionnaires (learners)
↓
Evaluation and adaptation (if necessary) of the blended learning model

The envisaged conceptual model will cater for multilingualism in a blended approach to teaching Information Technology. Multilingualism will be considered by making content (terminology as well as algorithms and explanations) available in Afrikaans and Sesotho and not only in English. This content should then be provided in a blended learning approach where face-to-face learning can be combined with interactive online learning material. Monitoring will take place throughout the implementation of the conceptual model. The model will consist of the following:

TABLE 1.1 Conceptual model structure

Introduction to main concepts and terminology (with equivalent terms and descriptions available in Afrikaans and Sesotho) using a face-to-face and online teaching approach
Explanation of algorithms in English using printed and interactive electronic media
Learners construct algorithms in own words in language of preference
Programming structure implemented in Delphi coding
Knowledge of programming structure tested with programming question and written questions

1.5.2.4 Research participants

The research participants for the first part of the empirical research will be the total population of all IT teachers at secondary schools in the Free State (n=17). The rationale for this purposeful sample (McMillan & Schumacher, 2006:126) is based on the fact that all these teachers work within a similar context with regard to the usage of the same programming language (in other provinces some schools use Java and not Delphi[3] as in the Free State). Furthermore, the researcher has established close contact with almost all these teachers through departmental training opportunities coordinated by the provincial Senior Education Specialist for Information Technology in the Free State. Interviews will be used to validate and extend the data gained through the literature study and the questionnaire completed by the IT teachers. The interviews will be conducted with provincial and national IT subject and blended learning experts.

With the implementation of the conceptual blended learning model, the research will be conducted at two respective secondary schools which offer IT as subject. Choosing two different schools will ensure that the study is representative of the types of schools that provide IT as a subject in the Free State, one being a multilingual former Model-C school and the other a township school from a previously disadvantaged background. To ensure the viability of the study, the researcher will establish the number of Grade 10 learners at the identified schools who included IT as subject in their curriculum.

By considering additional criteria such as learner diversity in terms of multilingualism, the schools' location within an accessible geographical region for easy facilitation by the researcher, availability of the required hardware, network facilities and easy online access, the two schools will be selected by means of convenience sampling (cf. McMillan & Schumacher, 2006:125). In order to address the selected research design's internal shortcoming of randomization partially, the researcher will use a random procedure to determine which Grade 10 IT classes of the selected schools will form the experimental group and which will be in the control group.

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[3] Delphi is application development software that utilizes an Object Pascal programming language. The software was developed by Borland, but is now (2010) owned by Embarcadero Technologies (cf. Embarcadero, 2010).

1.5.2.5 Variables

Variables that are important for this study include: the actual home language of learners, learners' proficiency in their home language, the language of teaching and learning at the selected schools, learners' computer literacy, learners' frequency of computer use, availability of computer and network resources, and Internet connection/facilities. Another important variable that needs to be taken into account is concerned with people's perceptions about language, especially on the use of multilingualism and the status of English. Being aware that some or all of these variables could act as confounding variables (Leedy & Ormrod, 2010:225), provision for ensuring internal validity will be made in the form of random assignment of the experimental and control groups, as well as for the implementation of a pre-test.

1.5.2.6 Data collection

The measuring instruments for the first phase of the study will be semi-structured closed and open-ended questionnaires (cf. McMillan & Schumacher, 2006:197) that can be filled in on paper or online by the teachers. Some of the questions will be open-ended as this makes the respondents more central to the response than just the questions being asked (cf. Cohen *et al.*, 2000:254).

Furthermore interviews will be conducted with provincial and national IT subject and blended learning experts in order to validate and extend the data found. The interviews will be structured around set questions. This information will assist the researcher to conceptualize and develop a blended learning model which aims to accommodate and promote multilingualism in the IT school classroom.

In the second phase of the research the developed conceptual blended learning model will be implemented at two schools and its effectiveness will be monitored constantly by the researcher over a period of time (five lessons within a period of about two weeks) and finally measured in terms of the degree to which learners have achieved Learning Outcome 4 and its associated assessment standards as set out in NCS. Embedded in this phase observations will be made during the model is being implemented.

Finally, in the third phase, learners from the experimental groups at the two schools will be required to complete a questionnaire after their exposure to the conceptual blended learning model.

1.5.2.7 Data analysis

From the process of describing, classifying and interpreting data provided by the teachers and experts through questionnaires and interviews, a conceptual blended learning model will be created and assessed by determining learners' achievement of the required assessment standards. In this regard, the following steps will be followed (De Vos, 2002c: 340)

- ✎ collecting and recording data;
- ✎ managing data;
- ✎ reading and memoing;
- ✎ describing, classifying and interpreting; and
- ✎ representing and visualizing.

Descriptive statistics will be used to express the achievement and responses of learners during the implementation of the conceptual model. In order to determine the significance, if any, of differences from data obtained from the quasi-experimental design, such data will be analysed and interpreted in consultation with the Statistical Consultation Services of the North-West University (Vaal Triangle Campus). This will be done using SPSS statistical software.

1.5.2.8 Procedure

The procedure that will be followed with this research can be set out and summarized as follow:

- ✎ Literature study on multilingualism, the subject IT and blended learning.
- ✎ Refinement of research aims and objectives.
- ✎ Planning of questionnaires and actual research design.
- ✎ Application for doing research in the Free State Province with the provincial Department of Education.
- ✎ Identification of individuals and schools to be used for this study.
- ✎ Pilot testing of measuring instruments.
- ✎ Communication with relevant schools and respondents.
- ✎ Completion of questionnaires by teachers.

- ✤ Execution of interviews with blended learning and IT experts.
- ✤ Data analysis and interpretation of data received in the first part of the research.
- ✤ Presentation and integration of processed data into existing literature study.
- ✤ Development of a conceptual blended learning model.
- ✤ Testing of the blended learning model at two secondary schools.
- ✤ Observation of execution of model.
- ✤ Completion of questionnaires by learners.
- ✤ Feedback, evaluation and adaptation of the blended learning model.
- ✤ Drafting of conclusions and recommendations.
- ✤ Conclusion of research – dissemination of conclusion and recommendations.
- ✤ Feedback to respondents, their schools and the Education Department.

1.5.3 Ethical aspects

The research will be conducted in terms of generally accepted research ethics and by adhering to the prescriptions of the ethics procedures of the North-West University. The ethics number NWU-00050-09-A2 was assigned to this study by the educational sciences ethics committee of the North-West University (cf. Appendix G). Permission will be obtained from the relevant Department of Education in order to execute the research. Ethical issues pertaining to the research will be discussed in detail in chapter 5.

1.5.4 Relevance of study

The importance of using computers in education has been highlighted by the Department of Education[4] (cf. DoE, 2003c) and a lot has been done to promote ICT and so-called e-education. Furthermore, it is clear from the *Constitution* (1996) that language rights are non-negotiable and should be respected. This research proposes that by appropriately extending (or establishing where necessary) blended learning as a mode of learning, as opposed to only utilizing more traditional modes and strategies, multilingualism can be accommodated and promoted.

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[4] The Department of Education (DoE) is used throughout this study as the sources refer to this entity. However, it has been separated into the Department of Basic Education (DBE) and the Department of Higher Education and Training (DHET).

Studies have been done on blended learning in the South African context, but they have focussed on computer literacy for students at tertiary level (Oosthuizen, 2004:1) or the creation of guidelines for creating meaningful blended learning experiences in higher education classrooms (Nel, 2005:3). From the literature study it is evident that little has been done on the use of blended learning in a school context.

Therefore the relevance of the study can be established through a desire from government to promote both main concepts (multilingualism and blended learning) investigated in this research. In conclusion, it is the long term aim of this research to culminate in a suitable conceptual model for the accommodation and promotion of multilingualism through blended learning in multilingual schools in South Africa. Such a model could also have application value for other subjects.

1.6 CHAPTER DIVISION OF THE STUDY

The study has been structured within the following chapter division:

CHAPTER 1: Introduction and contextualization

CHAPTER 2: Contextualization and explication of multilingualism

CHAPTER 3: Blended learning

CHAPTER 4: Blended learning and multilingualism in IT

CHAPTER 5: Empirical investigations

CHAPTER 6: Conclusions and recommendations

1.7 CONCLUSION

This chapter provided the introduction and substantiation of this study by providing the conceptual framework used as point of departure. Here the concepts of multilingualism, blended learning, as well IT were briefly discussed in terms of the literature available. Furthermore a central problem was posed based on four research questions that will guide the rest of the study. These research questions lead up to the research aim and objectives set for this study. Next the focus was placed on the research design and methodology in terms of the completion of the literature study and the empirical investigation. Brief references were also made to the ethical aspects pertaining to this study, as well as the relevance of the study. Finally the chapter division of the study was provided.

The first part of the literature study that follows focuses on the concept of multilingualism and how it relates to multiculturalism. Furthermore the concept will be discussed in terms of how it and language issues have been handled in South African policy and law. In conclusion, language will be discussed in terms of education.

CHAPTER 2: Contextualization and explication of multilingualism

2.1 INTRODUCTION

The aim of this chapter, as set out in the first research question, is to determine what multilingualism is and how it is realized in South African schools. The multiculturalism and multilingualism prevalent in South Africa is the result of the presence of different languages and cultures in the country. The concept of multiculturalism will be discussed, followed by multilingualism (2.2) as the relationship between culture and language is also explored in the first part of this chapter. In order to be able to explain the term multilingualism within the South African (2.3) and, more specific, educational context, the concepts of multilingualism and language rights will be clarified (2.4). This will be followed by an explanation of the role of language within education (2.5); a historical perspective on language at schools in South Africa (2.6) as well as current usage (2.7) and legislation and policies in this regard (2.8). The role of language in education is discussed because this is the context within which this study was conducted and the language realities and language legislation both influence the way in which teaching is conducted in South African schools. Finally, to support the use of blended learning as a possible way in which multilingualism can be accommodated and promoted, the influence of language in terms of blended learning will be discussed (2.9).

2.2 MULTICULTURALISM AND MULTICULTURAL EDUCATION

Multilingualism and, by implication, multiculturalism as well, imply that different cultures are found within a specific place. The interrelationships among languages and their speakers can cause conflict (Edwards, 1994:175-176). Therefore the bringing together of cultures and languages requires some form of accommodation. It is essential to consider that multilingualism also implies a bringing together of different cultures and this could influence the accommodation and promotion of multilingualism. An overview of multiculturalism and multicultural education is thus essential.

2.2.1 The concept of culture

Multiculturalism refers to the presence of more than one culture and therefore it is important to define the phenomenon of culture. From the literature it is evident that there is a distinct link between language and culture (Makoni & Trudell, 2009:39; Meier, 2007:660). The concept of **culture** is difficult to define and there are diverging opinions on what it includes (Lemmer, Meier & Van Wyk, 2006:15; Le Roux, 1998:104). Some definitions of this concept will briefly be discussed to provide a point of departure.

Culture is defined, within the context of this study, by the South African Concise Oxford Dictionary (SACOD, 2002:282) as "the customs, institutions, and achievements of a particular nation, people, or group". Furthermore, the word relates to the Latin word, *colere*, which means to grow or to cultivate (SACOD, 2002:282).

Le Roux (1998:104) defines the concept of culture as "The universal, distinguishing characteristics, products, values, traditional customs, symbols and acquired aspects of a specific human society. Material culture includes objects, technology and the arts, while non-material culture refers to language and other symbols, knowledge, skills, values, beliefs and customs." This definition is quite wide in the sense that it covers many human characteristics and activities. Yet it is evident that language is mentioned as a form of non-material culture.

Maintaining cultures is also associated with the maintenance of languages. In this regard Makoni and Trudell (2009:39) observe that "the maintenance or revitalization of language signals ongoing or renewed validity of the culture associated with that language". Meier (2007:660) also agrees in this regard by stating the language is used to "communicate within and between cultures". This emphasizes that language is not used only within a single culture, but actually serves to enable speakers to engage with speakers belonging to other cultures.

The significant link between education and culture (cf. Lemmer *et al.*, 2006:18-19) is also important for this study as the study takes place within a school context. Lemmer *et al.* (2006:16) emphasize that teachers need to be aware of both explicit and implicit culture. Explicit culture involves distinguishable characteristics such as

food, dress and languages, while implicit culture focuses on hidden phenomena such as attitudes, values and beliefs. Affirming the link between education and culture, Vandeyar (2003:193) also notes that through education "transmission of the normative heritage of a people from one generation to the next" takes place.

Culture is therefore a difficult concept to define, yet it can be described as a set of features associated with a nation, people or group. Furthermore, from the literature it is clear that there is a link between culture and language (Makoni & Trudell, 2009:39). It is also evident that culture has a significant role to play in terms of education. Following from this background on culture, multiculturalism will be discussed in the next section.

2.2.2 The concept of multiculturalism

Multiculturalism is relevant to this study since the focus of implementing a conceptual blended learning model to accommodate and promote multilingualism also implies making provision for more than one culture. The concept of multiculturalism will be discussed with further explications of assimilation and pluralism.

Cushner, McClelland and Safford (2009:22) define multicultural education as "a process of educational reform that assures that learners from all groups (racial, ethnic, socioeconomic, ability, gender, etc.) experience educational equality, success, and social mobility". This equality could extend to language as well. This concept of multicultural education implying a reform of a current situation is also stated by Nieto (1996:307) who defines multicultural education as "a process of comprehensive school reform and basic education for all students. It challenges and rejects racism and other forms of discrimination in schools and society and accepts and affirms the pluralism (ethnic, racial, linguistic, religious, economic, and gender, among others) that students, their communities, and teacher represent". From this definition it is clear that multicultural education is considered to be a process that needs to be executed in such a manner that the school as a whole is involved. Rejection of racism is emphasized and discrimination based on language can be added to this definition in terms of the focus of this study.

Education in South Africa takes place within a multicultural context (Le Roux, 1998:103) and as a result an approach that is inclusive of all the cultural differences

found within the country is required. As is the case internationally, there is also a choice between an approach of assimilation or multiculturalism in South Africa (cf. Lemmer *et al.*, 2006:1). To be able to substantiate why multiculturalism is preferred within the South African context, the two concepts of assimilation and multiculturalism will be discussed.

The inverse of multicultural education is **monocultural education**. Nieto (1996:312) defines this as "[e]ducation reflective of only one reality and biased toward the dominant group, monocultural education". Historically this was employed in South African schools and is in contrast to what is acceptable in terms of the *Constitution* (1996) and the *South African School's Act 84 of 1996* (Lemmer *et al.*, 2006:7). The implementation of educational systems based on racial grounds and the legacy of Bantu education promoted monoculturalism (cf. 2.6.1). Multicultural education is regarded as one way in which this can be countered (Lemmer *et al.*, 2006:4).

Assimilation implies the combining of different elements and in this context it refers to cultures. Lemmer *et al.* (2006:2) make the following statement in terms of this concept: "Assimilation is a monocultural policy that, until recently, has prevailed in most multicultural Western societies. It places emphasis on minimizing cultural differences and encouraging social conformity and continuity. Minority groups are therefore expected to become assimilated into the mainstream of the dominant group culture".

Assimilation therefore emphasizes a single culture above others and requires people from diverse cultural backgrounds to conform to this single culture. Lemmer *et al.* (2006:2) state that assimilation can be promoted through education whereby the policies and practices in education could remain ethnocentric.

Le Roux (1998:106-107) describes three models of assimilation:
- ✎ **Assimilation** can take place as a one-way process where less dominant cultures lose their cultures by being absorbed by a dominant culture.
- ✎ With **amalgamation** a "melting pot" is created where a new culture is established by combining minority and majority culture groups.

↳ An **open community** or **structural assimilation** can be created through rejecting ethnicity, religion, language or any other phenomenon that can be the foundation for forming a group. The focus with this approach is the individual and not groups.

With the first two approaches (assimilation and amalgamation) individuals are grouped together at the cost of their cultures and the two approaches therefore work against the maintenance of diversity. Furthermore, the third approach (structural assimilation) overemphasizes the individual above the interests of the group. (Cf. Baker, 1996:364-366; Le Roux, 1998:109).

Pluralism relates to the concept of multiculturalism and should also be taken into account. According to Edwards (1994:177), pluralism relates to maintaining social diversity and, as such, acts as the opposite of assimilation where the blending of culture is implied. Cushner *et al.* (2009:41) mention the concept of cultural pluralism and note the analogy of a salad bowl where different cultures are included. This also relates to pluralist ideology where "[t]he group provides the individual with identity, a sense of belonging or psychological support, particularly when faced with discrimination by the larger society" (Cushner *et al.*, 2009:41). Hence pluralists also view the identity group as important and necessary for schools to promote it.

Furthermore, Le Roux (1998:107-109) identifies three forms of pluralism:
↳ **Structural pluralism** or the "salad bowl" theory implies basically no contact between cultural groups. With structural pluralism the emphasis is too much on protecting cultural groups and does not account for national interests.
↳ **Amended cultural pluralism** implies the acknowledgement of different cultures, yet it allows for greater mutual interaction. It also allows for acculturation, cultural enrichment and cultural shift to take place. In this regard, acculturation refers to a situation where people experience a change in terms of their cultural context (Meier, 2007:658). Amended cultural pluralism does not allow for the individual's personal freedom, yet it allows for a balance between communality and diversity.
↳ **Dynamic cultural pluralism** involves a balance between individual and group rights. Groups are regarded as being dynamic and the individual has the right to choose freely to belong to a group or not.

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Following the above discussions of assimilation and pluralism, cognisance should be taken of the multicultural nature of South African classrooms. Furthermore, the distinction between assimilation where a single culture is promoted at the cost of others should be contrasted with pluralism where more than one culture is accepted. Within the South African context a pluralist approach is most likely to be followed in order to be in line with section 30 and 31 of the *Constitution* (1996) where association with the cultural life or cultural communities is entrenched.

In order to understand multicultural education it is important to provide an overview of the historical background. This matter is covered in the next section.

2.2.3 Historical background to multicultural education

Multicultural education as a strategy can be traced to the civil rights movement in the United States of America (USA). This background is traced in the discussion that follows.

According to Le Roux (1998:110, 117), multicultural education does not refer to education taking place within a multicultural context, but rather addressing and accounting for different cultures throughout the education system. This also implies learning about other cultures. The multicultural education approach was established in reaction to assimilation. Apart from the elimination of cultural differences, assimilation can also result in lowered self-esteem, poor self-concept and cultural alienation. Even though assimilation was heavily criticized in the 1960s, it still has a presence in education. (Cf. Lemmer *et al.*, 2006:2-3.)

The origins of multicultural education can be traced to the civil rights movement in the USA in the 1960s. The civil rights movement aimed at eliminating segregation and discrimination. With the desegregation of schools, an assimilation policy was followed and minority groups were expected to conform to the dominant group. Change only came when an approach was established that embraced not only different cultures, but also socioeconomic groups and gender. The impact of multicultural education extended from the USA to other countries with sizeable immigrant numbers such as Australia, Canada and Britain (cf. Lemmer *et al.*, 2006:3-4; Vandeyar, 2003:194).

In terms of the South African legacy it is important to take note of the country's apartheid history (cf. 2.4.2, 2.5.1.2 and 2.6.2). In this regard Vandeyar (2003:193) states "in the South African context, the notion of hegemonic and subordinate cultures is intricately linked to the complex legacy of colonialism and apartheid". Despite recognition of multiculturalism in documents such as the *Constitution* (1996), it is clear from the literature that in terms of recognition and promotion of the languages not enough has been done. Consequently Vandeyar (2003:197) makes the following observation "more work needs to be done in order to deal with both the discrimination and marginalization of the past, and the task of reconstruction and healing that needs to be undertaken across cultures in South Africa".

In conclusion it is clear that multicultural education is a reaction towards assimilation – as discussed in the previous section (cf. 2.2.2) – and that its origins in the civil rights movement emphasize a move from segregation. Since this context also relates to South Africa's apartheid history, it is therefore applicable to education in South Africa.

In the next section the implementation of multicultural education will be discussed.

2.2.4 The implementation of multicultural education

Accommodating and promoting multilingualism through blended learning is a focal point of this study and as such it is important to keep multicultural education in mind. The discussion that follows will focus on how multicultural education can be manifested at schools, followed by objectives of multicultural education, as well as an overview of the dimensions that make up multicultural education.

2.2.4.1 Manifestation of multicultural education at schools

Cultural transfer can take place through education and it provides learners with an integrated entity of reality. Therefore knowledge and understanding of different cultures are essential for learners (cf. Le Roux, 1998:105).

Edwards (1994:188-189) notes that multicultural education is essential to "inculcate cross-cultural respect, and to form a bulwark against racism and intolerance". This emphasizes how education can bridge gaps that may otherwise remain in society. With the historical background of South Africa concerning the legacies of the

apartheid political ideology and racism, the bridging of cultural gaps is relevant. In terms of the concept of inclusion within the South African school system diversity among the learner population is respected (cf. Lazarus, Daniels & Engelbrecht, 1999:46) and will probably redress the injustices of the past. Inclusion ties in with multicultural education and, in this regard, Banks (1994:3) notes that multicultural education tries "to reform the school and other educational institutions so that students from diverse racial, ethnic, and social-class groups will experience educational equality". Banks furthermore ties gender and religious equality to multicultural education. This discussion leads to the description of the objectives of multicultural education as discussed in the next section.

2.2.4.2 Objectives of multicultural education

It is essential to provide reasons why multicultural education should be implemented. Hence the objectives of multicultural education, as described by Le Roux (1998:111-112) are listed:

- ✎ ensuring acknowledgement, acceptance and appreciation for society's multicultural nature;
- ✎ promoting intercultural respect and interaction;
- ✎ promoting knowledge of the own culture, as well as positive contribution of other cultures to society;
- ✎ eliminating ethnocentrism, stereotyping and prejudices;
- ✎ eliminating intercultural conflict, which stems from racism, sexism and socioeconomic considerations;
- ✎ acquiring knowledge of a society's social and historical realities;
- ✎ developing critical thinking to solve social problems through negotiation and constructive dialogue;
- ✎ promoting social skills within a multicultural society;
- ✎ developing positive attitudes and tolerance towards other cultural groups;
- ✎ ensuring equal educational opportunities for every individual;
- ✎ ensuring individual deepening of an own cultural identity;
- ✎ ensuring a positive contribution towards the development of a just democratic dispensation;
- ✎ creatively promoting a society's cultural diversity;
- ✎ promoting an understanding that different cultural groups attach different interpretations to values, events and concepts;

- ✎ developing and promoting intercultural communication skills;

- ✎ developing problem-solving attitudes towards societal problems;

- ✎ teaching pupils life skills from a multicultural perspective;

- ✎ combating discrimination and cultural alienation;

- ✎ promoting analysis and evaluation to address societal problems such as sexism and racism rationally; and

- ✎ supporting the broader objectives of education, to ensure the optimal realization of all pupils' potential.

Although these objectives vary in terms of relevance and importance in different school contexts, they supply sufficient reason why multicultural education should be implemented within a South African context. Two key general notions can be drawn from this list of objectives in that there needs to be promotion and development of certain values and skills, as well as no discrimination based on cultural grounds.

Keeping the objectives of multicultural education in mind, it is also necessary to define the dimensions of multicultural education. These parameters are covered in the next section.

2.2.4.3 Dimensions of multicultural education

Banks (1994:5) illustrates the dimensions of multicultural education as reflected in the figure on the next page:

FIGURE 2.1 Dimensions of multicultural education

Content Integration

Content integration deals with the extent to which teachers use examples and content from a variety of cultures and groups to illustrate key concepts, principles, generalizations, and theories in their subject area or discipline.

An Equity Pedagogy

An equity pedagogy exists when teachers modify their teaching in ways that will facilitate the academic achievement of students from diverse racial, cultural, and social-class groups. This includes using a variety of teaching styles that are consistent with the wide range of learning styles within various cultural and ethnic groups

Multicultural education

The Knowledge Construction process

The knowledge construction process relates to the extent to which teachers help students to understand, investigate, and determine how the implicit cultural assumptions, frames of references, perspectives, and biases within a discipline influence the ways in which knowledge is constructed within it.

An Empowering School Culture and Social Structure

Grouping and labelling practices, sports participation, disproportionality in achievement, and the interaction of the staff and the students across ethnic and racial lines are among the components of the school culture that must be examined to create a school culture that empowers students from diverse racial, ethnic, and cultural groups.

Prejudice Reduction

This dimension focuses on the characteristics of students' racial attitudes and how they can be modified by teaching methods and materials.

These dimensions imply an integration of equity pedagogy, content integration, knowledge construction, empowering school culture and social structure as well as prejudice reduction. Equity pedagogy refers to how teachers should adapt their teaching to facilitate diverse classes, while content integration concerns the actual content used in classroom situations in using applicable examples and subject matter that is sensitive towards diversity in class. Knowledge construction, in turn, refers to an unbiased and sensitive approach to the construction of knowledge. Empowering school culture and social structure refers to changing the whole school approach to participation in different activities and creating a school culture that is conducive to diversity. The last sphere, prejudice reduction, refers to changing the attitudes of learners and their prejudices towards other races and cultural groups.

Nieto (1996:307) makes the following observation in terms of multicultural education:

> Multicultural education permeates the curriculum and instructional strategies used in schools, as well as the interactions among teachers, students, and parents, and the very way that schools conceptualize the nature of teaching learning. Because it uses critical pedagogy as its underlying philosophy and focuses on knowledge, reflection, and action (praxis) as the basis for social change, multicultural education promotes the democratic principles of social justice.

From this statement it is clear that multiculturalism needs to be integrated throughout the school environment and that all role players should be involved in the accommodation thereof. Importantly, such accommodation will possibly lead to social change.

In order for the preceding literature study to have application value for this study, it is important to establish the relationship between culture and language and, by implication, multiculturalism and multilingualism. The relationship between these two concepts is discussed in the next section.

2.2.5 Multiculturalism and multilingualism in South Africa

The focus of this section is on the relationship between culture and language as manifested through multiculturalism and multicultural education.

Cushner *et al.* (2009:83) note that "[l]anguage may be the most significant source of cultural learning because it is through language that most other cultural knowledge is acquired". It is also evident that language is considered to be the determiner of culture (cf. Cushner *et al.*, 2009:69).

Le Roux (1998:112) makes the following observation:

> Multicultural education acknowledges the *reality* of different ethnic, cultural, language, religious and other groups, as well as the necessity for the *retention* of such groups. [Italicization from the original text.]

The fact of the reality of different languages as well as a need of retaining language groups should be considered to be key to the relationship between multiculturalism (and by implication multicultural education) and multilingualism.

There is therefore a link between multiculturalism and multicultural education. Since the focus of this study is on the accommodation and promotion of multilingualism, this concept will be discussed further in the next section.

2.3 MULTILINGUALISM IN SOUTH AFRICA
2.3.1 The concept of multilingualism

Multilingualism, as an extension of multiculturalism, is a reality for many South Africans and in many South African classrooms (cf. Laufer, 2000:3; Lemmer *et al.*, 2006:52; Maartens, 1998:15), and serves as impetus for this study.

Before multilingualism is discussed, the concept of **language** needs to be declared. From the literature study it is clear that the concept of language is difficult to define (Kemp, 2009:16). The phenomenon of a language should not be considered to be a single objective entity. Furthermore, the dynamic and ever changing nature of language should be taken into consideration (Cenoz & Jessner, 2009:125; Kemp, 2009:16-17). In addition, the status of dialects and languages also influences how they are perceived, used and recorded. The distinction between language and dialect is also quite problematic as it is often based on the status of a language variant rather than on linguistic grounds (Halliday, 2007:233; Kroes, 2005:237; Olivier, 2003:13). The fact that different languages are sometimes viewed as 'one language' by multilingual speakers poses a problem in terms of counting languages and determining whether a monolingual, bilingual or multilingual person or society is researched (Kemp, 2009:18). For the purpose of this study, language will be approached in terms of what is recognized by the *Constitution* (1996) as official languages and with respect to how individuals view their language. The concept of an **official language** also seems problematic, as designating a language as being official does not necessarily automatically require legal consequence (Strydom & Pretorius, 2000:112). It is accepted as a fact that a language being official, only has meaning if such a language is used for all or most tasks of government (Strydom & Pretorius, 2000:111). To reach a situation where it is used for most tasks of government will obviously require the use of more than one language and therefore it is also important to discuss the three concepts of monolingualism, bilingualism and multilingualism.

When considering **monolingualism**, the phenomenon should be seen either in terms of individual or societal monolingualism. In terms of an individual, this pertains to a person only knowing one language. Here Skutnabb-Kangas (1988:13) notes that monolingualism implies monoculturalism for an individual and may mean that a person only views things from the person's or a group's own point of view. Furthermore, when considering monolingualism within a country, this may imply that minorities may be oppressed and their linguistic human rights violated. Kemp (2009:13) defines a person who is monolingual[5] in the following way: "Monolinguals are individuals who use one language and may be proficient at using a number of different varieties of the language together with different registers in the variety or varieties they know, and of switching between varieties and between registers in the appropriate context."

The concept of **bilingualism** refers to usage of two languages in terms of individual and societal spheres (cf. Baker, 1996:4). Furthermore, some literature (Kemp, 2009:14; Edwards, 1994:55) uses the term bilingualism to refer to societies that use two languages and bilinguality to an individual that uses two languages.

The next logical step in the hierarchy of language usage is the usage of more than two languages. For the sake of this study, this usage of more than two languages refers to **multilingualism**. Multilingualism can refer to the multilingual language abilities of an individual[6] or the state of having more than one language when referring to a society or, more specific, in relation to this research, within a classroom (cf. Baker, 1996:4; Kemp, 2009:12; Van Huyssteen, 2002:69).

Multilingualism may not necessarily require full proficiency of the languages commanded by a particular speaker. This type of language competency also varies in time as individuals' language knowledge changes as their language acquisition and need to use language change (Kemp, 2009:19). Therefore all languages used by an individual or society should be taken into consideration. Kemp (2009:19) asserts that "each language in the multilingual integrated system is a part of the complete system and not equivalent in representation or processing to the language of a monolingual

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[5] A monolingual speaking person is also sometimes referred to as a monolingual, monoglot or unilingual in academic literature (cf. Kemp, 2009:13).
[6] A multilingual individual can also be described as a polyglot or plurilingual, while multilingual communities can be described as polyglossia (cf. Kemp, 2009:15).

speaker". Crystal (1997:362) notes that "[m]ultilingualism is the natural way of life for hundreds of millions all over the world". In addition, Crystal (1997:362) states that around 5000 languages co-exist in fewer than 200 countries. This results in language contact taking place, leading to bilingualism and multilingualism. Language contexts differ between countries, yet it is clear that multilingualism is a global phenomenon which is increasing (cf. Schecter & Cummins, 2003:1).

With regard to multilingualism, Edwards (1994:209) notes that "[m]ultilingualism arises and is maintained through necessity, real or perceived". Multilingualism is therefore a reality and not necessarily a planned policy executed by a government or other regulatory bodies. Kemp (2009:12) makes the following statement with regard to the origin of multilingualism: "Multilinguals may use a number of languages on account of many different social, cultural and economic reasons. They may live in a multilingual community, or overlapping bilingual communities, or be in contact with several monolingual communities." Therefore multilingualism can be considered to be a very complex phenomenon that could occur because of language contact.

Alexander (1995:38) makes the following observation with regard to language hierarchy in multilingual countries "…in virtually all multilingual countries, the different languages used reflect and represent a hierarchy of dominant and dominated groups based on the inequality of power between the first-language speakers of the languages concerned." Furthermore, Alexander (1995:38) adds that within the broader socio-economic strategy improving the status of disadvantaged languages should be integral in order to reach equality and liberty in multilingual societies.

According to Skutnabb-Kangas (1988:11), the prevalence of multilingualism within a society does not relate to a choice or desire to be multilingual, but could be forced in order for the speakers to function within a particular society. In this sense multilingualism is present in South Africa as it is required to know more than one language to function in diverse areas such as Gauteng or because of status and usage of English and a lesser extent Afrikaans in some areas (cf. Mesthrie, 2002:12; Heugh, 2002:461).

Since the emphasis of this study falls on the prevalence of multilingualism within the school context, Killen (2000:xxvi) states that teachers "should take account of the cultural, racial and linguistic diversity of learners [in their classes] and try to use this diversity to enhance (rather than hinder) the learning of all learners". The teacher as change agent is highlighted in this instance. The responsibility of the teacher facilitating and accommodating diversity is also evident. Yet all of this must happen within policies set out by the Department of Education and within a legal framework established by the government (cf. 2.4.).

One main question asked in terms of multilingualism is whether a true multilingual language policy should be endorsed by a government or institution or whether to opt for a single language or *lingua franca* as basis of a language policy. Yet language planners are faced with two realities: on the one hand multilingual societies exist, while on the other hand a language such as English is spreading globally as a distinct *lingua franca* (Cenoz & Jessner, 2009:124; Cunningham, 2001:202-203; Edwards, 1994:1; Ferguson, 2006:7-8, 110-148).

Phillipson (1992:47) notes that "the dominance of English is asserted and maintained by the establishment and continuous reconstitution of structural and cultural inequalities between English and other languages" and that it therefore constitutes **linguistic imperialism** (cf. Spolsky, 2004:80-81). Ferguson (2006:113) also asserts that linguistic imperialism can be considered to be a reason for the global spread of English.

Webb (1998:131) asserts that multilingualism should be considered to be an asset for a country and a developmental resource. Some of the main points raised by Webb (1998:131), in terms of South Africa, include that social transformations (educational, economic, political, and administrative) can only occur multilingually; meaningful educational development can, in practice, only occur in languages which learners know well.

In conclusion, language should be considered to be a dynamic entity. The status of a language has definite effects on its usage and this is also evident from problems arising from the term official language. The use of language also relates to the number of languages used or prevalent in an individual or group where

monolingualism, bilingualism and multilingualism are manifested. The concept of multilingualism is relevant in the South African context where both the country and many individuals in the country are multilingual. Yet this context is influenced through the spread of English as a *lingua franca* and the linguistic imperialism linked to this language.

2.3.2 The current situation of multilingualism in South Africa

To comprehend the language situation in South Africa it is important to view the current situation in terms of the historical language background of the country. This is intrinsically linked to the movement of people both internally throughout Africa, but also from Europe and Asia as a result of colonization.

This background will be discussed, leading up to the recognition of eleven official languages and the latest language-related census data available. Finally the way in which multilingualism is currently manifested will be dealt with.

The language context of South African can be traced back to the presence of a very heterogeneous group of Khoe[7] and San-speaking people followed by the introduction of African and European languages (Mesthrie, 2002:13-14). Yet in terms of documented language in education, especially with regard to language policy, the emphasis in available literature has been on the emergence of colonial languages such as English and Dutch. With the establishment of the Union of South Africa in 1910, English and Dutch became the official languages of the Union and the two different languages of the republic after 1961. The official status of Afrikaans (with Dutch) was recognized in 1925 with Dutch only being removed as official language in 1983. With the establishment of the so-called Bantustans, nine African languages were used as official languages and language acted as a way of separating groups of people based on language. This situation of recognition of two official languages in South Africa with nine languages recognized in the Bantustans continued up to 1993 (cf. Du Plessis, 2000:105; Du Plessis, 2003:106-107; Herbert, 1992:3-5; Laufer, 2003:3, 7; Mesthrie, 2002:13-18; Webb & Kembo-Sure, 2000:9).

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[7] For the sake of consistency the spelling "Khoe" is used for the name of this language group yet it must be mentioned that the *Constitution* (1996) refers to "Khoi" and there are other sources that use "Khoikhoi" (cf. Webb & Kembo-Sure, 2000:13).

The national language debate – stirred up by political changes in South Africa at the beginning of the 1990s – was democratized by the National Language Project (NLP) established by Neville Alexander in 1986 (Du Plessis, 2000:104). Du Plessis (2000:103) also states that a 1992 press release of the African National Congress (ANC) set out the party's position in terms of developing eleven official languages, differentiation in terms of national regional language policies, empowerment of marginalized languages and the prevention of domination and division using language. The recognition of eleven official languages at national level was officially accepted in the 1993 interim constitution and ultimately the 1996 South African constitution. Yet Du Plessis (2000:104) is of the opinion that the eleven-language policy included in the *Constitution* (1996) is "no more than a compromise between the ANC's covert English agenda and the overt Afrikaans agenda of the Afrikaner negotiators" during the negotiations that took place at the end of the apartheid era. Ultimately the following languages were selected as official languages: Sepedi, Sesotho, Setswana, siSwati, Tshivenḓa, Xitsonga, Afrikaans, English, isiNdebele, isiXhosa and isiZulu (cf. 2.4.3.1 on Section 6 of the *Constitution*, 1996; Olivier, 2003:15; Orman, 2008:91).

The South African society can be described as being culturally diverse and hence multilingual in nature (cf. Maartens, 1998:15; Mutasa, 2003:219; Krügel, 2005:25; Van Huyssteen, 2002:69). Furthermore, many South Africans are multilingual themselves and use more than one language within different situations as required. This is also common in South African schools and is therefore relevant to this study as this phenomenon needs to be accommodated.

The availability of subject terminology can be used as an argument against the usage of the official African languages in teaching different subjects. Mutasa (2003:224) found in his research that for the majority of African language speakers their languages are not adequate for tuition. According to his research (Mutasa, 2003:224), 64.9% of African language speakers consider their languages as being not adequately developed in terms of technical and scientific terminology. This, on the positive side, presents the opportunity for further development of the languages in terms of terminology.

Kroes (2005:240) cites the example of Hebrew in Israel, where it was decided to use Hebrew as the language of learning and teaching and where a language used only for religious purposes in isolated contexts was revitalized and terminology developed for all academic purposes required. In the same sense, also due to political support, Afrikaans was also sufficiently developed as an academic language (Kroes, 2005:240). Van Huyssteen (2002:67) states that processes are already on track in the development of terminology in many South African languages.

Other than in most African countries, South Africa, has chosen an endoglossic solution to multilingualism (Du Plessis, 2000:96). In other words, local languages are used as official languages. Many African countries have decided on using exoglossic policies where foreign languages – often the language of their former colonisers – are used as official languages. Yet South Africa has 11 official languages that include indigenous languages (cf. Maartens, 1998:15; Du Plessis, 2000:96). Here the significance is that the *de jure* and *de facto* situations in terms of language in South Africa are not the same – consequently despite constitutional recognition all languages are not used equally. The most recent available language breakdown of the country looks as follows:

TABLE 2.1 Language distribution in South Africa

Language	1996 CENSUS		2001 CENSUS	
	Number of speakers	Percentage	Number of speakers	Percentage
IsiZulu	9 200 144	22.9%	10 677 305	23.8%
IsiXhosa	7 196 118	17.9%	7 907 153	17.6%
Afrikaans	5 811 547	14.4%	5 983 426	13.3%
Sepedi[8]	3 695 846	9.2%	4 208 980	9.4%
English	3 457 467	8.6%	3 673 203	8.2%
Setswana	3 301 774	8.2%	3 677 016	8.2%
Sesotho	3 104 197	8.2%	3 555 186	7.9%
Xitsonga	1 756 105	4.4%	1 992 207	4.4%
SiSwati	1 013 193	2.5%	1 194 430	2.7%
Tshivenḓa	876 409	2.2%	1 021 757	2.3%
IsiNdebele	586 961	1.5%	711 821	1.6%
Other	228 275	0.6%	217 293	0.5%
TOTAL	**40 583 574**	**100%**	**44 819 778**	**100%**

(Du Plessis, 2000:101; Mesthrie, 2002:13 and Statistics South Africa, 2003:15)

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[8] There exists some disagreement around the language name as Sepedi only refers to a dialect within the language Northern Sotho or Sesotho sa Leboa. For the sake of consistency with the *Constitution* (1996) the name Sepedi is used in this thesis (cf. Herbert, 1992:2-3).

Despite isiZulu having the most speakers when comparing the number of Whites, Indians and Coloureds who are capable of conversing in an African language, it is clear that there is no language that qualifies to be a common language in terms of numbers (cf. Alexander, 2001:116). Yet many people already regard English as a *lingua franca* that should be used within South African schools (Coutts, 1992:72; Henrard, 2003:11; Lemmer *et al.*, 2006:52; Spolsky, 2004:182). This ties in with the fact that a perception exists that English should be accepted as a *lingua franca* for the country (cf. Alexander, 2001:116; Van der Walt, 2003:19). The preferential treatment of English also constitutes a linguistic hierarchy (Edwards, 1994:89-97) where the official languages in the country are not considered to be equal in status. In support of the aforementioned literature Kroes (2005:238-239) also recognizes the importance of English and states that it is called the "language for wider communication".

African languages do not enjoy the same political, social and economic status as Afrikaans and especially English in South Africa (cf. Maartens, 1998:35; Nkabinde, 1997:100). Maartens (1998:35) notes that "[a]s a result of the official language policies over the years, most African people attach little value to their mother tongue and believe it to be deficient or impoverished in a way that makes it unsuitable for use in a modern society".

In terms of the existing perceptions around the status of African languages in South Africa, Laufer (2000:31) notes that there is "a view that African languages are too difficult for second language learners and that African languages are not suitable as languages of learning and teaching because they do not have the necessary scientific and technological vocabulary". Linguistically viewed, such assumptions are not justified and all languages are of equal value and are all linguistically equally complex (Webb & Kembo-Sure, 2000:15). According to Skutnabb-Kangas (1988:12), it is important to note that from a linguistic point of view all languages are equal and that it is not possible to make a distinction between advanced and primitive languages. All languages have logical structures, are considered to be cognitively complex and are capable of expressing any thought or concept. Yet it is true that not all languages have the same amount of resources spent on them or are cultivated lexically, usually due to government institutions or mother tongue speakers themselves. The phenomenon of all languages being equal also ties in with recognition and promotion

of languages and the status of the language in terms of government or even within a particular society.

The costs involved in accommodating and promoting multilingualism could be used as an impeding factor for extending such accommodation and promotion. Alexander (2001:118), however, maintains that there is no authoritative basis to claim that promoting a multilingualism policy would be costly. In actual fact, Alexander (2001:118-119) traces effective communication, and hence promotion of multilingualism, to increased productivity.

Murray (2002:434) states that in general there has been a move away from separate identities based on race, language and culture, and that multilingualism could play a unifying role in South Africa. In addition, Murray is also of the opinion that multilingualism can be "seen as a resource to be drawn upon". Furthermore, Laufer (2000:10) notes that "one of the problems in education in South Africa has been the wide gulf between linguistic diversity of the school population and the linguistic narrowness of education policy". Ferguson (2006:132) states that an economic reconfiguration is needed in South Africa in order for languages other than English to be made "attractive to the population" and only through such a process can the sociolinguistic balance of power be shifted.

In conclusion, multilingualism is therefore a reality in South African and there are concerns in terms of the hegemony of English as a *lingua franca* and the status of other official languages. The aforementioned discussion underscores the sociolinguistic support for the language, yet it is also important to view language in terms of language rights. In order to determine the rights of the speakers of the languages in South Africa the next section deals with language rights and multilingualism.

2.4 LANGUAGE RIGHTS AND MULTILINGUALISM

Language rights lay the foundation for the accommodation and promotion of multilingualism as it provides an opportunity for individuals to enable their linguistic human rights to be acknowledged and protected. When considering language rights, it is important to define the term clearly as it is used in relevant literature. In

addition, minority rights will also be discussed. The concept of language rights is examined in terms of how it can be interpreted using the *Constitution* (1996).

2.4.1 Defining Language Rights

In this section the concept of language rights will be defined followed by a discussion on what is meant by the related concepts of linguicism, language shift and language death.

From the literature it is clear that the concept of language rights is difficult to define (cf. Louw, 1996:27). From a sociolinguistic point of view, language rights or linguistic human right refers to the way human rights are manifested in terms of language (Baker, 1996:354-357; Makoni & Trudell, 2009:40-44; Phillipson *et al.*, 1995:1; Spolsky, 2004:132). Language rights also imply that inequality and unfair discrimination in terms of language should be countered. Louw (1996:27) notes that language rights "are commonly enshrined constitutionally, especially in a Bill of Rights or within a Language Charter".

Sachs (1994:110) identified three fundamental language rights: the right to use your language, the right to develop your language and the right to be understood and to understand other languages. This will be used as a reference framework in the exploration of language rights in terms of the constitutional content and the usage of language. In sections 6(1)-(5); 29(2); 30; 31(1)(a), (b) of the *Constitution* (1996) language rights are highlighted (cf. 2.4.3). An educational system in a multilingual society that only provides monolingual education infringes on the language rights of minority language speakers (cf. Corson, 1997:151).

Discrimination based on language use is called **linguicism** (cf. Nieto, 1996:198; Olivier, 2003:51; Phillipson, 1992:47, 55; Skutnabb-Kangas, 1988:13-14; Strydom & Pretorius, 2000:113). The term was created in analogy to terms such as racism or sexism by Skutnabb-Kangas (1988:13), who defines the term linguicism as follows: "Ideologies and structures which are used to legitimate, effectuate and reproduce an unequal division of power and resources (both material and non-material) between groups which are defined on the basis of language (on the basis of their mother tongues." Linguicism can take up different forms. Phillipson (1988:341) notes that linguicism can occur where a language may be prohibited within institutions such as

schools through institutional policies or informally due to discriminatory unwritten rules. Furthermore, there might be an ideology where linguicism is applied consciously with the banning of the use of language by teachers, for example, or unconsciously where a language is preferred as an ideal language for the sake of development or even national unity. In terms of these forms identified by Phillipson (1988:341), it is clear that quite often the type of linguicism prevalent in South Africa is covert or unconscious in the sense that legally any language may be used in South African schools, yet English is still preferred for different functions (cf. Du Plessis, 2000:106; Langtag, 1996:156; PanSALB, 2000:4-7; Malan, 1998:696 *et seq.*; Maake, 2000:10; Olivier, 2003:69; Kruger & Kruger, 2001:17; Webb, 2002:25).

Language situations are dynamic and ever changing (cf. Crystal, 1997:362) and this causes languages either to be preserved (*language maintenance*); the speakers to be assimilated into the dominant culture (*language shift*); new hybrid languages called pidgins and creoles to be created (cf. Crystal, 1997:336-339); or the language not being spoken or speakers dying out (*language death*) (cf. Baker, 1996:43-49; Ferguson, 2006:72-73). In some cases, **language shift** can take place where, after the ever increasing use of a second language, it eventually replaces the mother tongue. Language shift that has taken place within the South African context entails the languages used by the Indian community where English has replaced languages such as Gujarati, Hindi, Tamil, Telugu and Urdu among some Indian speakers (cf. Baker, 1996:43-47, 49; Herbert, 1992:12; Webb & Kembo-Sure, 2000:13).

In extreme cases where fewer and fewer speakers use a particular language, **language death** can occur. This happens when either all the speakers of a language have experienced language shift so that they do not use or identify themselves with a particular language anymore or when the last speaker of a language dies. This can clearly be seen with some Khoe and San languages that became extinct (cf. Baker, 1996:47-49; Cunningham, 2001:204-205; Ferguson, 2006:72-73; Mesthrie, 2002:11; Webb & Kembo-Sure, 2000:13).

The phenomenon of minority rights will now briefly be discussed followed by the language provisions included in the *Constitution* (1996).

2.4.2 Minority rights and regulations

Within the South African context, due to the historical background of apartheid, minority rights cannot be considered in the same way as in Europe. The main reason for this is that the percentage of speakers is not an indication of the status of a language. In South Africa, ten official languages – apart from English – are recognized by the *Constitution* (1996) and have a sizeable number of speakers. Yet they do not have the same status or perform the same functions as English (cf. Du Plessis, 2000:106; Langtag, 1996:156; PanSALB, 2000:4-7; Malan, 1998:696 *et seq.*; Maake, 2000:10; Olivier, 2003:69; Kruger & Kruger, 2001:17).

The focus in South Africa and for the sake of this study will therefore be on what Skutnabb-Kangas (1988:14) calls a **linguistic minority**. This refers to a situation where a certain language is used by a person within a country where another language other than the mother tongue of such a person is spoken most widely, either because of the number of speakers or because it was chosen as *lingua franca* by government or a ruling body (Skutnabb-Kangas, 1988:14). In this regard it is important to see how minority languages are dealt with internationally, as a similar approach can be taken with the ten official languages apart from English. Nevertheless, attention should be given to the fact that there are truly minority languages[9] that are not necessarily supported officially and whose speakers might even have greater need for recognition and support. For this study, though, the focus will mainly fall on the officially recognized languages.

According to Cushner *et al.* (2009:69), a 'minority group' refers to "a social group that occupies a subordinate position in a society". While Cushner *et al.* (2009:69) note that this term does not only refer to a specific number of people, but could also include things like socioeconomic status or historic oppression. Henrard (2003:9) believes that there is no generally internationally accepted definition of the concept of 'minority'. Yet Henrard (2003:9-10) comes to the conclusion that a number of essential elements defining a minority have emerged, which can be summarized as follows:

✎ Objective characteristics:

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[9] True minority languages in South Africa include: Khoe, Nama, San, Lobedu, Northern Ndebele and Phuthi as well as a number of African, Asian and European languages used by immigrants to the country. (Cf. Mesthrie, 2002:11-12.)

- ethnic features that differ from the rest of the population;
- religious features that differ from the rest of the population;
- linguistic features that differ from the rest of the population;
- a numerical minority position;
- non-dominance;
- the nationality of the state concerned; and
- the related requirement of close and durable with that state.

↳ Subjective characteristics:
- the wish of a minority group to hold on to their own distinctive characteristics or identities.

From the above it is therefore possible to determine whether a group of people can be considered to be a minority.

Related to the idea of a minority group is the association of an ethnic group with a language. The concept of a people grouped together in terms of language remains problematic within the South African context, as multilingualism is the norm (cf. Alexander, 1995:37; Olivier, 2003:41-42). The idea of a language being associated with a particular ethnic group or nation is closely related with the apartheid state in South Africa (Alexander, 1995:37; Reagan, 2002:428-429).

Reagan (2002:429) makes the following observation in terms of the relationship between group rights and ethnicity: "Closely related to the concept of ethnicity is that of ethnic or group rights, which will almost certainly include a recognition of language rights. Although the term 'group rights' is again a highly politicised and very controversial one in the South African context, it is not without merit."

Despite the fact that the literature sources (Alexander, 2001:116; Baker, 1996:357; Mazrui & Mazrui, 1998:115; Olivier, 2003:41-43; Reagan, 2002:429; Webb, 1992:235-236) refer to group rights, human rights in terms of the *Bill of Rights* in the *Constitution* (1996) can only be regarded as individual rights (cf. De Waal, Currie & Erasmus, 2001:471-474; Haysom & Kathla, 1997:280).

In the next section language rights and language provisions as presented in the *Constitution* (1996) will be discussed.

2.4.3 Language and the South African *Constitution* (1996)

Multilingualism has been entrenched in the *Constitution* (1996) and it is therefore the government's duty to design and practise a multilingual policy (Orman, 2008:91-92; Strydom & Pretorius, 2000:111; Webb, 2002:51). In accordance with the previous section Kroes (2005:250-251) also states that the *Constitution* (1996) protects minority language rights. For the sake of this study it is important to discuss language in terms of the *Constitution* (1996).

Language is mentioned in the *Constitution* (1996) in sections 6, 9, 29, 30 and 31. In the discussion of these sections it is important to note that, according to section 36, the rights in the Bill of Rights may be limited only in terms of law of general application to the extent that the limitation is reasonable and justifiable in an open and democratic society based on human dignity, equality and freedom, taking into account all relevant factors (cf. Alexander, 2001:116; Olivier, 2003:16-22; Verhoef, 2008:4).

According to the *Constitution* (1996), all the eleven official languages contained in the document are considered to have official status. Yet, according to Maartens (1998:34-35), only English has judicial status and the other languages have very limited use as working official languages or have a symbolic role. The inclusion of the other languages thus seems to be a symbolic act. This ties in with the view held by Du Plessis (2000:105-106) that the concept of equity and parity of esteem is quite vague and the *Constitution* (1996) does not compel the government to treat languages equally (cf. also Webb, 2002:51). Du Plessis (2000:106) also adds that very little additional language legislation was passed up to 2000 and "English, the colonial language, has become the language of government". Strydom (2003:23) also notes that claims for the accommodation of linguistic and cultural diversity through constitutional and legal means were initially met with scepticism as it was thought that such provisions would reinforce the privileged position of the white community during apartheid.

A brief overview of the relevant language-related sections of the *Constitution* (1996) will now be provided.

2.4.3.1 Section 6

Section 6 of the *Constitution* (1996) assigns official status to eleven languages and it sets out how government is supposed to support and handle official languages. This section also relates to how language is supposed to be handled in terms of provincial and local government. The final part of the section refers to the role the Pan South African Language Board (PanSALB) has to play with regard to the official languages and other languages used in South Africa. Section 6 contains the following:

6.   (1)   The official languages of the Republic are Sepedi, Sesotho, Setswana, siSwati, Tshivenḓa, Xitsonga, Afrikaans, English, isiNdebele, isiXhosa and isiZulu.

   (2)   Recognising the historically diminished use and status of the indigenous languages of our people, the state must take practical and positive measures to elevate the status and advance the use of these languages.

   (3)   (a)   The national government and provincial governments may use any particular official languages for the purposes of government, taking into account usage, practicality, expense, regional circumstances and the balance of the needs and preferences of the population as a whole or in the province concerned; but the national government and each provincial government must use at least two official languages.

      (b)   Municipalities must take into account the language usage and preferences of their residents.

   (4)   The national government and provincial governments, by legislative and other measures, must regulate and monitor their use of official languages. Without detracting from the provisions of subsection (2), all official languages must enjoy parity of esteem and must be treated equitably.

   (5)   A Pan South African Language Board established by national legislation must —

      (a)   promote, and create conditions for, the development and use of —

         (i)   all official languages;

         (ii)   the Khoi, Nama and San languages; and

         (iii)   sign language ; and

      (b)   promote and ensure respect for —

(i) all languages commonly used by communities in South Africa, including German, Greek, Gujarati, Hindi, Portuguese, Tamil, Telegu and Urdu; and

(ii) Arabic, Hebrew, Sanskrit and other languages used for religious purposes in South Africa.

This section implies that multilingualism should be considered to be a normative principle for the South African society (Olivier, 2003:16-17). Subsection 1 lists the languages Sepedi, Sesotho, Setswana, siSwati, Tshivenḓa, Xitsonga, Afrikaans, English, isiNdebele, isiXhosa and isiZulu as official languages. In section 6(2), the government's recognition of the status of languages in the past is noted. Furthermore, it states that measures should be taken to elevate the status and promote the usage of these languages. Section 6(3) relates to which languages should be used in government. A central provision here is the fact that at least two languages should be used at national and provincial level. In addition and in terms of local government the language used by municipalities is determined by the residents. Section 6(4) ties in with section 6(3) as this also deals with government usage and it emphasizes the fact that all languages should be treated equally. In subsection 4 it is stated that all languages should enjoy parity of esteem and should be treated equally, yet if this is viewed together with section 6(3) there is a discrepancy. When "usage, practicality, expense, regional circumstances and the balance of the needs and preferences of the population as a whole or in the province concerned" included in this subsection is considered, it shows that there is need for indications on how the diverging elements from this section of the *Constitution* (1996) should be interrelated (cf. Strydom & Pretorius, 2000:112; Spolsky, 2004:181; Verhoef, 2008:3; Webb, 2002:51-53).

Section 5 relates to the establishment of the Pan South African Language Board (PanSALB) and the promotion and development of the official languages, some minority indigenous languages, as well as sign language, together with the promotion of and respect for other non-official religious or community languages (cf. Du Plessis, 2000:104-105).

With regard to PanSALB, Strydom (2003:24) notes that the board is allowed to investigate violations of language rights and to make recommendations to

government organs in terms of language. Ferguson (2006:21) emphasizes PanSALB's promotion of officially sanctioned multilingualism rather than a single hegemonic national languages. Orman (2008:145) states that PanSALB has had little success in transforming multilingual practices. Orman (2008:145-146) adds that this lack of success can be ascribed to the limited mandate given to PanSALB by the *Constitution* (1996), lack of funding, restrictions in terms of being able to oblige government to act on recommendations. Webb (2002:296-297) evaluates PanSALB stating that in terms of positive features the board's members are not appointed based on language or ethnicity; all members are experts; the board was conceived as part of the South African political process; the board is accountable to parliament; the board was designed to have legitimacy; committees can be established; and expert or bodies with certain expertise can be consulted leading to the board having professional authority and standing. However, Webb (2002:297-300) also notes negative issues in terms of PanSALB such as lack of funding; restrictions in terms of enforcing policy and recommendations; ineffective communication between government departments and PanSALB with regard to language issues; and language management is done in a top/down manner.

2.4.3.2 Section 9 (3) and (4)

The subsections 3 and 4 from section 9 refer to discrimination against people by the state or by others, when it is stated that:

9.

(3)   The state may not unfairly discriminate directly or indirectly against anyone on one or more grounds, including race, gender, sex, pregnancy, marital status, ethnic or social origin, colour, sexual orientation, age, disability, religion, conscience, belief, culture, language and birth.

(4)   No person may unfairly discriminate directly or indirectly against anyone on one or more grounds in terms of subsection (3). National legislation must be enacted to prevent or prohibit unfair discrimination.

From subsection 3 it is clear that language may not be used as grounds to discriminate unfairly against a person whether it is done directly or indirectly.

2.4.3.3 Section 29(2)

Section 29 deals with education with subsection 2 dealing with language in education:

29.

    (2)   Everyone has the right to receive education in the official language or languages of their choice in public educational institutions where that education is reasonably practicable. In order to ensure the effective access to, and implementation of, this right, the state must consider all reasonable educational alternatives, including single medium institutions, taking into account—

        (a)   equity;

        (b)   practicability; and

        (c)   the need to redress the results of past racially discriminatory laws and practices.

In this subsection the right of learners to receive education in the official language or even any language of their choice in public educational institutions is guaranteed. Yet it is essential to note that the limitation of it being "reasonably practicable" is also included in this subsection. This is quite problematic as this limitation can imply that, if it is proven that in certain circumstance it is not reasonably practicable to use a particular language, then there is no obligation to use it. Furthermore, this subsection ensures that the state considers education alternatives, keeping equity, practicability and redress results of the past in mind.

Du Plessis (2003:112) notes that this section was basically part of a compromise on the education clause reached just before the adoption of the *Constitution* (1996) where single-medium institutions as an alternative was a contentious issue.

2.4.3.4 Section 30

Section 30 refers to the right to use one's own language:

30.   Everyone has the right to use the language and to participate in the cultural life of their choice, but no one exercising these rights may do so in a manner inconsistent with any provision of the Bill of Rights.

This section also makes the link between language and cultural life. In addition it is stated that the above-mentioned rights may not be exercised in a manner that goes against any provision of the Bill of Rights.

2.4.3.5 Section 31

Section 31 relates to language and other communities:

> 31. (1) Persons belonging to a cultural, religious or linguistic community may not be denied the right, with other members of that community—
>
>   (a) to enjoy their culture, practise their religion and use their language; and
>
>   (b) to form, join and maintain cultural, religious and linguistic associations and other organs of civil society.
>
> (2) The rights in subsection (1) may not be exercised in a manner inconsistent with any provision of the Bill of Rights.

In this section the usage of language within a community is acknowledged. This allows members of a community to form, join and maintain linguistic associations among others.

In conclusion it can be stated that the *Constitution* (1996) determines which languages have official status and sets out that all languages should be treated equally. However, there is a discrepancy in terms of how this equal treatment should be implemented because it depends on practicality and circumstances. The *Constitution* (1996) also allows for the creation of PanSALB which is responsible to promote, develop and protect languages. While discrimination based on language and language usage in terms of education may not take place, the right to use language in terms of culture or within a community is also guaranteed. It is evident, though, that clearer guidelines need to be set out on how the constitutional imperatives can be implemented.

The purpose of this study is to consider language within the context of education and how it is accommodated and promoted within the school environment. Therefore the role of language in education will now be discussed.

2.5 LANGUAGE AND EDUCATION

Language and education are two inseparable concepts as language acts as the medium through which learning and teaching takes place. Vygotsky (1978:28) makes

the following observation in terms of the role of language in learning: "The specifically human capacity for language enables children to provide for auxiliary tools in the solution of difficult tasks, to overcome impulsive action, to plan a solution to a problem prior to its execution, and to master their own behavior". Alexander (1995:38-39) also emphasizes the importance of language within the education process at pre-schools, primary and secondary schools since this is where the "socialisation of the next generation of South African citizens" will take place.

Therefore language is an essential element in the classroom as it is used by learners in problem-solving and in completing tasks. Consequently it is important to discuss how the presence of diverse languages in a classroom can be handled to facilitate the effective use of language for learning. In the following section a discussion on the concept of a language of learning and teaching (LoLT), mother tongue and non-mother tongue education, as well as bilingual and multilingual education is presented.

2.5.1 Language of learning and teaching (LoLT)

The concept language of learning and teaching (LoLT) or medium of instruction is used to refer to the language used within the classroom and the medium through which learning and teaching takes place (cf. Krügel, 2005:24).

The LoLT thus refers to the language medium used within the classroom context through which teaching and learning can be done. Since language and the use thereof is central to learning (cf. Killen, 2000:xxv), it is important to choose and use language effectively when it is employed within a learning and teaching environment.

2.5.1.1 Mother tongue education

The concept of a mother tongue is difficult to define as definitions vary from different sources. Furthermore, it is also difficult to determine which language used by multilinguals is actually the person's mother tongue (cf. Orman, 2008:88). Other terms are sometimes used to mean the same as **mother tongue**. In this sense, the Department of Education uses the term **home language** for example. The DoE (2003b:72) defines a home language as "the language first acquired by children through immersion at home; the language in which they learn to think". Webb (2002:xx) describes the mother tongue as "one's primary, best-known language" For

the sake of consistency with international sources and to distinguish it from the subject Home Language, the term mother tongue will be used in this study to refer to this phenomenon.

Several studies have indicated the importance of mother tongue education and the benefits it has for learners (cf. Corson, 1997:159; Edwards, 1994:193; Henrard, 2003:11-13; Nomlomo, 2006:119; Van der Walt, 2003:17, 25). In this regard, mother tongue education will be approached in terms of research done and the theoretical literature available from international as well as South African sources.

In this study, a mother tongue refers to a native language or home language as identified in the South African educational policy documents. In a multilingual country such as South Africa it does seem to be problematic as the languages used most often and actual home languages can differ. Cluver (1993:50) states that a mother tongue is ideally used in monolingual societies and he makes the following remarks about the concept: "It refers to the language a child knows best before going to school and in which he/she can most successfully work at school. It may not be the one his parents use, but it is the one which he/she can use in all domains in which a child functions." In this definition the primary usage is emphasized and especially in this sense it proves to be problematic. The reason why it may seem problematic in South Africa is due to the existence of different languages, the language contexts of communities, schools, families and even individual learners are very complex.

Skutnabb-Kangas (1988:16-17) defines a mother tongue in terms of origin, competence, function and identifications. The origin in this sense refers to the language that was acquired first. Competence refers to the language known the best and function refers to the language used the most. In terms of identification this can be done internally with the language a speaker associates him/herself with or externally as an association identified by others. As Skutnabb-Kangas (1988:16-17) notes further, these parameters of a definition for a mother tongue does pose a problem in the sense that a person might have more than one mother tongue or that the mother tongue can change during the lifetime of a person. The awareness of linguistic human rights may also result in a hierarchy of mother tongues depending on the status of particular languages.

Crystal (1997:368) notes that mother tongue education is maintained to "develop a desirable cultural diversity, foster ethnic identity, permit social adaptability, add to the psychological security of the child and promote linguistic (and perhaps even cognitive) sensitivity". This affirms the importance of mother tongue education in terms of developing the social and cultural needs of learners. Webb and Kembo-Sure (2000:5) note that cognitive development can only occur effectively in and through a language known very well by the learner. The cognitive skills referred to here, include:

- the ability to understand the central purpose of a text or to summarize its main line of argument;
- the ability to select information and to organize it into a new coherent whole;
- the ability to discover and formulate generalizations;
- the ability to understand abstract concepts and to manipulate them in arguments; and
- the ability to recognize relationships between events.
  (Webb & Kembo-Sure, 2000:5-6)

Crystal (1997:368) also highlights the problems that can be encountered with a mother tongue only policy where "the children may become 'trapped' in their mother tongue, and fail to achieve in the majority language, thus reducing their access to prosperity". It could be argued that this is the case in South Africa where English, seen as the majority language in this context, needs to be achieved at the cost of mother tongues.

Nkabinde (2007:101) states that "[t]he only way to reduce illiteracy in Africa, as well as to prevent education from being a mechanism for elitist differentiation, is to encourage the use of the mother tongue". To reach this aim, learners, parents and teachers should actively accommodate and promote mother tongues.

Mother tongue education is defined by Cluver (1993:50) as an "[e]ducation system based on the assumption that the child's mother tongue is the best medium of instruction". Cluver notes that, whether the mother tongue is an official language or not, plays a role. Apart from official recognition, the actual status and availability of resources are also important variables that need to be taken into consideration, even

within a system where learning and teaching takes place in a language other than the mother tongue. Instruction in the mother tongue should be maintained as long as possible. If the mother tongue is excluded too soon it can have a negative academical effect, as well as in terms of the cultural identity of the learner (cf. Van der Walt, 2003:45).

2.5.1.2 Education in a non-mother tongue

Education in a non-mother tongue is not only limited to South Africa and has been an issue in many countries over the world. This has resulted in concerted efforts to engage learners studying in a non-mother tongue to be able to function within the mainstream curriculum at schools as shown in the United Kingdom (UK). (Cf. Bourne, 1997:61-62; Levine, 1990:1-53).

Cluver (1993:51) notes that children who are educated in a dominant language that is not their own mother tongue are "at a considerable disadvantage compared with children who receive their education in their mother tongue". The disadvantages include that learners may lack adequate knowledge in the non-mother tongue, cultural diversity and ethnic identity might be lost and cognitive development may be impaired (Cf. Crystal, 1997:368; Webb & Kembo-Sure, 2000:5-6)

Despite the aforementioned (2.5.1.1) advantages of mother tongue education, Cluver (1993:51) highlights the following typical arguments against mother tongue education in terms of minority language learners, but it has application value in the South African language situation as well:

- ✤ it is too expensive;
- ✤ it promotes ethnicity; and
- ✤ it places the minority child at a disadvantage when he/she has to compete for work with children educated in the dominant language.

According to Van der Walt (2003:73), it was found in a study concerning learners, teachers and education students in the Vaal Triangle that economic factors exert the greatest influence in choosing the language of learning and teaching. Financial implications and practicality are used as reasons why mother tongue education cannot be extended in South Africa. Furthermore, reservations around ethnicity and overemphasis thereof in light of South Africa's political past (cf. 2.6) and the

significance of ethnic grouping under apartheid, contribute to the decline of the use of certain South African languages at schools (cf. Herbert, 1992:2; Nkabinde, 1997:102).

In South Africa it does happen that education takes place in a language that is not the mother tongue of the learners. As can be deduced from the literature study, it is clear that this situation has negative impacts on the learners despite some criticism against mother tongue education.

Countering the aforementioned situation, education can also take place in more than one language. Within the next section bilingual and multilingual education is discussed.

2.5.1.3 Bilingual and multilingual education

Bilingual and multilingual education refers to the use of more than one language within the classroom situation (cf. Edwards, 1994:193-196). In order to explain this further, the concept of bilingualism is explored. The application of both bilingualism and multilingualism is then applied within the context of education.

Baker (1996:36) states that, whereas bilingualism refers to the usage of two languages by an individual, for the use of two languages in society the term **diglossia** is used. In this regard, language communities use the two languages for different purposes.

Nieto (1996:190) defines bilingual education as "an educational program that involves the use of two languages of instruction at some point in a student's school career". In addition, Skutnabb-Kangas (1988:21) defines bilingualism according to origin, competence, function and identification. In terms of origin, it can refer to a speaker who has learned two languages in a family from native speakers or from parallel use. Competence involves complete mastery, native-like control or equal mastery of two languages. Competence also includes the ability to complete meaningful utterances in another language, having at least some knowledge and control of another language or to come into contact with another language. In terms of function it involves the use of two languages in most situations, whereas with

identification it is expressed internally where a person identifies him/herself as bilingual or externally where others identify a person as bilingual.

Baker (1996:165) traces the origins to bilingual education in the US to the 1960s, but also states that it has existed in one form or another for 5000 years or more. Furthermore, bilingual education in countries such as the US, England and Sweden must be seen within the context of immigration.

With regard to bilingual education, Kaplan (1997:xii) makes the following observation:

> The concept that bilingual education is about providing a transition for a disadvantaged segment of the population to be admitted to the corridors of power via language instruction is fallacious on two counts: first, it deprives the "advantaged" segment of the population of an important skill; and, second, it cannot accomplish the implied purpose since access to social mobility and political power is only partially a function of language proficiency.

In this statement it is clear that bilingual education is not only concerned with the mere acquisition of another language, but could also have social implications for learners. Edwards (1994:194-196) also stated that bilingual education can act as an agent of social change.

Levine (1990:5) notes that the term 'bilingual learner' can refer to learners "who use one or more languages other than English in their ordinary lives and outside school". Levine (1990:5) adds that often 'bilingual learners' suffer from the negative classification related to their developing knowledge of English. This results in names such as 'non-English speakers', 'children with no language', 'beginner learners' and 'English-as-a-second-language children' being used. Although Levine is referring mainly to the language situation in the UK, this attitude also has similar implications in South African contexts where learners with different mother tongues are educated in an English environment.

Bilingual education should be distinguished from second language learning (also sometimes called second language acquisition or SLA), as bilingual education refers to the usage of two languages for instruction of different subjects, while second

language learning refers to the actual study of a language as a subject (Cenoz & Jessner, 2009:123).

Different models of bilingual education exist and different approaches are followed through them. In this regard, submersion, transitional bilingual teaching, immersion and multi-medium approaches are prominent. **Submersion** is a model that employs teaching through the majority or more prominent language and not the home language of a child. **Transitional bilingual teaching** allows for a degree of use of the home language until the learner has sufficient knowledge to be instructed in the majority language. The focus with **immersion** language instruction is on an immersion programme where a part of a child's education is done through the medium of the home language by which sufficient language knowledge is built up and another language is taught as an additional language. In the same way, a **multi-medium** approach can also be followed where spontaneous use of languages used by learners is emphasized in the teaching of different skills. Another approach similar to the multi-medium approach is that of multilingual schooling where a dual-medium approach is followed in which learning and assessment can be done in either of the two selected languages (cf. Edwards, 1994:196-198; Ferguson, 2006:45-49; Louw, 1996:67-80; Laufer, 2003:49-50; Skutnabb-Kangas, 1988:23-27).

Nieto (1996:190-193) distinguishes between different variations of bilingual education. This includes:

- ✥ In bilingual/bicultural education the language and culture of learners are considered to be assets in their education.
- ✥ Transitional bilingual education is an approach where learners receive their content area instruction in their mother tongue while English is studied as an additional language. Once learners are ready to benefit from monolingual education, they are moved out of the programme.
- ✥ Maintenance bilingual education is comprehensive and long-term, learners receive their content area instruction in their mother tongue while English is studied as an additional language.
- ✥ Two-way bilingual education integrates learners with different mother tongues and the goal is to develop bilingual proficiency, academic achievement and positive attitudes towards the different languages and cultures.

- ✎ Immersion bilingual education means that learners are immersed into their second language for a year or two before the mother tongue is introduced as instruction medium. After this period, learners can either continue with their mother tongue or with an additional language.
- ✎ Submersion bilingual education implies total submersion within the second language.

The Department of Education emphasizes the development of multilingualism in terms of additive bilingualism. This approach also involves schools being encouraged to offer at least two languages of learning and instruction from Grade 1 of which one should be a language used by most learners in the school. From Grade 4 onwards learners should be encouraged to take an additional third language (cf. Kroes, 2005:249-250; Laufer, 2003:44; Maartens, 1998:16; Nomlomo, 2006:133; Van der Walt, 2003:29). With the publication of the *Report of the Task Team for the Review of the Implementation of the National Curriculum Statement* the following recommendation was made: "the importance of learning English in the curriculum from grade 1 must be underscored by introducing a fourth subject in the Foundation Phase - English as a First Additional Language" (DoE, 2009:9). It is important to consider that exposure to two or more languages at a very early stage of education can actually lead to learning problems and underperformance (cf. Van der Walt, 2003:19).

The approach of additive bilingualism improves, according to Henrard (2003:12), the multilingual competence of learners by improving their ability to master a second or third language after successful acquisition of the mother tongue. Verhoef (2008:5) also adds that the use of additive bilingualism leads to the best language development and cognition. Related to additive bilingualism is additive multilingualism. The Department of Education (2003b:69) makes the following statement in terms of additive multilingualism:

> when a person learns a language (or languages) in addition to his or her home language. This language does not replace the home language but is learned alongside it. In an additive multilingual programme, the home language is strengthened and affirmed while any further language learned is seen as adding value (e.g. all Additional Languages, including the Language of Learning and Teaching are taught alongside the home language but do not replace it).

In the report (DoE, 2009:41) initiating the review of the National Curriculum Statement the aforementioned statement is again supported:

> While the Home Language plays the primary role in developing literacy and thinking skills and is of importance in enhancing the protection and further development of the indigenous language, the Language of Learning (in particular English) is the one in which students must master educational concepts, and provides a platform to participate and engage meaningfully in the information age on a global stage.

In this statement despite the fact that the important role of the mother tongue (Home Language) is mentioned more emphasis is placed on the Language of Learning. In this statement English is clearly elevated above any of the other official languages. This fact is qualified when it is stated that English as First Additional Language has the highest enrolment number of any subject in the NCS and that the majority of learners learn and are assessed through the medium of English (DOE, 2009:41).

A problem in South African schools is the occurrence of subtractive bilingualism where home languages, often African languages, are replaced by English as language of learning and teaching and another language, possibly Afrikaans or another African language presented by a school (cf. Laufer, 2003:46-47; Van der Walt, 2003:30).

Multilingualism refers to the usage of more than one language as discussed earlier (cf. 2.3.1). Within the context of a school, multilingual education is important. A model for multilingual instruction in South Africa has been proposed by Louw (1996:90-91). In this model Louw emphasizes that the language curriculum should provide for both language maintenance and bilingual or multilingual programmes. Schools should also set up language policies and it is important not just to take provincial or national policy into consideration. Louw proposes the identification of language blocks – with regard to languages that are related – to facilitate the promotion of the related languages. The choice of language rests with parents and learners and may not necessarily involve only to the mother tongue, but also to the dominant language used by the learner. This type of approach does pose problems in terms of segregating learners and requires more research before successful implementation.

In the design of a model for using eleven official languages in education Louw (1996:91-92) took the following considerations into account:

- ✤ model being multilingual;
- ✤ implementation at a regional level;
- ✤ emphasis on initial mother tongue-based education at primary school level;
- ✤ adequate preparation of second language knowledge to facilitate transition to medium of instruction in the second language;
- ✤ sufficient access to English;
- ✤ incorporation of language enrichment programmes; and
- ✤ adequate language maintenance programmes.

These elements need to be taken into account when multilingualism is implemented. Furthermore, Cenoz and Jessner (2009:133-134) make the following observation: "Emphasis has to be put on the development of linguistic awareness as one of the core features of multilingual proficiency in teachers, learners and teachers as learners". Hence it is important that teachers be made aware of the linguistic realities of the country, schools and classes. Importantly this quote also mentions awareness among learners and the fact the teachers can learn from such multilingual circumstances.

According to Van Huyssteen (2002:69), multilingualism can be viewed as an asset through the reinforcement of the existing language skills of learners. Ideally the first language must be used for communication with peers and teachers and English language skills used for communication in the international academic community. Despite this being an admirable proposition, Van Huyssteen (2002:69) does not provide sufficient guidelines on how institutions should deal with situations where the first languages used by learners and teachers are different.

This section dealt with the use of more than one language in the classroom through the implementation of bilingual and multilingual education. It is clear that the Department of Education supports an approach of additive bilingualism. Even in terms of the review (DoE, 2009) of the National Curriculum Statement officially provision is made for African languages as Home Language subjects while English is emphasized as medium of instruction (cf. DoE, 2009:41-43).

In the next section, the historical background of language in education - specifically within the South African context - will be discussed in terms of legislation and language policies.

2.6 HISTORICAL OVERVIEW OF LANGUAGE IN EDUCATION IN SOUTH AFRICA

The focus of this section is on providing an overview of the history of education in South Africa followed by an overview of language in education in South Africa as documented in the literature. The discussion is structured around the way in which education was ordered along racial lines followed by an overview of the situation since the end of apartheid. In this study, the distinction based on race is purely based on the historical South African significance of separate policies and official approaches to education and language in education.

2.6.1 A historical overview of education in South Africa

Since language and multilingualism is always political it is important to contextualise any attempt at accommodation or promotion of multilingualism within a historical context (Setati, 2008:104). Nyembe (2003:8) traces the origins of education in South Africa to the Dutch tradition of religious education, the British tradition, as well as state-aided mission schools. De Vos and Schulze (2002:12) also note that South African education was influenced by educational systems from other countries and that education in this country served a political purpose. It is therefore clear from the advent of formal government or institutionally supported education in South Africa that there have been distinctions with regard to race or ethnic groups (cf. De Vos & Schulze, 2002:13). The background to education in South Africa will be discussed in the following sub-sections, firstly in terms of the four historically identified racial groups as used by the government, followed by a combined background of changes made after 1994.

2.6.1.1 Education for Blacks in South Africa

Prior to 1910, education for Blacks was organized through state-aided or self-administered mission[10] schools (cf. Louw, 1996:8). The language mediums used,

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[10] Missions involved in education in South African included the American Board Mission, Berlin, Church Missionary Society, Glasgow, London, Moravian, Paris Evangelical, Rhenish and Wesleyan missions. (Cf. Kroes, 2005:236; Nkabinde, 1997:5.)

tended to be the European language used by the particular missionary society or organization. One of the first exceptions to this approach was the introduction of isiZulu together with English as a medium of instruction by the Natal Council of Education in the then Natal province in 1884 (Louw, 1996:8). Later on this presence of missionaries had a definite effect on the elevation of certain dialects above others, as well as the division of related language groups. One reason for this was that different missionaries worked among speakers of basically the same language. Language served as the way in which ethnic groups could be divided, especially through language standardization (cf. Murray, 2002:435).

The division of Northern Sotho, Sesotho and Setswana can be traced back to the elevation of particular dialects. French missionaries worked among the Sesotho-speaking population and German missionaries with Tshivenḓa speakers (cf. Bailey, 1995:35-36; Herbert, 1992:3; Kroes, 2005:237; Louw, 1996:44; Nhlapo, 1945:3; Olivier, 2003:107, 110; Olivier, 2010; Orman, 2008:88; Webb, 2002:32). After the indigenous languages were reduced to writing and orthographies were set up, these languages could be used for instruction purposes.

The rise to power of the National Party in 1948 resulted in a shift towards the ideology of the Afrikaner and the resistance of English. Nyembe (2003:14) notes that the Eiselen commission was appointed in 1949 to "formulate plans designed to provide education for the blacks as an independent population group". Recommendations made by this commission led to the formation of the so-called Bantu Education System that aimed at having a separate education system set along racial lines. *The Bantu Education Act, Act 47 of 1953* that was implemented in 1955, placed the control of the education of Black learners under the Department of Native Affairs (cf. Coutts, 1992:2; Louw, 1996:8; Maartens 1998:31-32; Mesthrie, 2002:18-19, 22; Nkabinde, 1997:5; Olivier, 2003:14). The Department of Bantu Education-was established in accordance with the *Education and Training Act 90 of 1979*. This replaced the *Bantu Education Act of 1953*. A central department, the Department of Education and Training, was set up in Pretoria. Furthermore, this act made provision for mother tongue instruction at the primary school with the possibility of parents choosing the language of instruction after standard 2 (Grade 4) (cf. Louw, 1996:11). Orman (2008:87) further notes that the "social engineering attempted by apartheid language policy is shown by the fact that it did not seek merely to deepen and

reinforce existing ethnolinguistic cleavages amongst the Bantu population, but actually to create and insist upon them where they had previously never existed".

According to Nyembe (2003:19), the medium of instruction at Black schools from 1954 to 1976 was mother tongue from substandard A (Grade 1) to standard 4 (Grade 6), from standard 5 (Grade 7) to standard 10 (Grade 12) it was English or Afrikaans. Mother tongue instruction was legally provided according to Act 47 of 1953 and Act 90 of 1979 (cf. Louw, 1996:1, 8).

Despite a move from English as a medium of instruction to that of the mother tongue, this could be seen as an attempt to promote divisions along ethnic lines. Furthermore, it was assumed that teacher training could not be done in these languages and English was mainly used (cf. Nkabinde, 1997:5-7).

The opposition to Bantu education led to the Soweto uprisings in June 1976. This was mainly against the 50:50 policy where Afrikaans and English were also used as equal mediums of instruction in South African schools. Consequently a move was made toward hacing English as the main medium of instruction (Herbert, 1992:8; Kroes, 2005:240).

2.6.1.2 Education for Coloureds in South Africa

Nyembe (2003:21) notes the importance of education being the responsibility of the church rather than the state concerning coloureds in the former Cape Province. This can be traced back to the role played by mission schools in this area in the past. In 1920 the Provincial Council gained control over the mission schools.

It is significant that the approach to the education of Coloured learners differed between the four provinces. While a lot was done in the Cape and Natal provinces towards the education of Coloureds in Transvaal, there was a clear segregation between the education policy for Whites and Coloureds while Coloureds were treated as Blacks in the Free State province (cf. Nyembe, 2003:21-23). The *Cape Province Ordinance 11 of 1945* made school attendance compulsory for all Coloured learners. The *Coloured Persons Education Act 47 of 1963* placed the responsibility of Coloured education with the Department of Coloured Affairs of the Central Government. In 1983 the responsibility of Coloured education was transferred to the relevant

department for Coloureds formed after the establishment of the tricameral parliament. (Cf. Louw, 1996:11-12.)

2.6.1.3 Education for Indians in South Africa

The first school for Indians was established in 1869 by the reverend Ralph Stott of the Wesleyan Mission Society (cf. Nyembe, 2003:25). Initially only the Natal province provided schools specifically for Indians.

In terms of further contextualization Nyembe (2003:26) also mentions that:

> Indian education was administered as a sub-section of the provincial departments, with general education policy, finances, examinations, and curricula being determined by the provincial education departments within the guidelines of the National Department of Education. The administration of education was centralized in Natal, with a separate office in Transvaal.

The *Indian Education Act, Act 61 of 1965* moved the responsibility of Indian Education from provincial councils to the Department of Indian Affairs. No mother tongue education was available although some Indian languages were offered as optional languages. In most cases, instruction occurred in English. In 1983 the responsibility of Indian Education was transferred to the Minister of Education in the House of Delegates within the tricameral parliament (cf. Louw, 1996:12).

2.6.1.4 Education for Whites in South Africa

Education for Whites in South Africa started with the arrival of Dutch and other colonists at the Cape from the seventeenth century onwards. Significant groups of colonists can be identified: the Christian Protestant Dutch together with French colonists followed later by more liberal English settlers. This background set out a distinctly religious – largely Calvinist – context for education for Whites in South Africa. Yet British educational traditions were also transferred after increased British political importance[11] in the Cape (cf. Du Plessis, 2003:104; Maartens, 1998:29; Nyembe, 2003:8-9).

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[11] British influence increased after the first (1795) and second (1806) British occupation of the Cape.

An important characteristic of White education in South Africa has been bilingualism. English and Afrikaans (initially Dutch) were recognized as official languages of the country with the formation of the Union of South Africa in 1910. The policy of English and Dutch as official languages can be traced back to the Union Convention of 1908 and was enforced by Article 137 of the 1910 constitution. In 1925, Dutch was considered to include Afrikaans as an official language despite the usage of the language at a primary school in 1914 and at a secondary school in 1917. With increased focus on the usage of Afrikaans, this resulted in negativity towards the language by English speakers (cf. Louw, 1996:12-15).

Dual medium schools tended to be the norm up until the 1948 election when single medium schools were promoted where the other official language was presented only as an additional compulsory subject. The *Consolidated Education Ordinance of 1953* terminated parallel medium schools in which two languages were maintained at a school in a parallel manner. Single mediums schools were made the only legal choice with the *National Education Policy Act, Act 39 of 1967*. (Cf. De Vos & Schulze, 2002:13; Louw, 1996:12-15; Maartens, 1998:29-31.)

The *Education Affairs Act, Act 70 of 1988*, had a number of implications in terms of the language in education. Once again the medium of instruction had to be either English or Afrikaans, with the choice of language determined by the principal of a school, with limited parental choice. This act also provided for parallel medium schools (cf. Louw, 1996:15).

2.6.1.5 Nonracial Education in South Africa

Nonracial education was introduced in 1992 and was discussed in the Educational Renewal Strategy released in 1993. This report suggested a move towards a single department of education with divisions in terms of regions. This report still advocated a sense of ethnicity and no complete integration, as race was still considered a factor in terms of control at schools. Criticism against the report included very little input from Black stakeholders and no plans for the improvement of the quality of Black education (cf. Nkabinde, 1997:9-11; Nyembe, 2003:20). In 1995 the government of national unity announced the official merging of the eighteen different education departments into a single education system (cf. Nkabinde, 1997:15).

From the movement of school segregation, based on race, to nonracial and multilingual integrated schools, language remained a critical issue at schools. This will now be discussed in terms of the historical approach to language in education in South Africa.

2.6.2 Language in Education in South Africa

In this section, language in education is discussed in terms of it as a language of learning and not as a subject. As such the focus is on the historical background of language in education.

Murray (2002, 436) states that there had been a move away from terms such as 'medium of instruction' to 'language(s) of learning'. This concept emphasizes the possible use of more than one language in the classroom, as well as moving the focus from instruction to learning, i.e. from the teacher to the learner. In actual fact the usage of more than one language in the classroom is not quite so new, as code switching (cf. 2.7.3) has been used in classrooms for quite a while (cf. Murray, 2002:439-440).

Language presence in South Africa can be traced to the Khoe and San people (Mesthrie, 2002:13-14). They were followed by Bantu-speaking[12] tribes arriving from West Africa. From the arrival of the Dutch colonists in 1652 up until 1657, various Dutch and German dialects were common in the Cape. In 1658 slaves from the present-day Angola, Madagascar, Bengal, Guinea and later on exiles and convicts from South-East Asia came to the Cape and their common languages were Portuguese and Malay. To counter the spread of these languages, the Vereenigde Oostindische Compagnie (VOC) decreed in 1658 that all slaves should learn Dutch. Dutch was therefore also the medium of instruction in the earliest mission schools. The presence of English increased with the first British occupation in 1795 and the second British occupation in 1806 (cf. Du Plessis, 2003:104-109; Mesthrie, 2002:13-17; Orman, 2008:78-85; Spolsky, 2004:171).

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[12] The language family name Bantu is considered by some to be a derogatory term and the alternative terms Sintu and Ntu have been proposed (Herbert, 1992:6-7; Kroes, 2005:238; Webb, 2002:xix). For the sake of consistency with the literature, the linguistic term Bantu will be used in this study.

During the apartheid-era, schools in South Africa were managed by various departments based on language and racial lines. There were separate white and coloured departments with English and Afrikaans as medium of instruction at these schools. For Indians, the medium of instruction was English and they fell under the administration of the Department of Indian Education. With regard to Black schools that fell under the Department of Education and Training in South Africa and in the so-called homelands, this was administered by individual departments with control of the Department of Education and Training. This schooling for Black learners was based on four years of schooling in the mother tongue of the learners, followed by instruction through the medium of English. This also implied starting to learn English in the second year of schooling, followed by Afrikaans in the fourth year and a total move to English in the fifth year (cf. Murray, 2002:435; Kroes, 2005:241; Nkabinde, 1997:101; Olivier, 1993:130; Orman, 2008:85-90; Spolsky, 2004:171-172).

Before 1993, only English and Afrikaans were recognized as official languages by government policy (Louw, 1996:1). With the 1993 interim constitution, legislation for the first time reflected the multilingual nature of South African society. Despite integration of the various departments into one single Department of Education, as well as official recognition of all the official languages, at many schools the language situation remained the same as before with English and Afrikaans in advantaged positions (cf. Murray, 2002:435). The Department of Education produced a discussion document in 1995 proposing a multilingual policy, yet the Minister of Education proposed a policy in 1997 which, according to Murray (2002:437), had a more "pragmatic flavour".

Dialectical diversity (Louw, 1996:55, 64, 96-108) may also have an effect on the usage of language at schools. Despite the fact that languages are considered as single entities, as listed in the *Constitution* (1996) for example, they actually include a number of varieties (Herbert, 1992:3). In general, teachers need to be sensitive towards the usage of dialects within the context of inclusivity and accommodation and promotion of multilingualism. In terms of standard language, Kroes (2005:251-254) states that it is important that learners should not be disadvantaged by not being able to acquire a standard variety of language such as English. Kroes (2005:252) especially emphasizes the social affective factor in this regard as perceptions exist in terms of non-standard language variations. The speakers who do

not command an adequate form of Standard English may even be negatively affected in terms of opportunities (cf. also Webb, 2002:31). For the sake of this study, diversity in terms of language varieties is not explored further as it does not have bearing on the focus of the study.

Heugh (2000:8) makes the following observation with regard to the choice between English or mother tongue (African language) education in South African schools:

> Bilingual education for each child within a multilingual education policy does not mean a choice between either English or an African language. It means both. It means developing the first language and adding a second language in the best possible manner to ensure the successful learning of the second language.

In addition, Cushner *et al.* (2009:192) note that in South Africa "where the school's language of instruction is not a learner's first or home language, effective learning for such learners is usually impaired". Poor language abilities have a distinctly negative effect on academic performance. This occurs when the language of learning and teaching is not necessarily the home language of learners and where they do not acquire sufficient skills in either language (cf. Van der Walt, 2003:33-38). Language problems also extend toward social integration. According to Cushner *et al.* (2009:193), the language problem present in South Africa has inhibited interracial interaction at some schools.

Additive bilingualism was proposed as a solution by the Department of Education for the language situation in schools because, as noted by Murray (2002, 436), "any policy involving a transition from home- to second-language medium of instruction was 'subtractive'". Moreover, Nomlomo (2006:130) states that the inverse of additive bilingualism is subtractive bilingualism which results in the loss of a mother tongue.

2.7 LANGUAGE IN SOUTH AFRICAN SCHOOLS

The focus in this section is on the language use at South African schools. Firstly mother tongue education will be discussed in terms of the advantages and requirements set out in relevant literature. This is followed by strategies used in South African classrooms to facilitate effective communication through language, as well as the accommodation and promotion of multilingualism. In this regard, the focus is on code switching and interpreting. Finally the important concepts of

language planning and language policy are discussed in terms of how these two concepts influence language usage in South African classrooms.

2.7.1 Mother tongue education in South African schools

Schools and classrooms in South Africa are often multilingual in nature. In this context, multilingualism refers to learners speaking different languages as home language (cf. Laufer, 2003:27; Nkabinde, 1997:99; Hooijer, 2004:2).

An empirical study by Nyembe (2003:56) found that former Model-C schools are becoming more multicultural. This obviously has implications in terms of the languages represented at such schools. After the end of apartheid a number of African-speaking learners went to former white, Indian and coloured schools. In these cases the new schools did not change their language policies, but rather used language as a way of controlling admission (cf. Murray, 2002:436). In some cases learners living in multilingual (mostly metropolitan) areas went to the nearest school regardless of their own mother tongue (cf. Murray, 2002:435). In this regard Kroes (2005:241) states "Today, many of the more well-to-do black parents enrol their children in the formerly white public schools or in private schools from the very beginning". In the schools, mentioned by Kroes (2005:241), the medium of instruction is often English regardless of the mother tongues used by the learners.

Despite the fact that from a sociolinguistic and educational point of view mother tongue education is the ideal (cf. Van der Walt, 2003:1), English is generally preferred as the medium of instruction at schools especially by African-speaking parents (cf. Ferguson, 2006:185; Heugh, 2000:15; Laufer, 2003:18; Murray, 2002:438; Mutasa, 2003:239; Nkabinde, 1997:99-105; Nomlomo, 2006:123; Nyembe, 2003:59; Setati, 2008:104; Van der Walt, 2003:18, 31; Webb, 2002:299; Webb & Kembo-Sure, 2000:6).

One of the reasons for the preference of English is the fact that it is spoken and is dominant internationally (cf. Kembo, 2000:287; Phillipson, 1988:341; Setati, 2008:106; Van der Walt, 2003:2, 112; Webb & Kembo-Sure, 2000:6). However, statements of English being a true world language are contradicted by research of certain language communities. Smit (1996:96) notes that in South Africa "there is a shortage of local communicative needs for English paralleled by a relatively low

percentage of competent speakers as well as a substantial lack of resources". Furthermore, she notes that "it seems unlikely that country-wide communicative competence in English could be reached at present". In support of Smit's opinion, Webb (1998:126) notes that among Black trainee teachers in four Northern provinces, only 5% were found to be functionally literate in English, which is the language of learning for these teachers. This has implications for schools where these teachers will ultimately be teaching and English could potentially be the medium thereof.

English is considered to have economic power and is at least associated with economic opportunities (cf. Dalvit *et al.*, 2005:125; Murray, 2002:438; Nkabinde, 1997:99; Phillipson, 1988:342; Webb & Kembo-Sure, 2000:7; Wren, 1997:xxv). Moreover, a national sociolinguistic survey completed by PanSALB (2001:10) states a "massive dominance of English in the educational setting". It must be noted that their research focussed on participants of 16 years and older. Nomlomo (2006:123) states that parents choose English because of the economic advancement it promises, the high status of English, as well as its acceptance and accommodation of other language and racial groups when the language is used. Despite the preference for English, parents may still feel that a loss of the mother tongue might have an impact on the culture and identity of learners (Nomlomo, 2006:124).

English is also preferred in some instances because African languages are not developed sufficiently in terms of terminology and especially resources such as text books (cf. Dalvit *et al.*, 2005:125; Heugh, 2003:122; Makoni & Trudell, 2009:37; Nkabinde, 1997:24, 109; Van der Walt, 2003:3, 32, 104, 119; Webb, 2002:26-27). Mutasa (2003:7) observed that "some educators still use English to teach African languages because they do not have the academic jargon or register for the concepts they teach".

Ferguson (2006:185) also observes that throughout Africa there are parents who believe that education through the medium of indigenous languages is not feasible, due to limited material in the languages, as well as the few well-paid work opportunities that can be accessed with knowledge of the indigenous languages. Another perception that exists is that learners do not need to learn a particular language, because parents and others believe that they already know these

languages. This is, of course, usually not the case (cf. Kembo, 2000:290; Nomlomo, 2006:118). It is therefore not surprizing that Louw (1996:44) notes the frequent use of borrowed Afrikaans and English terms in African language teaching and the rare use of African languages as medium of instruction at secondary schools.

Alexander (2001:117) states that there is a resistance against mother tongue education by people whose home languages are African languages. Furthermore, Alexander (2001:117) adds that apart from English- and Afrikaans-speaking learners, other learners (more than 80% of the schoolgoing population) are taught in their second or even third languages in contexts where they and their teachers may have limited proficiency in the language of teaching. A further source of rejection of mother tongue education can be traced to the history of education in South Africa (cf. 2.6.1). Many parents reject mother tongue education due to the stigma associated with the so-called "Bantu Education" of the past (cf. Ferguson, 2006:185; Louw, 1996:34; Orman, 2008:95; Van der Walt, 2003:3; Verhoef, 2008:10).

Van der Walt (2003:4) also notes that support for English as language of learning and teaching is drawn from the fact that it can serve national unity. According to Alexander (2001:116), national unity does not depend on a single language and it is rather "constituted by the ability of people to communicate with one another without too much effort".

The emphasis on mother tongue education is seen as a way in which people are segregated instead of unified. In a study by Nyembe (2003:63) it was found that a significant number of teachers indicated that English should be advanced as a national language. In contrast, Nkabinde (1997:105) notes that developing English as a national language in South Africa would contribute to perpetuate class divisions among South Africans because the majority of South Africans are not proficient in English. The degree of English proficiency is an issue that would require further research and testing. Yet it is clear that at least the degree of proficiency among the greater number of South Africans would imply that mother tongue education should be developed.

Van der Walt (2003:39-40) notes that the average pass rate for schools in the Sedibeng East and West districts of the Gauteng Department of Education was

98.3% for schools where the home language of learners was used as the language for learning and teaching, while it was only 68% for schools where the two languages differed.

Webb (2002:163) notes that diversity can actually facilitate national unity. The choice of a colonial language above an indigenous one can be traced back to the so-called **information imperialism** or **information colonization**. These terms coined by Andrewskutty are recorded by Erasmus (1999:45). Erasmus adds that few developing nations resisted language imperialism. Phillipson (1992:47) defines English language imperialism as: "the dominance of English is asserted and maintained by the establishment and continuous reconstitution of structural and cultural inequalities between English and other languages". Phillipson (1988:339; 1992:47) is also of the opinion that such language imperialism is an example of **linguicism** that can be described as ideologies, structures and practices that are used to create and legitimize unequal power and resource distribution between groups in terms of language distribution (cf. 2.4.1). Language imperialism ultimately is, according to Phillipson (1988:351), the result of educational imperialism.

Despite attempts of learners to acquire English sufficiently, Webb and Kembo-Sure (2000:6) state that research has established that the English proficiency of South African learners is inadequate and this extends to some degree even to teachers who use this as a language of teaching.

In this section, mother tongue education was discussed in terms of the advantages that it poses. Despite the literature supporting this view, it is clear that in reality the choices made by parents (and learners) in South Africa may prove that English is often chosen as medium of instruction. Consequently the concept of linguicism was also discussed. In the section that follows, parallel- and dual-medium instruction will be considered for accommodating multilingual classes.

2.7.2 Parallel- and dual-medium instruction

Multilingualism at schools can be accommodated by employing parallel- and dual-medium instruction (cf. Mathey, 2008:180, 183). With parallel instruction more than one language can be accommodated by separating learners in terms of medium of instruction, while with dual-medium instruction or two-way immersion, more than

one language is used in a classroom. The opposite of these two modes is a single medium mode where only one language is used for education (cf. Mathey, 2008:182).

Parallel-medium instruction allows for the usage of more than one different language at the same time. This mode could require that lesson preparation needs to be repeated and that potentially more than one teacher may be required, depending on the language capabilities of the teachers available and the timetable constraints (cf. Mathey, 2008:183). Dual-medium instruction can take place by alternating between languages when a lesson is presented. Unfortunately in this manner it can happen that learners with little knowledge of any of the two languages might miss parts of the lessons. Alternatively lesson content can be repeated after being presented in a specific language, yet this poses a problem in terms of the time it would take to complete the content that needs to be taught (cf. Mathey, 2008:183).

Other strategies for accommodating multilingualism are the use of code switching, code mixing and language alternation.

2.7.3 Code switching, code mixing and language alternation at South African Schools

Code switching[13] refers to the changing from one language to another within a particular context that may require its usage or where a speaker chooses to do so (cf. Baker, 1996:86-87; Halliday, 2007:231; Herbert, 1992:9; Kemp, 2009:19; Myers-Scotton, 1992:165; Rose, 2006:1). Crystal (1997:423) defines code switching as "[c]hanging from the use of one language or variety to another". Furthermore, Holmarsdottir (2006:194) defines it as "a bi-/multilingual communication strategy consisting of the alternate use of two (or more) languages in the same utterance". Herbert (1992:9-10) also states that code switching tends to be common in multilingual communities.

Code switching is regarded as a way in which difficulties in learning through a second (by implication even third, fourth or other) language can be handled (cf. Ferguson, 2006:193). In a study within a multicultural multilingual school, Rose (2006:73)

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[13] The term code switching is also written as "code-switching" or even "codeswitching" in different sources. For the sake of consistency the spelling of "code switching" is used.

identified the following functions of code switching: clarification, humour, translations, expansion, confirmation, reprimanding, social, expression of identity as well as word-finding. Furthermore, Rose (2006:80) makes the following observation that "codeswitching in the classroom is that it is effective in the process of teaching and learning, and that it improves intercultural communication".

Where code switching refers to alternating between languages across sentence boundaries, **code mixing** refers to alternating between languages within a sentence (Kamwangamalu, 2000:92). Kamwangamalu (2000:93) also notes that recent studies tend to use code switching as an umbrella term for both concepts.

Myers-Scotton (1992:165) states that code switching may be used by speakers to present a particular persona, to identify themselves with a particular group or to be able to negotiate their position within interpersonal relations. Especially the last reason is relevant to teachers as well as learners within a classroom situation, as negotiation of meaning can be achieved through the mixing of codes and especially of languages.

According to Holmarsdottir (2006:194), code switching together with code mixing, repetition and borrowing between languages can be considered to be **language alternation**.

Holmarsdottir (2006:195) further notes that Chomsky as well as Appel and Muysken regard code switching as a form of language decay or language deficiency and, as such, as something negative. While on the other hand, Stroud suggests that this is indeed a way in which social interactions can be managed.

It is a well established fact that code switching is used in South African schools to bridge the barriers caused by non-mother tongue education, English as LoLT, multilingual classrooms and insufficient materials in languages used by learners (Rose, 2006:1). Holmarsdottir (2006:212) found that it is used by teachers as a coping strategy to deal with different home (and community) languages and other languages used at school. Holmarsdottir (2006:212) also found that the usage of code switching is neglected in teacher training although teachers do employ this strategy. According to Heugh (2000:24; 2003:123), terminology developed in the

past through the so-called "Bantu Education" system is still used through code switching in classrooms.

Van der Walt (2003:38) notes that although English is officially the most widely used language of learning and teaching in South Africa, teachers still make use of code switching or code mixing because of learners having another home language or the teacher being more competent in another language. A possible problem in this regard is where teachers do not have adequate knowledge of the language used by most learners or where classes are so multilingual that code switching cannot be used adequately.

Henrard (2003:13) suggests the use of partial mother tongue as a solution to deal with multilingual classrooms. This implies the use of various languages spoken by learners as medium of instruction in certain time slots, with code switching employed where necessary. This type of approach requires teachers to have some knowledge of one or more minority languages. It is therefore important that teachers are multilingual in order for them to facilitate code switching in a classroom successfully.

According to Louw (1996:57), code switching can be regarded as "an educational tool to overcome intrinsic impediments caused by the complex language situation". Louw (1996:57) also states that despite the recognition of English as a *lingua franca* by African language speaking teachers, many of these teachers employ code switching in class.

Heugh (2000:30) notes that at primary schools where teachers do not have sufficient knowledge of English, they code switch or code mix by "using two languages within the same sentence". This is quite problematic in that incorrect usage of these strategies can have a negative effect on learning. Heugh (2003:122) states that unsystematic code mixing or code switching does not solve the problem of having a sufficient knowledge of the language of learning and teaching.

In conclusion it can be said that code switching, code mixing and language alternation are strategies for accommodating more than one language in the classroom. Code switching does take place in South African classrooms, yet the prominence of English in South African classrooms should also be noted. In the next

section the focus is on how educational interpreting can be used at South African schools.

2.7.4 Educational interpreting at South African schools

Educational interpreting provides a possible solution to create a multilingual teaching and learning environment (cf. Mathey, 2008:181; Verhoef, 2008:12). Verhoef (2008:13) defines education interpreting as "simultaneous interpreting that is rendered by a professional interpreter who is present within the educational situation". Verhoef (2008:5) further states that the single-medium education model is modified to include a second medium of instruction without substantially changing the original model.

An important characteristic of educational interpreting is the fact that it allows teaching to take place even if teachers do not know the other language medium used in the classroom (cf. Verhoef, 2008:13). According to Mathey (2008:193), educational interpreting promotes inclusivity as learners are not segregated according to their language preference. Furthermore, learners have the freedom to choose the language they prefer as medium of instruction.

Despite the possibilities posed by educational interpreting, it is clear that although professional interpreters can be viable in tertiary environments (Verhoef, 2008:1), more research is required in terms of availability of interpreters to be used at school level, as well as the costs that would be involved. For the sake of this study, educational interpreting is therefore not considered to be a solution for the accommodation and promotion of multilingualism at schools.

Subsequently, language planning is discussed as a way in which multilingualism can be accommodated within education.

2.7.5 Language Planning

Language planning refers to the way in which language use can be organized through forms of regulation. In this regard a distinction is made in terms of status, corpus and acquisition language planning. In addition, this section deals with standardization, lexical elaboration, linguistic purism and calquing.

African languages need to be developed to be sufficient for the sake of instruction and as such, corpus and status planning is required (Webb, 2002:299; Webb & Kembo-Sure, 2000:15-16). Therefore, in terms of this study where the focus is on accommodating and promoting multilingualism, language planning should be taken into consideration.

Spolsky (2004:5) distinguishes between three components that make up the language policy of a particular speech community: "its language practices – the habitual pattern of selecting among the varieties that make up its linguistic repertoire; its language beliefs or ideology – the beliefs about language and language use; and any specific efforts to modify or influence that practice by any kind of language intervention, planning or management". This approach allows the concept of language planning to be extended from not only being used in terms of a wider speech community but smaller groupings and individuals as well (cf. Orman, 2008:40).

Three types of language planning can be identified: **corpus planning**, **status planning** and **acquisition planning**. Corpus planning focuses on issues such as grammar, orthography, spelling, and vocabulary; status language planning focuses on the functional role of a language within different levels of society while acquisition planning has to do with who uses which language variety (Ferguson, 2006:20-21; Louw, 1996:37; Orman, 2008:42-43; Spolsky, 2004:6). The division between corpus and status language planning can be traced to Heinz Kloss (1969:85). Corpus language planning is defined by Kloss (1969:85) as:

> …some agency, person, or persons are trying to change the shape or the corpus of a language by proposing or prescribing the introduction of new technical terms, changes in spelling, or the adoption of a new script.

Conversely, Kloss (1969:85) states that status language planning relates to a language's "standing alongside other languages or vis-à-vis a national government". Another difference between these two types of language planning is emphasized by Kloss (1969:85) where, with corpus planning, language specialists are required, while status planning can be done by politicians and bureaucrats that have little sociolinguistic background. Webb and Kembo-Sure (2000:16) define the two types of planning as follows:

Corpus planning refers to the determination of standards and norms for a language, as well as the introduction of new words and technical terms; status planning refers to authoritative decisions to use a language for important official functions, thereby enhancing its social prestige.

Halliday (2007:219-220) uses two alternative terms for language planning: linguistic (internal) and social (external) language planning. The linguistic planning is concerned with manipulating the language, while social language planning is concerned with manipulating the speakers. Hence it is possible to say linguistic language planning is similar to corpus language planning and social language planning is similar to status language planning. Halliday (2007:220) furthermore discusses the concept of educational language planning, which focuses on language at schools. According to Halliday (2007:220), this type of planning cannot be avoided as an entity should decide on which language or languages should be used as LoLT or subjects at school.

Ferguson (2006:21) observes that the distinction between corpus and status planning should not be overemphasized as they are interrelated. If a language is to be adapted to fulfil additional functions (status planning), it will need an extension of its structure and vocabulary through graphisation, standardization and modernization (corpus planning). Furthermore, Ferguson (2006:21) adds that both types of language planning could be driven by political considerations.

Standardization is important towards the effective use of language within education. Ferguson (2006:21) defines standardization as "the construction – and subsequent dissemination – of a uniform supradialectal normative variety". This concept is important in terms of the accommodation and promotion of multilingualism in the classroom, as standardization should take place with regard to terminology used within the different subjects. The extension of terminology is referred to as **lexical elaboration** (cf. Spolsky, 2004:35-38). Ferguson (2006:28-29) notes that borrowed terms already in widespread use are sometimes used instead of the coining of new terms, yet these decisions are often not only based on linguistic or technical merit, but can also be affected by ideological or political influences. In this regard, international language academies often lay down rules in terms of the borrowing from other languages such as English. Keeping a language

pure is called **linguistic purism**. In terms of purism, elitist purism refers to keeping a language free from non-standard and regional deviations while xenophobic purism relates to keeping a language free from influences of other languages (Ferguson, 2006:31; Kloss, 1969:84-85; Spolsky, 2004:22-25). Despite this view, borrowing takes place with or without official sanctioning. The process of borrowing poses challenges in that the degree to which a borrowed word should be adapted should be determined, as a word from a language such as English could be adapted phonologically, graphologically or morphologically depending on the target language. (Cf. Ferguson, 2006:29.) Halliday (2007:227) refers to **calquing** which is a process through which new terms are coined, based on a language's lexical resources.

The importance of education in language planning is noted by Ferguson (2006:33-34), as schools tend to be funded by the state and as such can act as agents for socialization and social change. Furthermore, education can be used for national transformation.

Both corpus language planning and status language planning have implications in terms of education. Languages need to be developed in order for them to be used in academic settings with a standardized language structure and effective lexical elaboration, taking into consideration that terms can either be borrowed or, from a purist view, be created from existing lexical resources. Furthermore, the status of a language will determine the need for the language within an educational context. Only through planning in this regard can multilingualism truly be accommodated at South African schools. From the literature, the need for corpus and status planning in terms of the African official languages is evident, due to the prominence of English, the status of the African languages and the lack of resources in African languages.

Policies and legislation regarding language in education is discussed in the next section in terms of the South African context.

2.8 POLICIES AND LEGISLATION REGARDING LANGUAGE IN EDUCATION

The right to choose a language of learning and teaching is determined by policies and legislation like *Constitution* (1996), the *South African School's Act* (Act 84 of 1996), the *Act on National Teaching Policy* (Act 27 of 1996) and the *Language in Education Policy* (1997) (cf. Van der Walt, 2003:82). It is important to take

cognisance of the fact that there is a perception that a discrepancy exists between what is required by language legislation and what is actually implemented (cf. Verhoef, 2008:9-11).

Language policy is defined by Orman (2008:39) as "the formulation of laws, regulations and official positions regarding language usage and the allocation of linguistic resources by some government or other political organisation". Key to this definition is the use of language and the allocation of linguistic resources.

According to Alexander (1995:40), it is important that three major problems are addressed through language policies:
- the creation of economic and political conditions that will allow for the promotion of multilingualism and national unity;
- acquiring English as a second language; and
- demonstrating that cognitive enhancement takes place through bilingual education programmes.

The focus in this section is on historical national language policies prior to 1993, the *Language-in-education policy* (1997), the *South African Languages Bill* (2003) and the *South African Schools Act* (84 of 1996). These documents, in conjunction with the *Constitution* (1996) – as discussed in section 2.4.3 – form the legal foundation for the accommodation and promotion of multilingualism in South African classrooms and is therefore essential for this study.

2.8.1 National language policies prior to 1993

Prior to 1993 education policy in South African was based on mother tongue instruction, racial classification and centralist planning (cf. 2.6.1, 2.6.2, 2.7).

Louw (1996:16-20) notes that the language clauses in the interim 1993 constitution were included because of the rich language diversity of the country that requires a multilingual language policy and the need to redress imbalances from the past in terms of languages and language policy. In addition to these items, Louw (1996:21-34) also notes that a policy of regional differentiation, a national and provincial language of record, language planning and the right to basic education form the principles of the eleven official languages policy.

In the next section the Language-in-education policy is discussed as an important document in terms of language use in the education system.

2.8.2 Language-in-education policy

The Language-in-education policy (LiEP) was published on 14 July 1997. The policy (SA, 1997:1) is to be viewed as part of a continuous process through which language in education is developed as part of the national language plan. The policy acts within a particular paradigm and, as such, recognizes cultural diversity present in South Africa which it regards as an asset. The policy also accepts that the Department of Education is tasked to promote, develop and respect the official languages and other languages mentioned in the *Constitution* (1996). The inherited language-in-education policy "has been fraught with tensions, contradictions and sensitivities, and underpinned by racial and linguistic discrimination" (SA, 1997:1). Therefore the policy is supposed to contribute in building a non-racial nation, facilitate communication across language barriers and create an environment of respect for languages (cf. Laufer, 2003:10; Verhoef, 2008:7).

The policy also accepts multilingualism as an important element. In this regard, it is noted that societal and individual multilingualism is a global and African norm. Learning more than one language is regarded to be general practice. Multilingualism is also supposed to counter separatism through mutual understanding. In addition the Department's preference for additive bilingualism is also maintained taking cognizance of the different views on the topic.

The last part of the LiEP refers to the fact that individuals have the right to choose the language of learning and teaching. Yet it is noted that this choice should be made within the overall framework of the department's obligation towards the promotion of multilingualism.

The LiEP (SA, 1997:2) also sets out six aims:

> 1. to promote full participation in society and the economy through equitable and meaningful access to education;

2. to pursue the language policy most supportive of general conceptual growth amongst learners, and hence to establish additive multilingualism as an approach to language in education;

3. to promote and develop all the official languages;

4. to support the teaching and learning of all other languages required by learners or used by communities in South Africa, including languages used for religious purposes, languages which are important for international trade and communication, and South African Sign Language, as well as Alternative and

Augmentative Communication;

5. to counter disadvantages resulting from different kinds of mismatches between home languages and languages of learning and teaching;

6. to develop programmes for the redress of previously disadvantaged languages.

As such, the six aims of the LiEP tie in with what is required in terms of the *Constitution* (1996) as it prescribes an additive multilingual approach for schools (Mathey, 2008:180).

In terms of language as subjects, the LiEP (SA, 1997:2) notes that one approved language should be offered in Grade 1 and 2 with the language of learning and teaching as well as one additional approved language as subject offered from Grade 3 onwards. The promotion requirements are also set out in this section.

A number of norms and standards are included in the LiEP (SA, 1997:2-4). The aim of these standards are to promote, fulfil and develop the state's language goals in education in line with the Constituion. Hence it involves (SA, 1997:2):

1. the protection, promotion, fulfilment and extension of the individual's language rights and means of communication in education;

2. the facilitation of national and international communication through promotion of bi- or multilingualism through cost-efficient and effective mechanisms; and

3. to redress the neglect of the historically disadvantaged languages in school education.

The norms and standards also include provisions that aim towards protecting the rights of individuals. In this regard, the learner (or parent in the case of a minor) may choose the language of teaching upon admission to a school – bearing in mind that the chosen language is used by the school for learning and teaching and whether place is available in the relevant grade. If the desired language is not

available, then the case is to be forwarded to the provincial education department that has to make provision for the learner.

The rights and duties of schools are also set out in the LiEP (SA, 1997:3). This includes that the governing body must show, in the school language policy that is set up, how multilingualism is promoted through the use of more than one language in teaching and by offering other languages as subjects. Where there are fewer than 40 requests in Grades 1 to 6 or fewer than 35 requests in Grades 7 to 12 for instruction in a language not offered by a school, the head of the provincial department of education will determine a solution.

Furthermore, the rights and duties of provincial education departments are also listed in the LiEP (SA, 1997:3). The provincial department should keep a register of requests by learners. School governing bodies determine the language policies of new schools in consultation with the provincial authority in accordance with the regulations set out in the *South African Schools Act of 1996*. Another important provision is that it is reasonably practicable to provide education in a language of learning and teaching if at least 40 learners in Grades 1 to 6 or 35 in Grades 7 to 12 in a particular grade request it at a particular school. The final provision in terms of the provincial department relates to the department's responsibility to provide alternative language maintenance programmes for schools or districts that cannot offer additional languages of teaching in the home languages of learners.

The last section of the LiEP (SA, 1997:3-4) relates to appeals on decisions made by provincial departments. Such an appeal may be lodged with the provincial member of the executive council (MEC) within 60 days of the decision. If the outcome is still unsatisfactory, PanSALB may be approached to give advice or the decision may be referred to the Arbitration Foundation of South Africa.

Despite the fact that language policy in South Africa promotes multilingualism it appears that languages other than English are being marginalized (cf. Maartens, 1998:16-17). The LiEP provides for the accommodation of multilingualism in education and sets out the duties in terms of schools and government.

In the next section the *South African Languages Bill* is discussed.

2.8.3 The *South African Languages Bill*

The *South African Languages Bill* (2003) was published in the Government Gazette on 30 May 2003, but has not yet been promulgated and should therefore only be regarded as a preliminary document. Consequently there is no national language legislation available to act as legislative foundation for the development of language policies (cf. Verhoef, 2008:5).

The introduction of the *South African Languages Bill* (2003) provides an overview of the purpose of the bill:

> To provide for an enabling framework for promoting South Africa's linguistic diversity and encouraging respect for language rights within the framework of building and consolidating a united, democratic South African nation, taking into account the broad acceptance of linguistic diversity, social justice, the principle of equal access to public services and programmes, respect for language rights, the establishment of language services at all levels of government, the powers and functions of such services, and matters connected therewith.

From this introduction the prominence of the promotion and acceptance of language rights is clear. Furthermore, the object of this bill (section 2) is to give effect to section 6 of the *Constitution* (1996) (cf. 2.4.3); promote the equitable use of the official languages of the country; enable South Africans to be able to use the language of their choice in different contexts and facilitate the constitutional obligations in terms of multilingualism.

Verhoef (2008:5) identifies the *South African Languages Bill* (2003) as primary language legislation and it would therefore "constitute the statutory framework and create the legal infrastructure by means of which official multilingualism in South Africa should be realised".

The *South African Languages Bill* (2003) provides for recognition of the requirements set out by the *Constitution* (1996), yet the fact that it has not been promulgated is problematic.

2.8.4 The *South African Schools Act* (84 of 1996)

The *South African Schools Act* (84/1996) lists the following language provisions in section 6:

6. (1) Subject to the Constitution and this Act, the Minister may, by notice in the Government Gazette, after consultation with the Council of Education Ministers, determine norms and standards for language policy in public schools.

(2) The governing body of a public school may determine the language policy of the school subject to the Constitution, this Act and any applicable provincial law.

(3) No form of racial discrimination may be practised in implementing policy determined under this section.

(4) A recognised Sign Language has the status of an official language for purposes of learning at a public school.

According to Verhoef (2008:6), the *South African Schools Act* allows for needs of schools to be met through individual language choices and the setting of language policies by governing bodies. Yet there is no obligation from the government to implement constitutional principles that relate to multilingualism.

2.9 DISCREPANCY BETWEEN LANGUAGE POLICY AND PRACTICE

From the preceding discussion it is clear that an appropriate framework exists in terms of acknowledging language rights as well as accommodating and promoting multilingualism in terms of the *Constitution* (1996) (cf. 2.4.3) as well policies and legislation (cf. 2.8). However, in practice this does not take place. Orman (2008:95) states that "the position of the Bantu languages within education remains very weak, while English continues to become ever more dominant".

Webb (2002:59) makes the following comment with regard to language use by government: "Since 1994 official language practice has gradually become more and more monolingual, with English being used almost exclusively as official public language, and with little indication that state institutions are contemplating any meaningful implementation of the multilingualism prescribed by the constitution".

2.10 INFLUENCE OF THE LANGUAGE ENVIRONMENT ON BLENDED LEARNING

The language medium used in a blended learning context depends on the language used within a particular class or school. In addition the language of content placed on the Internet also has an impact on blended learning.

Blended learning may provide a way in which content can be available in more than language. Heugh (2003:124) notes that understanding – in this instance referring to examination papers – can be improved when learners can check their understanding in English and a mother tongue. The same principle can be applied in providing learning content online multilingually.

Holmes and Gardner (2006:62) make the following observation in terms of technology and cultural identities that have implications with regard to multilingualism, where language can be related to such cultural identities.

> The new technology brings people – individuals, communities and nations – closer together and creates better possibilities for collaboration and exchange of ideas and knowledge, but it also risks the loss of the richness and uniqueness of cultural identities.

As such, the technology provides for opportunities for multilingualism to be accommodated and promoted.

Only through use of language can learning take place. Vygotsky (1978:28) makes the following observation:

> Just as a mold gives shape to a substance, words can shape an activity into a structure. However, that structure may be changed or reshaped when children learn to use language in ways that allow them to go beyond previous experiences when planning future action.

This reliance on language should therefore also be kept in mind in implementing blended learning systems, especially within a multilingual environment where, through the use of the electronic medium, more than just one language should be accommodated.

Blended learning itself can also include existing multilingual accommodation resources such as code switching. Crystal (2001:220) notes in this regard that code mixing can be found in interactive online situations.

It is also evident that multilingualism can be accommodated through blended learning with the aid of online resources. Since interactive online situations also allow for code mixing to take place, the medium is therefore very appropriate.

A link was established between language and culture at the start of this chapter (section 2.2) and therefore it is essential to take note of studies that tie these concepts with blended learning technologies. Meier (2007:669) makes the following observation: "The use of a blended approach that accommodates teaching at a distance and uses communications technology combined with traditional education (instructor-led learning) is considered the best way to create a supportive e-learning environment that will help learners to achieve intercultural understanding". This statement supports the underlying objective of this study in terms of determining whether blended learning can be used to accommodate and promote multilingualism.

2.11 CONCLUSION

The existence of more than one language in South Africa is due to historical reasons such as migration patterns and colonization. This also resulted in the prevalence of various cultures. Since multilingualism is a reality in South Africa and in South African school classrooms it has different implications with regard to teaching and learning. The fact that not all learners in South Africa are able to learn in the official language of their choice is an infringement of their language rights. Based on the *Constitution* (1996) and relevant legislation and national policies, a framework is set for mother tongue education and an approach of additive bilingualism. Yet the development of the African official languages and the prominence of English are problematic. This situation has led to a degree of linguicism due to the linguistic imperialism of English.

Since the focus of this study is on the accommodation and promotion of multilingualism through blended learning, the preceding background on multilingualism in South Africa will now be augmented with the discussion on blended learning.

CHAPTER 3: Blended learning

3.1 INTRODUCTION

The aim of this chapter is to provide a theoretical background to the concept of *blended learning* to obtain clear parameters for the implementation of blended learning to accommodate and promote multilingualism in an Information Technology classroom.

Blended learning and related concepts such as online learning or e-learning are often associated with distance education[14], but for the purposes of this study focus will be on these approaches of learning in general within a Further Education and Training (FET) school context and not as a part of distance, open or flexible programmes. Even though this study combines "informatics as content of education" and "informatics as an instrument of education" as distinguished by Romiszowski (1988:300), the focus of this chapter will be on the "instrument" – in other words the approach of blended learning.

In terms of the background to research done on blended learning a lot of focus is on how blended learning can be implemented in corporate environments (Bersin, 2004:xiv; Bonk & Graham, 2006:57-149; Macdonald, 2008:2) or in tertiary education contexts (Bonk & Graham, 2006:151-415). Yet in both instances deductions can be made and elements identified that can be applied within a secondary school context. Limited research has been done in terms of blended learning within a South African context (Nel & Wilkinson, 2008:145), with the first virtual conference, Blended Collaborative Learning in Southern Africa, on educational technology only held at the University of Cape Town recently (2004).

This chapter starts by defining and discussing the basic features of blended learning (3.2). This is followed by a historical background to blended learning based on the history of learning delivery technologies, key concepts as well as computers and the Internet as learning mediums (3.3). Towards pedagogic implementation, *blended*

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[14] For more on blended leaning or media and distance education (including open and flexible programmes) see Bates (2005:1-66), Crocker (2006:3-4), Garrison & Anderson (2003:24, 34-41), Jolliffe *et al.* (2001:32-40), Macdonald (2006:1), Romiszowski (1988:363-376); Ruhe & Zumbo (2009:2-7), Simpson (2002:9-215) and Van der Westhuizen (1999:21-30,39-41).

learning is then considered in terms of related learning theories, which include: behaviourism, cognitivism, socio-constructivism and communal constructivism (3.4). The elements of which *blended learning* are discussed in terms of various approaches assumed by theorists, learning models implemented, followed by a discussion of the requirements (3.5) and standards that are set and need to be set for effective implementation of *blended learning* (3.6). Finally, motivation is provided why *blended learning* is chosen as an approach and more information is presented on how it can be applied within a multilingual (3.7) South African IT (3.8) classroom context.

3.2 DEFINITION AND FEATURES OF BLENDED LEARNING

Blended learning is used in the literature to refer to different concepts and ideas and there are conflicting opinions on what it constitutes (cf. Hanson & Clem, 2006:136; Cunningham, McDonnell, McIntyre & McKenna, 2009:57; Jones, 2006:185; Macdonald, 2008:3; Rennie & Mason, 2004:97; Walker & Baets, 2009:242, 244). There also seems to be no consistency in the use of the term blended learning and related terms (cf. Bates, 2005:8).

Blended learning is widely viewed as an integrated approach to learning with traditional face-to-face and computer-supported, web-based or online approaches (cf. Crocker, 2006:3; Cunningham *et al.*, 2009:57; Graham, 2006:4; Holmes & Gardner, 2006:10, 14, 110; Jung & Suzuki, 2006:269; Lajbcyier & Spratt, 2007:12; Littlejohn & Pegler, 2007:1, 26, 226; Mason & Rennie, 2006:xxxii, 11-14; Nel, 2005:67-68, 109; Nel & Wilkinson, 2008:145; Oosthuizen, 2004:14; Ruhe & Zumbo, 2009:2; Thorne, 2003:2; Walker & Baets, 2009:242, 244).

In order to define the concept clearly for the purpose of this study some additional relevant definitions will be considered.

In defining blended learning it is necessary to understand what each of the words in the concept 'blended learning' mean separately. According to the South African Concise Oxford Dictionary (SACOD, 2002:117) the word 'blend' means to "mix and combine (something) with something else" or to "form a harmonious combination or part of a whole". The word is probably of Scandinavian origins and is related to the Old Norse *blanda* which means 'to mix'. Furthermore, the word 'learning' refers to

"acquire knowledge of or skill in (something) through study or experience or by being taught" (SACOD, 2002:659). This word can be traced to Old English and West Germanic origins. The word is also related to the word 'lore' which refers to "a body of traditions and knowledge on a subject" and its Old English equivalent 'lār' which means 'instruction' and is in turn of Germanic origins. From these definitions it is clear that the concept of 'blended learning' has to do with the mixing of the way knowledge and skills are acquired.

The concept of blending different approaches can be traced to a time prior to the advent of computing and online technologies (cf. Masie, 2006:22, 25). In this regard, Littlejohn and Pegler (2007:1) make the following observation with regard to blending:

> Blending is an art that has been practised by inspirational teachers for centuries. It centres on the integration of different types of resources and activities within a range of learning environments where learners can interact and build ideas.

Keeping this statement as well as definitions that apply the term blended learning to any type of learning where mediums, approaches and technologies are mixed into consideration, it is evident why the term blended learning evokes criticism. From the literature it is also clear that the term could be seen as a new label for an old concept (Mason & Rennie, 2006:12; Rennie & Mason, 2004:97). For the sake of this study, the focus will therefore be on the blending of different online learning technologies and traditional learning strategies such as face-to-face instruction and print media. Some relevant features and characteristics, as well as additional definitions of this phenomenon from the literature, will subsequently be presented and discussed.

Alternative terms exist for this mixed approach to learning. Bates (2005:8) mentions *distributed* (cf. Macdonald, 2006:3), *mixed mode* or *hybrid learning* as terms to "designate a combination of face-to-face and online teaching". Bates prefers to use *mixed mode* where class time is reduced for more time spent studying online and *hybrid* and *blended* for merely adding online teaching to regular class time. Oosthuizen (2004:1) defines it as "the mixing and integration of different learning delivery approaches, including face-to-face classroom teaching e-learning and self-paced computer mediated learning to create a single learning programme".

Oosthuizen adequately brings the essential components of blended learning together although a differentiation between e-learning and self-paced computer mediated learning could be questioned because it is clear from the literature that self-paced computer mediated learning could be considered to be part of e-learning.

Blended learning is defined by Thorne (2003:16) as follows:

> Blended learning is the most logical and natural evolution of our learning agenda. It suggests an elegant solution to the challenges of tailoring learning and development to the needs of individuals. It represents an opportunity to integrate the innovative and technological advances offered by online learning with the interaction and participation offered in the best of traditional learning. It can be supported and enhanced by using the wisdom and one-to-one contact of personal coaches.

This definition emphasizes the fact that blended learning supposes a form of customization in terms of the needs of individuals while combining both new technological advances and traditional learning techniques. These two aspects are key to defining the phenomenon of blended learning, as well as how this phenomenon is used within this study. According to Hofmann and Miner (2009:6) blended learning combines different training methodologies and allows for the use of the best delivery method for specific objectives. Macdonald (2008:2) makes the following statement with regard to blended learning:

> The term is commonly associated with the introduction of online media into a course or programme, while at the same time recognising that there is merit in retaining face-to-face contact and other traditional approaches to supporting students. It is also used where asynchronous media such as email or conferencing are deployed in conjunction with synchronous technology, commonly text char or audio.

This definition focuses on the media used in the classroom and it is related to the definition given by Bersin (2004:xv): "Blended learning is the combination of different training "media" (technologies, activities, and types of events) to create an optimum training program for a specific audience. The term "blended" means that traditional instructor-led training is being supplemented with other electronic formats." Bersin thus highlights the fact that different approaches and media should be combined. He also presents the importance of the audience in this definition. The goal of blended learning, according to Bersin (2004:xv-xvi) is "to synthesize training media into an integrated mix – one you can tailor to create a high impact, efficient,

and exciting training program". Although the efficiency of such a programme could be measured by tracking performance or assessment, it may prove difficult to track more subjective issues such as "impact" or "excitement".

In contrast to the above, Rennie and Mason (2004:97) define blended learning as a customized mix of learning opportunities that "takes cognition of the subject(s) being learned, the level of study, the method of interaction with the tutor (and other learners), as well as the abilities and motivations of learners". In this statement the content, level of study, method of interaction and learner ability and motivation are also mentioned and this accentuates the fact that any study of blended learning cannot merely focus on the delivery method. Therefore participants (teacher and learner) as well as the content should also be considered.

Masie (2006:22-25) notes that blended learning refers to the "use of two or more styles of content or context delivery or discovery". He also adds that since 1998 the term has referred to a mixture of e-learning and classroom learning and furthermore traces the origin of this 'blended learning' to a reaction to structural weaknesses of e-learning at the time.

Graham (2006:4) notes that three main opinions exist in terms of defining blended learning. Firstly it can refer to combining instructional modalities or delivery media, secondly combining instructional methods and thirdly combining online and face-to-face instruction. According to Graham the first two positions "reflect the debate on the influences of media versus method on learning" and he is furthermore of the opinion that blended learning is defined too broadly in these terms. Graham prefers the third option as it accurately reflects the historic background of blended learning. Graham (2006:5) creates the following working definition: "Blended learning systems combine face-to-face instruction with computer-mediated instruction". Two main issues emerge from this definition by merely referring to "computer-mediated instruction". This implies any form of using computers in learning and not only narrows it down to using online or web-based learning. In using the word "instruction" instead of "learning" the emphasis is also put on the teacher or facilitator rather than on the learner. As a concept, "blended learning" accentuates learning, not necessarily instruction.

According to Thorne (2003:16-17), blended learning combines traditional forms of classroom and one-to-one teaching with the following:

- ✋ CD ROM video-streaming;
- ✋ multimedia technology;
- ✋ online text animation and video-streaming;
- ✋ virtual classrooms; and
- ✋ voicemail, e-mail and conference calls.

To motivate the choice of using blended learning it is important to look at some advantages of this approach. Macdonald (2008:45) lists the following advantages of blended learning:

- ✋ greater scope for reflection than in face-to-face environments;
- ✋ access to wider and more readily updated resources;
- ✋ enhancement of learner engagement; and
- ✋ a sense of community.

From the above-mentioned discussion it is clear that blended learning has many different meanings and can be approached in many ways. Despite some slight variation, the literature emphasizes the blending of more than one instructional medium. To elucidate the phenomenon of blended learning further, a background to blended learning will now be provided, starting with the historical background of learning delivery technologies.

3.3 BACKGROUND TO BLENDED LEARNING

A very important aspect in the literature study of blended learning is contextualizing the phenomenon. This is done in terms of the historical development of learning delivery technologies where the development of various media leading up to computers and the World Wide Web (WWW) are discussed. Furthermore, the focus is also placed on terminology that is used in practice and in the literature. Lastly, within this section the different tools that can be used in a blended learning environment are discussed in terms of synchronous and asynchronous learning. Finally, mobile learning as a medium through which blended learning can be facilitated, is discussed.

3.3.1 Historical background to learning delivery technologies

Learning and teaching have always benefited from the use of resources. In this regard, the resources used in learning portrayed approaches and mediums found in reality outside the realm of schools and educational institutions. Rosenberg (2001:20) traces the prominence of the use of technology in learning to Thomas Edison's prediction in 1922 that the motion picture would replace textbooks. The origin of learning delivery technologies can be traced to even earlier. A brief overview of learning delivery technologies will be provided, followed by background on the development of computers and the Internet in terms of learning delivery.

3.3.1.1 Early learning delivery technologies

Blended learning should be approached within the chronology of learning delivery technologies. In this regard, the following table presents a historical overview of these technologies:

TABLE 3.1 Historical overview of Learning Delivery Technologies

Years	*Learning Delivery Technology*
1450	Johannes Gutenberg introduces the first Western printing press
1840	First correspondence study (a secretarial program focused on teaching shorthand)
1870s	Telephone services
1900s	Audio recordings
1920s	Radio
1930s	Television
1940s	Audio tapes, computing devices
1950s	Film strip
1960s	Satellite
1960s	Pre-World Wide Web Internet (text-based databases and discussion boards)
1980s	PC, Fibre optic, audiosvisual technology, video disc, CD-ROM
1990s to present	World Wide Web

(Cf. Bersin, 2004:2; Boardman, 2005:5; Crystal, 2001:2; Hofmann, 2006:29; Romiszowski, 1988:136-239; Van der Westhuizen, 1999:22)

From this overview it is clear that learning delivery technologies develop as devices and hardware evolve. Since the focus of this study is not on printed resource materials, it is important to take note of the usage of other media. In terms of the South African context, it is important to note that the South African Broadcasting

Corporation (SABC) started with radio transmission in 1936 mainly in English, but with some Afrikaans content later. Furthermore, African languages were introduced on radio between 1943 and 1945. Yet the first South African test transmissions for television were only made in 1975 (cf. Olivier, 2003:57-58). Furthermore, the Internet was well established in South Africa at universities and even in private homes in the mid 1990s.

Rosenberg (2001:20) highlights the advances made with the creation of training films made by the United States Military during the Second World War. Consequently the United States Military has also, according to Rosenberg (2001:21), been "generally regarded as a pioneering and leading organization in e-learning".

Cook and Finlayson (1999:8) note that instruction with the use of television tends to be very passive and that computers present many more opportunities for interactivity. Ruhe and Zumbo (2009:6) mention interactive television (iTV) as a possible medium through which greater interactivity can be achieved when the Internet can be accessed through the use of a digital set-top box without the aid of a computer.

The term **learning technologies** (LT) is often used to refer to instruments, machines, electronic resources or interfaces that are used to learn or supplement learning. In this regard, Sieber and Andrew (2003:219) make the following statement:

> LT may be considered to range from typewriters, overhead transparencies, and simple audiovisual aids to sophisticated video, DVD, audio displays and computer-aided learning (CAL), multimedia, the Internet and Web pages, or virtual and managed learning environments (VLEs/MLEs).

A historical background of computers is provided to trace the use of computers in general, but more specifically as learning delivery devices.

3.3.1.2 Computers as learning delivery technology

In terms of this study, it is important to view the usage of computers (and by implication the Internet) within the historical chronological context. This emphasizes that communication devices, such as computers are developed, so their presence in

classrooms has also changed. Since blended learning relates to the use of more than one medium in the instructional process, the development of these media should also be considered.

The development of computers spans a long period of time and can be traced back to the creation of basic calculating machines as created by Blaise Pascal (1642), Gottfried Wilhelm Von Leibnitz (1692), the difference engine by Charles Babbage (1821) and the tabulating machine by Herman Hollerith (1880). Yet the first electronic digital computing device can be traced back to John V. Atanasoff and Clifford Berry in 1939. This was followed by five so-called generations of computers leading up to the computers being widely available (cf. Bitter, 1989:30-47; Garrison & Anderson, 2003:5). Sidney Pressey developed the first testing machine in 1924 which allowed for testing and teaching. This type of learning is described as "programmed instruction" or "programmed learning" and allows for learning and assessment in a linear manner (cf. Anderson, 2010; Holmes & Gardner, 2006:35; Shelly, Cashman, Gunter & Gunter, 2006:45).

Wiburg (2009:49) emphasizes the importance of concrete and sequential learning during the two world wars in USA where audiovisual tools were employed especially since there was a need to use materials over and over again without extensive preparation of teachers. This programmed learning was also important for the behaviourist movement in education and the work done by B.F. Skinner. Programmed learning involved repetition and feedback giving either rewards or sanctions to facilitate learning and this could be easily implemented by technology. Skinner built a teaching machine, called the 'Skinner box', in 1958 (Cf. Hergenhahn & Olson, 1993:85; Holmes & Gardner, 2006:36; Romiszowski, 1988:243; Wiburg, 2009:49-51). Holmes and Gardner (2006:38) also highlight the work *Understanding Media: The Extensions of Man* by Marshall McLuahn in 1964 that stimulated thinking around media and the importance of "the medium is the message". According to this work, media such as television would have an effect on society.

Despite the fact that the first computer was installed in a UK school in 1965, the use of computers at schools internationally increased with the release of the first microcomputers in 1978. Specifically the Apple II became the most common microcomputer used by schools. This was followed with the release of IBM's personal

computer in 1981 and Apple's Macintosh in 1984. (Alessi & Trollip, 2001:3; Holmes & Gardner, 2006:40; Shelly *et al.*, 2006:5, 49).

One of the first applications of computers for teaching was the PLATO project of the University of Illinois which was started in 1960 (Alessi & Trollip, 2001:4; Inglis, Ling & Joosten, 2002:11; Van den Berg, 1990:45). This was followed by Coursewriter created by IBM to be used to create lesson content. During the 1960s Stanford and Pennsylvania State Universities were busy with similar projects (cf. Van den Berg, 1990:45). Another noteworthy system was TICCIT (Time-shared Interactive Computer Controlled Instructional Television) as developed by the MITRE Corporation and the Brigham Young University in 1972 (cf. Alessi & Trollip, 2001:4; Van den Berg, 1990:45-46).

Research done at the Massachusetts Institute of Technology lead to the development of the programming language LOGO (cf. Romiszowski, 1988:322; Van den Berg, 1990:46). This language introduced learners to the basic programming concepts and is still used in classrooms in the United Kingdom (UK).

In terms of computers in education, the following spheres of use can be distinguished: computer-assisted instruction (CAI), computer-based training (CBT) and computer-managed instruction (CMI). The focus of this study is more on computer-assisted instruction where the computer is used as additional resource (cf. Bitter, 1989:10) and computer-based training where the computer is used as sole medium, rather than computer-managed instruction where it concerns administrative and record-keeping functions for teachers (cf. Bitter, 1989:10-11; 16-18; 268-284; Romiszowski, 1988:302).

3.3.1.3 The Internet as learning delivery technology

In discussing the Internet as learning delivery technology it is important to discuss the historical background and the concepts of the World Wide Web, browsers, web sites, web pages, web servers as well as newer concepts such as Web 2.0 and the Semantic Web. This background introduces the context in which blended learning takes place and is essential to this study as the focus is on determining how blended learning can accommodate and promote multilingualism in a South African classroom.

Rapid expansion of the Internet and the World Wide Web has led to many changes in education in general, but also in terms of the way learning can take place (cf. Bates, 2005:8).

The Internet can be traced back to the establishment of ARPAnet (or ARPA-NET in some sources) by the Advanced Research Projects Agency of the US Department of Defense in 1969. The aim of this network was to connect computers used by the military and universities. This was succeeded by the National Science Foundation Network in 1986 that provided universities and research organizations with access to five super computers. During this time, similar developments also followed in other countries apart from the USA with the development of the Australian Academic Research Network in Australia in 1989 and the Joint Academic Network in Britain (cf. Alessi & Trollip, 2001:139, 373; Holmes & Gardner, 2006:47; Inglis *et al.*, 2002:7; Shelly *et al.*, 2006:75-77; Targowski, 2007:66; Van der Westhuizen, 1999:68).

Targowski (2007:62-80) contends that the origin of the Internet can be traced back to the Cold War between the United States of America (USA) and the Union of Soviet Socialist Republics (USSR) as it had an influence on the growth of the global economy and civilization. The period of development during the 1990s in terms of new technology, multimedia and the Internet is called the **information revolution** and this has had a big influence on education (Pachler, 2001:15).

The **Internet[15]** (also shortened to the 'Net' in some literature) refers to a global group of extended computer networks that use a common communication protocol and addressing scheme to exchange resources with one another. It is not owned by anyone, but is administered by different networks (cf. Crystal, 2001:2-3; Jonassen, Howland, Moore & Marra, 2003:33; Jolliffe *et al.,* 2001:3-5; Mason & Rennie, 2006:65; Shelly *et al.*, 2006:19, 73; Strydom, 2000:83 and Taylor, 2001:11) The National Curriculum Statement (DoE, 2003a:61) describes the Internet as "the biggest computer network in the world, reaching millions of people, on thousands of interconnected networks". Computers connected to the Internet act either as clients or as servers. Servers provide information to clients that access the information.

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[15] The word "Internet" (with capitalized 'I') is used throughout this document (cf. Crystal, 2001:3)

Information can be found using a unique address or URL (Universal Resource Locator) that also includes the server's address. (Cf. Jonassen *et al.*, 2003:33.)

The **World Wide Web** or WWW was developed by Tim Berners-Lee from the European Laboratory for Particle Physics or CERN in Geneva as way to transmit documents over the Internet in 1989. At that stage the Internet already existed and was used to send e-mail, give remote access to computers and transfer data files. At this point the Internet also required some technical knowledge and it was not until the World Wide Web was added that it could be used more widely. The structure of the World Wide Web required a universal set of standards and this led to the creation of the Hypertext Mark-up Language (HTML) and the Hypertext Transfer Protocol (HTTP). HTML was based on the Standard Generalized Mark-up Language (SGML). HTML determines the commands that can be used to format a text document that can be accessed on computers with different operating systems as long as the computer has an appropriate browser installed. A **browser** refers to software that can interpret HTML documents and display them on screen (cf. Alessi & Trollip, 2001:386-387). The first browser, *Mosaic*, was created by Marc Andreeson from the National Supercomputer Laboratory (NCSA) in the USA. This browser was released in 1993 and soon became very popular as it provided users who did not have a lot of computer knowledge the opportunity to use the Internet. In 1994 Andreeson left the NCSA and founded the Mosaic Communications Corporation that later became the Netscape Corporation. It is important to note that **web pages** that make up **web sites** are stored on **web servers** or computers that deliver the pages to other computers or clients. Furthermore, a web site is composed out of many web pages (cf. Alessi & Trollip, 2001:4, 139, 373; Boardman, 2005:9; Crystal, 2001:13; Holmes & Gardner, 2006:47; Inglis *et al.*, 2002:4-5; Jonassen *et al.*, 2003:34; Leedy & Ormrod, 2010:18; Oosthuizen, 2004:44; Richardson, 2006:1; Shelly *et al.*, 2006:20, 50-51, 82-83; Targowski, 2007:71; Van der Westhuizen, 1999:45, 70-71). Often the World Wide Web is wrongly used as a synonym for the Internet, yet it actually refers to a part of what can be described as the Internet (cf. Dudeney, 2000:3). An important concept is the fact that the WWW or web does not refer to an entity, but rather to a set of standards used for the storage and transmission of data on the Internet (Alessi & Trollip, 2001:139, 374). The National Curriculum Statement (DoE, 2003a:61) defines the World Wide Web as "an Internet client-server hypertext distributed information retrieval system". Oosthuizen (2004:44) highlights that an

advantage of the WWW is the "ease and instantaneous access to a magnitude of resources, opening new doors to the educational process".

A distinction can be made between hypertext and hypermedia in that **hypertext** refers to documents and **hypermedia** to mediums such as video, animations, sound, images and other graphics. Hypertext was initially only associated (on the Internet) with text-based documents written in HTML. Hypertext can also be distinguished from normal text in that it allows for linking within a webpage, a website and then to other websites. In other words, by clicking on a hyperlinked piece of text or image, the browser will either go to a particular part of a website or load another webpage (cf. Alessi & Trollip, 2001:138-139; Crystal, 2001:202-203; Jonassen *et al.*, 2003:170; Inglis *et al.*, 2002:5; Snyder 1998:126-128; Van der Westhuizen, 1999:71).

The term hypertext was coined by Theodor Nelson to refer to a method in which academic texts could be published electronically and this was executed within the Xanadu Project he developed. This in turn was based on 'memex' which was a device created by Vannevar Bush that allowed for the creation of links between text and illustrations in publications. (Cf. Alessi & Trollip, 2001:138; Boardman, 2005:9; Holmes & Gardner, 2006:46; Inglis *et al.*, 2002:6; Snyder, 1998:130-131.)

The phenomenon of **Web 2.0** has been identified as a trend on the Internet where focus is more on interactivity and social interaction. Web 2.0 can be defined in contrast to Web 1.0. The focus with Web 2.0 is the fact that any persons can contribute their own content (cf. Bonk, 2009:41-45; Crook, 2008:6; Ruhe & Zumbo, 2009:3). According to Ruiz (2008), the origin of the term Web 2.0 can be traced back to a July 1999 issue of the Print magazine. In this magazine, Darcy DiNucci wrote a piece titled "Fragmented Future" in which the term Web 2.0 was first used. Yet the term is closely associated with Tim O'Reilly (cf. O'Reilly, 2005).

Crook (2008:7) emphasizes greater virtualization as a Web 2.0 characteristic and mentions the concept of a 'perpetual beta' which refers to a product or, by implication, to a text that is not necessarily the final version. The concept can be traced back to beta versions of software that were released for testing prior to releasing a final version.

Four key services of Web 2.0 have been identified by Crook (2008:7-8):

- ↳ Socializing the playful: games and virtual worlds;
- ↳ Socializing the expressive: media design, sharing, and publication;
- ↳ Socializing the reflective: blogs, social networks, and wikis; and
- ↳ Socializing the exploratory: syndication, recommenders, folksonomies.

According to Crook (2008:9), Web 2.0 allows for collaboration between learners and the creation of classroom communities. Web 2.0 also allows for publishing and discussion of content created by learners. Through the interaction with digital artefacts, new literacies, apart from just literacy associated with the printed word, must be considered. Finally Web 2.0 also allows for personal research to be done and data to be organized. Fee (2009:24) mentions the extension of Web 2.0 through the emergence of e-learning 2.0 that refers to e-learning taking place through the use of blogs and wikis. But Fee (2009:25) notes that jargon such as learning 2.0 and e-learning 2.0 does not contribute to the understanding of e-learning.

A further extension of the web is the **Semantic Web**. The origin of the concept can be traced to Tim Berners-Lee and the W3C consortia along with other researchers (cf. Mason & Rennie, 2006:104-105; Rennie & Mason, 2004:152-154). Mason and Rennie (2006:104) state that the Semantic Web "extends the current, human-readable web by providing a common framework for data to be shared and reused by machines on a global scale". This aim of the Semantic Web is to enable computers to 'understand' data to be displayed and to be able to communicate effectively.

According to Van Aswegen (2008:152), the integration of information and communication technology at schools has a number of advantages. In terms of learners, this implies that they may become active, self-regulated and skilled lifelong learners. With regard to educators, the integration creates unique teaching approaches, supports the use of new teaching models and improves the educator's productivity.

Additional key concepts related to blended learning not covered in this section will be defined and discussed. An understanding of these concepts is imperative in terms of the content of this study.

3.3.2 Additional key concepts

Adding to the aforementioned concepts, this section deals with defining learning and multimedia as well as some of the alternative terms used to refer to the use of computers in education.

Learning is described by Romiszowski (1988:4) as a change in behaviour. Communication is closely linked to learning. Romiszowski (1988:5) adapted the following model of two-way communication from the Norton Weiner and Shannon-Weaver models:

TABLE 3.2 Two-way communication model
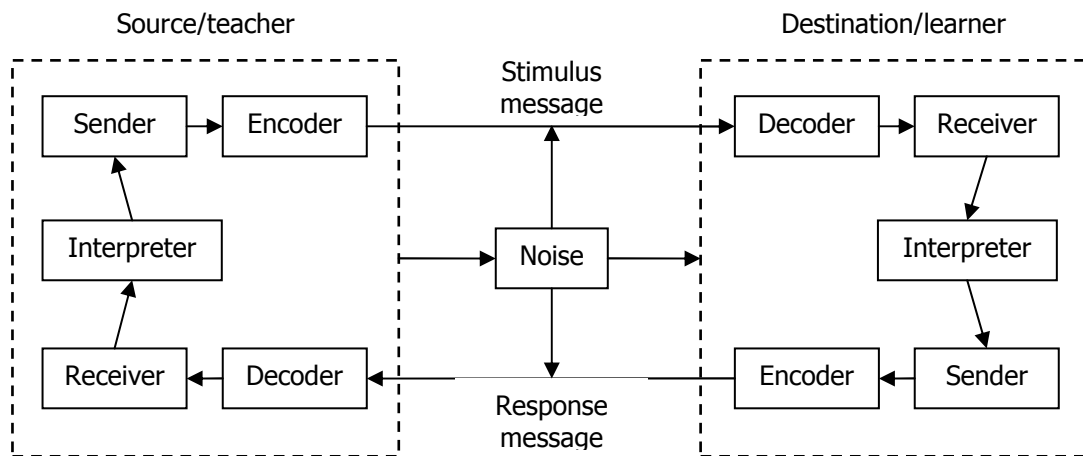
(Romiszowski, 1988:5)

According to Romiszowski (1988:6), the process of instruction is a two-way communication process. The teacher transmits information and the learners decode the message and, in turn, send back a message by performing tasks or communicating with the teacher. This concept ties in with the idea of a stimulus and a response, highlighted by Vygotsky (1978:39-40), that can be created through an intermediate link. Such an intermediate link could be the teacher who prompts the psychological process of stimulus and response.

Mason and Rennie (2006:xvii) use the term **distributed education** that includes face-to-face instruction, blended learning, distance education and e-learning. This phenomenon can be represented as follows:

FIGURE 3.1 Distributed Education
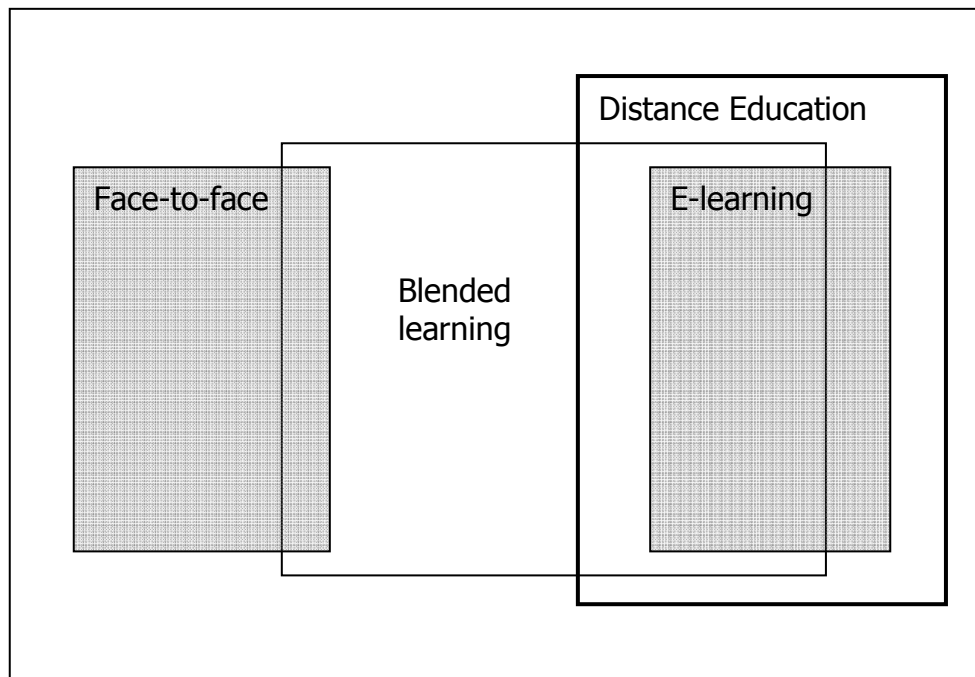
Another concept associated with the Internet as well as blended learning is **multimedia**. This term is used in the literature as an umbrella term where more than one medium is combined to form one artefact (cf. Shelly *et al.*, 2006:278). Romiszowski (1988:8) defines media as "the carriers of messages, from some transmitting source". The term multimedia is closely related to the term hypermedia that refers to the combination of text with pictorial, audio and video content (cf. Alessi & Trollip, 2001:32). Snyder (1998:126) states that multimedia is often used to refer to both hypermedia contents as well as to the hardware and software used to display it. Another viewpoint is to define multimedia as the phenomenon (albeit a combination of physical medium and content) perceived by a "reader" of the media (Gottlieb, 2001:viii).

Various other concepts are used by different authors to denote the use of computers in learning and teaching. This includes:

- ✎ Computer-assisted instruction (CAI) – Bitter (1989), Hergenhahn & Olson (1993:450-451); Papert (1993:41), Romiszowski (1988:301-303) Shelly *et al.* (2006:297);
- ✎ Computer-assisted learning (CAL) – Oosthuizen (2004:35-41), Romiszowski (1988:301-303);
- ✎ Computer-based instruction (CBI) – Bitter (1989), Gibbons and Fairweather (1998);

♧ Computer-based learning (CBL) – Mason and Rennie (2006:15)

♧ Computer-based training (CBT) – Hofmann and Miner (2009:5), Rosenberg (2001), Shelly *et al.* (2006:285); Van den Berg (1990); and

♧ Computer-managed instruction (CMI) – Bitter (1989), Romiszowski (1988:301-303).

Some of these concepts that relate to this study, are now discussed further in the next section where the focus is on the use of computers in terms of learning.

3.3.3 Computers and learning

This section deals with the background to the computer as learning medium. Initially the advantages and disadvantages of the medium in terms of learning are presented in order to substantiate the use of computers within this study. This is followed by some initial remarks on computers and learning and a discussion of the major fields of study in this regard: Computer-assisted learning (CAL), Computer-assisted Instruction (CAI), Computer-based training (CBT), as well as Computer-managed instruction (CMI).

3.3.3.1 Advantages of the computer as learning medium

Pachler (2001:19) identified four characteristics of new technologies, such as computers, that influence learning and teaching:

♧ interactivity and communicative potential;

♧ non-linearity and provisionality of information;

♧ distributed nature; and

♧ multimodality.

Furthermore, Pachler (2001:19) highlights **interactivity** as being the most prominent of these features as this implies that learners are not passive when they are learning, but rather active participants. Van der Westhuizen (1999:47) also emphasizes interactivity as a feature of online education environments that engages learners. According to Mayes (2006:10-20), interaction can take place with concepts (conceptualization), learning tasks (construction) and people (dialogue).

According to Cook and Finlayson (1999:4), ICT enhances the learning process in allowing learners to:

♧ take more control of their own learning;

↳ access up-to-date information from a wide range of real world sources; and

↳ communicate efficiently with other people on a worldwide scale.

Bitter (1989:8-9) lists a number of reasons why computers are popular as teaching and learning tools:

↳ *Computers are fast.* – This implies immediate feedback to learners and immediate grading for teachers.

↳ *Computers are accurate.* – With adequate software, computers will perform correctly and consistently and also ensures reliability.

↳ *Computers can work twenty-four hours a day.* – Computers are available to learners throughout the school day and teachers can also use them after hours.

↳ *Computers perform repetitive tasks without becoming bored.* – Computers can drill learners with specific exercises and allow learners to work at their own pace.

↳ *Computers are able to work under conditions hazardous or difficult for people.* – Learners can conduct simulated experiments that would have involved dangerous materials.

↳ *Computers are becoming smaller and more portable.* – This has implications in terms of placement and portable computers can be shared among several classrooms.

↳ *Computers are becoming less expensive.* – Computers are therefore more affordable and accessible.

Mooney and Stoane (1983:90) identified certain strengths in using a computer:

↳ infinite patience;

↳ the ability to generate endless examples and practice situations;

↳ carrying out calculations quickly;

↳ simulations; and

↳ responding to and controlling external devices through interfacing.

In addition to the reasons why computers are popular in teaching and learning, Bitter (1989:240-245) mentions advantages of using a computer:

↳ Computers involve the student actively in the learning process.

↳ Computers provide fast and systematic feedback.

- ✤ Computers allow all students – slow and gifted alike – to learn at their own pace.
- ✤ Computers facilitate and sometimes even manage remediation.
- ✤ Computer free teachers for more "human" tasks, such as helping individual students, listening to student concerns, and providing pats on the shoulder for work well done.
- ✤ Computers can bring real-world conditions into the classroom.
- ✤ Not only does the computer present, drill and test concepts and skills in all areas of the curriculum, but it teaches students computer literacy as well.

According to Jolliffe *et al.* (2001:12-13), using the Internet for education purposes will have the following advantages:
- ✤ More people can access the materials.
- ✤ Learners can access materials quicker.
- ✤ Learning material can easily be updated.
- ✤ A web-based environment means that it is not platform-dependent.
- ✤ The diversity of learners can be accounted for.
- ✤ Administrative support can be provided.
- ✤ Resource and reference opportunities of content can be created.
- ✤ Learner expectations are increased.
- ✤ Knowledge is constantly changing and lifelong learning should be facilitated.
- ✤ Competition between learning institutions is increased, regardless of the physical location.

A motivation in choosing blended learning could be the restrictions of traditional learning environments (cf. Percival & Ellington, 1993:28,32):
- ✤ The whole class should work at a set tempo.
- ✤ Learners come from different backgrounds.
- ✤ Pre-knowledge of learners differs.
- ✤ Intellectual capabilities vary.
- ✤ Traditional education also takes place at set times.

3.3.3.2 Disadvantages of computer as learning medium

Conversely, some disadvantages (in this context with regard to computer-assisted instruction) are also identified by Bitter (1989:245):

- Some people fear that computers will dehumanize education.
- For CAI to be effective, many teachers will have to be trained in the use of computers.
- The cost of computer hardware and software can dictate how widely computers are used in the classroom.
- CAI software is still developing and some users prefer to wait for further development.

Learning on a computer in an isolated manner is criticized by Pachler (2001:20) when he mentions "the lack of direct human interaction and face-to-face communication, which might lead to an ineptitude in non-virtual, i.e. 'real-life' social contexts". Littlejohn and Pegler (2007:14-15) note that since the start of using computers in education, the quality of the learning experience, the control of a class and change in terms of technology were regarded as concerns.

3.3.3.3 Computer as learning medium

Apart from the technical limitations in the eighties and nineties with regard to poor graphics, colour use and especially speed and memory restrictions, the learning medium was not conducive to learning. A 'drill and practice' instructional strategy was followed where learning content was provided, followed by questions and little or no feedback (cf. Rosenberg, 2001:23). Content stability is also an issue as the knowledge base changes – yet this is a problem that would also be experienced concerning traditionally paper-based knowledge sources.

Säljö (1999:154) makes the following observation with regard to learning on the computer:

> The computer can respond, although always within the limits given by the alternatives that the program designer managed to put into the software, and it can provoke active reflection on the part of the learner who has to consider alternatives, manage concepts and representations and so on in order to work through a task.

This emphasizes the fact that, as such, a computer is still dependent on the software and content used on a computer. Gibbons and Fairweather (1998:6-11) list five qualities that distinguish computers from other instructional mediums:

- dynamic display;

- ✎ ability to accept student input;
- ✎ fast processing of the input;
- ✎ ability to select between course of action; and
- ✎ memory.

Dynamic display refers to the fact that, unlike print matter, computers can be used to display multimedia. The computer can also react to learner input and structure learning around the individual. Input can be processed by the computer and then used to adapt content or the medium immediately. Learners can make choices and determine the order in which actions should take place. Lastly, a computer has memory capacity and can save data in the short term or even longer term. Because of long term capabilities the concept of 'storage' could have been added to the above-mentioned list of qualities, as storing of input such as answers or even results and records can be useful to teachers.

The basic premise of the approach to these concepts in this section will be taken from a adapted table set out by Romiszowski (1988:300). The focus will here be on informatics as 'instrument' and not as 'content'.

TABLE 3.3 CAL, CMI and CAI

As a tool for management	Large-scale management of education/training projects/ institutions		
	Control, evaluation and management of the progress of individual learners/groups	CMI	
As a tool for teaching	Programmed (expositive) → Testing / Drill/practice / Programmed tutorial	CAI	CAL
	(experiential) adaptive → Conversational/dialogue tutorial / Simulation / Inquiry-type database search		
As a tool for the Learner	To think with → Programming for logic/analysis / Programming for specific problem-solving		
	To simplify delegate tasks → Use of special purpose application software / Use for word processing / Use as calculator, etc.		

(Adapted from Romiszowski, 1988:300)

This table emphasizes the distinction in use between management, teaching and learning. Romiszowski (1988:300) uses the term CAL as an umbrella term covering the wider use of computers within an education context. This phenomenon is then broken down into two subdivisions with CMI that refers to how management uses computers and CAI that refers to teaching with the aid of a computer. These concepts, together with CBT that focuses on the training in a corporate setting, are discussed in the sections that follow.

3.3.3.4 Computer-assisted learning (CAL)

Oosthuizen (2004:35) uses the term computer-assisted learning (and computer-based training as a synonym) to refer to the use of the computers as self-contained teaching machines that can be used for self-guided learning by learners.

Hergenhahn and Olson (1993:450-451) state that CAI allows for student-computer interactions to be personalized and even allow for corrective information to be provided and interaction through branching programmes. In addition, a computer can be used for testing. Hergenhahn and Olson (1993:451) note that "students learn more from CAI than from traditional instructions, and they do so in a shorter period of time".

Inglis *et al.* (2002:46) identifies the following instructional models that were developed for the design of computer-assisted learning's courseware:
- drill and practice – learners respond to question;
- tutorials – presentation of information via computer;
- simulations – learners are presented with a real-world situation to which they are required to react;
- problem-solving – learners are given a problem situation and asked to find a solution.

3.3.3.5 Computer-assisted instruction (CAI)

Computer-assisted instruction implies the use of computers as an additional resource by teachers in the classroom. From the literature it is clear that computers do offer potential towards the enhancement of learning (cf. Crook, 1994:224; Shelly *et al.*, 2006:297).

Despite widespread use of computer-assisted instruction as a generic term Romiszowski (1988:301) notes that in Britain it was used in a restricted sense to refer to 'programmed instruction' types of exercises.

3.3.3.6 Computer-based training (CBT)

Shelly *et al.* (2006:285) define CBT as a tool with which individuals can learn through the use and completion of instructional software tasks on the computer. According to Hofmann and Miner (2009:5), CBT was common before the advent of the Internet where training was done on the computer often via CD ROM.

Mason and Rennie (2006:28) distinguish between CBT and CAI by stating that CBT refers to training within a corporate setting and CAI refers to the equivalent in education. Hergenhahn and Olson (1993:450) define CAI as "[w]hen a computer is used to present programmed or other kinds of instructional material". According to Papert (1993:34), CAI refers to "the fully assimilated usage of computer technology" in education.

Computer-based training (CBT), also called computer-based instruction (CBI), was introduced in the seventies and eighties especially due to the advent of the personal computer. The enthusiasm of having so many mediums through which learning could take place was short-lived because, as Rosenberg (2001:22) states, the "differences in hardware, software, programming languages, and other technical barriers made universal availability more a wish than a reality". This kind of problem has been solved through the use of websites as they generally do not depend on the operating system used by the user (cf. Rosenberg 2001:42-48).

Rosenberg (2001:24) observes that the history of computer-based training is characterized by cycles of failure where users became reluctant to use computers because of expectations not being met and they then return to using traditional methods such as face-to-face instruction.

3.3.3.7 Computer-managed instruction (CMI)

According to Romiszowski (1988:301), computer-managed instruction (CMI) is considered by some to be a variety of computer-assisted learning. Yet Romiszowski

(1988:302) defines computer-managed instruction (CMI) as "the use of computer programs for the on-line management of the instructional process". This view is also supported by Van den Berg (1990:43). In addition, Gibbons and Fairweather (1998:13) note that, with CMI, the computer's memory is used to record the progress of learners and then determine what should be done next. Similarly, Bitter (1989:268) notes that CMI refers to the use of computers by teachers in administrative management or with all the non-teaching tasks done by teachers.

In the next section the way in which learning can take place within the context of the Internet is discussed.

3.3.4 The Internet and learning

The Internet as a communication medium provides opportunities for learning to take place. Since this environment is central to the implementation of the model proposed by this study, it is important to discuss it in detail. Initially the concept of e-learning is defined, background to the phenomenon is provided and criteria are listed for the implementation of e-learning. Furthermore, web-based or online learning, as a subdivision of e-learning, is briefly discussed, followed by a detailed exploration of the different asynchronous and synchronous learning tools found on the Internet. This literature overview provides background to the choice made in terms of which learning tool is used in the proposed model that accommodates multilingualism through the use of blended learning.

3.3.4.1 Defining e-learning

The term **e-learning** (also sometimes written as elearning) refers to learning that takes place through an electronic medium. E-learning relates to learning done by learners, whereas **e-teaching** refers to the instruction done through an electronic medium by educators (Kelly, 2009:36).

E-learning is defined by the Joint Information Systems Committee (JISC, 2004:10) as "learning facilitated and supported through the use of information and communications technology". Furthermore, according to JISC, e-learning covers a number of activities from supporting learning, to blended learning, to learning that is delivered entirely online. It is also emphasized that e-learning must no longer only be associated with distance of remote learning.

Holmes and Gardner (2006:14) define e-learning as "online access to learning resources, anywhere and anytime". This definition focuses on a diminished scope of the definition and emphasizes it being online. At the centre of this definition is the access and not necessarily the way the medium works or how it is presented. Garrison and Anderson (2003:xi) define e-learning as "learning facilitated on-line through network technologies" or as "networked, on-line learning that takes place in a formal context and uses a range of multimedia technologies". Fee (2009:16) provides a wider definition with: "E-learning is an approach to learning and development: a collection of learning methods using digital technologies, which enable, distribute and enhance learning". In this definition, the emphasis is less on the medium, but more on the result achieved with the medium. Notable Fee (2009:16) also calls e-learning an approach rather than just a type of learning.

3.3.4.2 Historical background to e-learning

According to Mason and Rennie (2006:xiv), the term e-learning was coined by Jay Cross in 1998. Mason and Rennie (2006:xiv) state that definitions for e-learning tend to focus on content, communication or technology. Holmes and Gardner (2006:14) define e-learning as "online access to learning resources, anywhere and anytime". It is also relevant to mention the definition of e-learning by Ruhe and Zumbo (2009:253): "any learning that uses a network (LAN, WAN, or Internet) for delivery, interaction, or facilitation". This definition emphasizes that e-learning does not necessarily have to take place over the Internet, but also within other networking structures.

Littlejohn and Pegler (2007:11) trace the origins of e-learning to the usage of computers in education in the 1980s. Yet the term can be traced back to 2002 (Littlejohn & Pegler, 2007:16). Before then other terms were used to refer to this phenomenon. This includes: networked learning, online learning, computer-assisted learning, web-based instruction and computer-mediated learning. Yet, since then, the term e-learning is considered to be an umbrella term used to refer to all the aforementioned concepts (Littlejohn & Pegler, 2007:16, 228).

3.3.4.3 Criteria for implementing e-learning

Rosenberg (2001:28) defines e-learning as the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance. According to Rosenberg (2001:28-29), it is based on three fundamental criteria:

- ✎ E-learning is networked, which makes it capable of instant updating, storage/retrieval, distribution and sharing of instruction or information.
- ✎ It is delivered to the end-user via a computer using standard Internet technology.
- ✎ It focuses on the broadest view of learning – learning solutions that go beyond the traditional paradigms of training.

Littlejohn and Pegler (2007:18) identified four drivers towards the adoption of e-learning: cost, quality, widening participation, as well as student expectations.

Littlejohn and Pegler (2007:45) state that informal learning takes place online through research done on the Internet, sharing of information and discussions. This can take place individually or in communities based around work, research topics, specific learning and hobbies.

With the increasing importance of the Internet as educational tool many institutions added e-mail and online resources to existing printed material, yet not to such a degree that access to resources is reduced (cf. Bates, 2005:8; Taylor, 2001:1-2).

According to Stratakis, Christopides, Keenoy and Magkanaraki (2003:5), e-learning constitutes "a distributed, learner-oriented, personalized and non-linear/dynamic learning process, whose aim is to provide on-demand, task relevant educational material".

E-learning can be provided in the following ways (Thorne, 2003:10):

- ✎ online programmes with similar activities and information;
- ✎ online learning portals with online and offline provisions;
- ✎ websites focussing on specific product and service offerings similar to a corporate brochure; and
- ✎ sites that provide downloads of articles and tools.

Garrison and Anderson (2003:8) state that e-learning is not mere infotainment. Hence, if it only disseminates information without some form of critical assessment and the chance to form knowledge structures, it is only an illusion.

Anderson (2004:34) identified the collaborative and independent study modes as two forms of e-learning. The rationale behind this can be to facilitate either individual or group tasks with the usage of this medium. Anderson (2004) has constructed a model of e-learning in which the major variables are displayed and the relationships among the variables are schematized in order to build a theory.

FIGURE 3.2 Model of E-learning
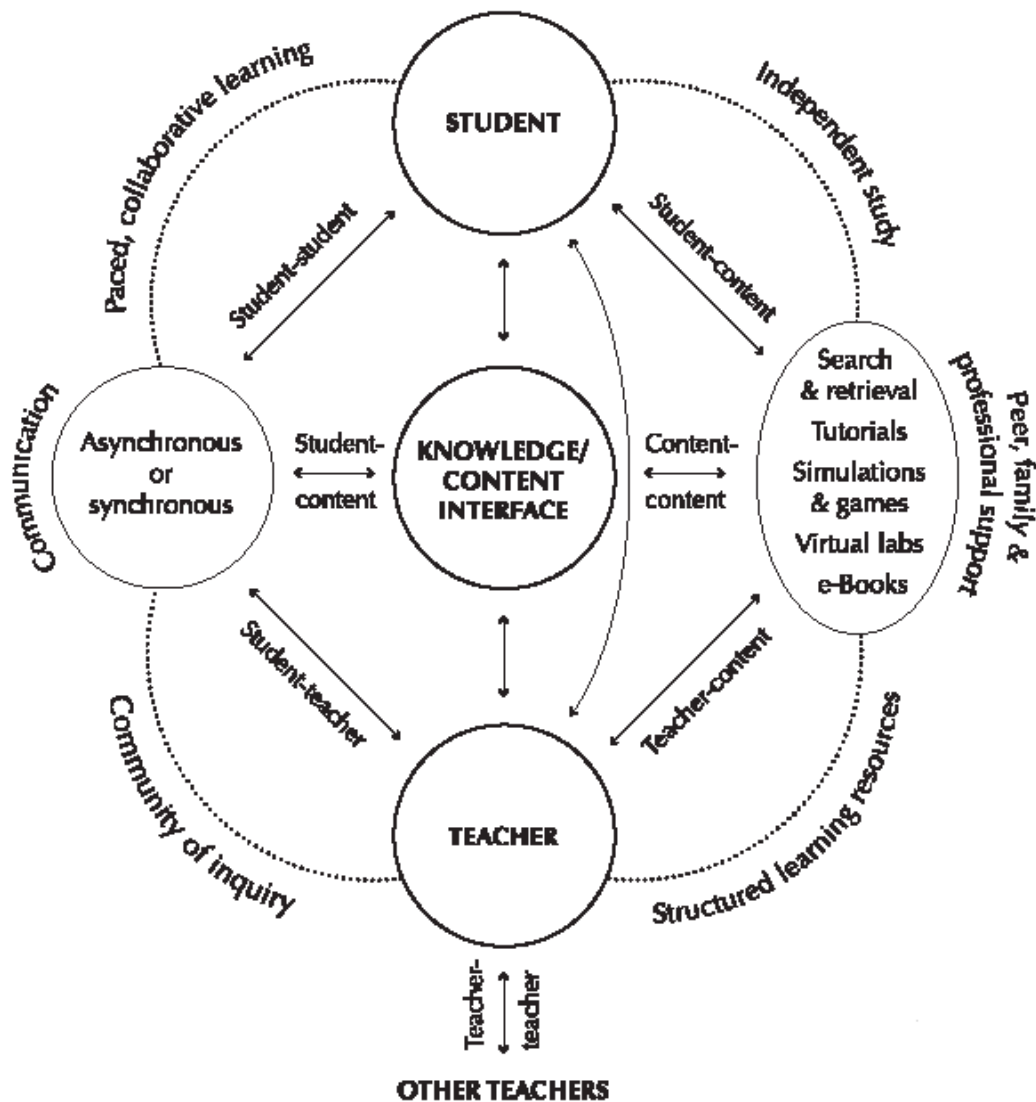
Anderson (2004:49)

This model emphasizes the interaction between learner and content. Anderson (2004:49) notes that many learners prefer their learning to be sequenced, directed and evaluated with the assistance of a teacher. From this model, there is a clear link between student, knowledge/content interface and the teacher. Furthermore, learning can either be done in collaboration where the communication is between students or independently where the focus is on the student's link with the content. In a collaborative situation communication can either be handled in an asynchronous or synchronous manner, while, in terms of independent study, the focus is on the resources used as well as the peer, family and professional support. From a teacher's perspective, with paced collaborative learning a community of inquiry is created while with independent study the emphasis must be on the creation of structured learning resources. Similar to this model that integrates learning, content and interface, Fee (2009:16-17) notes that e-learning consists of three components: technology, content and learning design.

According to Garrison and Anderson (2003:3), the "goal of quality e-learning is to blend diversity and cohesiveness into a dynamic and intellectually challenging 'learning ecology'". This type of learning does not imply a one-way transmission of content, but rather communication between everyone involved in the educational process.

E-learning uniquely combines the freedom of control by the learner within a learning community (cf. Garrison & Anderson, 2003:3). According to Garrison and Anderson (2003:3), e-learning recognizes and integrates both the personal and public aspects of the educational experience. Garrison and Anderson (2003:4) note that the concept of e-learning as a "collaborative constructive transaction" is core to the approach.

With the spread of learning through the use of the Internet, institutions such as eUniversities have been established. Here courses are present online at institutions based only on the Internet. Furthermore, traditional universities have also started to present online courses. In addition, less formal learning portals have been established as well as so-called learning sites where experts present classes in various subjects. Examples of eUniversities include: Virtual University – http://www.vu.org ; Expert Central – http://www.expert-central.com and Fat Brain –

http://www.fatbrain.com. Even businesses have started to provide e-learning facilities to customers in order to extend their services (cf. Rosenberg, 2001:26-27).

Littlejohn and Pegler (2007:40) make the following statement with regard to the blending of media in e-learning: "One of the most exciting recent developments in e-learning is the use of web-based applications that allow streaming of audio and video within web pages, enabling the integration of several types of media within a single space. This is a significant move towards a more seamlessly blended experience of multiple media within a single course, or even inside a single learning activity".

E-learning is sometimes used as a synonym for online learning (cf. Ally, 2004:4 and Bates, 2005:8). Yet, for the sake of this study, a distinction will be made between the two as e-learning may also include resources that are not connected to the Internet.

3.3.4.4 Web-based and online learning

Thorne (2003:10) links e-learning to web-based training which, in turn, refers to "training packages that are available using the Internet". This takes place within virtual classrooms via multimedia. A virtual classroom can be defined as an environment in which education can take place by online means (Van der Westhuizen, 1999:46).

A study of online learning is integral to any approach to blended learning as the online environment can be part of a blended learning approach. Thorne (2003:10) states that blended learning evolved from online learning.

Jolliffe *et al.* (2001:8) use the term **web-based learning** to refer to this phenomenon and describe it as follows: "Web-based learning can be described as the delivery of and access to a co-ordinated collection of learning materials over an electronic medium using a Web server to deliver the materials, a Web browser to access them and the TCP/IP and HTTP protocols to mediate the exchange." In this quotation some important concepts are mentioned. Firstly TCP/IP refers to Transmission Control Protocol/Internet Protocol that allows host computers to connect to the Internet. Furthermore, HTTP refers to HyperText Transfer Protocol that is used by the World Wide Web to determine how data is formatted and

transmitted and, in effect, how web servers and web browsers should handle certain instructions. Another related protocol is FTP that refers to File Transfer Protocol and allows for the transfer of files from a host to a server (cf. Jolliffe *et al.* 2001:8-9; Shelly *et al.*, 2006:78; Van der Westhuizen, 1999:68, 71).

The concept of online learning is distinguished from e-learning by Bates (2005:8) when he states that "e-learning can encompass any form of telecommunications and computer-based learning, while online learning means using specifically the Internet and the Web".

Van der Westhuizen (1999:46) uses online education as a synonym for Web-Based Instruction (WBI) or Web-Based Teaching (WBT)[16]. He furthermore emphasizes that this refers to instruction primarily via the WWW, supplemented by Internet services such as e-mail. Oosthuizen (2004:45-46) also notes that WBI has advantages when used within a blended learning environment.

Hofmann and Miner (2009:5) note that WBT courses can be accessed on the Internet and can either be downloaded or used online on a website.

Jolliffe *et al.* (2001:9-10) contend that most co-ordinated web-based learning programmes include the following:
- ✎ learning materials made up of text, graphics and multimedia elements such as video, audio and animation;
- ✎ synchronous or asynchronous communication applications such as video conferencing, chat rooms, or discussion forums;
- ✎ the use of a Web browser;
- ✎ the storage, maintenance and administration of the materials on a Web server;
- ✎ the use of TCP/IP and HTTP protocols to facilitate the communication between learner and the learning materials and/or the resources.

Van der Westhuizen (1999:47) identifies the following important features of online educational environments in the form of virtual classrooms:

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[16] Shelly *et al.* (2006:293) use WBT to refer to web-based training which refers to the same concept.

- ✎ online education is interactive;
- ✎ online education is multimedial;
- ✎ online education supports open systems that are globally accessible;
- ✎ online education is distance and time and device independent;
- ✎ online education makes use of online resources;
- ✎ online education supports cross-cultural interaction and the development of virtual cultures;
- ✎ online education environments can be controlled by learners;
- ✎ online education allows for online assessment;
- ✎ online education allows for just-in-time, self-directed learning; and
- ✎ online education is environmentally friendly.

Various features are combined to form the online learning environment. Some literature refers to this as e-learning (Ally, 2004:4 and Bates, 2005:8) but for the purposes of this section the focus is on the online component thereof. The features include:

- ✎ live broadcasts;
- ✎ mobile video and audio telecommunications;
- ✎ three-dimensional (3D) graphics;
- ✎ e-mail;
- ✎ the Web; and
- ✎ object-oriented interfaces.

(Cf. Holmes & Gardner, 2006:14)

Bates (2005:8) observes that even though many course are described and promoted as online courses, it happens that only part of such a course is presented online, the course might require additional textbooks or printed matter or courses may even require attendance of summer or weekend classes, which actually defies the definition of an *online course* or *online learning*. This type of approach can better be described as blended learning.

In terms of online or web-based learning, Taylor (2001:19) distinguishes between technological and learning components. Technological components include hardware such as the computer, the memory and storage mediums; software such as browsers to be used; as well as internet service providers. With regard to learning

components, Taylor notes the curriculum, syllabus and learning content. Although this framework does give an idea of what is needed, it oversimplifies a far more complex context.

Garrison and Anderson (2003:5) note that e-learning supports both synchronous and asynchronous communication. These two types of learning tools are discussed in the next two subsections.

3.3.4.5 Asynchronous learning tools

Asynchronous learning tools refer to tools where communication takes place at different times and from different geographical locations (cf. Cunningham *et al.*, 2009:65; Hofmann & Miner, 2009:5, 72); Inglis *et al.*, 2002:253; Jolliffe *et al.*, 2001:9, 50; Mason & Rennie, 2006:7).

Macdonald (2008:45) notes that asynchronous online support to learning presents "opportunities to develop independent self-directed learners, providing a good foundation for lifelong learning, and in some cases offering greater choice to students and a wider range of teaching approaches".

The usage of asynchronous tools can be extended to be combined to form, what Jolliffe *et al.* (2001:9) call an asynchronous learning network (ALN). Jolliffe *et al.* (2001:9) define this as "a network of people who communicate at different times from different locations using the computer as a tool to manage that communication". Mason and Rennie (2006:7) state that an advantage of asynchronous learning is that it allows for learning to be organized around participants' own schedules. Hofmann and Miner (2009:86) also note that in addition to this convenience, asynchronous learning tools allow for self-paced learning. Littlejohn and Pegler (2007:138) list a number of e-tools that can be used with asynchronous interaction:

- ✎ class discussions areas;
- ✎ shared workspaces;
- ✎ content management systems;
- ✎ e-portfolios; and
- ✎ newsfeeds.

To contextualize Internet-based asynchronous learning tools, the continuum devised by Hofmann and Miner (2009:86) can be used:

FIGURE 3.3 Asynchronous training continuum

Hofmann and Miner (2009:86)
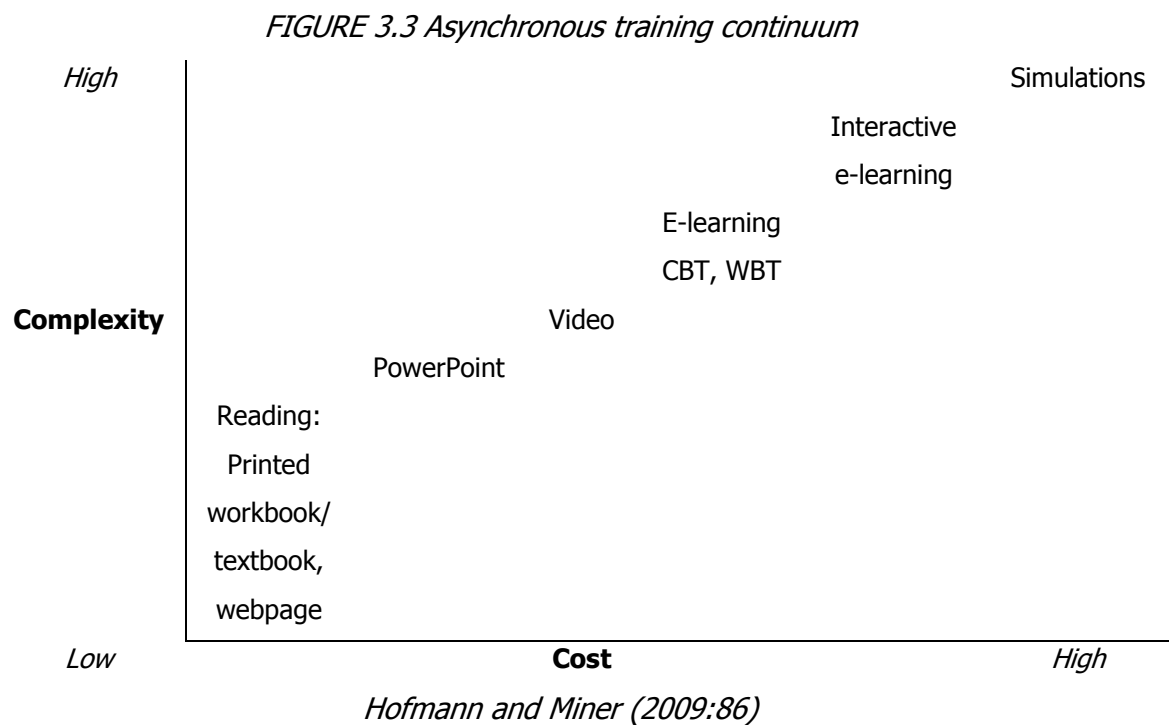
From this continuum it may seem that Internet-based asynchronous learning tools are relatively high in terms of cost and complexity. In addition, it is important to take note of possible disadvantages in using these tools. Hofmann and Miner (2009:86-87) identified the following disadvantages of asynchronous e-learning:

- ✎ Learners need to be self-directed and self-motivated and clear deadlines must be set.
- ✎ Learning may be impaired if the process is broken into pieces.
- ✎ Support may be lacking.
- ✎ Interpersonal interaction cannot be facilitated.
- ✎ It is more expansive to develop than other methods of training.

As the concept of asynchronous learning was explored in this section in terms of the technology that facilitates such communication and the tools that can be used with it, emphasis will now shift to the following online tools that can be used with blended learning: blogs, forums, wikis, online published content, podcasting and screencasting, e-mail and websites. This discussion provides an overview of the relevant tools or instructional media available for blended learning.

3.3.4.5.1 Blogs

A **blog** or **weblog** (also sometimes written as web log) is generally used by an individual for posting blog entries online. Some blogs also act as online diaries. These entries are listed in chronological order and can optionally allow for comments by readers. The action of adding entries to a blog is called **blogging**. Editing a blog does not require any knowledge of HTML code or being able to use FTP software to upload edited files. Furthermore, collaboration can also be extended through the use of blogs edited by groups although this type of setup is closer to that of a forum (cf. Boardman, 2005:42; Fee, 2009:87; Hofmann & Miner, 2009:178; Macdonald, 2008:58; Mason & Rennie, 2006:14-16; Richardson, 2006:17; Shelly *et al.*, 2006:95).

Macdonald (2008:58) describes the function of a blog as "[a]n online log or diary, often used for personal opinions and reflections, may also be used for sharing ideas with a group". Richardson (2006:18) emphasizes the fact that, other than regular websites, blogs generally include reflections or conversations that are updated daily or even more than once a day. In addition, blogs also tend to allow for readers to respond by leaving comments. According to Richardson (2006:21-23), blogs can be used at school as a class portal that can be used to publish learning content and administrative information. Another application could be to let learners have their own blogs on which work can be posted. This allows for reflection and discussion after work has been completed and it also allows for feedback from educators or peers. An extended version of such a blog is the creation of an e-portfolio.

Richardson (2006:27-28) identifies a number of pedagogical advantages of blogs:
- ✎ Blogs can be considered to be a true constructivist learning tool as learners and teachers construct content that is placed on the WWW and by implication becomes part of a wider body of knowledge.
- ✎ Blogs can also facilitate interaction outside the physical boundaries of a classroom. In addition, this allows for collaboration to take place.
- ✎ Blogs allow for reflection and metacognitive analysis as content is searchable, can be shared and the history of editing is kept.
- ✎ Blogs supports different learning styles.
- ✎ Blogs can lead to the establishment of expertise for learners within a particular subject or field.

⮠ Blogs teach learners literacies required to function within an information society.

According to Mason and Rennie (2006:15), blogging will develop the following skills: information literacy, critical thinking, writing and self-expression. The writing genre used on blogs can be described as 'connective writing'. Richardson (2006:29) regards 'connective writing' as "a form that forces those who do it to read carefully and critically, that demands clarity and cogency in its construction, that is done for a wide audience, and that links to the sources of the ideas expressed".

The following table summarizes the spectrum of blog posts identified by Richardson (2006:32) to indicate the difference between mere posting and blogging:

TABLE 3.4 Posting and blogging in blogs

Posting	Type of posting
Posting assignments	Posting
Journaling	Posting
Posting links	Posting
Links with descriptive annotation	Posting
Links with analysis that gets into the meaning of the content being linked	Simple form of blogging
Reflective, metacognitive writing on practice without links	Simple form of blogging
Links with analysis and synthesis that articulate a deeper understanding or relationship to the content being linked and written with potential audience response in mind	Real blogging
Extended analysis and synthesis over a longer period of time that builds on previous posts, links, and comments	Complex blogging

(Adapted from Richardson, 2006:32)

The introduction of blogs within a classroom setting needs to be done by scaffolding the assignments. Richardson (2006:33) suggests starting off by letting learners find interesting sites and write about what is useful at these sites. This can be followed by letting learners become experts on certain topics and, after evaluation, post

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information on blogs. Finally learners can use blogs for extended study and reflection on certain topics, while including feedback in the synthesized final product.

Blog contents can be distributed with the aid of feeds generated from Extensible Markup Language (XML) coding through the usage of **Really Simple Syndication** or RSS. Aggregator software or feed collectors can be used to collect contents and then display them to a user. Sites such as Bloglines (http://www.bloglines.com) allow for a number of RSS feeds to be combined (cf. Richardson, 2006:75-86).

A number of online services provide opportunities for the creation of blogs, this includes:
- ↳ Blogger
- ↳ Wordpress
- ↳ Blogspot

Richardson (2006:57-58) also lists some commercial services that could be used within a school environment, such as: Manila and Movable Type.

3.3.4.5.2 Forum

The function of a forum is described by Macdonald (2008:58) as something that "[e]nables online discussion between students and tutors, with groups of varying size". Forums also allow for interaction between educators and learners and the forums can later be used as a reference or learning resource (Fee, 2009:87; Jolliffe *et al.*, 2001:203).

Mason and Rennie (2006:39) trace the origin of discussion forums or discussion boards (or electronic forum in the US) to the functionality of a bulletin board system (BBS). According to Mason and Rennie (2006:39), it "allows learners and tutors to engage in an extended, structured dialogue on topics of relevance of their course of study". A BBS acts as an electronic bulletin board where notices can be posted (cf. Alessi & Trollip, 2001:376; Oosthuizen, 2004:43).

Littlejohn and Pegler (2007:50) state that an advantage of using a discussion forum is the fact that, when it comes to online 'conversations', everyone could have access

to the discussed content. This can also be used for learning or even revision of content after a formal class session.

Online discussions need to be controlled and organized. Littlejohn and Pegler (2007:58-59) list the following tools to control online discussions:

- setting deadlines through dates and times for discussions;
- summaries of key points of discussions can be provided;
- moderation of discussions;
- usage of other support such as e-mail, telephone or face-to-face discussions;
- modelling of productive online discussions;
- usage of alerts or other system tools; and
- assigning different roles to different forums.

Macdonald (2008:65-66) notes that forum interaction needs to be facilitated and monitored constantly as participation often tends to be very low. A concern such as this can be countered by adding participation to a forum as a requirement for assessment.

3.3.4.5.3 Wiki

A wiki refers to web software that allows for easy creation of wiki pages that can generally be edited by anyone. A widely used example of a wiki is Wikipedia which is an encyclopaedia to which anyone can contribute. Using the same kind of software, wikis can be created for specific purposes (cf. Ebersbach, Glaser & Heigl, 2006:1-30; Fee, 2009:87; Littlejohn & Pegler, 2007:103; Mason & Rennie, 2006:130-131; Parker & Chao, 2007:57; Richardson, 2006:1, 8, 59-61).

The origin of the wiki is traced back to the WikiWikiWeb developed by Ward Cunningham in 1995 (Bonk, 2009:235-240; Ebersbach *et al.*, 2006:10; Richardson, 2006:59). The main purpose of the first software was to enable users to publish information quickly and easily while also documenting all the editing steps. The name wiki is derived from the Hawaiian word "wiki-wiki" which means "quick" or "hurry" (Bonk, 2009:235; Ebersbach *et al.*, 2006:11; Parker & Chao 2007:57; Richardson, 2006:59).

Matthew, Felvegi and Callaway (2009:51) define wikis as "collaborative Web-based environments that allow multiple users to easily and quickly contribute content". In addition, a wiki is described by Ebersbach *et al.* (2006:10) as "web-based software that allows all viewers of a page to change the content by editing the page online in a browser". Furthermore, they add that "[t]his makes the wiki a simple and easy-to-use platform for cooperative work on texts and hypertexts". Therefore wikis allow for a great degree of collaboration as they "offer opportunities for collaborative authoring or revisions to content, as well as options for organizing and tagging content in a retrievable fashion" (Macdonald, 2008:58).

Littlejohn and Pegler (2007:103) state that wikis can be used to support productive activities and, as such, allow for easy access and editing. Yet Littlejohn and Pegler (2007:103) also question the reliability of information from wikis and emphasize the need for quality assurance.

Matthew *et al.* (2009:58-62) note that reading and rereading of wiki entries as well as connections made with prior knowledge proved to be beneficial to the users of wikis. Matthew *et al.* (2009:62-64) also note that participants, in a study focusing on the use of a wiki in a learning situation, found that wikis are useful learning tools and they (the participants) assume ownership of the wiki as they are involved in generating content. Yet Matthew *et al.* (2009:65-67) found that there are some technological concerns in terms of how easy it is to use a wiki, and limitations in terms of layout and structure of the wiki pages.

According to Ebersbach *et al.* (2006:11), wikis can either be used within a closed group or be directed to a wider audience over the WWW. Therefore wikis can be considered to be collaborative constructions of knowledge (Matthew *et al.*, 2009:52; Richardson, 2006:61, 65). Parker and Chao (2007:58) also note the collaborative properties of wikis and confirm that wikis can act as a platform for a **community of practice** which, in turn, refers to a group of people engaged in learning.

A wiki can also be used as a web-based content management system (CMS). With regard to the security of the implementation of wikis in the aforementioned cases, learners could be made responsible to ensure that content is monitored. This should

firstly be done in terms of accuracy and quality of articles, but also in terms of external vandalism (cf. Richardson, 2006:64).

Matthew *et al.* (2009:52) state that students can create online material that shows what they have learned, tied to their prior knowledge, the content and how learning was experienced. Richardson (2006:65) notes that a password based wiki will allow for greater control on wikis. Furthermore, server-installed systems will allow for computers on a network to access a wiki, instead of placing it on the Internet.

Macdonald (2008:58) describes a wiki as a "website which anyone can edit" and states that it can be "used for collaborative writing, or for publishing resources, pictures and links to favourite sites". This presents a problem with regard to the copyright of the text published in wikis as to who actually owns the text: the author or the publisher of the wiki. One possible solution is the one followed by Wikipedia where the GNU[17] Free Documentation Licence is used and any person using the content from the wiki only needs to make the original content from Wikipedia available by, for example, adding a hyperlink to the original content.

An important feature of wikis is, according to Macdonald (2008:154, 160), that it can be used by learners to comment on each other's work. This, in turn, can be employed to improve their writing skills. Matthew *et al.* (2009:52) also emphasizes the fact, that through the use of wikis, reading and reflection of learning content can be facilitated.

A possible use for wikis in a classroom situation is the posting of learning content as well as teaching resource files such as MS PowerPoint presentations, video and audio files (Richardson, 2006:65). In this regard Richardson (2006:67) lists the South African FET National Curriculum Statement that is available on the Wikibooks site[18].

The openness of wikis also allows for diversity with regard to the individuals contributing to a particular wiki. In this regard, Ebersbach *et al.* (2006:23-24) contend that "[a] variety of experiences, backgrounds and knowledge are seen as the

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[17] GNU refers to the recursive acronym "GNU's Not Unix" and refers to the free software movement developed by Richard Stallman (Bonk, 2009:143-144).
[18] The site is available at: http://en.wikibooks.org/wiki/South_African_Curriculum

basis of creative processes and as an enrichment, and thus, every user is initially recognised as an expert".

Therefore, from these varied participants, a balanced result is expected. Apart from different backgrounds, the concept of multilingual contributions can be added. This phenomenon has been effectively employed in Wikipedia where articles can be linked directly to similar articles in other languages.

To facilitate and monitor this collaboration, wikis allow for administrators – often with various levels of access and responsibility – to be able to maintain content and the technical setup of wikis.

Furthermore, Ebersbach *et al.* (2006:13) note that wikis allow for the creation of associative hypertexts with non-linear navigation structures that employ hyperlinks to accommodate movement between pages. Editing wiki texts are also very easy and users do not need any additional software to access or edit wikis. The installed wiki script on the server translates the wiki code into HTML.

A number of characteristics and functions are common in most forms[19] of wikis. These characteristics and functions have been identified by Ebersbach *et al.* (2006:19):

- ✍ An Edit button allows the editing of wiki pages. Initially, the idea behind wiki pages was that editing should be available to all and without any restrictions, yet wiki sites, such as Wikipedia, allow for restrictions to be put on certain pages. In this regard, only individuals with administrator rights are allowed to edit title pages. For the sake of the use of wikis in schools, restrictions can also be used effectively to protect certain content that must only be read and not edited.
- ✍ Hyperlinks can be created to link inside wiki pages, between different wiki pages, as well as link to external sites. Generally, hyperlinks are created using square brackets, but they function in the same way as normal HTML hyperlinks. If internal links are created to pages that do not exist, the pages

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[19] Since the creation of the WikiWikiWeb software many similar types of software have been developed including: UseModWiki, MediaWiki, MoinMoin, PhpWiki, WakkaWiki, TikiWiki and TWiki (cf. Ebersbach *et al.* 2006:18).

are automatically created when the link is clicked so that a new page can be created.

↳ Wikis also save previous versions or modifications to pages in the History section of every page. This allows for pages to be reset to earlier versions or comparisons to be made between versions. This has pedagogical possibilities, as learning progress can be checked and editing by fellow students can be monitored.

↳ Wikis also include a *RecentChanges* page which tracks pages that have been changed recently. This can sometimes be based on a specific time period. For administrators or educators, this feature can be used to track recent changes made to the wiki.

↳ The *SandBox* section allows for new users to be able to practise within the wiki environment and try out different functions. This kind of functionality is essential for new wiki users.

↳ Search functions are also provided in wikis. Generally, searches can be based on full text or just page title searches. Usually a 'Go' and 'Search' button is used on wikis. The 'Go' button takes the user straight to the page name entered in the search edit box, while the 'Search' button returns all the pages that contain instances of the term.

The type of wiki code used by most wikis, such as Wikipedia, has particular syntax and this will now be discussed briefly. (Cf. Ebersbach *et al.* 2006:46-100)

Due to the fact that wikis are used extensively in this study to facilitate blended learning, detail is provided in terms of wiki-coding.

For general text, the content just has to be typed inside the wiki edit window. Paragraph breaks are created by adding an additional blank line. The formatting of text can be extended by changing text into italics using double single quotation marks on either side of the formatted text.

Wiki code	*Result*
`The ''Wiki''`	The *Wiki*

Text can also be placed in bold type by adding three single quotation marks around certain text.

Wiki code	Result
`A '''new''' site`	A **new** site

To combine bold and italics, five single quotation marks should be added.

Wiki code	Result
`'''''Wikipedia'''''`	***Wikipedia***

A hierarchy of headings can also be used within a wiki. This is determined by adding equal signs around headings. This could range from one equal sign for the largest type of heading down, to say three equal signs, for one of the smallest.

Wiki code	Result
`=Heading 1=`	# Heading 1
`==Heading 2==`	## Heading 2
`===Heading 3===`	### Heading 3

Bulleted lists can also be added by adding asterisks (*) to the beginning of words or sentences. Additional levels can be added by adding more asterisks.

Wiki code	Result
`* First item`	■ First item
`* Second item`	■ Second item
`** Additional item`	■ Additional item

Similar to bulleted lists, numbered lists can be added using the hash (#) symbol. Additional levels can also be created by adding more hashes.

Wiki code	Result
`# First item`	1. First item
`# Second item`	2. Second item
`## Additional item`	2.1 Additional item

Another form of listing is the usage of definition lists that employ a semicolon preceding the term and the definition following a colon.

```
; Website: collection of webpages
```

Website

    Collection of webpages

A horizontal line can be added to text by adding four dashes.

Wiki code	*Result*
----	▬▬▬▬▬▬▬▬▬▬

An internal wiki hyperlink can be inserted by adding text in double square brackets, while external links can be set by adding the website address in single square brackets. If the link itself should not be displayed within the wiki, page text separated by a vertical line can be used as an alternative.

Wiki code	*Result*
[Introduction]	Introduction
[www.google.co.za]	www.google.co.za
[www.google.co.za|Google]	Google

Strikethrough text can be achieved by using the <strike> tag.

Wiki code	*Result*
The <strike>old</strike> new site	The ~~old~~ new site

To underline text, the <u> tag can be used. As with the previous tag, this tag must be closed with a tag preceded with a front slash.

Wiki code	*Result*
The <u>wiki</u> site	The <u>wiki</u> site

Images can be added by using an Image tag. In this example the picture stored as logo.gif will be displayed. In this instance it is assumed that the image has been uploaded as part of the wiki. For external images the URL or address of the image can be used.

```
[[Image:logo.gif]]
```

In addition to the above-mentioned code, wikis often also allow HTML code to be used within wiki pages.

Different online services provide opportunities for the creation of wikis. Richardson (2006:70) lists the following wiki tools that can be used within a school context:

⮮ Peanut Butter Wiki (http://www.pbwiki.com)

⮮ JotSpot (http://www.jot.com)

⮮ SeedWiki (http://www.seedwiki.com)

⮮ Wikicities (http://www.wikicities.com)

⮮ Web Collaborator (http://www.webcollaborator.com)

Based on the aforementioned discussion wikis will be used as instruction tool in the implementation of the conceptual model proposed by this study through which multilingualism can be accommodated and promoted.

3.3.4.5.4 Online published content

Flickr (http://www.flickr.com) allows for the publishing of images online. Flickr also allows for annotations to be made and this can have educational value as collaborative tasks can be facilitated in this manner. Furthermore, discussions can be established with varying levels of access (cf. Richardson, 2006:102-103).

3.3.4.5.5 Podcasting and screencasting

Podcasting refers to the broadcasting of audio content over the Internet. Generally this is done through MP3 files that are made available for downloads and in turn can be played back either on computer or on MP3 compatible devices. A number of software applications can be used to record MP3 files, for example the open source application Audacity[20]. The advantages of using podcasting include wider distribution of content, access to expertize, as well as the reuse and archiving of content (cf. Fee, 2009:88; Mason & Rennie, 2006:xxxvi-xxxvii; Richardson, 2006:112-122).

Screencasting is similar to podcasting in that it involves the recording of audio – usually voice commentary – but it also includes recordings of what happens on the screen of the person doing the recording. From an educational point of view, this

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[20] The open source sound recording application Audacity can be downloaded at: http://audacity.sourceforge.net

type of application will allow for voice annotations to be made on work done on the computer or even searches on the Internet. A number of screen-capturing software exist, for example the Windows Media Encoder that can be used with a microphone (cf. Richardson, 2006:122-124).

3.3.4.5.6 E-mail

E-mail (sometimes written as email) or electronic mail allows for messages that can optionally include attachments to be sent over the Internet in an asynchronous manner (cf. Alessi & Trollip, 2001:375; Jonassen *et al.*, 2003:76; Leedy & Ormrod, 2010:19; Oosthuizen, 2004:42; Shelly *et al.*, 2006:92-93). Although e-mails can be sent quickly and be used basically in a synchronous manner, because of the time delay involved it is, for the sake of this study, considered to be an asynchronous communication medium.

From the literature it is clear that e-mail is considered to be one of the main forms of communication on the Internet (cf. Crook, 1994:195; Crystal, 2001:10; Holmes & Gardner, 2006:22; Jolliffe *et al.*, 2001:203; Nel & Wilkinson, 2008:165; Van Aswegen, 2008:33).

E-mail can be used for communication between learners and educators. Yet this can even be extended to communication between schools. Co-operation between different educators – even outside the borders of the country – can be facilitated.

A useful application of e-mails is the capability to send e-mails to a number of addresses at the same time using a **listserv** (or *mailing list server*). This allows individuals to send an e-mail to a single address and this is then delivered to a number of people at the same time (cf. Alessi & Trollip, 2001:375; Jonassen *et al.*, 2003:476-77; Oosthuizen, 2004:42-43; Shelly *et al.*, 2006:96).

Van Aswegen (2008:33) emphasizes the fact that the skill of being able to use e-mail is also important for learners.

3.3.4.5.7 Websites

Websites are mainly pages written in hypertext or more traditionally in HTML or Hypertext Markup Language. The part of the Internet where websites are found is

referred to as the World Wide Web or WWW (cf. section 3.3.1.3). Holmes and Gardner (2006:115) note that this language "enables instructions to be given to a Web browser about how to read the text or other information it is required to display or use". Horton (2000:16-17) identifies three functions a website can perform in terms of a teaching course. This includes handling administrative tasks, being a classroom resource and/or serving an instructional purpose.

The basic HTML syntax works with coding placed in angle brackets[21]. This is basically stored as text and the browser reads the commands placed in these brackets and displays it correctly. Hixson and Schrock (1998:185-202) provide an extensive guide to HTML coding. HTML is also commonly supplemented with graphics, multimedia and Java, and other applets or applications. Boardman (2005:92) describes the function of HTML code as a form punctuation in that it interrupts text to provide instructions to the browser.

Printed text is generally regarded as being selective and exclusive and is basically confined to the limits of a page and its bounded form like a book. On the other hand, hypertext is considered to be inclusive as the space of what can be considered to be a "text" may cover more than one hypertext file and can be changed often (cf. Burbules, 1998:103).

A key property of websites is the use of **hyperlinks**. Hyperlinks are commonly described as links between websites. This implies that, to move from one page (or website) to another, a user can just click on an underlined piece of text, a certain picture or hotspots within a picture. This turns content that would seem to be linear into a non-linear entity where users can move from one relevant piece of information to another. The order in which links are followed can be determined by the website designer, but quite often the reader determines which route is followed (cf. Alessi & Trollip, 2001:383-384; Crystal, 2001:202-203; Burbules, 1998:105; Snyder, 1998:126; Van der Westhuizen, 1999:94). Van der Westhuizen (1999:47) states that hyperlinks can be used to facilitate interactivity through choices that learners need to make when following hyperlinks.

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[21] The < and > are examples of angle brackets.

In this regard, Crocker (2006:3-4) highlights the use of hyperlinked study materials. Crocker defines this as "electronic study materials in which words, phrases, paragraphs, digital images etc. may be linked electronically to, for example, a text box containing text or pictures that explain or elaborate on a term; or to an internet site that can provide further insight to the study materials".

Pachler (2001:23) makes the following observation with regard to the influence of hyperlinks on the concept of a narrative:

> Hyperlinking breaks up traditional conceptual notions of narrative such as the display, in Western cultures, of text from front to back and from top left to bottom right, and in terms of beginning, middle and end. Hyperlinking brings with it the need to become socialised into new ways of 'reading' and processing 'text'.

For educators this also means that preparing learners to read and write only linear texts is not sufficient and that non-linear hypertexts should also be used. The focus of the reading action, with hypertext, is not determined by the text, but rather on the reader, as the reader decides the path of the narrative as hyperlinks are followed.

Snyder (1998:134-135) highlights the fact that hypertext has the potential to be an effective teaching and learning tool as it changes learners into reader-authors as they explore and construct their own meaning from the text. Meaning is contextualized through the way that links can be followed to definitions or explanations of key words or concepts.

Min (2006:120) lists the following types of digital learning environments found on the web:

- ordinary readable text;
- data files;
- relational data banks;
- canned lessons which could include multimedia;
- discovery environments that include games as well as programmes that allow for drills and practices; and
- digital learning tools or applets that allow for simulations.

A way in which websites can be used in learning is through **WebQuests**. The concept of a WebQuest was developed by Bernie Dodge in 1995. Jonassen *et al.*

(2003:45) states that a "WebQuest is an inquiry-oriented activity in which teachers choose Web resources for students to use as information sources in activities designed to support analysis, evaluation, and synthesis of information. Furthermore, Jonassen *et al.* (2003:45) list twelve types of tasks in the taxonomy of WebQuests: retelling, compilation, mystery, journalistic, design, creative product, consensus building, persuasion, self-knowledge, judgment, analytical, and scientific. Jonassen *et al.* (2003:46) state that the main goal of WebQuests are that "students develop a well-reasoned opinion, communicate that, and get feedback from an actual representative".

Websites can be created using commercial web site design packages such as Microsoft Front Page, Macromedia's Dreamweaver or even Microsoft Word (cf Shelly *et al.*, 2006:192-208, 462-484).

In contrast to asynchronous learning tools where communication takes place at different times, synchronous communication takes place simultaneously between different participants (teachers and learners). In the next section, synchronous learning tools will be discussed.

3.3.4.6 Synchronous learning tools

Synchronous learning tools refer to tools that allow for communication to take place in real time or simultaneously (cf. Hofmann & Miner, 2009:5, 117; Inglis *et al.*, 2002:258; Mason & Rennie, 2006:112; Thorne, 2003:11-12). Jolliffe *et al.* (2001:9) state in this regard that "those involved in the communication process are present all at the same time, but not necessarily in the same place". This section starts off with some explanatory statements from the relevant literature followed by an overview of application sharing, audio tools, polls and feedback, synchronized web browsing, text chat, video conferencing, virtual spaces and whiteboards.

According to Hofmann and Miner (2009:117), synchronous interactions include: conference calls, instant messaging, video conferences and virtual classrooms. Synchronous learning requires adequate bandwidth for all users in order for sound and video quality to be sufficient (Thorne, 2003:12). Littlejohn and Pegler (2007:51) state that synchronous discussion can take place online at the same time, yet with participants being at different places.

Synchronous learning tools can act as effective communication tools although Macdonald (2008:91) states that, if possible, face-to-face meetings are preferred and that the synchronous tools should rather be employed in addition to face-to-face meetings or when distance between students and the learning facility is an issue.

According to Macdonald (2008:92), synchronous learning tools prove to be especially useful for "community building and socialising, for brainstorming and decision making, and for the pacing of studies". Through the use of synchronous learning tools, learners can also be motivated; goals can be set and educators can gauge what students know and how they are coping with a particular class (cf. Macdonald, 2008:100).

Littlejohn and Pegler (2007:52) list the following differences between face-to-face communication and online synchronous communication:
- taking turns when talking;
- concern about who is paying attention;
- technical difficulties that hamper communication may still occur;
- time differences (especially in terms of distance education across borders) may influence availability for communication; and
- identity confusion can also occur if participants take part in online communication anonymously.

These differences emphasize the difference in medium and context, and this depends on the tools used. In this regard, Littlejohn and Pegler (2007:139) list the following e-tools that can be used with synchronous interaction:
- audio and videoconferencing, instant messaging and text-based discussion tools;
- shared whiteboards and drawing tools; and
- online formative assessment tools such as quiz tools.

3.3.4.6.1 Application sharing
Application sharing is defined by Macdonald (2008:90) as "to share or demonstrate the use of programs such as spreadsheets or databases with the group". In such an instance, students may have the opportunity either to just view how the computer program is used or even interact with it.

3.3.4.6.2 Audio tools

In terms of online audio tools, this refers to audio delivered over the Internet – including Voice over IP (VoIP) systems. This may be done on a one-to-one or many-to-many basis (cf. Macdonald, 2008:90). Holmes and Gardner (2006:21) note that VoIP systems, such as the software Skype, could ultimately replace traditional telephony and will be used even more in future and thus reduce costs.

Macdonald (2008:106-107) notes the importance of using audio tools with visual aids before using the audio tools. Audio tools also require microphones or headsets that need to be set up prior to using them. Furthermore, silences should be avoided, as this may be misinterpreted by other users and should therefore be announced.

3.3.4.6.3 Polls and feedback

Polls and feedback allow teachers to track whether learners are following discussions and can be implemented through the use of Yes/No or multiple-choice buttons used by learners (cf. Macdonald, 2008:90).

Furthermore, Macdonald (2008:100) mentions that "[p]olls can add a sense of topicality to a course by encouraging students to contribute their views on a course topic".

3.3.4.6.4 Synchronized web browsing

The phenomenon of synchronized web browsing refers to browsing as a class to a specific website (cf. Macdonald, 2008:90). With the aid of this tool learners can follow, not only the same content, but can also witness the search process or use certain website functions such as editing a wiki.

3.3.4.6.5 Text Chat

Text chatting refers to communication over the Internet using text over either computers or even cellular phones (cf. Alessi & Trollip, 2001:376; Shelly *et al.*, 2006:96; Simpson, 2002:62-63). Jonassen *et al.* (2003:45) define chatting as "real-time (synchronous) exchanges among individuals who are gathered in a *virtual location*" [italicization from the original text]. Crystal (2001:11) defines chatgroups as "continuous discussions on a particular topic, organized in 'rooms' at particular Internet sites, in which computer users interested in the topic can participate". Unlike

Crystal that views chatgroups as both synchronous and asynchronous electronic discourse, in this study text chat will refer to synchronized chatting.

Mason and Rennie (2006:19) define chatting in a chat room or chat box as "[a] simple form of computer mediated communication (CMC) that allows users to participate in synchronous communication with each other, usually in the form of short text messages". Macdonald (2008:90) also notes that transcripts of such text chat sessions can be archived for future reference. Chat rooms can also be organized around certain themes or topics and, as such, it creates online communities of individuals with shared interests. Some chat rooms even allow for the usage of avatars (Mason & Rennie, 2006:19).

According to Macdonald (2008:105), the use of text chatting tools can be very effective when they are used with other tools such as audio tools and may not be that effective in terms of "content related learning outcomes".

An example of text chatting is the use of Internet Relay Chat (IRC) which allows for a number of people to take part in simultaneous chat sessions. Users can join channels or chat rooms based around particular topics. IRC communication is facilitated through the distribution of IRC servers all over the world (cf. Crystal, 2001:151; Van der Westhuizen, 1999:72).

According to Van der Westhuizen (1999:72), text-based chat tools are not necessarily used for the creation of virtual worlds and are therefore easier to use.

3.3.4.6.6 Video conferencing

Video conferencing can refer to many-to-many or one-to-many communication through the aid of Internet video conferencing software. Apart from hardware requirements, this also requires an adequate Internet connection (cf. Alessi & Trollip, 2001:376-377; Bonk, 2009:231-234; Holmes & Gardner, 2006:23; Jonassen *et al.*, 2003:36, 79; Oosthuizen, 2004:43-44; Simpson, 2002:63-64; 102-109; Van der Westhuizen, 1999:73).

3.3.4.6.7 Virtual spaces

Virtual spaces or **virtual worlds** refer to learning areas created on the Internet. Examples of virtual worlds are MUDs (Multi User Dungeons) and MOOs (Multiple Object-orientated environments) (cf. Jonassen *et al.*, 2003:101-104; Van der Westhuizen, 1999:72).

Macdonald (2008:90) notes that virtual worlds can be used to form sub-groups that focus on certain topics discussed in a classroom. Holmes and Gardner (2006:23) note that role-playing games also allow for engaging and innovative e-learning environments.

Crystal (2001:12) defines virtual worlds as "imaginary environments which people can enter to engage in text-based fantasy social interaction". An example of a virtual world is a MUD (multi-user dungeon) which was used for role-playing adventure games. Holmes and Gardner (2006:24) state that MUD publishers maintain worlds that participants inhabit. Users use avatars to function within MUDs. An **avatar**[22] refers to a visual representation of an individual in either an online chat environment, online game or virtual world (cf. Holmes & Gardner, 2006:24; Mason & Rennie, 2006:10). In addition, Crystal (2001:13,172-173) lists the following subgenres of MUDs: DikuMUD, LPMUD, MUSH, MUCK, MUSE and TinyMUD.

A MOO or MUD Object Oriented refers to programmed objects that can be used in virtual worlds (Crystal, 2001:174). Holmes and Gardner (2006:24) note that MOOs has education capabilities especially in terms of language learning.

Inglis *et al.* (2002:5) state that the term **virtual classroom** refers to synchronous conferencing in the US, but is generally used to refer to asynchronous conferencing in the rest of the world. The concept of **virtual communities** also relates to virtual spaces and virtual classrooms. According to Rennie and Mason (2004:22), a virtual community refers to communication networks whose members are not present in the same geographical location. Rennie and Mason (2004:24, 33) prefer the term 'Connecticon spaces' as the relationships established in the virtual environment often seems to be closer than real than those relationships that are geographically closer.

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[22] The word avatar can be traced back to Hindu mythology where it refers to a deity's incarnation in an earthly form (Crystal, 2001:12).

3.3.4.6.8 Whiteboards

Van der Westhuizen (1999:73) defines whiteboards as "systems [that] allow two or more users to share a page on which they can collaboratively enter data by means of entering text or drawing tools". Whiteboards, within the context of online learning, refers to software that allows users to share a section of screen and be able to create pictures, text or diagrams which can be seen by all users. Macdonald (2008:90) also mentions concept maps which can be employed to illustrate relationships between certain items or concepts.

Macdonald (2008:107) emphasizes that whiteboards should rather not be used only for text presentations and for the sake of keeping the interest of the individuals following the lessons graphics and icons should be employed effectively.

3.3.5 Mobile learning

Mobile learning or m-learning refers to learning that takes place through the use of mobile devices such as personal digital assistants (PDAs), smart phones and mobile phones[23] (cf. Fee, 2009:89; Hofmann & Miner, 2009:181; Littlejohn & Pegler, 2007:40.) Hofmann and Miner (2009:5) note that mobile learning is inexpensive and may not require high bandwidth.

One potential use of mobile phones within an educational environment is the sending of short text messages through the use of SMS (Short Message System) messages (Bonk, 2009:315; Cunningham *et al.*, 2009:71; Littlejohn & Pegler, 2007:40).
According to Bonk (2009:315), m-learning helps individuals overcome problems associated with poor connectivity, especially within the African context. This statement was made due to work done in South Africa and Kenya by John Traxler of the University of Wolverhampton in the UK. In addition, it is clear that mobile phone ownership is increasing and it counters problems associated with having computers or even having training to use the computers (cf. Bonk, 2009:314-315).

There are some concerns with regard to the use of mobile devices when it is expected that learners use their own mobile devices. This includes the fact that some

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[23] Some sources uses the word 'cell phone' to refer to this type of device, yet for the sake of consistence with the phenomenon of 'mobile learning' the word 'mobile phone' will be used in this study.

learners might not have mobile devices at all. In addition, the standard of the devices used by learners may not be the same and as such might not all have the same capabilities. Furthermore, the ability by learners to be able to use devices up to their full capability is a factor that needs to be taken into account (cf. Littlejohn & Pegler, 2007:41-42). As such, in this study, the focus will not be on mobile learning.

As theoretical grounding for blended learning it is important to get an overview of learning theories relevant to this medium and this study.

3.4 BLENDED LEARNING AND LEARNING THEORIES

Blended learning should be considered within existing learning theories because this background forms the foundation to the implementation thereof. In this regard, Jolliffe *et al.* (2001:3) make the following observation: "Any good Web-based learning has to be based on sound learning principles, not on the myriad of resources to be found on the Web or the number of animated icons that appear on a page. The use of the Web and its many resources does not necessarily equate to an effective learning environment". Jones (2006:192) also supports this view by stating that "blended learning needs to be grounded in sound education theory". In addition, learning theories should be considered when implementing blended learning. It should be noted that the medium itself does not constitute a different approach. Furthermore, merely using the Internet or even a blended learning approach does not necessarily guarantee learning (cf. Van der Westhuizen, 1999:76).

To be able to approach blended learning within a suitable context the following learning theories will be discussed shortly and the relevance to blended learning highlighted: behaviourism, cognitivism, constructivism, socio-constructivism and communal constructivism. These theories have been chosen because of their importance in the literature in terms of blended learning (cf. Holmes et al., 2001:1-7; Holmes & Gardner, 2006:76-89).

3.4.1 Behaviourism

The behaviourist approach to learning, as developed by Skinner, focuses on the repetition of learning content and behaviour in order for it to trigger an automatic response when necessary. Learning is measured through a change in behaviour that can be observed and hence internal processes are not necessarily evaluated as they

cannot be observed. In addition, research by Pavlov suggests that conditioning initiates automatic and instinctive responses. The major theorists within this field included Ivan Petrovich Pavlov (1849-1936), John Broadus Watson (1878-1958), Edward Lee Thorndike (1974-1949) and Burrhus Frederic Skinner (1904-1990). (cf. Du Plessis, 2002:12-13; Fincher & Petre, 2004:35-36; Gagné, 1985:6-10; Hergenhahn & Olson, 1993:48-51, 56-123, 161-201; Holmes & Gardner, 2006:80-81; Nieuwoudt, 2003:17-20; Pretorius 2005:15; Roblyer, 2006:38; Romiszowski, 1988:16; Shelly *et al.*, 2006:382-385; Smith & Ragan, 1999:19-20; Van Aswegen, 2008:48-49; Vygotsky, 1978:19-20).

According to Holmes and Gardner (2006:80), Watson coined the term 'behaviourism' and he was opposed to the idea that the mind and consciousness of a person can be used to explain behaviour. According to Mentz (2000:77), behaviourism focuses on the external behaviour of people that can be studied. This is a philosophy that has departed from the perception that human behaviour is driven by deep internal motives such as power, fear, order, love and others. Within behaviourism it is believed that human behaviour is measurable and can be observed. This behaviour is then reliant on stimuli from outside. Holmes and Gardner (2006:80) furthermore maintain that the behaviourist theory "based predicted success on the use of rewards as reinforcement stimuli and punishments (or sanctions) as deterrents". According to Säljö (1999:148), behaviourist learning is linked to a change in physical behaviour and, as such, only if new behaviour is displayed does it imply learning has taken place. Walker and Baets (2009:245) note that, according to instructional behaviourism, knowledge refers to modified behaviour and learning takes place in response to a stimulus. Typically this is manifested in a blended learning environment through the usage of web-assisted instruction.

Ruhe and Zumbo (2009:178-179) make the following observation in this regard: "Behaviourism led to linear models of instructional design, including the first teaching machines, programmed instructions, and assessment activities based on the mastery of discrete, measureable bits of content knowledge".

With regard to this approach to learning, the application of blended learning lends itself towards repetition of work as learners can work at their own pace and repeat sections if necessary. Learning technologies can be employed to present information

in a linear fashion while navigation choices are limited (cf. Sieber & Andrew, 2003:221).

As Holmes and Gardner (2006:81) also state, the drill and practice approaches are still used in e-learning contexts. Tutorials are also regarded as behaviourist since content is taught and then tested. The reward for successful learning is being able to continue to the next stage of the work and the sanctions include extension tasks or having to repeat a task (cf. Holmes & Gardner, 2006:81). Furthermore, behaviourist principles are also still found in many web-based learning activities where extrinsic motivators are used as rewards (Ruhe & Zumbo, 2009:179).

With regard to the use of behaviourism in blended learning, it is important to take note of its contribution to instructional design. Alessi and Trollip (2001:18) associate Instructional Systems Design (ISD) with behaviourism. This association can be traced to the use of behavioural objectives that focus on what learners should be able to do, the analysis of learning tasks and the teaching of specific learner performance levels (Alessi & Trollip, 2001:18-19; Mayes, 2006:14). In addition, Alessi and Trollip (2001:18-19) make the following statement with regard to ISD:

> The ISD model begins at curriculum level with analysis of content, definition of overall objectives, delineation of sequences and subsequences of the curriculum. It proceeds with the selection of instructional methods and media, designing individual lessons to enhance learner mastery of the objectives, developing delivery systems for the individual lessons, and ends with evaluation of the lessons and the entire instructional system.

Yet ISD does not take unobservable aspects of learning into consideration.

Van der Westhuizen (1999:87) notes that, in terms of the behaviourist theory, the following principles will have an impact on instructional design: coherence, repetition, feedback and reinforcement, as well as encouragement and withdrawal.

Mentz (2000:77) notes that the setting of specific outcomes or aims is integral to behaviourism. In terms of learning and teaching, the teacher should observe learners. Hence learners prove what they have learned through what they can do. The emphasis on the aim of educating is on the result rather than on the actual teaching. Mentz (2000:78) also indicates that the Outcomes-Based Education (OBE)

model demonstrates many behaviourist properties with the emphasis on visual, measurable and specifically formulated outcomes. There is also a lot of focus on behaviour that can be observed.

3.4.2 Cognitivism

The basic premise behind cognitivism is the thought process behind the behaviour. Changes in behaviour can be viewed as indicators of what transpires in a learner's mind. Furthermore, associations can be formed during the process of learning through deductions made from similar situations that could be repeated. Learning is also viewed as a process through which cognitive structures are obtained and reorganized to allow the retention and processing of information by learners. The main difference between cognitivism and behaviourism is a distinct move from behaviour to knowledge. With regard to cognitivism, Jean Piaget, Jerome Bruner and Lev Vygotsky are primary figures in the development of the cognitivist approaches. (Cf. Alessi & Trollip, 2001:3; Cook & Finlayson, 1999:13; Crook, 1994:31; Du Plessis, 2002:15-16; Fincher & Petre, 2004:35; Hergenhahn & Olson, 1993:275-288; Holmes & Gardner, 2006:81-83; Nieuwoudt, 2003:20-29; Olivier, 2009:44-48; Romiszowski, 1988:23-24; Shelly *et al.*, 2006:385-390; Smith & Ragan, 1999:20-23.)

The cognitivist theory emphasizes developmental stages that require different types of learning. Piaget identified the following cycles (Holmes & Gardner, 2006:81-82):
  ✎ 0 – 2 years: sensory-motor skills with the focus on reaching, touching, etc.);
  ✎ 2 – 7 years: pre-operational with the emphasis on linguistic development and the intuitive understanding of simple processes);
  ✎ 7 – 11 years: concrete operations in terms of organized thinking and problem-solving real contexts;
  ✎ 11 – 15 years: formal operations regarding abstract conceptualization and formal logic.

Despite criticism regarding rigidly aligning these stages to ages (Holmes & Gardner, 2006:82), the theoretical background can still be used.

Min (2006:122) emphasizes Piaget's idea that teachers should provide an environment in which spontaneous research can take place where learners can

construct meaning at their own pace. Furthermore, learning should be considered to be an active process in which errors can be made and solutions found.

Holmes and Gardner (2006:82) also mention the learning capability being measured in terms of steps, as set out by Bruner, which implies that some learning capabilities require the consolidation of others before they can be reached. Similarly, the concept of scaffolding, devised by David Wood, acts in the same way. Vygotsky also used developmental stages in his theoretical approach according to which learning should also be adapted according to the developmental stage or level attained by learners (cf. Holmes & Gardner, 2006:82-93, 95; Vygotsky, 1978:85-86).

According to Fincher and Petre (2004:35), the work of Vygotsky "centred on the notion that knowledge and learning are culturally and societally constructed". In addition, Vygotsky's notion of the zone of proximal development (ZPD) is of importance as it implies that only through intervention by a teacher can learners progress (cf. Mayes, 2006:16-17; Vygotsky, 1978:84-91). Vygotsky (1978:86) defines the zone of proximal development as follows: "It is the distance between the actual developmental level as determined by independent problem-solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers". Furthermore, learning with the aid of social interaction is also emphasized as it facilitates cognitive and intellectual growth (cf. Crook 1994:33-35;48-50; Holmes & Gardner, 2006:83; Vygotsky, 1978:84-91).

Due to cognitivism, computers have been more adaptive and responsive to individual needs and actively involve learners when it comes to online learning (Ruhe & Zumbo, 2009:179). Sieber and Andrew (2003:221) highlight the use of multimedia computer-aided learning, simulations and virtual worlds as examples in which the cognitivist theory can be implemented. This also ties in with constructivism which will be discussed next.

Alessi and Trollip (2001:19) highlight information-processing theories that "attempt to describe how information in the world enters through our senses, becomes stored in memory, is retained or forgotten, and is used". An underlying principle of this

approach is complex, yet systematic laws that the senses and the brain follow (Alessi & Trollip, 2001:19).

Instructional events are identified by Gagné (1985:302-330) based on the information-processing model (cf. Nieuwoudt, 2003:22). These events are as follows (Gagné, 1985:304; Shelly *et al.*, 2006:386):

- ✎ gaining attention;
- ✎ informing learner of the objective, activating motivation;
- ✎ stimulating recall of prior knowledge;
- ✎ presenting the stimulus material;
- ✎ providing learning guidance;
- ✎ eliciting performance;
- ✎ providing feedback;
- ✎ assessing performance; and
- ✎ enhancing retention and transfer.

The theory of semantic networks also relates to cognitivism. The emphasis is here on parallels to connections in the human brain. As brain cells are connected to one another, so nodes (pieces of information) are connected in a semantic web. Prior knowledge is important and learning is the incorporation of new knowledge with prior knowledge through assimilation or accommodation. The semantic network theories can also be associated with the Schema Theory of Sir Frederick Bartlett where schemas or schemata are organized collections of information and their relationships (Alessi & Trollip, 2001:20).

In terms of multimedia design, cognitive theory is important in terms of "perception and attention, encoding of information, memory, comprehension, active learning, motivation, locus of control, mental models, metacognition, transfer of learning, and individual differences" (Alessi & Trollip, 2001:20-31).

3.4.3 Constructivism and Socio-constructivism

With regard to constructivism, the focus is on the construction and interpretation of reality, drawing on a person's own reality as deduced from previous experiences, the perceptions thereof, mental structures and beliefs. Learning takes place within a social context and, as such, knowledge can be constructed from interaction with the

environment (cf. Alessi & Trollip, 2001:31; Crook, 1994:57; Du Plessis, 2002:16-21; Holmes & Gardner, 2006:83-84; Jolliffe *et al.*, 2001:21; Killen, 2000:xviii; Mason & Rennie, 2006:xviii, 31-32; Matthew *et al.* 2009:54; Mentz, 2000:74-75; Nieuwoudt, 2003: 29-34; Pretorius, 2005:15-16; Shelly *et al.*, 2006:390-395; Smith & Ragan, 1999:14-16). Constructivism can also be traced back to the philosophy and perspectives of Jean Piaget, Jerome Bruner and Lev Vygotsky (cf. Crook, 1994:57-59; Jolliffe *et al.*, 2001:21; Mayes, 2006:14; Smith & Ragan, 1999:15).

Crook (1994:57) emphasizes that Piaget's view on cognition neglected social influences as they played a very small role in his theories. In contrast Vygotsky and socio-cultural theorists emphasized the impact of social events on cognition. Where Piaget and psychological theorists approached the individual to make deductions from society, Vygotsky focussed on society because to Vygotsky the social dimension is a fundamental tenet (Crook, 1994:58; Olivier, 2009:43).

According to Mayes (2006:14), the following items are emphasized through the design principles for constructivist learning activities: "ownership of the task, coaching and modelling of thinking skills, scaffolding, guided discovery, and opportunity for reflection".

Ruhe and Zumbo (2009:180-183) state that the following theories relevant to instructional design and e-learning, are based on constructivism:

- ✎ problem-based learning;
- ✎ distributed cognition;
- ✎ situated apprenticeship; and
- ✎ human-computer interaction (derived from distributed cognition).

In addition, Alessi and Trollip (2001:32) state that, in terms of the constructivist point of view, learning constitutes people constructing knowledge. An early example of applying constructivism is the program Logo created by Seymour Papert to teach learners mathematics and problem-solving by constructing computer programs. Papert also emphasizes the idea of "playing" with a problem in order to solve it and acquire skills to solve other problems (cf. Papert, 1993:16-17, 86-87).

Clancy (2004:87) states that a constructivist approach to research can place the focus on the links between concepts and how they are built and reorganized to result in learning taking place.

Macdonald (2008:128) notes that constructivism relates to the fact that learners construct their own understanding through the execution of learning activities. As such, Macdonald (2008:129) also emphasizes the importance of learners that 'learn by doing' and hence develop skills.

Alessi and Trollip (2001:32) identified the following principles associated with constructivism:

- emphasize learning rather than teaching;
- emphasize the actions of thinking of learners rather than of teachers;
- emphasize active learning;
- use discovery or guided discovery approaches;
- encourage learner construction of information and projects;
- have a foundation in situated cognition and its associated notion of anchored instruction;
- use cooperative or collaborative learning activities;
- use purposeful or authentic learning activities;
- emphasize learner choice and negotiation of goals, strategies, and evaluation methods;
- encourage personal autonomy on the part of learners;
- support learner reflection;
- support learner ownership of learning and activities;
- encourage learners to accept and reflect on the complexity of the real world; and
- use authentic tasks and activities that are personally relevant to learners.

These principles can be applied in various situations, yet within a blended learning environment they set particular requirements. Firstly, the focus is turned from teacher and content to the learner. As learners need to construct knowledge from the learning activity, so they also guide what needs to be done and what content needs to be covered. Another important issue is the use of cooperative and collaborative learning which is also an integral part of blended learning where

collaboration either online or face-to-face can be facilitated. With regard to cooperative and collaborative learning it is also important to take notice of the concept of Communal Constructivism (cf. 3.4.4) where learning within a community is emphasized. Lastly, according to these principles, the learning process has certain requirements in terms of facilitating guided discovery, being purposeful and authentic, and being driven by learners themselves.

Smith and Ragan (1999:15) distinguish between individual and social constructivism. In terms of individual constructivism, the following assumptions can be made:

- Knowledge is constructed from experience.
- Learning results from a personal interpretation of knowledge.
- Learning is an active process in which meaning is developed on the basis of experience.

Furthermore, Smith and Ragan (1999:15) state that social constructivism also implies the key assumption that "[l]earning is collaborative with meaning negotiated from multiple perspectives".

Jolliffe *et al.* (2001:21) make the following observation with regard to the execution of a constructivist approach: "learning needs to focus on problem-based scenarios, project-based learning, teams-based learning, simulations and the use of technology resources. It also means that learning has to be based on authentic learning tasks that no longer occur in a linear fashion".

Garrison and Anderson (2003:12) focus on the collaborative constructivist approach to learning in their discussion on e-learning. Here the focus is on the relationship between "personal meaning making" and the "social influence" in shaping the education transaction.

The collaborative constructivist learning approach ties in with the work of John Dewey. Dewey emphasized the co-existence of individual and society. Furthermore, none of the two is supposed to be more prominent than the other (Garrison & Anderson, 2003:12).

Dewey also identified two important concepts of *interaction* and *continuity.* According to Garrison and Anderson (2003:13), interaction "unifies the subjective (personal)

and objective (social) worlds in an immediate timeframe". This allows meaning to be constructed and shared. Furthermore, the principle of continuity allows for further learning in the future.

Garrison and Anderson (2003:13) note that, in terms of Dewey's approach to learning, e-learning provides opportunity for "active inquiry" and "individual variations". In addition, e-learning should provide for continuity through the application of extended learning experiences. Here learners must construct knowledge rather than just passively receive knowledge from a teacher.

Walker and Baets (2009:245) distinguish between personal and social constructivism. Personal constructivism refers to knowledge as personally constructed meaning. In this instance, learning refers to autonomous experience and reflection. It can be executed through the use of content-rich tools such as simulations and microworlds. Social constructivism emphasizes knowledge as socially constructed meaning and learning is experience and reflection within a social context. This can be done through use of knowledge-sharing and collaboration tools such as blogs, forums and wikis. Papert (1993:139) uses the term constructionism that assumes that learners excel through finding knowledge themselves.

According to Holmes and Gardner (2006:84), socio-constructivism can be described as learning that is social, reflective, authentic, scaffolded, progressive and experiential.

More traditional methodologies such as tutorial and drill instruction are criticized from a constructivist point of view and, in terms of multimedia design, the focus should be on hypermedia, simulations, virtual reality as well as open-ended learning environments (Alessi &Trollip, 2001:35).

3.4.4 Communal Constructivism

Communal constructivism is an extension of socio-constructivism or social constructivism and is a term coined by Holmes, Tangney, FitzGibbon, Savage and Mehan (2001:1). Holmes *et al.* (2001:1) define communal constructivism as follows: "an approach to learning in which students not only construct their own knowledge (constructivism) as a result of interacting with their environment (social

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constructivism), but are also actively engaged in the process of constructing knowledge **for** their learning community". [Emphasis in original.] This approach is key to this study since only through a blended learning approach can learners, who might not be geographically together and yet speak the same languages, be able to constructed knowledge. The concept of communal constructivism will now be explored further.

According to Holmes *et al.* (2001:2) "Social Constructivism is defined as a process by which students make meaning, and the central role their community, through culture and language, plays in this process". Learning is regarded as a social and collaborative activity facilitated and not taught by a teacher. Furthermore, because of the constructivist element included in this theory, the focus is on learners constructing their own knowledge and more specifically within interaction with others. The focus is not just creating knowledge, but also sharing it with others and this relates to the concept of learning *with* and *for* others. Group work is one way of implementing this approach, yet peer tutoring can also be used (cf. Holmes *et al.*, 2001:2-3).

Holmes *et al.* (2001:2) emphasize Vygotsky's concept of children learning within themselves, as well as the influence of the social and cultural environment on children. The importance of speech for Vygotsky is even more relevant with the development of better communications media. Crook (1994:59) notes that Vygotsky sees that cognition is socially-mediated. Therefore there is sound theoretical support for this approach.

The term communal constructivism is used by Holmes and Gardner (2006:85) to refer to an expanded definition of socio-constructivism where "e-Learning provides the learners with the tools to create new learning for themselves and to contribute and store their new knowledge, in whatever form it is, projects, artefacts, essays and so on, in a communal knowledge base for the benefit of their community's existing and new learners". Holmes and Gardner (2006:85) also note that socio-constructivism is extended due to the availability of effective media that takes communication out of the classroom and online.

Even though the work within a learning community and thus collective work is emphasized with communal constructivism, Holmes and Gardner (2006:87) state that both the individual and collective dimensions need to be addressed. A learner, together with a tutor, develops his/her own learning and then takes on the role of tutor scaffolding to others with less knowledge (Holmes & Gardner, 2006:87.)

The communal constructivist approach has specific implications for the use of blended learning where materials can easily be produced electronically, be distributed and kept for reuse. Pachler (2001:20) mentions that "[n]ew technologies allow users to create and distribute their own work and become active participants in the culture creation process". Pachler (2001:20) also adds that this implies that learners should be taught higher order skills as well as "electronic/informatic, visual and critical media literacies".

In this regard, Cook and Finlayson (1999:3) view learning "to be firmly located in social activities which are influenced by many things outside the actual time and space in which the learning happens – things which are part of our everyday culture". With the initial application of computer-based instruction, the focus was on the individual and especially customizing learning around the individual. Yet with the advent of the WWW, collaboration has been easier as communication can also be facilitated through the learning medium. As such, emphasis in the design of interactive multimedia has shifted to the creation of **GroupWare** or programs that facilitate teamwork (Alessi & Trollip, 2001:34).

Holmes *et al.* (2001:4-5) state that a communal constructivist approach requires courses being dynamic and adaptive. Moreover, tasks and projects should have presentation included in the instructions so as to allow for redistribution of content. Despite the fact that Holmes *et al.* (2001) emphasize the use of this technique within a tertiary environment, it could be adapted to be used within a school environment. An open-ended approach where students can build on existing knowledge by adding new content would, for example, be more suitable for a tertiary environment, yet this could still be facilitated in a school context especially in terms of multilingual content.

Collis and Moonen (2006:54) advocate an "approach whereby the student can contribute to the learning material based upon their own experiences, experiences

from others, material available in the Web-based system, in reality or in the literature". Collis and Moonen (2006:56) furthermore emphasize that the focus should be on activities where learners contribute to a course with additional activities built on contributions. Collis and Moonen (2006:56-58) also identify different activities that facilitate contribution to the learning content by students:

- ✎ creating group-made bookmarks by adding hyperlinks (with comments) to sites relating to the learning content;
- ✎ online discussions on case studies relating to the content being studied;
- ✎ creation of reports to extend text books – placed on a website;
- ✎ creation of test items based on content used; and
- ✎ discussion activities.

According to Collis and Moonen (2006:63), a contribution-oriented pedagogy results in the role of the instructor shifting from that of a presenter to the manager of activities. In addition, assessment should focus on the contributions made and peer interaction displayed by learners. Collis and Moonen (2006:64) also note that contributing skills of learners should be developed and that only through careful instructions and scaffolding is a contribution approach manageable. Finally, Collis and Moonen (2006:64) also mention that the problem of plagiarism must be countered through strict guidelines. Matthew *et al.* (2009:54) note that wikis provide environments in which content can be constructed cooperatively. Therefore the focus for this study will also fall on the construction of knowledge through the use of a wiki.

3.4.5 Summary of blended learning and learning theories

The discussed learning theories have application value for the implementation of blended learning. As discussed in the above-mentioned section, blended learning and learning theory can be integrated to the benefit of this study. Based on the overview of the literature, the wiki has been chosen as instructional medium for this study. This allows for cooperative learning to take place in an easy customizable online environment.

In terms of behaviourism, two forms of behaviour can be measured within the context of this study. The usage of the medium, which in turn also refers to a skill that can be acquired, can be measured. In this regard, the skill level of being able to

use computer hardware as well as software can be measured. Furthermore, behaviour can change, based on the content being studied through an electronic medium. By applying this statement in terms of programming, the result of a programming task may also be proof of how behaviour has changed. Lastly, although not necessarily to be associated with blended learning, but relevant for the study, language use, especially in terms of the accommodation and promotion of multilingualism, can be observed in the usage of more than one language. This can transpire through the use of code switching, for example.

As cognitivism focuses on thought processes that cause behaviour, this should also be taken into account when approaching blended learning. Moreover, the prominence of social interaction in blended learning allows for both traditional face-to-face interaction as well as classroom interaction between learners. Yet when learning takes place outside the classroom, the same advantages can be met through the use of simulations and virtual learning environments.

3.5 APPLYING BLENDED LEARNING

Blended learning can be implemented in varying degrees. Jones (2006:186) reproduces a continuum of e-learning as used by the University of Glamorgan, which can also be applied in terms of blended learning. See an adapted version of this continuum in the pyramid below.

It is important to take note of subject-related learning theories when discussing the implementation of blended learning in Information Technology. According to Fincher and Petre (2004:36), the work of Seymour Papert, a collaborator of Jean Piaget and co-founder of the MIT Media Laboratory, is of importance. According to Papert, learning should take place based on items found in the everyday environment of learners. This provides relevance and concrete experience from which learning can then take place. In addition, this approach supports a focus on sensitivity towards diversity and the backgrounds of a multiethnic class (cf. Crook, 1994:17).

Fincher and Petre (2004:36) also note that Jean Lave and Etienne Wenger extended this notion of "the social nature of learning with ideas that learning is always situated within authentic situations, and takes place within communities of practice".

FIGURE 3.4 Continuum of e-learning
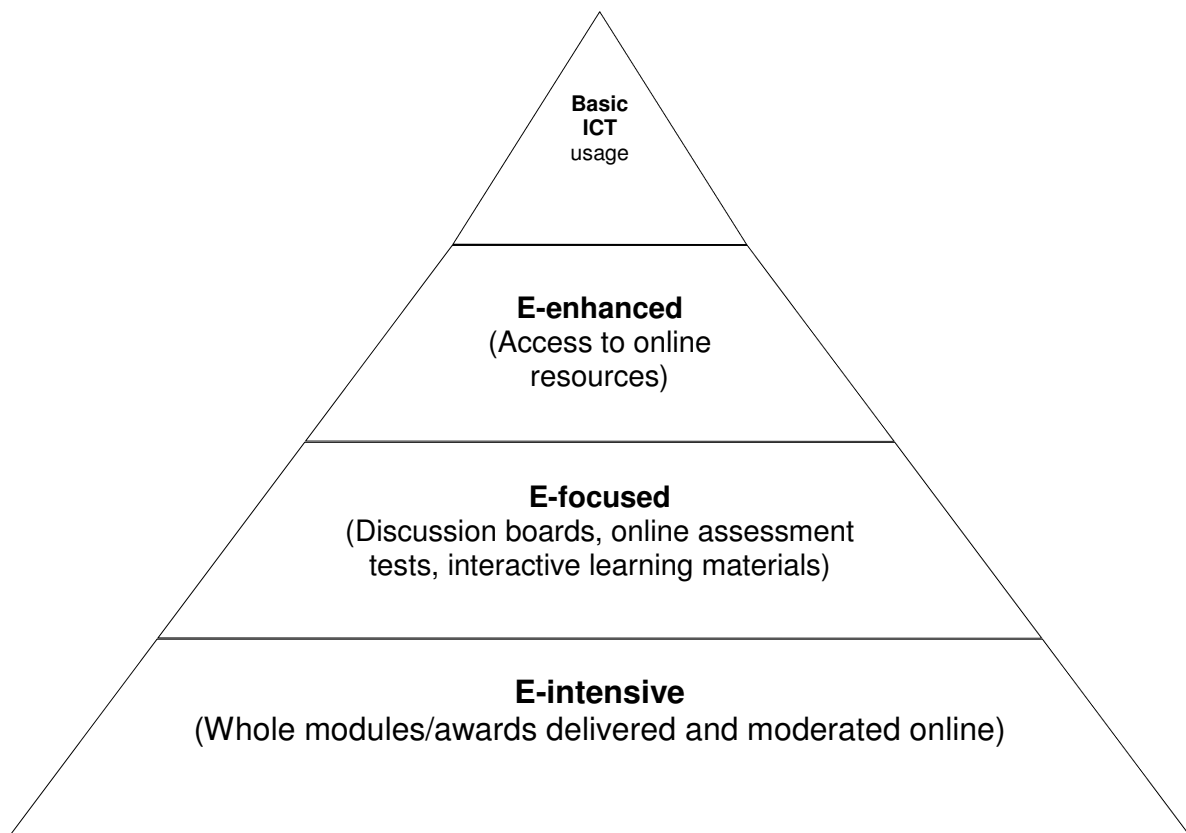
Adapted from Jones (2006:186)

The basic level of usage of information communications technology (ICT) refers to a blended learning approach where the usage of simple resources such as MS PowerPoint or word processing documents are used in addition to traditional learning approaches such as face-to-face instruction. The second layer (e-enhanced) only supplements the previous blended step by adding some resources online through Virtual Learning Environments (cf. 3.5.2.6). This may include online announcements or material used in class. The third layer (e-focused) uses an online medium for actual learning and teaching activities by adding discussion boards, online testing and interactive materials which allow for greater online interaction. Finally, the last layer allows for all learning and teaching to take place online, yet this layer might still include some face-to-face instruction for the sake of induction that prepares learners for the course (cf. Jones, 2006:186).

Littlejohn and Pegler (2007:44) note that blended learning may facilitate the creation of personalized learning environments or personal electronic learning environments. A **personal learning environment** (PLE) refers to an environment, usually electronic, where individualized learning can take place. According to Taraghi *et al.* (2010:25), personal learning environments have gained prominence after the development of Web 2.0 technologies. Furthermore, Taraghi *et al.* (2010:26-27) emphasize the importance of widgets, small applications that can be embedded in HTML web pages, in creating customized personal learning environments.

3.5.1 Approaches to blended learning

Approaches to blended learning as expressed in applicable literature will be briefly discussed. Bersin (2004:56-83) identifies two approaches to blended learning: the *program flow approach* and the *core-and-spoke approach*.

The program flow approach is defined by Bersin (2004:56) as an approach where "one creates a step-by-step curriculum that integrates several media into a chronological program or syllabus". Here each section or chapter builds on the previous one and learners go through the content in a linear fashion. At the end of the program the learning is assessed. With the core-and-spoke approach, Bersin (2004:56) notes that a fundamental training approach is created and other "materials, interactivities, resources, and assessments" are provided as supporting material around the central approach. This approach uses different media and exercises, but they do not build on each other. Huang and Zhou (2006:303) established procedures to be followed in the design of blended learning that consist of three steps: preanalysis, activity and resource design, and instructional assessment. The procedures can be summarized graphically (Figure 3.5).

FIGURE 3.5 Design procedures for blended learning
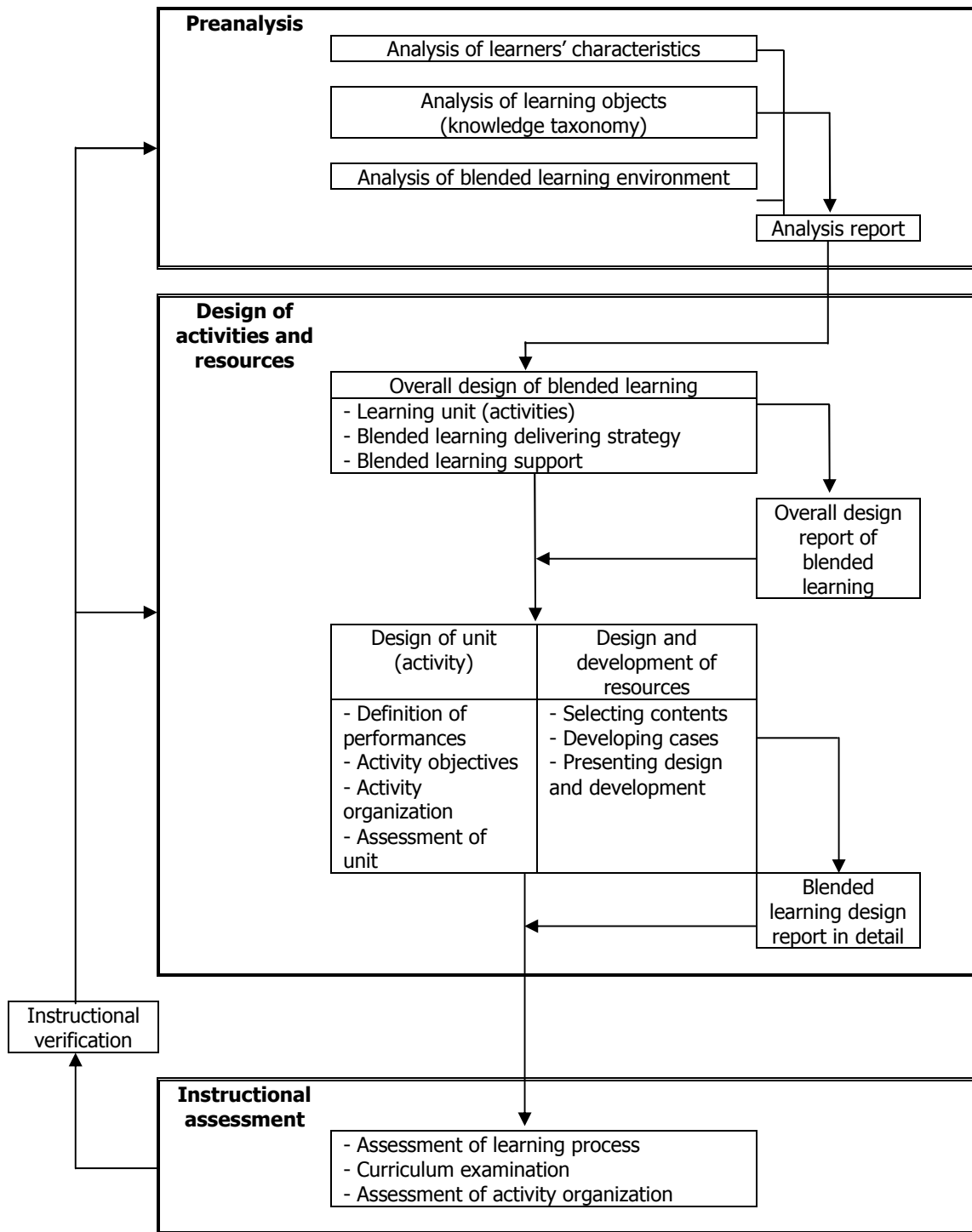
(Huang & Zhou, 2006:303)

According to Huang and Zhou (2006:302) the preanalysis in the foregoing diagram determines whether blended learning should be used and it consists of: assessment of the prior knowledge, learning styles and strategies of learners; analysis of learning content and analysis of environmental features. Furthermore, Huang and Zhou (2006:302-303) note that in the design of the activities and resources stage, a design report is important to determine the instructional methods and how the

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course events, activities and assessment should be organized. Lastly, the instructional assessment design is based on the objectives set for the activity, the performance definitions and the blended learning environment (Huang & Zhou, 2006:303-304). These procedures can also be adapted to be used within a school context and it can be used in this study as a guideline for designing a blended learning model.

3.5.2 Blended learning models and categories

Bersin (2004:85) identified five blended learning models: e-learning self-study, instructor-led, live e-learning, on-the-job training and simulation, which will be discussed. Oosthuizen (2004:22-46) lists the following elements of blended learning: printed material, face-to-face instruction, instructional television, video-conferencing, computer-assisted learning, computer communication technology, and web-based instruction. This list poses some problems in that it involves both methods of instruction as well as mediums and there seems to be a degree of overlapping between the different elements. Yet it does present some background to what could be considered to be part of blended learning. In terms of printed material, Oosthuizen (2004:22-23) mentions textbooks, study guides, self-contained study materials, workbooks and a syllabus.

Blended learning can also be implemented through the use of electronic learning environment systems. Apart from commercial versions, open source electronic learning environments such as Moodle also exist. Moodle can be downloaded[24] for free and used to allow for more control by learners for their learning (cf. Littlejohn & Pegler, 2007:143).

Graham (2006:13) identifies three categories of blended learning systems: enabling blends, enhancing blends and transforming blends. With enabling blends the focus is on access and convenience in that through blending learning opportunities are provided which would otherwise not have been possible, thereby allowing equal access to the learning. Enhancing blends allows for improvements in the pedagogy yet it does not really change the way in which learning and teaching takes place. Finally, transforming blends allows for fundamental changes in pedagogy and it

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[24] Moodle can be downloaded at http://www.moodle.org

involves activities that would not be possible without a blending of instructional modalities or modes. (Cf. Graham, 2006:13-14.)

3.5.2.1 e-Learning self-study

This model emphasizes self-study by learners in an online environment. There is thus no classroom and the programme does not have cultural or socialization goals (cf. Bersin, 2004:84-86). Littleton (1999:192) observes that "computer technology does undoubtedly have the capacity to free students from the constraints of time and place, but participating in activities situated in a particular specific time and place does not necessarily constrain human activity".

3.5.2.2 Instructor-led

With the instructor-led programme, instructor-led events are blended with self-study e-learning. Here the learners and instructor are in the same room and e-learning resources are used in conjunction with actual instruction by a person (cf. Bersin, 2004:86-88).

3.5.2.3 Live e-learning

Live e-learning events or webinars are key to the live e-learning model. Activities, exercises and references are provided to contribute to the live learning taking place. Other than the instructor-led model where the instructor is available in person, here the instructor interacts with learners through online video for example.

3.5.2.4 On-the-job training

Although this approach is more suitable to the workplace – this is the focus of the research done by Bersin (2004) – it is still reported for the sake of theoretical background and that it could have some application value in the school context. Here the focus is on "exercises, coaching, discussions, and other activities that occur in the workplace and are typically led by an individual's manager" (Bersin, 2004:90). For the school context, the concept of simulating a real-world experience can be useful (cf. 3.5.2.5). Learning from peers may also be facilitated better in such an approach. On-the-job training ties in with the next model which focuses mainly on simulations.

3.5.2.5 Simulation

With the simulation model, real-world situations can be simulated or tested in online virtual labs (cf. Bersin, 2004:92-94; Crook, 1994:19-20; Holmes & Gardner, 2006:25-26; Romiszowski, 1988:263-297; Säljö, 1999:152-153). Alessi and Trollip (2001:213-214) state that, with simulations, the focus may be on the creation of situations that may not pertain to a real-world context and may omit certain aspects of this context. Alessi and Trollip (2001:214) also maintain that in terms of education, simulations adding features such as feedback or hints are important resources and this adding of elements within a simulation is called augmentation of reality.

According to Min (2006:117), simulations include "role plays, group discussions, games, war training simulators, model driven simulation, virtual reality, etc.". Min (2006:117) also makes the link between discovery learning and simulations through which learners acquire knowledge without necessarily being consciously aware of learning taking place.

Alessi and Trollip (2001:214-226) distinguish between two categories of simulations where the focus is either on what something is or how something must be done. In terms of the first category where the emphasis is on some concept, the simulation can represent a physical object or phenomenon or it can be iterative. With physical simulations manipulation of the simulation happens within real or a set time while with iterative simulations the simulations are repeated a number of times with different conditions or parameters. In terms of simulations where the focus is on how something is done, procedural and situational simulations can be identified. Procedural simulations aim at teaching a set sequence of actions to reach a specific goal, while situational simulations are concerned with the behaviours and attitudes of participants using the simulation.

Holmes and Gardner (2006:26) state that simulations can contribute to changing information into knowledge through the application of what learners know and the fact that results can be observed. According to Bersin (2004:85), simulations are "[o]ften used for IT and application training where an entire environment can be simulated".

Säljö (1999:159) states that "the technology provides opportunities for manipulating models and concepts in a manner that might be conducive to learning, provided that students are involved in conversations with competent partners who can assist in articulating the general conceptual issues involved in what is presented". Crook (1994:19) makes the following observation in terms of simulations: "The promise of such scaled-down experiences lies in their capability for offering the learner control over the operating parameters of some system. In this way, a system's characteristics may be explored through experimentation."

Horton (2000:71-72) states that using a simulation is one of the strengths of using computers in learning. In this way, real-world situations can be simulated within a safe and controlled environment (cf. Holmes & Gardner, 2006:26). Unfortunately simulations can potentially also pose a problem by over-simplifying complex systems (Crook, 1994:20). Limitations in terms of the usage of simulations online have been ascribed to the fact that mere HTML cannot be used to create simulations and other computer languages such as Java or Flash need to be used to create simulations. This, in turn, requires more specialized skills from the website designer.

Min (2006:120) distinguishes between simulations that are dependent on computers and ones that are not. For the sake of this study, it is important to focus on simulations that depend on computers. These include:

- simulated discussions;
- computer games;
- computer simulations based on mathematical models of phenomena;
- intelligent computer simulation; and
- training simulators.

3.5.3 Blended learning instructional design

The concept of instructional design relates to how learning content and materials are created on paper or on screen. Smith and Ragan (1999:2) define instructional design as "the systematic and reflective process of translating principles of learning instruction into plans for instructional materials, activities, information resources, and evaluation". Furthermore, it is important to define instruction. Smith and Ragan (1999:2) define instruction as "the intentional facilitation of learning toward identified learning goals".

Gagné (1985:302) makes the following observation with regard to instructional design: "Knowledge of the learning process combined with analysis of the tasks for learning in accordance with instructional theory finds a direct application to the *design of instruction*." [Italicization from the original text.]

According to Willis (2009:11-20), the term instructional design can be approached in two ways. The first focuses on the learning theories, teaching principles and pedagogical strategies that should be employed in the creation of education materials and resources, while the second refers to the actual process used to develop these materials. Oosthuizen (2004:47-65) emphasizes the importance of instructional design for blended learning and sets out a possible process for designing a blended learning programme.

Virtual Learning Environments (VLEs) can be used where existing software or web interfaces may be used to create platforms for learning. Alternatively teachers may also design learning environments manually and here the theoretical background to instructional design will be applicable. (Cf. Holmes & Gardner, 2006:93). VLEs refer to platforms that allow for e-learning to take place. Walker and Baets (2009:243) state that in the UK the deployment of e-learning is associated with the establishment of VLEs. Furthermore, VLEs can also be created using learning management systems (LMSs)[25] that can be online or just on a computer or network without Internet capabilities. Holmes and Gardner (2006:27) states that LMSs "provide shells to populate with course content and offer a variety of course delivery methods". A number of learning management systems exist such as Blackboard, Desire2Learn, Intralearn and WebCT. Apart from these commercial systems, free open source alternatives also exist such as Moodle and PostNuke (cf. Fee, 2009:82-84; Holmes & Gardner, 2006:27-28, 93; Ruhe & Zumbo, 2009:3; Taylor 2001:30-31).

It is important to take design models into account because this study aims to establish a model for the accommodation and promotion of multilingualism through the use of blended learning. Smith and Ragan (1999:7) created the following

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[25] Learning management systems (LMSs) are also sometimes referred to as managed learning environments (MLEs) and integrated learning systems (ILSs). (Cf. Holmes & Gardner, 2006:26.)

diagram to represent the establishment of an instructional design model based around the analysis, strategy and evaluation of an instructional design process. This provides an example to follow in the creation of instructional design processes.

FIGURE 3.6 Instructional Design Process Model
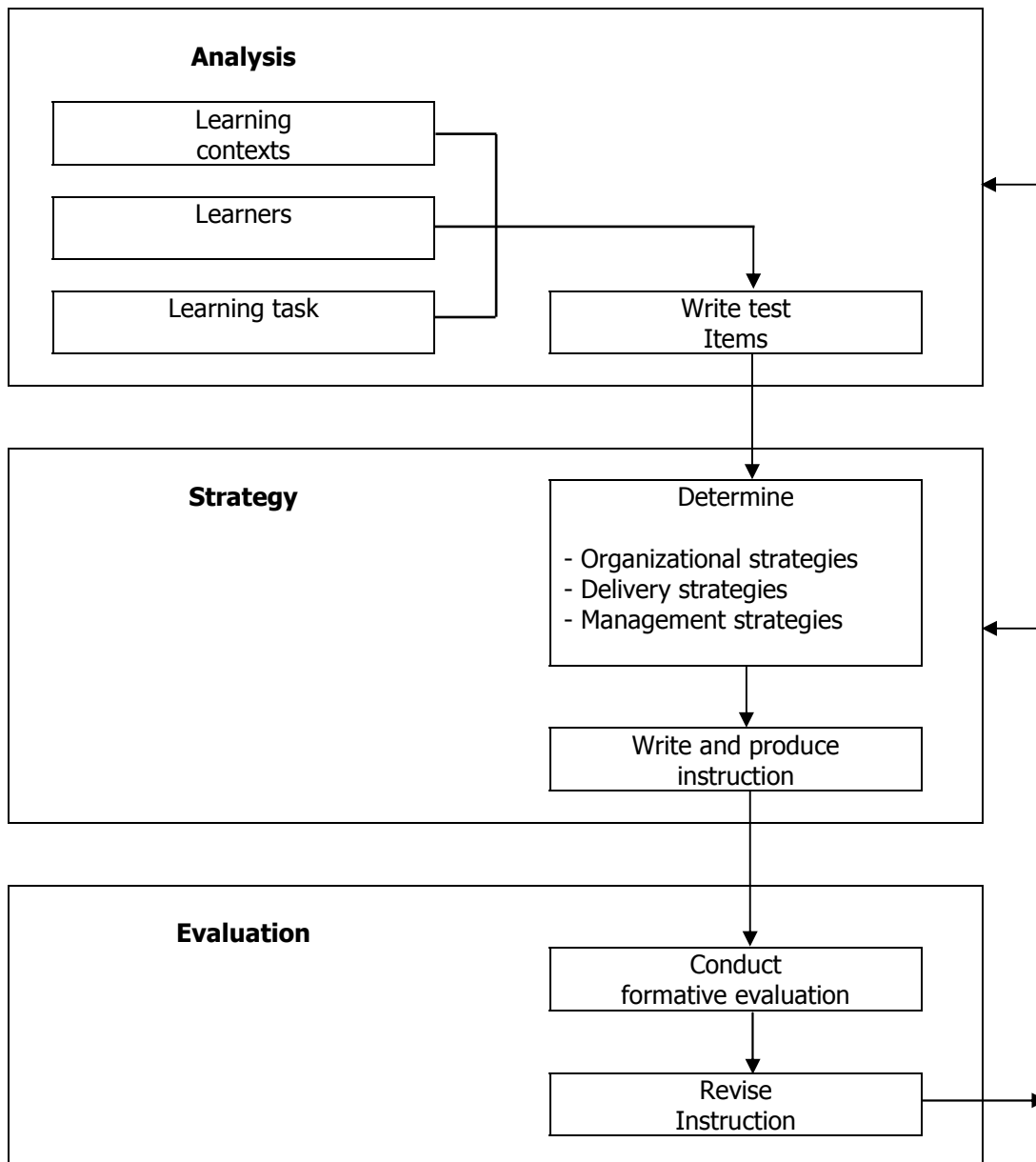
(Adapted from Smith & Ragan, 1999:7)

In choosing learning management systems for web-supported learning, Taylor (2001:51-54) has identified relevant criteria. The following are mentioned:

↳ general properties (such as ownership of source code, modules, use of multimedia, troubleshooting and access for the disabled);

- ease of use (pre-knowledge, easy navigation, online help, descriptive links and instructions);

- development and modules (control of design and changes, previews, creation of indexes and study guides and backups);

- module administration (easy and effective administration, monitor of use, easy and open registrations and control of administration);

- study aids (search engines, relevant software, bookmarks, word lists, notes, calendar and being able to see overview of modules);

- asynchronous communication (e-mail, facilities for downloading of mail and files as well as access to library and websites);

- synchronous communication (chat, white board, video-conferencing and web-browsing in groups);

- evaluation (self assessment, subjective and objective assessment, changeability according to progress and answers, timed tests, random questions, easy management of marks, feedback to learners);

- security (usernames and password, levels of security and access according to progress);

- price (free demonstration, affordable price, licence restrictions and renewal);

- support (experience of provider, technical support online, updates, telephonic support, training, modules on provider's server);

- operating system (support for different platforms); and

- institution specific circumstances (adaptable to different contexts).

As such, formal learning management systems are useful tools, but tend to be too expensive as well as effort- and time-consuming for the school context. Unless it is administered from a central point within a province or district with dedicated staff, it is not necessarily a viable choice. Yet principles and the criteria used for these systems can easily be applied to any blended learning system, whether it is formally managed such as most learning management systems or not.

3.6 BLENDED LEARNING STANDARDS

3.6.1 Requirements of blended learning

Blended learning does prompt certain requirements and it is important to determine the requirements from literature in order to set out standards for the application of blended learning in a South African school environment.

According to Romiszowski (1988:299), the impact of computers has been on the content of education and training rather than on methods. This statement should be seen in the context within which it was made, yet this is still true within the current so-called information age where emphasis is on content. In this sense, the Internet is also misused as pure source of information and the pedagogical possibilities are easily ignored.

A very important concern is raised by Snyder (1998:132) in terms of technological determinism which refers to the perception that a computer medium in itself will change social and cultural practices which translates into an improvement in learning. Hence the technologies employed in a blended learning approach do not necessarily equate to a potential improvement but rather to the way in which they are used.

In implementing blended learning three main fields are drawn together. Mooney and Stoane (1983:89) mention the following in terms of computer-assisted learning: a subject expert who initiates the project, an educational technologist who designs the learning system and the programmer who designs the computer program.

Blended learning requires, as with other computer-based instruction, that instruction be designed to the strengths of the medium and it also implies that content cannot be merely transferred from one medium to another (cf. Gibbons & Fairweather, 1998:15).

Littlejohn and Pegler (2007:12-14) list the following innovations from the start of computing in education that can be identified in blended e-learning:
- ✎ personalization;
- ✎ saving individual work-in-progress;
- ✎ self-paced learning;
- ✎ multiple choice and automated feedback;
- ✎ tracking student progress; and
- ✎ using third-party content.

Nel (2005:41-63) has found that using student feedback in the design of online collaborative activities is essential. Nel (2005:63) notes that "[t]aking greater consideration of the feelings and attitudes of students proved to have a positive influence on the outcomes of the project".

A distinguishing factor between pure online learning and blended learning is the presence of a tutor, facilitator or teacher who mediates the learning and, to an extent, intervenes where necessary. Macdonald (2008:21) uses the term intervention to indicate instances where a tutor steps in and changes the flow of learning taking place. Macdonald (2008:22) lists seven spheres of intervention:

- affective – confidence building;
- dialogic – tailoring to individual needs;
- focusing – bringing study to the fore;
- reflective – allowing time to think;
- timely – arriving when relevant and useful;
- reversionable – using support to individual as well as group; and
- accessible – available to maximum number of students.

The above-mentioned issues mainly focus on a more social level of learning in the sense that contact is emphasized, learning is personalized and focus is drawn to certain areas of learning at certain times.

In the construction of a blended learning approach to be followed in this study, it is essential to define set parameters to work in. Holmes and Gardner (2006:111) identified that a blended learning course will require:

- learners to see themselves as producers and not just as consumers of information;
- a process of constructing knowledge and that this construction is a communal activity;
- learners to be trained in the various technologies they are using, and particularly those needed to communicate or present to their peers;
- authentic coursework to be built in;
- presentation to peers to be a fundamental part of the communication activities, including placing it on the Web for use by learners in subsequent years and for inspection by the wider community;

- ✤ active collaboration by all learners in both the preparation and the presentation of the new knowledge and other outcomes for a shared and wider audience;
- ✤ use to be made of group work and project-based learning pedagogies;
- ✤ appropriate assessment techniques such as portfolios that may benefit the individual, their peers and the learners that follow them;
- ✤ resources to be presented in good time to enable pre-reading and optimum use of class time for communal discussion and group work;
- ✤ use to be made of peer tutoring and mentoring, with more experienced learners taking on the role of mentor;
- ✤ learners to take on responsibilities such as leading a discussion group;
- ✤ developing specific elements of course content.

Writing aimed at website audiences adhere to specific rules as quite often readers scan through the text and might not read the website sequentially. Horton (2000:44) therefore states that the content of a specific page must be summarized first, the content should be concise and should be written so that it is appropriate for scanning by the potential readers.

According to Simpson (2002:90), e-learning courses often use a mixed mode of delivery in that online material is combined with printed matter or even content provided on CD ROM. In addition, Simpson (2002:91) adds that support can also be provided in mix media through phones, correspondence or even face-to-face meetings. This, in effect, actually refers to what is understood as blended learning.

Macdonald (2008:80) notes that different from online learning, face-to-face instruction allows for additional communicative processes to take place. This is clear because "[i]n the course of a conversation unconscious checking takes places, which helps to establish what is known as *common ground*" [italicization from the original text]. Through this process learners show with their body language and facial expression whether what has been taught is understood.

Macdonald (2008:80) states that learners gain reassurance through interaction with other learners while acting in a classroom situation.

Lajbcyier and Spratt (2007:13) state that blended learning can facilitate variation in learning and thus allows for the creation of engaging learning opportunities with learners actively participating and collaborating in a classroom situation. According to Littlejohn and Pegler (2007:72) three factors need to be taken into account when deciding how learning should be blended:

- ✤ the purpose of learning;
- ✤ the context of learning; and
- ✤ approaches to learning and teaching.

Horton (2000:60-66) also mentions interactivity as an important aspect of using websites in a classroom. Discussions and chat rooms can be used effectively to promote interactivity between learners. Social interaction needs to be planned and designed within an e-learning environment as this is regarded as interpersonal contact which is an essential element of the learning process (Littlejohn & Pegler, 2007:50; Thorne, 2003:85-86).

It is important to keep the ethics around the creation of online content in mind when it is posted online. In this regard, the publisher is responsible to ensure that copyrighted material is not published without the necessary recognition. Furthermore, the rights of an author, whether it is a teacher or learner, should not be infringed (cf. Littlejohn & Pegler, 2007:221-224).

An important property of an online environment is the fact that it allows for multimedia content to be used. Multimedia learning refers to learning that takes place while more than one medium is used. In this regard, Mayer (2001:ix) states that multimedia learning takes place with "people learning from both words and pictures". Research done by Mayer (2001:78-79) found that presenting learning content not only in text format, but also in text and pictures results in more effective learning taking place. Mayer (2001:79) makes the following comment in this regard: "meaningful learning occurs when learners build picture-based and word-based representations and build systematic connections between them".

Walker and Baets (2009:252-256) identified the following phases of the design and delivery of a blended learning pathway:

- ✤ preparing the blended learning pathway (design phase);

↳ socializing learners (start of the learning pathway);

↳ supporting online participation (early stages);

↳ sustaining online interaction (later stages); and

↳ summing up the learning outcomes (end of the learning trajectory).

According to Masie (2006:23-24), blended learning is used because learners require different learning processes; learners can engage in discussions around learning material; context can be added to learning material, value sorting of content can be facilitated; learning occurs in a longitudinal manner, the social dimensions of learning are accommodated; and learning could be tacit and unstructured.

Some form of technical and academic support is essential in the provision of online learning (cf. Kelly, 2009:43). In this regard, Jolliffe *et al.* (2001:43) identify four basic categories of web-based learning support which is reflected in Table 3.5.

TABLE 3.5 Web-based learning support

Categories	Type of support
Online materials	Distributing learning materials
Computer-based training	Drill and practice
	Simulations
	Computer-managed learning
Asynchronous communication	Non-real-time interactions
Synchronous communication	Real-time interactions

Jolliffe et al. (2001:43)

3.6.2 Blended learning criteria and assessment

Certain criteria can be identified to be used to measure or assess blended learning structures.

Bersin (2004:97-117) identifies eight criteria that need to be met before a blended learning programme can be designed or a blending model is chosen:

↳ programme type (whether the focus is on knowledge or skills);

↳ cultural goals (shared beliefs, values and practices);

↳ audience (size, level, familiarity with technology, motivation, time and access);

- budget (development, infrastructure and delivery budgets);
- resources (developers and content providers);
- time (development time, time to complete and content shelf life);
- learning content (content complexity and content interactivity); and
- technology (bandwidth, plug-ins required, tracking standards, display standards and security standards).

According to the JISC (2004:10), effective e-learning practice should meet the following criteria:

- engage learners in the learning process;
- encourage independent learning skills;
- develop learners' skills and knowledge; and
- motivate further learning.

Reeves, Benson, Elliott, Grant, Holschuh, Kim, Kim, Lauber and Loh (2002) examined how e-learning programmes can be assessed, using heuristic evaluation. Their protocol is based on heuristic evaluation which is a method of evaluating software developed by Jacob Nielsen. This includes (Reeves *et al.*, 2002:4-6):

- Visibility of system status:

  The e-learning program keeps the learner informed about what is happening, through appropriate feedback within reasonable time.

- Match between system and the real world:

  The e-learning program's interface employs words, phrases and concepts familiar to the learner or appropriate to the content, as opposed to system-oriented terms. Wherever possible, the e-learning program utilizes real-world conventions that make information appear in a natural and logical order.

- Error recovery and exiting:

  The e-learning program allows the learner to recover from input mistakes and provides a clearly marked "exit" to leave the program without requiring the user to go through an extended dialogue.

- Consistency and standards:

  When appropriate to the content and target audience, the e-learning program adheres to general software conventions and is consistent in its use of different words, situations, or actions.

✤ Error prevention:

The e-learning program is designed to prevent common problems from occurring in the first place.

✤ Navigation support:

The e-learning program makes objects, actions, and options visible so that the user does not have to remember information when navigating from one part of the program to another. Instructions for use of the program are always visible or easily retrievable.

✤ Aesthetics:

Screen displays to not contain information that is irrelevant, and "bells and whistles" are not gratuitously added to the e-learning program.

✤ Help and documentation:

The e-learning program provides help and documentation that is readily accessible to the user when necessary. The help provides specific concrete steps for the user to follow. All documentation is written clearly and succinctly.

✤ Interactivity:

The e-learning program provides content-related interactions and tasks that support meaningful learning.

✤ Message Design:

The e-learning program presents information in accord with sound information-processing principles.

✤ Learning Design:

The interactions in the e-learning program have been designed in accord with sound principles of learning theory.

✤ Media Integration:

The inclusion of media in the e-learning program serves clear pedagogical and/or motivational purposes.

✤ Instructional Assessment:

The e-learning program provides assessment opportunities that are aligned with the program objectives and content.

✤ Resources:

The e-learning program provides access to all the resources necessary to support effective learning.

The e-learning program provides feedback that is contextual and relevant to the problem or task in which the learner is engaged.

In developing a web-based learning model, Jolliffe *et al.* (2001:23-25) identified elements that must be considered. An adapted version of these considerations is included as Table 3.6

TABLE 3.6 Design considerations for a web-based learning model

General development methodology:
- introduction of formative reviews in the design process;
- use only the steps needed to complete the given material; and
- end users should be included as part of the design team.
Needs assessment:
- job aids, just-in-time learning and performance support can be included;
- use market-oriented needs assessment strategies with gap analysis; and
- do not be driven by easily measured learning outcomes.
Goal/task analysis:
- educational and training goals must be distinguished;
- objectives should guide the design;
- multiple layering of objects around learning experiences should be allowed;
- content should not be included in the goal or task analysis;
- instruction and additional learning goals must be allowed to emerge during instruction;
- multiple levels of expertise should be allowed when learners are assessed;
- problem-solving should be prioritised;
- information-rich ways to present material and assess should be used; and
- content must be defined in as many ways as possible.
Instructional strategy development:
- instructional and learner goals should be identified and learners be supported;
- multiple goals for different learners should be allowed;
- interdependency between content and methodology should be determined and developed;
- content should be covered in as much depth as possible;
- learning how to learn should be encouraged;
- instructional strategies should be designed that use authentic problems in collaborative and meaningful environments;
- actual learning environments must be designed;
- learners' responsibility of their own learning should be extended; and

- strategies should provide for multiple perspectives.
Media selection:
- media should be considered very early in the design process; and
- materials sensitive to the learners' media sophistication should be developed.
Learner assessment:
- assessment should be included as much as possible;
- assessment should take place in an authentic context; and
- processes and products should be evaluated.

(Jolliffe et al., 2001:23-25)

3.6.3 Possible problems that could be encountered with blended learning

In order to counter possible problems with the application of a blended learning model within the South African context it is important to evaluate the problems pertaining to blended learning listed within the literature.

A major concern is the misuse of online learning resources. Mooney and Stoane (1983:89-90) mention 'abuses' with regard to computer-assisted learning. This includes presenting material on the computer in linear fashion as it would have been on paper or letting the computer do routine calculations, tasks or experiments that learners are supposed to do themselves. Similar to the first issue raised by Mooney and Stoane (1983:89-90), Oosthuizen (2004:37) also raises concern about the implementation of e-reading in contrast to an intended form of e-learning where content is transferred from a printed format to an online medium. Crook (1994:29) notes, in terms of general computer use in education, that research has found that, despite training, many teachers are "slow to gain confidence in making active use of computers".

Walker and Baets (2009:251) note that the combination of face-to-face and e-learning methods does not by itself motivate learners to be able to take charge of their learning or engage them in gaining knowledge or sharing experience. Learners also need to be triggered into accepting e-tools for formal learning and only through support can collaborative learning take place. Bersin (2004:xvii) gives a number of reasons why e-learning often fails:

- there is no 'class' to interact with;
- it is easy to disengage with the learning; and
- Internet-based content is often boring and slow.

According to Bersin, blended learning provides a solution for these problems, but they may still be encountered in unsuccessfully structured blended learning situations. After evaluating an online learning programme for three years, Jones (2006:190) found that the top negative aspects of online learning experienced by learners included: technical problems, isolation, lack of support, lack of student interaction and absence of face-to-face opportunities. All these issues can be accounted for in the planning of an online learning programme by following a blended learning approach.

Nel (2005:48) did a SWOT analysis regarding online collaborative activities and this has definite application value with regard to blended learning. Nel (2005:48) summarizes it as reflected in Table 3.7 below.

TABLE 3.7 Online collaborative activities SWOT analysis

Strengths	Weaknesses
▪ Less anxiety for shy learners. ▪ No need for learners to feel isolated. ▪ No time wasted in organising face-to-face meetings. ▪ Workload divided among learners. ▪ Learning outcomes attained by majority of learners.	▪ Difficult to get information on certain topics. ▪ Insufficient incentives to increase participation. ▪ Limited time for formation of learning communities. ▪ No synchronous or face-to-face contact between group members. ▪ Time-consuming nature of assignment.
Opportunities (to)	**Threats**
▪ Develop collaborative skills needed for future assignments. ▪ Practise use of e-learning tools. ▪ Stimulate activity and motivation. ▪ Strengthen personal relationships and social interaction.	▪ Actions (no action) of individuals can demotivate the rest of the group. ▪ Carelessness in following assignment specifications. ▪ Lack of access to technology at home. ▪ Lack of e-knowledge. ▪ Lack of planning on learner's side. ▪ Lack of the required "group skills". ▪ Attitudes of individual learners.

Hofmann (2006:30) identified a number of problems that could occur in the implementation of blended learning. Firstly, creating a programme without a formal design process could be problematic, as well as presuming that changing an existing programme would be easier than restarting one. Similarly, adding existing components together to form a new programme could also potentially be problematic. In terms of the facilitation of blended learning, problems may occur when live components are emphasized more than self-directed tasks and the person or team facilitating blended learning might lack experience or training. With regard to support it is important to note that an absence of organizational support could also potentially cause problems. Also in terms of support, learners need to be instructed on how to learn online. These considerations need to be taken into account in the implementation of blended learning (cf. Hofmann, 2006:30-39).

3.6.4 Access and layout of computers

The way in which computers are deployed or placed within a school and classrooms also has implications on learning, as can be seen from the literature study that follows. Taylor (1997:229) sets out the advantages and disadvantages of having a number of computers in a laboratory against having one per class:

TABLE 3.8 Computer laboratory versus a single computer in the classroom

The computer laboratory	
ADVANTAGES	DISADVANTAGES
Ease of management and supervision of equipment	Promotes a didactic approach
Ease of use for whole class teaching	Mixed ability teaching difficult
Security simplified	Access can be restricted
Peripherals and software can be shared	Health and safety difficulties multiplied

A single computer in the classroom	
ADVANTAGES	DISADVANTAGES
Encourages a flexible approach to organization	Time restrictions on learners' access
Acts as a focus for group work	May be of little use in a formal teaching situation

Does not demand specialist support and facilities	Management is devolved to learners
	May increase security difficulties
	Increased cost if networked to the main computer room

3.6.5 Setting up web teaching

According to Jolliffe *et al.* (2001:16-17), a typical web-based learning environment could use all or some of the following:

- ✎ a learning event plan providing direction for the learning activities;
- ✎ presentation of learning materials as well as learner interactions such as quizzes;
- ✎ assessment of learner progress through online, written or other means;
- ✎ usage of external existing Internet resources;
- ✎ instructional support electronically or by the educator; and
- ✎ technical support in terms of the usage of the computer itself.

Thorne (2003:35-40) identifies some criteria to ensure successful blended learning:

- ✎ identifying the core learning need;
- ✎ establishing the level of demand/timescale;
- ✎ recognizing the different learning styles;
- ✎ looking creatively at the potential of using different forms of learning, i.e. matching the learning need to different delivery methods and identifying the best fit;
- ✎ working with the current providers, internal and external, to identify the learning objectives and to ensure that the provision meets the current need;
- ✎ undertaking an education process and developing a user-friendly demonstration to illustrate the potential of blended learning;
- ✎ being prepared to offer follow-up coaching support; and
- ✎ setting up a monitoring process to evaluate the effectiveness of the delivery.

3.6.6 Standards for blended learning

There are few set standards that apply to all approaches of online and blended learning. With respect to this, Taylor (2001:6) notes that there is not sufficient

standardization between learning management systems and that study material cannot be used interchangeably between such systems.

Rosenberg (2001:169) notes that industry has recently started to move to a set of standards for e-learning. These standards also have implications for blended learning. Rosenberg mentions a number of organizations and groups that are working to develop e-learning standards. This includes:

↵ Airline Industry CBT Committee (AICC) – http://www.aicc.org;

↵ EDUCAUSE Instructional Management Systems Project (IMS) – http://www.imsproject.org;

↵ Advanced Distributed Learning (ADL) – http://www.adlnet.org;

↵ Alliance of Remote Instructional Authoring and Distribution Networks for Europe (ARIADNE); and

↵ IEEE Learning Technology Standards Committee (IEEE LTSC) – http://ltsc.ieee.org

Key to these standards is the hypertext programming language used for websites HTML (Hypertext Markup Language) and the new XML (Extensible Markup Language) developed by the World Wide Web Consortium (W3C). Server-side technologies can be added to HTML pages to increase the power and provide for more functionality, this includes: CGI scripts, COM components, SSL security and Active Server Pages (ASPs) (cf. Crystal, 2001:198; Jolliffe *et al.*, 2001:297; Mason & Rennie, 2006:58-59).

Guidelines need to be set in terms of HTML and general website publishing in order for effective usage of web pages. The following aspects should be taken into account (cf. Horton, 2000:116-160):

↵ The structure of web pages should be made within layout tables in order to obtain consistency and to make them easy to read.

↵ Pages need to be flexible enough to be opened in different browsers and on different screens and resolutions.

↵ Pages must have consistent page headers with appropriate links to menus as well as footers with contact information.

↵ Websites should also be easy to navigate and as such have menus to facilitate this.

↳ Files used as web pages should also be named appropriately so that they can easily be recorded or used as reference. Furthermore, the following should be taken into account:

- File names should preferably be in one case.
- File names should not include spaces.
- Special character should be avoided.
- Web pages must have *htm*, *html* or other relevant suffixes.

↳ Page titles should also be used effectively as this is used automatically to represent web pages as bookmarks and in search engine results.

↳ Clear type faces or fonts should be used with easily readable font sizes – preferably having an option to adjust font size.

↳ Images should be scaled to fit on a website and to allow quick downloads. Images should also be used in order to contribute to the content available on the sites.

Macdonald (2008:81) lists steps to communicate effectively in a teaching situation within an asynchronous blended learning approach. This can be summarized as follows:

↳ Common ground needs to be established through introduction and encouragement of interaction and exchanges within a group.

↳ The tone needs to be set by writing as one would speak and keeping the text friendly and informal.

↳ Learners should be constantly reminded that they are not alone and that contributions are read. This process also implies monitoring of progress.

↳ Opportunities for contributions should be created at regular intervals.

↳ Synchronous tools must be used strategically to encourage students to contribute and take part. This includes the usage of telephone as well as audio and video conferencing.

Nel and Wilkinson (2008:168-169) identified the following guidelines for blended learning:

TABLE 3.9 Blended Learning guidelines

Cultural diversity in collaboration	● Involve students in the group allocation process.
	● Provide groups opportunities to communicate both online and face-to-face.

	● Provide opportunities for interaction among culturally diverse students. ● Provide opportunities for inter-group activities (especially when dealing with homogeneous groups). ● Make online material available in all the institution's official languages. ● Address lack of prior e-knowledge by providing students with opportunities to practise the use of the various e-learning tools. ● Let students practise the use of e-tools in a safe, non-assessed and less formal space. ● Be aware of possible differences (e.g. in learning style, attitudes, behaviour, support links) towards collaborative learning among advanced and less advanced students.
Student attitudes and lack of participation	● Orientate students on what to expect from a blended learning mode of delivery. ● Make it very clear what should be done online and what in the contact situation. ● Require students to complete a pre-class worksheet before each contact session. ● Make use of a face-to-face orientation session to prepare students for collaboration (i.e. to explain the reasons for collaboration, prepare students on what to expect, establish rules, etc.). ● Select interesting and challenging assignment topics to which students can relate. ● Assess all collaborative activities. ● Incorporate peer assessment for collaborative activities.
Academic dishonesty	● Educate students on academic dishonesty (with help of a code of conduct, and practical examples). ● Design assignments to minimise the likelihood of student-to-student plagiarism (e.g. individual topics). ● Investigate the possibilities of using plagiarism detection software/ resources. ● Require students to submit a signed declaration with each individual assignment which states that they have worked on their own and that all sources have been cited. ● Require students to list the names of their support group members when submitting an assignment. ● Enforce the academic dishonesty policy.

Communication and interaction	● Online ○ Use an online public discussion board to deal with procedural queries/enquiries. ○ Create an online FAQ section to address the most common or general queries/enquiries. ○ Use e-mail communication only when the message/answer is not intended for the whole class. ○ Do not answer procedural queries for which the answer is already available. ○ Facilitator: Keep an online presence. ○ Design additional activities for students to practise their interaction/ collaboration skills. ● Face-to-face ○ Demonstrate use of e-tools (e.g. discussion threads) ○ Discuss problems/misunderstandings experienced online. ○ Provide opportunities for groups to meet/interact face to face.
Assessment in large classes	● Require students to submit assignments online for electronic marking and feedback. ● Compile a list of feedback/comments for common mistakes before grading starts. ● Devise electronic feedback instruments in order to create more opportunities/time for providing individualised feedback. ● Appoint suitable tutors to provide more personalised attention/ feedback to students in large classes.

Online tools should be used as part of the assessment for adequate use of such tools by all learners. Macdonald (2008:93) maintains that a course should be designed in such a way that online activities are framed within the assessment strategy of the course.

Rosenberg (2001:170) notes how standards would benefit interoperability, but he mentions that unless developers, vendors as well as clients are aware and support set standards, it would not be worthwhile. It is to this end that it is also necessary to agree on set standards to be used within South African e-learning. These standards should facilitate the promotion of language rights as this is expected from any learning especially in the context of schools.

Taylor (2001:17-18) highlights the following outstanding properties of the web as delivery medium:

- ↳ Interaction;
- ↳ World-wide access;
- ↳ Hypertext organization of study material;
- ↳ Hypermedia; and
- ↳ Updatability.

Jung and Suzuki (2006:277) identified open interaction, knowledge creation, information distribution and efficient management as reasons for using blended learning. Open interaction allows for the creation of groups within which debate and discussion that integrate classroom lectures and readings can be facilitated. These online activities can be used for evaluation and can even reduce class time. In terms of knowledge creation, it is possible to use external experts in online situations. Asynchronous and synchronous learning can take place and anchored learning can be promoted where learners are required to preview content for online learning. Information distribution allows for the posting of material prior, during and after classes. Furthermore, the usage of materials by learners can be tracked and encouraged through direct communication with learners. Finally, in terms of efficient management, assignments can be submitted electronically and standardized feedback as well as customized messages can be sent back to learners (cf. Jung & Suzuki, 2006:277).

Initial meta-analyses of studies done by Kulik and his collaborators (Romiszowski, 1988:325), has shown that the use of the computer as an instructional medium against that of conventional instruction by teachers, proved significant advantages in using computers. After reanalysis it was proven that if the content and circumstances were to be the same, the same result would be achieved with computer-based instruction with conventional instruction (cf. Romiszowski, 1988:325). Nonetheless, it is imperative to note that, in this particular study, the focus is on a blended approach where computers are used for learning.

According to Bates (2005:8), governments and institutions are requiring institutions to report on the number of online courses presented. Yet in this regard Bates (2005:9) notes that often there exists no clear definition of what is expected and that

the "[c]hoice of technology should be driven by the needs of the subject matter and of the students".

Bates (2005:10) provides two main reasons why governments want to promote e-learning:

  ✎ E-learning as a new knowledge-based industry [is] able to lever the advantage of advanced educational systems to create educational products and services that can be marketed internationally.

  ✎ E-learning [is used] to improve the quality of education and to produce technology-savvy graduates, able to use new technologies in the new economy.

An evaluation done at the University of Illinois in teaching Computer Studies on computers using the PLATO system showed that learners learned as much with this system as with traditional methods, but that they preferred learning on the computer. It is, however, true that they experienced a high dropout figure as learners had to be self-motivated and responsible for completing the course (cf. Van den Berg, 1990:45).

A number of controlled studies, including evaluations done with PLATO and TICCIT systems have proved that the use of interactive computer simulations, games and tutorials as teaching aids increase the tempo and amount of learning (cf. Inglis *et al.*, 2002:11; Van den Berg, 1990:45).

According to Taylor (2001:24), there are some shortcomings with regard to web-supported learning. This includes that the development of a web-supported learning environment is labour- and time-intensive. Furthermore, the design and development of web-supported learning requires specialist skills in different fields. Taylor (2001:25) continues to say that it is quite expensive to implement; bandwidth and hardware limitations can also hamper successful implementation. Moreover, technical support can be problematic. Lastly, learners are working in isolation and evaluation depends on their integrity. Some of these concerns can be countered as, with the approach of blended learning, the basic assumption is not that each teacher should create a complete new web-supported learning environment, but that they should rather use existing resources. Moreover, in the school context, most of the work will

be done at school and the presence of the teacher is essential for blended learning to take place.

Nel (2005:68) notes that a blended approach is a very efficient teaching model and that various institutions in the United States of America have reported "a significant increase in throughput after the introduction of blended learning into some of their courses".

The application of blended learning in multilingual classrooms will be discussed in the section that follows.

3.7 BLENDED LEARNING IN MULTILINGUAL CLASSROOMS

Central to this study is the application of blended learning in a multilingual classroom in order to accommodate and promote multilingualism. This refers, however, is not a unique situation and has been dealt with internationally (cf. Hafsa, 2003; Kushwah & Vijayakumar, 2001).

Le Roux (1998:112) makes the following observation in terms of creating multicultural contexts through the use of technology:

> Modern *communication technology* necessitates multicultural education as an educational strategy in all mono and multicultural societies. In both multicultural and monocultural societies modern communication technology within a modern technotronic dispensation has made the possibility of daily intercultural contact a realistic way of life. [Italicization from original text.]

Therefore it is clear that multilingualism can and should be accommodated and promoted through communication technology. In this regard the computer is an appropriated communication technology tool available to teachers.

In a survey on blended learning conducted by Nel (2005:161) with university lecturers, it was found that most respondents agreed that inter-group activities might counteract the negative effect of segregation caused by same-language groups. Online, 56% of the respondents showed "agreement with the statement that the online environment provides opportunities to students to communicate in their preferred language".

According to Holmes and Gardner (2006:63), "today's Web does indeed reflect the language and social diversity of the modern world". Bonk (2009:380) affirms that English dominates the Web despite it not being the most widely spoken language in the world. This view is supported by Cunningham (2001:207) that states that English is the "language of the Internet". Kushwah and Vijayakumar (2001:2) argue that only using English in e-learning contexts would restrict access to facilities for certain communities. Therefore Kushwah and Vijayakumar (2001:2-3) propose a multilingual e-learning system that accommodates different Indian languages. Projects in India (Kushwah and Vijayakumar, 2001:2), related to this concept, proved that multilingual e-learning is possible and viable.

Cunningham (2001:209) supports the notion that multilingualism can and should be promoted through the use of websites. Holmes and Gardner (2006:63) also state that "eLearning educators are continuing to consider how languages and cultures, particularly minority cultures, can be enriched and supported". The multicultural context is a very important consideration when implementing blended learning. Holmes and Gardner (2006:64) make the following statement in this regard: "e-Learning designers and facilitators therefore need to take such factors as language competence, cultural background and learning style into account when creating and presenting the information and content for e-Learning environments they provide".

Holmes and Gardner (2006:64) observe that studies concerning cultural aspects of educational technology in multicultural classrooms showed that the usage of computers had a positive effect especially in terms of minority groups. Blended learning has particular benefits with regard to multicultural and multilingual contexts where, through online collaboration of learners, they can develop cultural sensitivity (cf. Nel, 2005:20).

Hafsa (2003:2) notes, with regard to business, that "there are now more and more multilingual and multicultural individuals within each entity who require their needs to be met with e-learning". In addition Hafsa (2003:5) is of the opinion that multilingual e-learning solutions would give companies a competitive advantage as content can be shared globally between employees.

Hafsa (2003:3) links learning multilingually with the concept of localization and states that it includes the translation of content, adjustment of user interfaces, customization of features and testing. Hafsa (2003:4) is of the opinion that the major expense in localization is the cost of the translation of the content. In terms of design, Hafsa (2003:4) emphasizes the need to separate content, formatting and navigation in order for translations to be done without programming knowledge. Hafsa (2003:4) is of the opinion that machine translation could be used effectively in localizing software if only words and short sentences are required, however, if the text is complex then human translation is required.

Localization can be defined as the translation of software into a local language which is different from the language in which the software was developed (Dalvit *et al.*, 2005:126). Hafsa (2003:3) defines localization in terms of learning by stating that: "Localization is the process of adapting learning content, module, program or service to meet the language, cultural and other requirements of a specific target environment or market". The translation of websites is linked to localization by Crystal (2001:223) where something is adapted to a certain language or culture. With the advent of the Internet, English was the major language used on the Internet, yet recently the Internet has become more multilingual as the presence of other languages has increased online (Crystal, 2001:216, 223). Localization has taken place in terms of end-user software such as OpenOffice that is being translated into the eleven official languages by Translate.org.za, a Non-Governmental Organization (Njobe, 2007:1, 39-41).

Nel and Wilkinson (2008:156-157) note that research shows that with blended learning at tertiary level where it is done by means of group work, students tend to align according to the languages they speak. Yet when students who speak different languages are forced together a common language such as English is used.

Nel and Wilkinson (2008:157) state that an online environment presents a realistic way in which the development of a language such as Sesotho as medium of instruction can be encouraged.

Despite the fact that learners are diverse in terms of background, context, knowledge and skills, in general they do favour a visual, auditory or kinaesthetic

approach. Bersin (2004:32) notes that most Internet-based content is targeted towards visual learning. Visual learning focuses on the use of text, diagrams and graphics – elements that have been included in Internet websites since the early 1990s. With auditory learning, learners prefer listening and interacting with others by speaking – this may prove difficult in situations where inadequate hardware or fast connections are available, but it still is a distinct possibility with many video conferencing software available. Kinaesthetic learning takes place when learners touch or do certain tasks. This can only be achieved by simulations done online unless the actual skill to be learned is typing or using certain software. Cook and Finlayson (1999:110) note that computers provide opportunities for bilingual learners in that a number of languages can be facilitated at one time. The usage of word-processors in this regard is named.

Nel (2005:161) notes that online environments can contribute to the development of African languages such as Sesotho as medium of instruction. Nel (2005:175) also notes that blended learning "addresses the issue of diversity, particularly language diversity, in collaborative activities, involving learners in the group allocation process, and providing additional practice time to address historical backlogs".

Van der Westhuizen (1999:49) state that "online education can also be described as being non-discriminatory, as virtual classrooms are accessible to all students regardless of their location, age, ethnicity, gender, language, physical limitations, etc." Admirable as it may seem, this does not account for accommodation in online media for different languages through the provision of multilingual interfaces.

Van der Westhuizen (1999:52) states that virtual classrooms can facilitate interaction by multinational and multicultural students. In addition, Van der Westhuizen (1999:53) identified the following guidelines to ensure that virtual classrooms are culturally sensitive:

- ✎ Do not assume that more communication or interaction is best, especially if such activities place a burden on students.
- ✎ In terms of language, be especially sensitive to cultural differences in terms of communication styles, who may start and terminate conversations, what degree or debate or disagreement is expected, and level of formality.

⮞ Select content where cross-cultural aspects are either of minimal relevance or course where cross-cultural aspects are integral to the content, like foreign studies.

⮞ Representative form refers to the use of visualizations to replace or supplement text. Cultural differences may exist in the acceptability and interpretability of certain aspects of visualizations.

Pachler (2001:15) makes the following comment with regard to digital culture:

> Digital culture I deem to be a linguistically mediated discourse community in which the semiotic specificities of computer-mediated communication as well as electronic/informatic, visual and critical media literacies are important higher-order skills; an environment which is characterised by a novel interplay of text, sound and pictures requiring, amongst others, net text construction, composition and decoding skills as well as new navigational strategies.

Extralinguistic clues and cues are not necessarily available with many computer-mediated communication mediums, with the exception of video conferencing (Pachler, 2001:21). Hence the following strategies have emerged in such online situations:

⮞ 'posing', i.e. metatags denoting the speaker's mood or actions;

⮞ smilies[26], e.g. :-) for smiling, :-] for smirk;

⮞ acronyms/abbreviations[27], e.g. *lol* = laughing out load (with * representing a physical action in non-virtual space) or f2f = face-to-face;

⮞ neologisms, e.g. c-girl = cyber girlfriend.

This type of extralinguistic compensation can also be linked to so-called SMS-language and can be used as a resource by teachers when it comes to online interaction. Pachler (2001:21) goes as far as to state that these types of conventions are part of basic literacy, as they may in future be linguistic skills required to function in society. In terms of technical terminology on the Internet, Crystal (2001:223) notes that English loan words are often used as some of the terms have not been translated into certain languages.

In a web-based application designed to facilitate the study of Computer Science in an African language at tertiary level Dalvit *et al.* (2005:124) suggest "cooperative production and sharing of multilingual support material in both English and the

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[26] Crystal (2001:36-37) refers to this as 'smileys' and lists related emoticons.
[27] Also compare Crystal (2001:85-86) for more abbreviations used with online communication.

students' home languages". The web-based application used by Dalvit *et al.* (2005:127) consisted out of a chat room, an online glossary as well as a knowledge base or newsgroup. Importantly Dalvit *et al.* (2005:129) also note that the university students who used the web-based application could choose whether they wanted to learn through English or their mother tongue. Furthermore, it is emphasized that material can be developed electronically by students. At the end of their study, Dalvit *et al.* (2005:129), found that a multilingual web-based application could help to overcome learning problems due to language problems, provide access to the study of computers to more individuals and that similar resources could be made for other subjects and at other levels of education.

In terms of the application of blended learning in this study, it is important to approach blended learning in terms of the subject of Information Technology, as the model proposed by this study will be tested in this subject.

3.8 BLENDED LEARNING AND IT

The subject of Information Technology is used as a context in which the conceptual model for accommodating and promoting multilingualism through blended learning as proposed by this study will be implemented.

Since problem-solving is an important concept in IT instruction, it is also important to approach this in terms of blended learning. In this regard, Littlejohn and Pegler (2007:134) note that problem-based learning allows for authentic learning activities that could allow learners to work together in groups to solve a problem. This type of learning can begin with an open-ended problem which would, in turn, require a solution that can be reached either individually or within groups. Problem-based learning also tends to be based on a set of activities rather than on just one single activity.

Gagné (1985:178) states that the act of solving a problem "is guided by the stored verbal knowledge possessed by the learner, which makes possible the interpretation of the problem". In addition, Gagné (1985:178) notes that problem-solving includes

a process through which learners should discover rules that have been learned earlier, as well as planning for new problem situations.

Littlejohn and Pegler (2007:135) identified three stages in the problem-based learning process:

- ✎ Learning objectives are determined by learners and tasks are set. E-learning tools can be used in this phase to facilitate collaborative planning.
- ✎ Learners generate resources and integrate materials they created with the provided material. Content management tools can be used to support this stage.
- ✎ Peer discussion and reflection may be used with testing and evaluation of a solution. Discussion tools can effectively be used to support this stage.

While taking these problem-solving issues into consideration, it is important to note that generally a lot of work is done on computer by both the teacher in teaching the subject, but also by the learners doing programming. Yet blended learning does provide opportunities for mixing both computer-based instruction with face-to-face instruction, as well as adding subject-specific online resources[28].

An important consideration for using a blended approach is the fact that learners are increasingly exposed to technology at a younger age. In this regard, they tend to adapt easier to changing technologies while adults tend to prefer older more traditional teaching methods (cf. Cook & Finlayson, 1999:8). Yet it is essential to keep in mind that the skills in using technology might vary, depending on their exposure to technology (cf. Cook & Finlayson, 1999:9).

3.9 CONCLUSION

Blended learning supposes a combination of traditional face-to-face and computer-supported, web-based or online approaches. The history of learning delivery technologies has been traced following early technologies, following on with computers in education and ultimately with the use of the Internet and e-learning. A distinction was also made between asynchronous and synchronous learning tools. This was followed by a contextualization of blended learning in terms of learning theories and how it could be applied. Appropriate blended learning standards were

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[28] An example of an IT specific online resource is the site http://www.teachitza.com

highlighted, followed by remarks around the application of blended learning in multilingual classrooms and in terms of the subject of Information Technology, in order to allow the accommodation and promotion of multilingualism through blended learning.

In the next chapter, the focus is shifted to how blended learning can be applied and multilingualism be accommodated and promoted in the subject IT.

CHAPTER 4: Blended learning and multilingualism in IT

4.1 INTRODUCTION

The aim of this chapter, which ties in with research objectives set at the start of the study, is to provide background on why blended learning is a possible solution for accommodating and promoting blended learning specifically in the subject IT. Furthermore this chapter also provides background information on the education system in which the subject IT functions. In this chapter an overview is provided of Outcomes-Based Education (4.2), the subject of IT (4.3) and the specific content used in the proposed conceptual model where multilingualism is accommodated and promoted through blended learning (4.4). Furthermore, some remarks are made in terms of the application of blended learning within the South African school situation with reference to some policies, learning and requirements (4.5).

4.2 OUTCOMES-BASED EDUCATION (OBE)

4.2.1 Defining OBE

Since this study focuses on the accommodation and promotion of multilingualism through blended learning within a South African context, the concept of Outcomes-Based Education (OBE) is important and is discussed.

Spady (1988:5) states that OBE "means organizing for results: basing what we do instructionally on the outcomes we want to achieve, whether in specific parts of the curriculum or in the schooling process as a whole" (cf. Oosthuizen, 2004:74-75).

To clarify the concept of OBE further, the background to this phenomenon is discussed.

4.2.2 Background to OBE

OBE is a key approach to the South African education system and a background to this approach will provide a point of departure in order to be able to discuss the phenomenon further.

Killen (2000:vii) traces the roots of OBE to earlier work on educational objectives, competency-based education, mastery learning and criterion-referenced assessment. Four educational philosophies influenced OBE. This includes: behaviourism, pragmatism, critical theory and social reconstruction (Du Plessis, 2002:23; Van Aswegen, 2008:48-51).

According to Du Plessis (2002:23), the emphasis in OBE is on outcomes and the end result of the learning process. Furthermore, traditionally the focus was content and it has now shifted to the learners with the result that they are playing a more active role in the learning process.

Therefore in terms of blended learning this emphasis on outcomes should also be taken in to consideration. In addition certain distinguishing elements can be identified in terms of OBE. These elements will now be discussed.

4.2.3 Elements of Outcomes-Based Education

Killen (2000:vii) states that all decisions about planning, teaching and assessment in OBE are guided by four simple questions:

- What do we want learners to learn?
- Why do we want learners to learn these things?
- How can we best help learners to learn these things?
- How will we know when learners have learned?

Language can be associated with all four of these questions as language needs to be used to describe what will be learnt and determine why it needs to be done. Furthermore, when helping learners, language should be used and to determine whether learning has taken place, assessment can be done through learners employing language. This ties in with the the emphasis on accommodatin ang promoting multilingualism.

Related to the above-mentioned elements are the main principles that guide OBE as identified by William Spady (1994). The principles of OBE, within a South African context and therefore relevant for this study, will now be discussed.

4.2.4 Principles of OBE

Since this study focuses on teaching within a South African and a secondary school environment, it is important to set the parameters of teaching as implemented through an OBE approach. The four main principles that guide OBE as identified by William Spady (1994:10) are:

- ✎ Clarity of focus on culminating exit outcomes of significance;
- ✎ Expanded opportunities and support for learning success;
- ✎ High expectations for all to succeed; and
- ✎ Design down form the ultimate, culminating outcomes.

These principles are widely acknowledged as integral to OBE and it is stated that OBE's purposes will be achieved if teachers apply these principles consistently, systematically, creatively and simultaneously (cf. Du Toit & Du Toit, 2004:4-6).

Killen (2000:viii-ix) identified the following underlying principles for OBE:

- ✎ Schools, and other educational institutions, exist so that learners can learn things that will be useful to them after they have finished their formal education.
- ✎ Learning is the most important aspect of education.
- ✎ Learners have different characteristics and dispositions that influence what and how they learn.
- ✎ Learners are capable of achieving complex outcomes if they are given appropriate opportunities and time.
- ✎ Teachers and learning contexts influence learning.
- ✎ Learners need to experience success in order to remain motivated to learn.
- ✎ Learning needs to be challenging in order to engage learners.
- ✎ Every instructional/learning episode should have a purpose.
- ✎ The purpose of an educational programme can be expressed as a set of significant learning outcomes that will then influence everything else in the programme.
- ✎ If learners know what outcomes they are supposed to achieve, they will have a better chance of achieving them.
- ✎ Memorizing isolated facts and simply accumulating knowledge for no clear purpose are of limited value to learners.
- ✎ Learners should be expected to take some responsibility for their learning.

- ✤ Assessment should be an integral component of instruction and should, as far as possible, be authentic (use real-world situations in which to test applications of knowledge and skills).
- ✤ Teachers and educational institutions (not the learners themselves) control most of the factors that determine whether or not learners are able to learn.
- ✤ The way educational institutions (and all aspects of instruction) are currently organized, is not the only way (or necessarily the best way) to organize them.

Garrison and Anderson (2003:64) state that e-learning is conducive to expanded educational opportunities. In addition, Garrison and Anderson (2003:64) make the following statement, emphasizing the approach being learner-centred:

> With the expanded capabilities and choices that e-learning presents, it is natural to shift towards an interactive and inquiry-based approach. This shift, which favours learner control and responsibility, has biased e-learning to a 'guide on the side' approach. We argue that this is a learn*er*-centred approach rather than a learn*ing*-centred approached. [Italicization in original]

In conclusion the principles as set out by Spady (1994) and Killen (2000) create the relevant context for the interpretation on how OBE should be approached. The next section briefly looks at the implementation of OBE in South Africa.

4.2.5 OBE in South Africa

OBE was introduced in South Africa with the introduction of Curriculum 2005 in 1998. Curriculum 2005 was revised by a Ministerial Committee in 2000 producing the Revised National Curriculum Statement (cf. Oosthuizen, 2004:81). In 2010 a process of new drafting of new Curriculum and Assessment Policy Statements was started (cf. DoE, 2010). Since it falls outside of the scope of this study the reasons behind and the process of implementation of OBE in South Africa is not discussed further. However, for the sake of this study it is important to take note of the importance of OBE for education in the South African context.

To clarify the context within which this study was done the subject Information Technology will be discussed in the next section.

4.3 INFORMATION TECHNOLOGY (IT)

4.3.1 Background to IT

Since the focus of this study is on the accommodation and promotion of multilingualism through blended learning and a conceptual model is proposed to actualize this goal, a subject is needed for the application of the conceptual model. The subject chosen is IT and it is discussed in this section. The initial part of this section deals with the origin of this subject and then progresses into a discussion on how the subject is structured within curriculum at the time of the completion of this study.

In research done by Van Aswegen (2008:152), it is evident that often it is mainly computer-related subjects[29] that facilitate the integration of information and communication technology in classrooms. Van Aswegen (2008:153) also notes that this is, among other reasons, due to a lack of policy, knowledge, skills, funds, and equipment. Keeping this in mind, the subject IT has been chosen as focus for this study.

The first computer courses taught internationally and in South Africa included instruction in computer-programming languages. Yet, as Romiszowski (1988:321) notes, since the late 1980s, the tendency has been "towards much less emphasis on programming languages and much more on the efficient use of special purpose applications software".

Nachmias, Mioduser and Chen (1985:89) describe computer programming as: "a rather complex activity, requiring technical control of the hardware, language acquisition ability, ability to solve problems in an algorithmic or procedural manner, and capacity for understanding abstract mathematical concepts".

Van den Berg (1990, 30) notes that Computer Studies, a subject related to IT in terms of content, is a problem-solving discipline that is concerned with the development of cost effective solutions for problems. Key also to the subject IT is the use of problem-solving. Killen (2000:129) defines problem-solving as "the process of

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[29] Within the FET phase the computer-related subjects refer to Computer Applications Technology (CAT) and Information Technology (IT).

applying existing knowledge to a new or unfamiliar situation in order to gain new knowledge".

Jonassen *et al.* (2003:25-26) note that problem-solving can take place through technology and through information searching. Yet in this regard it is clear that merely looking for answers does not necessarily mean that learning has taken place. Only by having knowledge about a problem can it be solved. Furthermore, Jonassen *et al.* (2003:27) add that the creation of mental models can also be used for learning.

Jonassen *et al.* (2003:20-24) identify the following kinds of problems: lexical, algorithmic, story, rule-using, decision-making, troubleshooting, diagnosis-solution, tactical/strategic, case/systems analysis, design, and dilemmas. Jonassen *et al.* (2003:21), criticize algorithmic approaches to problem-solving by stating that there is "overreliance on procedural knowledge structures and the lack or absence of conceptual understanding of the objects of the algorithm and the procedures engaged".

Van Aswegen (2008:58) describes problem-solving as a teaching strategy with which learners are required to use existing knowledge on new situations so that hypotheses and predications can be made of what will happen, and by doing this, gain new knowledge.

Furthermore, Van Aswegen (2008:59) identifies six steps in the implementation of a problem-solving learning strategy:
- outcomes must be set by the educator;
- learners should be empowered so that tasks can be individually identified and organized;
- educators should provide help when learners function in groups or individually;
- appropriate artefacts such as reports and models should be designed;
- educators should help learners to analyse and evaluate their thought processes; and
- educators should help learners with the evaluation of their research and intellectual skills.

The subject Information Technology is used to implement a model to accommodate and promote multilingualism through the use of blended learning and therefore it is important to define the subject clearly. In order to determine the scope of the subject, the specifications indicated in the national policy document, the National Curriculum Statement, will now be discussed.

4.3.2 National Curriculum Statement

The National Curriculum Statement (DoE, 2003a:9) defines the learning area IT as follows:

> Information Technology focuses on activities that deal with the solution of problems through logical thinking, information management and communication. It also focuses on the development of computer applications using current development tools. The subject develops awareness and an understanding of the social, economic and other implications of using computers.

Breed (2009:2) states that computer-related disciplines can be divided into programming skills, use of computer applications and technical aspects of computers, however, the scope of IT extends wider than just these three areas. The purpose of the learning area is described as: "The subject Information Technology will enable learners to understand the principles of computing through the use of current programming language, hardware and software, and how these apply to their daily lives, to the world of work and to their communities" (DoE, 2003a:9).

The understanding set out in the purpose of the learning area will be achieved by providing learners with opportunities to:

- ✎ demonstrate an understanding of concepts, principles and knowledge of computers and computer applications in various disciplines;
- ✎ demonstrate an understanding of how computers impact on the management of natural resources, cultural values, socio-economic and human rights development;
- ✎ critically analyse the impact of computers on ethical, social, economic and political relations;
- ✎ work competently in a dynamic computer-using environment which includes:
  - • effective communication,
  - • problem-solving approaches,
  - • team work,

- responsible use of technology,
- precision and accuracy;

↳ demonstrate proficiency in the use of computers in managing and critically interpreting information;

↳ demonstrate how the creative uses of different computer technologies facilitate human interaction;

↳ show proficiency in selecting and customising appropriate computer applications, hardware and media to provide and communicate innovative solutions across all sectors of society;

↳ design and programme well-tested and user-friendly computer-based solutions to meet specific requirements; and

↳ prepare for a career path, Higher Education and lifelong learning, thus enabling learners to become effective members of a computer-using society.

(DoE, 2003a:9)

The National Curriculum Statement (DoE, 2003a:12-13) sets out four learning outcomes for the learning area IT:

↳ Learning Outcome 1: Hardware and System Software

↳ Learning Outcome 2: e-Communication

↳ Learning Outcome 3: Social and Ethical Issues

↳ Learning Outcome 4: Programming and Software Development

Learning Outcome 4 is described by the National Curriculum Statement (DoE, 2003a:12; Breed, 2009:10) as "a heavily-weighted outcome because it is the crux of the subject".

To explain the outcomes further each of the outcomes will now be discussed individually.

4.3.3 Learning Outcomes

4.3.3.1 Learning Outcome 1: Hardware and System Software

According to the National Curriculum Statement (DoE, 2003a:14-19), Learning Outcome 1 expects that "[t]he learner is able to demonstrate an understanding of and competently operate computer-based technologies". Assessment standards under this outcome focus on the description of certain theoretical concepts in terms of the physical as well as software nature of computing devices.

4.3.3.2 Learning Outcome 2: e-Communication

With regard to Outcome 2, the National Curriculum Statement (DoE, 2003a:20-21) requires that "[t]he learner is able to apply creative uses of different computer technologies to facilitate electronic communication". This implies that the assessment standards also focus on electronic communication, in other words communication through the use of the Internet.

4.3.3.3 Learning Outcome 3: Social and Ethical Issues

The National Curriculum Statement (DoE, 2003a:22-25) makes the following statement about what the expectation is in Outcome 3: "The learner is able to critically analyse the impact of computer technologies on socio-economic, environmental, political and ethical issues." The focus in this outcome is therefore more on the impact of computers on humans and surrounding issues.

4.3.3.4 Learning Outcome 4: Programming and Software Development

For Outcome 4, the National Curriculum Statement (DoE, 2003a:26-31) states that "[t]he learner is able to design, implement, test and deliver efficient and effective solutions to problem situations". Assessment standards in this outcome focus mainly on the development of software through programming using a programming language.

4.3.4 Information Technology and language

Due to the nature of the subject, Information Technology is accessible through the medium of English (Dalvit *et al.*, 2005:124; Njobe, 2007:1). This can be traced to the fact that since the contents of the subject is based on theory related to computers and programming and software development through computer languages based on English.

Language was identified as a barrier to effective teaching, learning and assessing of IT outcomes by Marchant (2004:24). Marchant (2004:24) states that due to the fact that the language of many IT learners is not the same as the LoLT and because of the "special terminology and writing style used" in IT the problem of languages is compounded. In addition, Marchant (2004:24) lists the following strategies that can be used to address language problems in IT:

- ✍ alternative communication systems used – besides only vocal;
- ✍ allowing home language to be used to consolidate concepts;

- ✎ a less rigid style of reporting and use of terms to be allowed; and
- ✎ use of diagrams, models, mind maps instead of descriptions in words.

Despite the limited view Njobe (2007:4) presents in terms of what Information Technology involves at school level it is important to take the conclusions made in terms of Information Technology and language use into consideration. In research conducted by Njobe (2007:126-127) at both school and tertiary level it was found that learners improved in terms of marks when they used interfaces in isiZulu, their mother tongue, rather than one in English. The respondents in the study by Njobe (2007:137) also indicated the importance of both English and their mother tongue in the instruction of Information Technology. Furthermore, the usage of dual-medium technology was received positively and the use of the respondents' mother tongue in the teaching of Information Technology is acknowledged as a solution to problems experienced in terms of language.

Serfontein (2009:23-24) discusses how inclusivity and learner diversity can inform the development of IT Learning Programmes. Despite the fact that Serfontein (2009:23-24) states that the diversity of learners should be acknowledged in terms of learning styles, pace of learning, levels of achievement, gender and cultural diversity no mention is made about language diversity. The only related concept is that of cultural diversity and in this regard Serfontein (2009:24) maintains that learning programmes should "recognise, celebrate and be sensitive when choosing content, assessment tasks and LTSM". As such this statement does not directly related to language or even a sensitivity towards multilingualism.

Since the content used in the application of the conceptual model proposed by this research is based on computer programming, this part of the subject IT is discussed in the next section.

4.4 COMPUTER PROGRAMMING AND LANGUAGE

Since computer programming is central to the part of the subject used in the proposed conceptual model for accommodating and promoting multilingualism through blended learning, it is important to give background on the phenomenon in terms of language.

Havenga (2009:120) states that the action of learning how to program "is a complex cognitive task that includes learning the programming language, comprehending existing programs, modifying written programs, composing new programs and using debugging techniques". Furthermore, programming requires specific cognitive knowledge and skills. In particular higher cognitive functions such as "reasoning, language processing and problem solving" are necessary (Havenga, 2009:121).

Du Plessis and Janse van Rensburg (2006:122-123) found that for an ICT course, at a South African university of technology, it was necessary to implement an English language proficiency intervention course. The need for this course was based, amongst other reasons, on the link between teaching a programming and the development of language competency (cf. Du Plessis & Janse van Rensburg, 2006:113).

According to Clancy (2004:87-88), linguistic transfer is a source of confusion in terms of programming as terms may not have the same meaning in English as in programming. This problem can be compounded with weaker or limited knowledge of English.

Crook (1994:20) makes the following observation: "Expertise arises from dense experience with representative and discrete problems from particular domains of practice. Such human reasoning demands a particular kind of resource to support new learning: access to a library of concrete situations (cases) in which problem-solving can be exercised". In terms of problem-solving, Crook (1994:70) makes the following statement with regard to programming:

> Here, it is argued, what mediates the creation of a useful cognitive residue is not 'internalisation'. It is some (more constructivist) process of reflective abstraction – reflection centred about these procedures as products of thought. Through successful programming, learners are empowered to confront and examine a concrete representation of their problem-solving processes.

Clancy (2004:85-86) notes that misconceptions among programming students can interfere in the learning process. Hence Clancy (2004:94) makes the following statement:

Better strategies encourage knowledge integration, the dynamic process of linking, connecting, distinguishing, organizing, and structuring ideas about a given concept. Techniques for doing this include bridging analogies, self-explanation, and group learning via discussion and experimentation.

According to Goosen (2004:46), the reason why an algorithm can be used, is "to focus on understanding new concepts during the initial sessions with natural language, and can then tie these concepts to the syntax of the programming language in the subsequent sessions".

Stasko and Hundhausen (2004:199) highlight the importance of algorithm data structures in terms of learning how to program. Data structures are "collections of data that are organized to particular conventions" while the algorithms refer to abstract descriptions of the programming process (Stasko & Hundhausen, 2004:200).

Stasko and Hundhausen (2004:199) define an algorithm as a "set of operations that are carried out to achieve some objective or to perform some task". In addition, Stasko and Hundhausen (2004:199-200) state that algorithms could be difficult for learners to learn as they can be highly complex and include many steps. Furthermore, algorithms are expressed using prose or pseudo code.

From this discussion it is clear that some programming languages, such as the one used in the Delphi environment, are based on English. This means that different languages cannot be used in the actual programming, yet planning activities such as algorithms can be done in different languages.

In the next section, applying blended learning in a South African environment will be discussed.

4.5 APPLYING BLENDED LEARNING IN SOUTH AFRICA

While keeping the aforementioned discussion on the subject IT in mind, certain issues need to be considered in terms of applying blended learning in the South African and specifically Free State context.

Pretorius (2005:13) emphasizes the fact that teaching and learning are at the core of education and that the use of computers cannot be separated from the practice of teaching. This implies that an integrated approach should be followed in teaching and that the medium itself should not be treated as an outcome itself, but also as a resource in reaching other outcomes.

Furthermore despite the fact that the concept blended teaching should also be considered, it should be noted that with blended learning it is accepted that a learner-centred approach to learning is more prominent (cf. Setswe, 2004:14).

To substantiate the reason why blended learning is considered as a solution to the accommodation and promotion of multilingualism in the teaching of IT, the advantages of web-based learning, as compiled by Jolliffe *et al.* (2001:11-12), have been adapted and presented below:

- learning can be delivered at any time or place;
- elements of CD ROM-based learning is used, but enhanced communication is added;
- learning materials can easily be updated;
- interaction between learners and facilitator (or educator) can be increased;
- learners can form both informal and formal web-based learning communities;
- problem- and assignment-based learning is facilitated;
- resources already available on the Internet can be used;
- real-time content such as video conferencing, streaming video or discussion rooms can be provided;
- multiple media such as text, graphics, audio, video and animations can be included into the learning materials;
- the use of materials and learner progress can be tracked by facilitators;
- learners are usually comfortable for the web-based environment; and
- learner-centred delivery can be accommodated while taking the differences between learners into account.

In keeping the above-mentioned in mind, the advantages of blended learning can also be approached. Thorne (2003:133) identified the following advantages of blended learning:

- learning can be more targeted, focused, delivered bite-size, just in time;

- ✎ learners can interact with the tutor;
- ✎ learners can interact with their peers;
- ✎ learning materials are readily accessible;
- ✎ a variety of techniques can be utilized by maximizing different technologies;
- ✎ it can build on other off-the-job provision.

In terms of applying blended learning, it is necessary to look at the implementation of web-based learning materials. Jolliffe *et al.* (2001:64) identified eighteen steps for developing web-based learning materials:

- ✎ prepare the web-event information document;
- ✎ develop the learner profile;
- ✎ develop the learner sub-profile;
- ✎ develop learning objectives;
- ✎ determine assessment guidelines;
- ✎ determine delivery method and parameters;
- ✎ determine instructional strategies;
- ✎ determine the design approach;
- ✎ determine material standards;
- ✎ review and select learning resources;
- ✎ design graphic user interface and screen templates;
- ✎ develop flowcharts;
- ✎ develop storyboards;
- ✎ input all learning materials;
- ✎ conduct formative evaluation;
- ✎ conduct facilitator and learner orientation;
- ✎ conduct field trial; and
- ✎ review learner performance.

This list provides a checklist for the development of a web-based part of a blended learning environment.

4.5.1 Application of web-based blended learning tools

Macdonald (2008:61) summarizes small group activities in terms of web-based blended learning tools as follows:

TABLE 4.1 Small group activities in terms of web-based blended learning tools

Activity	Tool
Discussion and debate	Forum or blog
Reflective diary	Blog or forum
Collaborative writing	Wiki or forum
Peer review	Wiki or forum
Enquiry-based learning	Forum or wiki
Resource-based learning	Forum or wiki
Online note-taking and peer comment	Wiki or forum
Knowledge repository on course concepts	Wiki

A small group could, according to Macdonald (2008:61), be between four and six learners, but larger groups are sometimes used in collaborative projects. Macdonald (2008:61) notes how important moderation is for wikis and forums. Furthermore, such moderation can be used to set up and maintain these tools. A moderator can also track discussions and make sure that all members of the groups taking part in discussions are effectively involved.

According to Graham (2006:10-12), blended learning can be applied at four different levels: activity level, course level, program level and institutional level. Although this distinction focuses on a tertiary environment it has implications in terms of a school environment where the levels can be adapted to activity level, subject level, grade level and school level. In such a division, the activity level refers to blending taking place within a single activity. In terms of a subject, level blending is employed only within a specific subject while with the grade level, the emphasis could be on more than one subject, but within a fixed grade. Finally, with a school level – which is similar to Graham's (2006:12) institutional level – a wider commitment can be made through which blending can be implemented in all grades and subjects within a school. For the sake of this study, the focus will only fall within an activity level where a specific set of activities will be used.

4.5.2 Policies and background to e-education

The Department of Education in South Africa encourages schools to integrate computers in the learning and teaching process. Yet statistics show that projections made by the department have yet to be achieved (cf. Setswe, 2004:2).

4.5.2.1 Draft White Paper on e-Education

In the foreword to the *Draft White Paper on e-Education* (DoE, 2003c), the then Minister of Education, Ms G.N.M. Pandor, highlights the fact that Information and Communications Technologies are central to changes taking place in the world. It is stated that infrastructure is gradually increasing. In addition, Minister Pandor states that the Department of Education wants "to ensure that every school has access to a wide choice of diverse, high-quality communication services which will benefit all learners and local communities". By mentioning "diverse" and especially the fact that this should benefit all learners and local communitie, this implies intrinsically multilingual support. Yet further on it is mentioned that in order to provide suitable technologies, "significant investment" is required. Collaboration between government and the private sector is also expected to fulfil this need.

The White Paper is divided into seven chapters and also has a glossary of ICT terms. The first two chapters focus mainly on the clarification of definitions while chapters three to five are concerned with how e-education is used, translated into educational policy and structured. Chapter six deals with funding and resourcing while the last chapter relates to an actual implementation of the material discussed in the previous chapters.

For the purpose of this study, the White Paper will now be discussed with specific focus on e-learning and how this can be employed to promote multilingualism in South Africa.

4.5.2.1.1 White Paper Introduction

The White Paper (DoE, 2003c) notes the role ICT can play in education and acknowledges limitations such as fiscal constraints and spatial barriers. Yet the positive contribution it can have on education outweighs negativity associated with the execution. As observed, ICTs "have the potential and capacity to overcome most

of these barriers". The challenges the ICT revolution poses for education and training systems are:

- participation in the information society;
- impact of ICTs on access, cost effectiveness and quality of education; and
- integration of ICTs into the learning and teaching process.

The following section in the white paper deals with the digital divide where it concerns the great difference in access to digital resources between rich and poor nations (Graham, 2006:15; Holmes & Gardner, 2006:13). In terms of the digital divide, it is important to note that the White Paper (2003:9) includes:

- local content development in terms of the number and quality of local website, local language content and the use of local online content by key sectors;
- collective knowledge generation;
- developing the capacity of the workforce by improving Internet access and educational offerings in schools and colleges, creating digital libraries for universities, promoting professional training institutes, and stimulating the economy to absorb people with a variety of ICT skills.

The White Paper further acknowledges Africa as a developing continent and mentions that the New Partnership for Africa's Development (NEPAD) identifies the role ICT can play in overcoming barriers of social and geographical isolation, as well as increasing access to information and education.

Moreover, the White Paper lists responses made by the South African government to counter the digital divide. This includes the establishment of the Presidential National Commission on Information Society and Development (PNC on ISAD), the Presidential International Advisory Council on Information Society and Development (PIAC on ISAD), the Electronic Communications and Transactions Act (2002) through the Department of Communications, as well as other legislative and policy frameworks provided by government departments. Three critical elements are also highlighted to determine ICT's future as an effective tool for social and economic development:

- cost-effectiveness;
- sustainability; and
- efficient utilization of ICTs.

These criteria can effectively be included in any model used to evaluate e-learning and ultimately the effectiveness it can have in terms of the promotion of language rights.

Under the subheading of "The current profile and distribution of ICTs in schools", the White Paper provides an overview of the infrastructure that exists at South African schools. Some key projects regarding ICT integration in education are also highlighted, such as Khanya in the Western Cape, Gauteng Online in Gauteng and the Connectivity Project in the Northern Cape.

Of fundamental importance is the number of schools with computers for teaching and learning. Here it is indicated in the White Paper (2003:12) that the percentage of schools increased from 12.3% in 1999 to 26.5% in 2002. As stated, more than 19 000 schools are without computers for teaching and learning.

The following table indicates schools with computers as recorded in the White Paper from EMIS data for 2002[30]:

TABLE 4.2 Percentage of schools with computers

Provinces	Schools with computers	Schools with computers for teaching and learning
Eastern Cape	8.8%	4.5%
Free State	25.6%	12.6%
Gauteng	88.5%	45.4%
KwaZulu-Natal	16.6%	10.4%
Mpumalanga	22.9%	12.4%
Northern Cape	76.3%	43.3%
Limpopo	13.3%	4.9%
North West	30.5%	22.9%
Western Cape	82.4%	56.8%
National	39.2%	26.5%

Despite growth in computer availability, the White Paper notes that Internet access is not that good. The White Paper states:

> Internet access is becoming more common, but the use of the Internet for teaching and learning purposes is very limited, due to high connectivity and telecommunication costs, lack of local content and examples, and inadequate technical and pedagogical support at local level.

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[30] None of the EMIS national reports (up to 2009) provide any recent statistics in this regard.

It is furthermore noted that a lot of teaching done on computers is aimed at teaching basic computer skills and yet there is still a gap in the ability of learners and teachers to use these technologies effectively especially "to access high-quality and diverse content, to create content of their own, and to communicate, collaborate and integrate ICTs into teaching and learning". As a resolution, the White Paper poses professional development of teachers as well as increased access to ICT resources for teaching and learning. Yet – especially in terms of African languages – these resources need to be created before the development of skills would be sufficient. There must be adequate need for resources to be available in all the official languages before they could be used and ultimately extended.

4.5.2.1.2 e-Education

It is noted in the White Paper that the concept of e-education concerns the use of ICTs to reach national educational goals, as well as the connection of teachers and learners. Significantly it is stated that the challenge lies in transcending just the exchange of information and transforming e-Education into learning activities. Therefore e-Education includes the ability to (DoE, 2003c:15):

- ✎ apply ICT skills to access, analyse, evaluate, integrate, present and communicate information;
- ✎ create knowledge and new information by adapting, applying, designing, inventing and authoring information;
- ✎ enhance teaching and learning through communication and collaborating by using ICT; and
- ✎ function in a knowledge society by using appropriate technology and mastering communication and collaboration skills.

It is also noted that through successful integration of ICT in teaching and learning, learners can be well equipped to participate in the "knowledge society". These learners are also more likely to utilize e-Government processes. Apart from an involvement in government, individuals can then also be regarded as lifelong learners. In this regard, the emphasis is on the acquisition of basic skills using ICT resources. This once more extends the existing focus purely on the acquisition of basic ICT skills other than stressing the generation of relevant, i.e. multilingual, content.

Further key terms such as information technology (IT), communications technology (CT), information and communication technology (ICT), digital literacy, information literacy, e-learning and online learning are defined. These definitions are quoted where relevant in this study.

According to the White Paper, ICT is transforming education and training by enabling teachers and learners to move away from traditional approaches with:

> …a shift from teacher-centred, task-oriented, memory-based education (with technology at the periphery) to an inclusive and integrated practice where learners work collaboratively, develop shared practices, engage in meaningful contexts and develop creative thinking and problem-solving skills.
>
> (DoE, 2003c:18)

The White Paper mentions that there is sufficient empirical evidence that investments in ICTs yield positive results for learners. Improvements can be experienced for learners on various levels, but also for the community by creating opportunities for lifelong learning.

An e-Education policy goal is set by the White paper (DoE, 2003c:19):

> Every South African learner in the general and further education and training bands will be ICT capable (that is, use ICT confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community) by 2013.

In order to achieve the e-Education policy goal according to the White Paper, GET and FET institutions will have to be developed into learning organizations consisting of a community of both teachers and learners. They must then function across three dimensions: the operational, cultural and critical dimensions.

Schools with learners using ICTs to enhance learning, as well as qualified and competent leaders and teachers, as well as sufficient access and connections to resources and infrastructure will be known as e-schools. Moreover, guidelines will be established regarding community collaboration. The Department of Education will determine and revise the tools supplied to e-schools to provide equity and guide the implementation of ICT.

4.5.3 Implications for blended learning in teaching

4.5.3.1 Concerns regarding blended learning

According to Bitter (1989:11), teachers may suffer anxiety as "they may be afraid that the computer can perform their job as well as they can". Bitter does note, though, that the role of the teacher is an essential element of the classroom. Bitter (1989:11) states that "[t]he human factor that teachers bring to education cannot be mechanized by even the most gifted computer programmer". Furthermore, lack in adequate training is also a concern for teachers especially as training or self-study through manuals may be too time-consuming (Bitter, 1989:11).

In addition, Bitter (1989:11) observes that "educational software packages are not always designed by people who understand the needs of the classroom teacher". The key is effective integration of software into the regular curriculum. Software should therefore be designed with the teacher in mind. Kelly (2009:37) states that there are a number of common concerns with regard to the implementation of e-learning and, as such, also apply to blended learning:

- ✎ the quality and rigour of the instruction;
- ✎ student persistence in completing tasks; and
- ✎ student satisfaction with the course.

The following disadvantages of web-based learning adapted from Jolliffe *et al.* (2001:12) should be considered when implementing blended learning:

- ✎ due to technical limitations the learning environment may be static and interactivity controlled by a forward arrow;
- ✎ in comparison to other learning environments web-based environments are more expensive and may require specialist staff;
- ✎ individuals compiling the content must have knowledge of computer-based learning;
- ✎ limited bandwidth may create problems when graphic, video, sound and animation intense materials are downloaded;
- ✎ learning environments may require advanced computers and updated web browsers; and
- ✎ learners and educators need to be trained to use the system.

4.5.3.2 Collaborative and cooperative learning

Collaborative and cooperative learning implies learning that takes place together within a learning community (Nieuwoudt, 2003:101-103). Blended learning effectively encourages collaborative learning. (Cf. Van der Westhuizen, 1999:91-92.)

From the literature it is evident that a collaborative or cooperative experience has many advantages in terms of learning (cf. Cunningham *et al.*, 2009:61; Garrison & Anderson, 2003:49; Vygotsky, 1978:90). Alessi and Trollip (2001:34) state in this regard that interactivity is enhanced and that interactivity can be more multisensory; participants are both learners and teachers; and motivation, social skills and metacognitive skills can be improved. In terms of cooperative learning, Vygotsky (1978:90) notes that through learning a number of internal processes are initiated that can only operate when learners are interacting with people in their environment or in cooperation with their peers. Only after this cooperative process can processes be internalized. Consequently this process, called the creation of a zone of proximal development by Vygotsky (1978:90), emphasizes the importance of cooperation for the sake of learning. The process of internalization consists of three transformations:

- ✍ An operation that initially represents an external activity is reconstructed and begins to occur internally.
- ✍ An interpersonal process is transformed into an intrapersonal one.
- ✍ The transformation of an interpersonal process into an intrapersonal one is the result of a long series of developmental events.
  (Vygotsky, 1978:56-57)

Vygotsky (1978:88) emphasizes the social nature of learning when he states that "human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them".

Crook (1994:226) also stresses the central place of "socially shared knowledge in learning" as well as the "collaborative relationships within which such knowledge gets constructed".

Alessi and Trollip (2001:34) distinguish between the terms of collaborative and cooperative learning. Hence cooperative learning implies learners helping one another while busy with individual tasks, while collaborative learning refers to more than one learner being busy with a single task or project together. Despite some

disagreement existing in terms of the definitions, Alessi and Trollip (2001:34) conclude that "*collaborative* suggests joint goals whereas *cooperative* more generally implies similar goals and helping one another [italicization in the original]".

Put differently, Crook (1994:133) distinguishes between collaborative and cooperative learning by making the following statement: "Cooperative learning studies help to define a motivational and organisational structure for an overarching program or group; while collaborative learning studies focus on the cognitive advantages that arise within the more intimate exchanges of working together".

Cunningham *et al.* (2009:59) note that from research it is evident that there are divergent views from learners who experience blended learning with regard to the usage of collaboration and communication. In some cases, learners found collaboration as effective and contributing to learning, yet in other cases it did not. Cunningham *et al.* (2009:60) identifies lack of prior experience in learning in a blended learning environment, attitudes to computers as well as how learners view their involvement in the learning process, as possible factors influencing their view on collaboration.

Conversely, collaborative or cooperative learning may also have some disadvantages such as that not all learners will benefit equally from this type of learning. Furthermore, classroom behaviour such as the fairness of grading, the ownership of content generated and the optimal grouping of the learners taking part may pose problems (Alessi & Trollip, 2001:34). Crook (1994:187) states that "successfully supporting much collaborative work in classrooms may involve confronting pupils with abstract material within concrete and manipulable representational formats". Futhermore Crook (1994:229) is of the opinion that as with class-based learning, collaborative interactions need to be organized when using computers. A form of collaborative learning is collaborative project-based learning (CPBL) which refers to the construction of knowledge by learners within a group by working on a specific problem (Cunningham *et al.*, 2009:61).

It is clear from the literature perused, that e-learning and by implication also blended learning could effectively facilitate collaborative learning (cf. Garrison & Anderson, 2003:48-54).

Garrison and Anderson (2003:50) make the following observation with regard to social presence and e-learning:

> Social presence means creating a climate that supports and encourages probing questions, scepticism and the contribution of more explanatory ideas. This is where e-learning with appropriate teaching presence can be a very effective medium for supporting an intellectually challenging yet respectful, and a personal yet focused community of inquiry.

According to Vygotsky, meaning-making activity using language and multiple sign systems allow learners to appropriate new knowledge and peer interaction and can therefore facilitate learning and even problem-solving (Littleton, 1999:184-185).

The cognitive process may also be associated with the educational community within which learning takes places. In this regard, Garrison and Anderson (2003:55) note that "while social presence is an essential element of a community of inquiry, the purpose of that community is more than social interaction". Furthermore, Garrison and Anderson (2003:55) also state that the social presence and even the teaching presence facilitate the learning process. Littleton (1999:186) emphasizes the role of the computer in "framing and mediating joint activity". Underwood and Underwood (1999:12) define cooperative learning as "learning environments in which small groups of students work together to achieve a common goal". According to Van Aswegen (2008:54), cooperative learning has two main aims:

- ✎ improving comprehension and skills of learners in a subject; and
- ✎ enhancing learners' appreciation of other learners and other cultural groups within a cooperative group.

Littleton (1999:179) notes that collaborative learning practices were promoted long before the advent of the "computer revolution". In addition, collaborative and cooperative learning were taking place in classrooms in any case. As a practical solution to the problem of not having enough computers so that all learners in classrooms could be accommodated, pairs or groups of learners were placed at computers. Littleton (1999:179) also states that the introduction of computers led to an ideal environment in which working in groups could be facilitated and the interaction effectively observed.

Nel (2005:18) describes the difference between collaborative and cooperative learning as follows: "in the cooperative model the teacher maintains complete control even though the students work in groups, while in the collaborative model the group would assume almost total responsibility for the execution of the assigned task". A number of studies have indicated the benefits of collaborative learning even within the context of e-learning and blended learning (Cook & Finlayson, 1999:92; Garrison & Anderson, 2003:29; Macdonald, 2008:161-162, 164; Nel, 2005:16, Underwood & Underwood, 1999:10).

Underwood and Underwood (1999:12) make the following statement with regard to the reason why cooperative learning is used: "The social underpinning of co-operative learning emphasizes that learning under positive contact conditions can facilitate interpersonal relationships which may in turn have positive effects on student motivation, self-esteem and academic learning".

Furthermore, Underwood and Underwood (1999:12) add that these positive effects have been shown regardless of age, ethnic group, class or abilities. Littleton (1999:184) notes the importance of educators or tutors supporting or scaffolding the collaborative learning of learners with computers.

Garrison and Anderson (2003:50-51) classify social presence according to three categories: affective, open communication and cohesive communicative processes. They also identify indicators with relevant definitions and appropriate examples. This information is presented in table form below:

TABLE 4.3 Social presence classification and indicators

Category	Indicators	Definition	Example
Affective	Expression of emotions	Conventional expressions of emotion, or unconventional expressions of emotion, includes repetitious punctuation, conspicuous capitalization, emoticons	'I just can't stand it when… !!!' 'ANYBODY OUT THERE!'
	Use of humour	Teasing, cajoling, irony, understatements, sarcasm	The banana crop in Calgary is looking good this year ;-)

	Self-disclosure	Presents details of life outside of class, or expresses vulnerability	'Where I work, this is what we do...' I just don't understand this question'
Open communication	Continuing a thread	Using reply feature of software, rather than starting a new thread	Software dependent, e.g., 'Subject: Re' or 'Branch from'
	Quoting from others' messages	Using software features to quote others' entire message or cutting and pasting selection of others' messages	Software dependent, e.g., 'Martha writes:' or text prefaced by less than symbol <
	Referring explicitly to others' messages	Direct references to contents of others' posts	'In your message, you talked about Moore's disctinction between...'
	Asking questions	Students ask questions of other students or the moderator	'Anyone else had experience with WEBCT?'
	Complimenting, expressing appreciation	Complimenting others or contents of others' messages	'I really like your interpretation of the reading'
	Expressing agreement	Expressing agreement with others or content of others' messages	'I was thinking the same thing. You really hit the nail on the head'
Cohesive	Vocatives	Addressing or referring to participants by name	'I think John made a good point.' 'John what do you think?'
	Addresses or refers to the group using inclusive pronouns	Addresses the group as we, us, our, group	'Our textbook refers to...' 'I think we veered of track'
	Phatics, salutations	Communication that serves a purely social function; greetings, closure	'Hi all,' 'That's it for now' 'We're having the most beautiful weather here'

(Garrison & Anderson, 2003:51)

According to Underwood and Underwood (1999:12), cooperative learning employs the following cognitive processes:

    ↲ conflict resolution;

    ↲ hypothesis testing;

- ✎ cognitive scaffolding;
- ✎ reciprocal peer tutoring;
- ✎ over-execution of cognitive and meta-cognitive processes; and
- ✎ modelling.

According to Macdonald (2008:174), "the use of forums or wikis allows for the assessment of the process of collaboration and scope for assessing the contribution of individuals to the group effort". Furthermore, collaborative products may include written reports, web pages or presentations that can create opportunities for self and peer review. Macdonald (2008:162) notes that before collaborative tasks can be done learners need to practise the following skills: team-working, negotiation skills, group decision-making and task management. Littlejohn and Pegler (2007:65) state that social computing "focuses on recreating and even extending social conventions and social context online by using email, instant messaging, conferencing or blogs for micro-coordination of study or work-based activities, building communities or maintaining social relationships".

Nel (2005:20) lists the following benefits of online collaboration:
- ✎ Creating an online identity and culture (in a learning community).
- ✎ Developing various skills (critical thinking, problem-solving, etc.).
- ✎ Encouraging active participation
- ✎ Increasing motivation.
- ✎ Increasing the student's comfort level.
- ✎ Intensifying connectivity between students.
- ✎ Making learning more effective (i.e. attaining the outcomes).
- ✎ Promoting deeper levels of knowledge generation.
- ✎ Providing greater convenience than the face-to-face equivalent.

In research conducted by Nel (2005:35) at the University of the Free State it was found that online collaboration is beneficial and that "[t]he successes achieved by the majority of the students included increased motivation, increased levels of comfort, intensified connectivity and more effective learning as all module outcomes were attained".

According to Underwood and Underwood (1999:11), there is substantial evidence that learners tend to be more likely to work collaboratively when working on computer tasks than in a standard classroom. Underwood and Underwood (1999:13) are also of the opinion that learners learning in groups are more successful than when learning takes place individually. Underwood and Underwood (1999:13) state that with "appropriate group organisation" discussions flourish in group work situations.

Cook and Finlayson (1999:92) note that collaboration proved a greater degree of engagement with tasks, as well as clearer understanding of aims, than individual learning. Yet it is stressed that this requires trust between the different learners working together, as well as the participants valuing the others' contribution. Moreover, Cook and Finlayson (1999:94) add that learners should be aware that helping each other is important for learning to take place and that they need to know how to disagree respectfully with each other. Cook and Finlayson (1999:92) state that "[i]t is social interactions mediated by talk which cause changes in learning".

The relevance of cooperative and collaborative learning is emphasized by Mentz and Goosen (2009:141-164) in terms of group work and pair programming in the IT class. Mentz and Goosen (2009:163) state that "group work in the IT class could enhance the understanding of programming skills and improve social skills".

Littleton (1999:193) states that computer technology will never replace communication between learners and should be seen as a resource to facilitate collaborative learning. However, for the sake of this study the importance of the advantages that blended learning can provide in terms of cooperative and collaborative learning is evident.

4.5.4 Requirements of blended learning in South Africa

4.5.4.1 Availability

According to Howie, Muller & Paterson (2005:xviii), less than 15% of South African schools have access to computers for teaching and learning. Furthermore, it is stated that very few schools "can be described as being well-resourced in terms of computers". In order to address the problem of availability of computers at schools, it is essential to determine the reasons behind the current situation.

Howie *et al.* (2005:xviii) believe that the following factors constrain the use of computers for teaching and learning:

- financial constraints (lack of funds, insufficient number of computers);
- the lack of computer literacy among teachers;
- a lack of training regarding the integration of ICT into different learning areas; and
- the absence of a properly-developed curriculum for teaching computer skills.

4.5.4.2 Costs

In discussing the requirements for the implementation of blended learning in South Africa, it is important to take note of costs involved. Blended learning can mean increased cost-effectiveness (Graham, 2006:10).

The phrase **digital divide** is often used to refer to the division of people with access to technology who can help to increase their wealth in contrast to people who are less fortunate and do not achieve any degree of digital wealth (cf. Cawthera, 2002:9; Graham, 2006:15; Holmes & Gardner, 2006:13; Lesame, 2005:2-4; Mason & Rennie, 2006:38; Van Aswegen, 2008:2). In addition, Lesame (2005:3) makes the following statement with regard to the definition of the concept of a digital divide:

> The term "digital divide" refers to the gap between the access of individuals, households, organisations, countries and regions at different socio-economic levels to ICTs and Internet Usage. Thus, the digital divide not only refers to the gap between the affluent, urban "haves" and the impoverished, rural "have-nots", but also to the digital and ICT chasm between the African continent and the developed world.

According to Pachler (2001:15), the digital divide can be countered through the acquisition of ICT skills in school-based learning.

Crook (1994:21) makes the following statement with regard to cost:

> The falling cost of new technology has had the effect of creating a greater continuity between school and work, in that powerful tools that would previously only have been encountered in specialist settings are now accessible in classrooms.

Printing costs are also eliminated or at least lowered with the use of blended learning (cf. Crocker, 2006:3-4), although for the sake of further revision – especially where

learners do not have access to computers outside the school – printouts need to made. Taylor (2001:4) notes that the use of wireless Internet services reduces the cost of access. Yet the cost of Internet access depends on the infrastructure available at schools. A possible option is the usage of ADSL-dedicated Internet lines that will allow for all computers connected to a network to have Internet access. This implies sufficient computers, servers and availability of data cabling in a particular area. Littlejohn and Pegler (2007:169-191) note that cost effectiveness can be ensured in terms of blended learning by allowing for the reuse of resources and making the resources adaptable so that they can be used for different purposes. This can be achieved by using a modular approach to the design of courses where information is designed into self-contained modules. Inglis *et al.* (2002:73) state that costs involved in the creation of web-based courses are comparable to that of print-based courses. In addition, multimedia materials tend to be very expensive and should be used selectively. This statement ties in with the view Littlejohn and Pegler (2007:18) hold in terms of it being difficult to prove that e-learning actually leads to savings for tertiary institutions as it often includes hidden costs. Yet Littlejohn and Pegler (2007:19) add that cost reductions were identified in terms of the usage of e-learning in corporate settings.

An important factor with regard to cost concerns is the use of learner-contributed content. Collis and Moonen (2006:59) note that content created by learners can be created in a cost-effective way.

4.5.4.3 Setting
Central to the implementation of blended learning is the usage of computers in classrooms. To a limited extent, learning can be enhanced through the use of a single computer in a classroom for use by learners or by a teacher with the aid of a data projector. In this study, blended learning requires that learners themselves use computers within a room often termed a computer laboratory.

Cook and Finlayson (1999:73) note that computers need to be placed effectively in computer rooms. Furthermore, safety should be a primary consideration as in the usage of long leads and trailing wires.

4.5.4.4 Content

Key to the development of blended learning in South Africa especially towards the promotion of multilingualism is the provision of efficient and high quality content. As Anderson and Elloumi (2004:xvii) note, "free sharing of course content is a powerful tool to encourage the growth of public education institutions". Similarly, the concept of open sources can be highlighted. Open source is often used to refer to software with an open or freely available source code which implies that this can be used by programmers either to change the software or even to copy parts thereof for reuse, for example (cf. Mason & Rennie, 2006:89).

Anderson and Elloumi (2004:xvi) observe that "[o]pen source gifts also provide those from wealthy countries with some small way to redress many economic inequalities and to share more equitably the gifts we receive from our planet home".

In terms of content, the matter of **plagiarism** needs to be kept in mind. Mason and Rennie (2006:91) state that "[t]he act of plagiarism occurs when a person passes off the words or ideas of another person as their own". This is important with regard to the creation of blended learning materials, but also with learners who need to be made aware of what it entails and how it could be avoided (cf. Macdonald, 2008:144, 149).

Plagiarism can be detected through systems where work can be submitted and checked against electronic databases (cf. Macdonald, 2008:145).

4.5.4.5 Presentation and facilitation

Bitter (1989:12) states that a "computer teaches, evaluates, and reteaches as often as students require and on an individual basis, which is often difficult for teachers to do who have many students".

The use of computers also implies differentiation through individualization where specialized remedial work may be provided or gifted learners can be challenged with higher-order thinking simulations (cf. Bitter, 1989:13, Crook, 1994:12).

Bitter (1989:13) notes that "students feel that they are actively involved in the process, computer-assisted instruction can motivate them to learn concepts and skills they might otherwise dismiss as routine or boring".

Cook and Finlayson (1999:82) note that in terms of differentiation it is important to match the task demand with the ability of learners to ensure progress in ICT and learning through ICT. This type of approach requires adequate planning from teachers with regard to support and extension material. In addition, the use of self-paced learning strategies will aid learners in working at their own rate. This also ties in with the concept of a *differentiation spiral* as developed by Carpenter (Cook & Finlayson, 1999:83). This involves all the learners engaging in the core activity to some extent with weaker learners having some support to access the core activity and stronger learners having additional work beyond the core activity.

It is essential to moderate the usage of blended learning teaching tools. In this regard, Macdonald (2008:83-87) lists a number of moderating techniques. In terms of forums, this relates to the archiving of older messages; weaving or in other words facilitating online discussions; summarizing or providing an overview of the discussion; and threading by renaming subjects to reflect the content of specific messages. Some of the techniques mentioned with regard to forums also apply to blogs, although the focus is not necessarily on maintaining a discussion. Moreover, Macdonald (2008:86-87) notes that, in terms of blogs, the following should be kept in mind: a clear explanation of the purpose of the blog postings; an example of a posting should be made; deadlines should be set; students should post profiles of themselves; tags and links to friends with similar interests could be encouraged; and encouraging comments can be provided for postings by the facilitator.

Finally Macdonald (2008:87) also mentions techniques applicable to the moderation of wikis. This includes: creating a 'sandpit' in which usage of the learning tool can be practised; the community must be created with profiles; the wiki should be appropriate for the activity with adequate headings and core content; the core content should represent an appropriate style and facilitate editing; rules should be set in terms of how content can or may be changed and commented on; the site structure should be adapted in terms of posted content; and content that is

inappropriate and inaccurate should be checked and older versions must be available if necessary.

4.5.4.6 Motivation and participation

Nel (2005:35) notes that the benefits provided by online learning (especially in terms of online collaboration) "are unlikely to be realized if the participating students are not committed to active and regular participation". Yet, as in face-to-face collaboration, this also implies clear facilitation by teachers or instructors. Otherwise external factors such as access, ability to use computers, overall motivation or other learning barriers should be investigated.

Macdonald (2008:123-124) notes that, in terms of keeping learners on course, it is important for learners to be aware of the following:

- what they are expected to learn;
- how they are expected to do it;
- timescale is for learning;
- boundaries of the course;
- expectations of the course;
- level of commitment required for the course;
- degree of independence required; and
- degree of self-direction required.

4.5.4.7 Learners

Marc Prensky describes learners who are more computer literate than their teachers as **Digital Natives**. On the other hand, the teachers are then considered to be **Digital Immigrants**. In this regard, teachers should adapt their teaching as learners do not learn in the same way the teachers did. Furthermore, such a change in approach covers both content and methodology. (cf. Fee, 2009:2-3; Min, 2006:119; Prensky, 2001:1-6; Richardson, 2006:6).

Shelly *et al.* (2006:7) observe that due to exposure to computers the learners in schools can be described as "digital students" or "digital kids" who are:

- hypercommunicators who use multiple tools to communicate;
- multitaskers who do several things at once with ease; and
- goal oriented as they pursue multiple goals at the same time.

This statement should be viewed in terms of the South African context where exposure to computers vary between learners and this could not be applicable to all learners. However, for some schools and the schools targeted in this study (cf. 5.6.3 and 5.9.4) the learners would have at least had some experience working on computers.

Macdonald (2008:114-117) emphasizes a number of essential requirements for competent online learners, which includes:

- ⮬ Learners need to be developed as *e-investigators* and must be able to cope in an online environment and not rely too heavily on the technology in terms of what they need to know (cf. Macdonald, 2008:135-147).
- ⮬ Learners need to be able to write appropriately and as such must become efficient *e-writers* (cf. Macdonald, 2008:149-160).
- ⮬ Learners must also be able to work effectively with others and must develop as *e-collaborators* (cf. Macdonald, 2008:161-175).
- ⮬ Learners must be independent, self-directed and reflective in the way they function.

Macdonald (2008:136-137) notes that learners should have *information literacy* and must consequently be able to use Internet resources effectively. In addition, learners must be aware of the context of the topic that they are studying and be conscious of what knowledge they lack. The individual learner and his/her capabilities and stage in a course also influence a learner's *information literacy*, as not all learners are capable of independent learning. This notion ties in with Pachler's (2001:20) view that learners should have electronic/informative, visual and critical media literacy skills.

One requirement with regard to learners in the implementation of blended learning is the safety of learners. In this regard, the identities and contact details of learners should be kept safe and private. Furthermore, the content accessed by learners should also be controlled. (Cf. Richardson, 2006:9-12.)

4.5.4.8 Implementation
Macdonald (2008:124) emphasizes the importance of presenting pre-course information or induction prior to starting with any type of online or blended learning

course. Macdonald (2008:125-126) also notes the importance of having course study guides or schedules outlining what is learned, as well as learning contracts that encourage students to take responsibility for their own learning.

Teachers need to be aware of their responsibilities in terms of setting tasks on computers. According to Cook and Finlayson (1999:77), this includes:

- ensuring that the computer work extends the learning opportunities of the specific curriculum domain;
- setting clearly-focused objectives for the ICT tasks; and
- ensuring that the children understand the objectives and their role in attaining them.

Although these three issues might also be considered to be relevant in other manifestations in the classroom without computers, it is essential to make sure that the computer is used effectively. Tasks should be set clearly and learners be kept focussed as it may happen that learners with rudimentary computer skills may be distracted by other software or features on the computer. This issue ties in with general classroom climate and discipline. The setting of objectives or specific outcomes – that are relevant to learning and assessment – also contributes to keeping learners focussed.

In addition to the above, Cook and Finlayson (1999:77) note careful planning in terms of timing when using computers. Here the crucial factor is that the majority of time used for learning must be spent on the central focus of the content or skill to be learned and not only on the preparation thereof. Data entry versus exploration on how structures and application function within the database environment on a computer is a good example of appropriate time management. This is important as pure data entry has limited educational value.

Pedagogic control is emphasized by Cook and Finlayson (1999:60). This relates to the fact that teachers should not merely implement the use of educational software without having overall control of the learning content. The pedagogic responsibility cannot be transferred from the teacher to the computer programmer in this regard.

Macdonald (2008:149-150) emphasizes the importance of note-taking in learning and lists the following enhancements provided by online tools, which makes it possible to:

- create summaries in a table;
- cut and paste illustrations and graphs (with appropriate acknowledgement);
- compile a list of hyperlinks and references on a specific topic for future use in a course;
- compile a glossary of difficult terms and concepts;
- use fonts and highlighting tools to enhance notes;
- capture archive data from forums; and
- use 'track changes' and 'comment' facilities in different software packages.

Outcomes must be clear when implementing blended learning. Macdonald (2008:129) mentions *aligned teaching* where the "teaching method, assessment and learning activities are aligned to learning objectives". This approach also ties in with the concept of *learning design* that "has particular relevance to blended learning, because it lays emphasis on the relationship between activities and the need for coherence between different course elements" (cf. Macdonald, 2008:128-130).

Thorne (2003:133) states that the following things should be considered when implementing blended learning:
- it should be launched both online and offline;
- technical and coaching support networks should be identified;
- learners must ensure that they are not interrupted when they are busy with online learning;
- learners should create a learning environment suitable for them;
- learners should share successes and support one another;
- learning should be stimulating, visually compelling and must recognize different learning styles; and
- online learning should be integrated with other forms of learning.

4.5.4.9 Assessment
Assessment is, as with any other form of learning, an essential part of the learning process. As such it is important to employ assessment-framed activities as part of a blended learning approach (cf. Macdonald, 2008:130).

Macdonald (2008:130-131) notes that assessment in blended learning should reflect the course philosophy and learning outcomes, create learning opportunities and critical points, and provide opportunity for feedback.

Littlejohn and Pegler (2007:64) list the following assessment strategies that recognize and reward online discussions:

- marks can be allocated for the quantity, quality, length or frequency of contributions made by learners;
- marks can be allocated based on reference made to contents by quoting from a certain amount of existing messages;
- tasks can be completed through collective or collaborative online work; or
- marks can also be allocated for individual activities such as being a moderator, scribe or reviewer.

4.5.4.10 Teachers

Blended learning cannot be implemented effectively without teachers being prepared and effectively trained to execute this approach.

The importance of having a tutor to facilitate blended learning is confirmed by Cunningham *et al.* (2009:69) and according to them the presence of a tutor, especially at the beginning of a blended learning module, is essential.

Macdonald (2008:180-183) mentions a number of ways in which staff can be developed in order for them to be able to implement blended learning, includes:

- face-to-face workshops and seminars;
- resources such as distance technologies and self-study activities;
- formal courses;
- appointing mentors (with existing knowledge of the approach) that help and instruct their peers; and
- online communities that facilitate staff development.

Kelly (2009:36) emphasizes adequate professional development for e-teachers. As such, teachers need to be prepared for the e-learning environment. Kelly (2009:36) makes the following statement on how development can take place: "Professional development for e-learning often takes the form of face-to-face workshops, one-on-

one assistance and mentoring, and sometimes hybrid or blended e-learning experiences".

According to Kelly (2009:38-39) and Cunningham *et al.* (2009:60) it is essential that teachers who want to teach online not only need to have theoretical background or experience observing online teaching taking place, but also need to have experienced learning online in order to model good practice.

According to Holmes and Gardner (2006:90), within an e-learning environment teachers act as content facilitators, resource providers, e-learning activity managers as well as administrators. In addition to keeping diversity in mind, such teachers must know their audience, know the resources to be used and be aware of how capable learners are using these resources. Furthermore, teachers must also be aware of the learning outcomes that need to be achieved and determine what the needs and methods of assessment will be (cf. Holmes & Gardner, 2006:90-93).

Kelly (2009:39) lists the following characteristics that need to be taken into account in order to ensure effective teaching practice:
- longer rather than shorter courses are more effective;
- social construction;
- a focus on content;
- an experiential model of learning; and
- reflection on learning.

4.6 CONCLUSION

In conclusion it is evident that it is challenging merely to define a concept such as *blended learning*, but most of the literature agrees that it concerns the mixing of a traditional approach to teaching, as well as the use of computers and online resources within the classroom. This field has its origins in the spread of the printed word and the ensuing use of broadcast media. In this context, the development of the use of computers in education and the various approaches in this regard have been discussed. Moreover, *blended learning* has definite implications in terms of learning theory and various existing approaches and models may prove useful to the teacher.

Certain requirements and standards need to be set in order for *blended learning* to be adequately implemented. This implies not only technical standards, but also learning and teaching standards or outcomes that will benefit teachers and learners. Although many possible alternatives exist, *blended learning* has unique distinguishing properties. Through the section on the application of blended learning in South Africa, detail is provided in terms of local implementation of the approach. In conclusion it can be said that *blended learning* can play an integral role in the accommodation and promotion of multilingualism in South African schools especially within the learning area of IT.

The next chapter focuses on the empirical study conducted for the sake of the development and testing of the proposed conceptual model to accommodate and promote multilingualism through blended learning.

CHAPTER 5: Empirical investigation

5.1 INTRODUCTION

This chapter is concerned with the empirical investigation conducted in this study. Initially the research aim (5.2), research paradigm (5.3), research approach (5.4), research design (5.5), research ethics (5.6) and data collection process (5.7) are discussed. The main purpose of the empirical investigation was to gather complementary data to the information obtained through the literature study for developing a conceptual model and then to implement and evaluate such a model with regard to the accommodation and promotion of multilingualism through blended learning. In the development and implementation of the conceptual model, a mixed method research design combining both quantitative and qualitative approaches was used. The quantitative approach was mainly used to investigate the language and blended learning through questionnaires aimed at teachers in the Free State province (5.8). This was followed up with qualitative research in the form of interviews aimed at provincial and national experts in terms of the subject IT within which this study was done, as well as blended learning and related issues such as e-learning (5.9). Based on the literature and these two investigations, a conceptual model was developed (5.10). The conceptual model's effectiveness was tested through an experimental study. In this regard a control and experimental group was selected at two different schools in the Free State province. Embedded in this part of the research observations were also made. Finally a questionnaire was also completed by the learner respondents at the schools after the completion of the study (5.11).

5.2 RESEARCH AIM

Kumar (2005:6) states that the purpose of research is to get answers for a particular question or questions. The purpose of the study is derived from the central problem as stated in section 1.3 and centres on determining how multilingualism can be accommodated and promoted through the implementation of blended learning in the IT school classroom.

To operationalize the aim of this research the following objectives directed the study:

- ✎ To explain the phenomenon of multilingualism and to describe how it is realized in the South African school context by means of a literature study.

- To discuss blended learning in terms of its origins, related theories, standards in the field of teaching and learning, and to relate it to multilingualism in the South African context by means of a literature study.
- To arrive at tentative conclusions and make preliminary statements regarding the accommodation and promotion of multilingualism by means of blended learning in the school subject IT, based on the aforementioned literature reviews.
- To gather additional information from "information-rich" sources to complement the information obtained from the literature study, for developing a conceptual model for accommodating and promoting multilingualism through blended learning in the IT school classroom by means of an empirical investigation.
- To implement and evaluate a conceptual model for accommodating and promoting multilingualism through blended learning in the IT school classroom by means of an empirical investigation.

As the research aim and its composite objectives are grounded within a research paradigm, the latter will be discussed in the next section.

5.3 RESEARCH PARADIGM

This research is philosophically founded on pragmatism due to the fact that this study aims at implementing the notion of blended learning in the IT school classroom in order to determine its application value in terms of the accommodation and promotion of multilingualism. Pragmatism can be traced back to the work by Charles Sanders Peirce, William James, John Dewey George Herbert Mead, and Arthur F. Bentley (cf. Creswell, 2003:11; Johnson & Onwuegbuzie, 2004:16; Maxcy, 2003:52-75). Creswell (2003:12) states that pragmatism cannot be limited to one system or philosophy and that it facilitates mixed methods research with researchers having the freedom to draw from both qualitative and quantitative research approaches. Furthermore, Johnson and Onwuegbuzie (2004:17) emphasize that both the empirical and practical consequences of the research should be taken into account when ideas are judged, as has been done in this study. According to Maxcy (2003:52) pragmatism embraces the use of multiple methods and "has moved researchers away from sole considerations of knowledge and knowns to a discourse centred on consequent knowings and meanings". With pragmatism the focus is on

what works rather than a specific truth that can be derived from research (Tashakkori & Teddlie, 2003:713).

Pragmatist research is thus rooted in both the interpretivist and positivist paradigms. The German philosopher Immanuel Kant (1724-1804) identified three categories that make all enquiry possible: contingency, plurality and cause. This was challenged by Johann Gustav Droysen's (1808-1884) two types of knowledge: explaining (*erklären*) and understanding (*verstehen*). According to Droysen, physical phenomena can be explained by means of causes or universal laws and social phenomena can be understood through interpretation. In contrast to Kant's categories, Dilthey (1833-1911) created his own categories: purpose, meaning and value. Through these categories sense can be made of the human experience and the world (cf. Counsell, 2009:260-261; Hergenhahn & Olson, 1993:39).

The interpretivist paradigm is relevant to this research as it aims at deriving meaning from IT teachers' current teaching practices in order to accommodate and promote multilingualism. The research is also positivist since it utilized blended learning within an experimental context.

5.4 RESEARCH APPROACH

Three approaches for conducting research can be distinguished: quantitative, qualitative and mixed methods. Quantitative research relies on numerical data to test relationships between variables and is either descriptive or experimental in nature. Qualitative research is an inquiry process where a phenomenon is explored in order to gain a better understanding of such a phenomenon and relies mainly on textual data (Ivankova *et al.*, 2007:255-258). Qualitative research is thus more descriptive in nature. The purpose of this type of research is to attain better comprehension and insight into a particular situation (cf. Leedy & Ormrod, 2010:94, 135-163; Van der Merwe, 1996:291). Flick (2006:15) notes that the goal of qualitative research is to discover as well as to develop new ideas and empirically grounded theories rather than just to test existing theories. Fouché and Delport (2002:79) are of the opinion that qualitative research "elicits participant accounts of meaning, experience or perceptions". Fouché and Delport (2002:79) note that a qualitative research paradigm "aims mainly to understand social life and the meaning that people attach to every day life".

Mixed methods research is described by Johnson and Onwuegbuzie (2004:14) as "the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study."

This study can be typified as mixed methods research, since it was approached by collecting both quantitative and qualitative data.

5.5 RESEARCH DESIGN

Following the explanations of Ivankova *et al.* (2007:261-270) and Creswell (2009:206-216) regarding different mixed methods strategies, this research design can best be described as a sequential embedded design. The research design consists of three distinct phases with some processes embedded within the three phases that follow a set order. All three phases contribute towards the aim of the study.
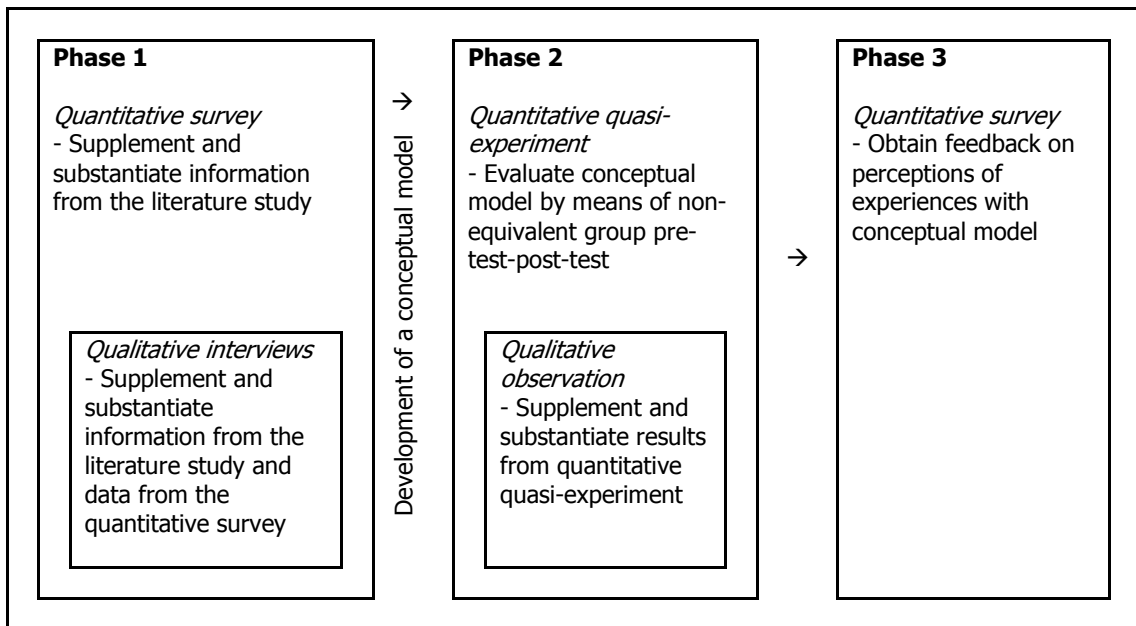
In the first phase of the empirical research, quantitative and qualitative data was collected to supplement information gathered from the literature study and to provide substantiated evidence in support of the envisaged experimental research. This part of the research was non-experimental and descriptive in nature in the form of surveys.

In the second phase a conceptual blended learning model for accommodating and promoting multilingualism was developed based on the information obtained from the literature study and the findings from the first phase of the empirical research. By following an experimental design in the form of quasi-experimental research and based on a non-equivalent group pre-test-post-test control group design (McMillan & Schumacher, 2006:274), the conceptual model was implemented and evaluated.

In the third phase provision was made to obtain feedback from the research participants involved in the second phase. In this way the participants can give feedback on their perceptions and experiences when working with the conceptual model.

Visually the sequential embedded mixed methods research design, used in this study, can be represented as in Figure 5.1 below.

FIGURE 5.1 Phases of the sequential embedded design

Phase 1		Phase 2		Phase 3
Quantitative survey - Supplement and substantiate information from the literature study	→ Development of a conceptual model	*Quantitative quasi-experiment* - Evaluate conceptual model by means of non-equivalent group pre-test-post-test	→	*Quantitative survey* - Obtain feedback on perceptions of experiences with conceptual model
Qualitative interviews - Supplement and substantiate information from the literature study and data from the quantitative survey		*Qualitative observation* - Supplement and substantiate results from quantitative quasi-experiment		

5.6 RESEARCH ETHICS

In terms of ethical issues, this study adheres to the ethical procedures and regulations set out by the North-West University. As stated earlier (cf. 1.5.3), the ethics number NWU-00050-09-A2 was assigned to this study by the educational sciences ethics committee of the North-West University. The letter confirming approval from the ethics committee can be found in Appendix G. In addition the Department of Education's official form of request to conduct research and a covering letter was sent to the Department and approval was obtained for conducting the research. The approval letter from the Department of Education can also be found in Appendix H.

The importance of recognizing the ethical aspects that need to be taken into consideration when individuals are approached to participate in research was also observed. This is of particular concern because as Cohen *et al.* (2000:245) state, obtaining information from research respondents in whatever form, "will always be an intrusion into the life of the respondent". Therefore clarification of the purpose of the research as well as the nature of respondents' or participants' involvement was provided to the relevant parties.

Informed consent of all parties concerned was obtained before the commencement of each phase of the research and respondents or participants were assured that their participation would be treated confidentially and anonymously (cf. Flick, 2006:49). The consent forms are in the possession of the researcher and are available on request. Furthermore, reporting of data obtained from respondents and interviewees is done anonymously as to protect the identities of all parties concerned. Provision for the feedback of the research results was made in order to justify the research, but also to create a sense of co-operation between the researcher and the respondents or participants. In order that all learners could benefit from the research, the control group will also be exposed to the conceptual blended learning model in which the accommodation and promotion of multilingualism forms the primary focus after the research results have been compiled. Hence all participants will have the opportunity to be exposed to the results of the research without the process interfering with research.

In the next section the research procedure followed in this study is discussed.

5.7 DATA COLLECTION PROCESS

The data collection process followed in the empirical investigation of this study is represented in Figure 5.2.

FIGURE 5.2 Data collection process
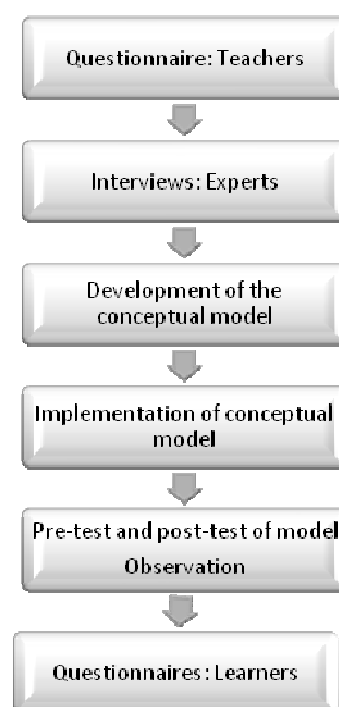
With regard to the proposed conceptual model, the following tasks were executed in the development and the evaluation of the conceptual model. The conceptual model was constructed based on the literature study and data acquired from the questionnaire that was completed by the IT teachers of the Free State province. The information obtained was further refined by interviews with national and provincial experts within the subject IT and blended learning. Finally a conceptual model was constructed. This model was then tested with the aid of standardized tests applied before and after the intervention (implementation of the model). Finally questionnaires were also completed by the learners exposed to the model.

The next sections deal with the different phases of the empirical investigation and the designed conceptual model as mentioned in the previous paragraph. Firstly the questionnaires conducted with the IT teachers will be discussed.

5.8 EMPIRICAL INVESTIGATION: TEACHERS

5.8.1 Introduction

The initial investigation that focused on the IT teachers followed a quantitative non-experimental survey research design. The data collection procedures followed with the teachers will be discussed, followed by a discussion of the general findings.

5.8.2 Data collection procedures: teachers

5.8.2.1 Data collection instrument

This phase of the research was done using a structured questionnaire with both open and closed questions also known as open-ended and closed-ended questions (cf. Cohen, Manion & Morrisson, 2007:320-321; Kumar, 2005:132). The purpose of the questionnaire was to enable the researcher to describe the current situation in IT -classrooms in the Free State with regard to blended learning and the accommodation and promotion of multilingualism from the viewpoint of the teachers involved.

Kumar (2005:126) defines a questionnaire as a "written list of questions, the answers to which are recorded by respondents". The questionnaire used in this phase of the study was completed using an online interface using *Google docs* and follow ups were made with a printed copy of the same questionnaire mailed to individual teachers. An accompanying letter was also included in order to explain the research

thoroughly and to request the respondents to complete the questionnaire. This letter and the questionnaire are available in Appendix A.

The measuring instruments for this part of the study was a structured closed and open-ended questionnaire (cf. McMillan & Schumacher, 2006:197) that can be filled out on paper or online by the teachers. The investigation was primarily quantitative in terms of closed questions where only predetermined choices or numeric data is recorded. In terms of the secondary qualitative focus of the questionnaire, there were also open-ended questions that gauged opinions and perceptions. The open-ended questions made the respondents more central to the response than just the questions being asked (cf. Cohen *et al.*, 2000:254). The information gathered would assist the researcher to conceptualize and develop a conceptual blended learning model which aims to accommodate and promote multilingualism in the IT school classroom.

In the next section, the questionnaire design is discussed in terms of how the questionnaire was structured regarding the purpose of each of the questions.

5.8.2.2 Questionnaire design

Delport (2002:172) distinguishes between open, closed, "yes" or "no" (dichotomous) questions where respondents are required to react on a statement. A combination of these types of questions was used in this study (Cf Leedy & Ormrod, 2010:194-204.)

A summary of the nature of the questions is provided in Table 5.1 in terms of the type and purpose behind the questions.

TABLE 5.1 Teacher questionnaire summary

Nature of questions	Type of questions	Purpose of questions
1. Teacher mother tongue/home language	Open-ended	Determines the language profile of the IT teachers in terms of the mother tongue.
2. Other language spoken by teacher - language 1	Open-ended	Determines the language profile of the IT teachers in terms of other languages.

3. Other language spoken by teacher - language 2	Open-ended	Determines the language profile of the IT teachers in terms of other languages.
4. Other language spoken by teacher - language 3	Open-ended	Determines the language profile of the IT teachers in terms of other languages.
5. Other language spoken by teacher - language 4	Open-ended	Determines the language profile of the IT teachers in terms of other languages.
6. Languages spoken by teacher – indicate proficiency	Likert scale	Determines the language proficiency of IT teachers.
7. Languages spoken by teacher in CLASS – indicate proficiency	Likert scale	Determines the language proficiency of IT teachers in languages used for learning and teaching.
8. Do the learners at your school speak more than one language at school?	Dichotomous	Determines the multilingualism of the learners.
9. Indicate the number of learners in the Gr. 10 class according to their home languages:	Open-ended	Determines the language profile of the IT learners.
10. Frequency of the languages mentioned in the previous question as used by learners in the class.	Likert scale	Determines the language use of the IT learners.
11. Indicate which methods are facilitated/used to accommodate and promote multilingualism in the classroom.	Likert scale	Determines the nature and extent to which multilingualism is accommodated and promoted in the classroom in terms of some established strategies.
12. Indicate the language of learning and teaching support-materials: textbooks, notes and	Matrix questions	Determines the language in which the learning and teaching support-material is

additional printed material and electronic presentations		provided.
13. If the school accommodates and promotes multilingualism through learning and teaching, please elaborate.	Open-ended	Provides description of multilingualism accommodation and promotion strategies.
14. Number and purpose of computers used at school.	Open-ended	Provides the number and purpose of computers used.
15. Internet connectivity –indicate the type of Internet activity available.	Likert scale	Determines the number of computers connected to the Internet.
16. Kind of electronic learning tools used at school.	Multiple choice	Determines which electronic tools are used.
17. Do you use electronic tools for assessment?	Dichotomous	Determines whether any electronic tools are used for assessment.
18. Do you employ blended learning techniques in your teaching?	Dichotomous	Determines whether blended learning is used.
19. Substantiate the previous question on blended learning by menas of examples.	Open-ended	Provides examples of the way in which blended learning is implemented.
20. Frequency of use of blended learning techniques.	Likert scale	Determines how often blended learning is used.
21. Do you think blended learning can accommodate and promote multilingualism in providing an additional resource in a language not spoken by the teacher?	Dichotomous	Determines whether teachers are of the opinion that blended learning can accommodate and promote multilingualism.
22. Substantiate response to the previous question.	Open-ended	Determines why respondents are of the opinion that blended learning provides for an additional resource to

		accommodate and promote multilingualism.
23. Would you be willing to allow further research with a Grade 10 IT class at your school?	Dichotomous	Answer used to determine which schools could be contacted/considered for the testing of the model.

5.8.2.3 Reliability

Reliability, in terms of quantitative research, is described by Cohen *et al.* (2007:146) as "a synonym for dependability, consistency and replicity over time, over instruments and over groups of respondents". In terms of qualitative research the focus is on how the recorded data corresponds with what actually occurs (Cohen *et al.*, 2007:149). Questionnaires are considered to be reliable because they are completed anonymously (Cohen *et al.*, 2007:158). Pilot testing can be used to ensure the reliability of the questionnaire (Cohen *et al.*, 2007:158). Delport (2002:177) attests that errors can be rectified prior to executing the research. A pilot test was therefore done with an IT teacher outside of the Free State province research area and necessary changes were made to the questionnaire. The reliability of the investigation is also based on the sampling applied (cf. 5.8.2.5) and in this regard the focus was on the whole population of IT teachers in Free State.

5.8.2.4 Validity

Kumar (2005:154) explains validity as the "judgement that an instrument is measuring what it is supposed to, is primarily based upon the logical link between the questions and the objectives of the study". Content and face validity is employed with the measuring instruments in the questionnaire in this phase. According to Cohen *et al.* (2007:162-163) content validity is achieved "by ensuring that the content of the test fairly samples the class or fields of the situations or subject matter in question". The content of the questionnaire used in this phase was compared to the objectives set for this study (cf. 1.4). Face validity is defined by Cohen *et al.* (2007:163) as "where, superficially, the test appears – at face value – to test what it is designed to test". In this regard, at face value it is clear that the teachers' questionnaire can be used to describe the current situation in IT classrooms in the Free State with regard to blended learning and the accommodation and promotion of multilingualism.

5.8.2.5 Profile of the research population: teachers

The research participants for this phase of the empirical research is the total population of all IT teachers at secondary schools in the Free State province (n=17). A purposeful sample (McMillan & Schumacher, 2006:126) was used and the criteria for selecting participants were based on the fact that all these teachers work within a similar context with regard to the usage of the same programming language (in other provinces some schools use Java and not Delphi as in the Free State province). Furthermore, the researcher has established close contact with almost all these teachers through departmental training opportunities coordinated by the provincial Senior Education Specialist for Information Technology in the Free State; thus they were easily accessible to the researcher. In total, 11 respondents completed the questionnaire.

5.8.2.6 Data collection process: teachers

An e-mail was sent to all IT teachers using addresses provided by the Senior Education Specialist for IT in the Free State. The e-mail included the accompanying letter of consent and instructions on how to complete the questionnaire online. The potential respondents, IT teachers in the Free State, had a choice of taking part in the study or not. All of the identified population who took part gave consent to take part in this study. Initially only six responses were received. The next step was to send e-mails to remind the targeted teachers about the questionnaire. After no response, printed copies of the questionnaire were sent to the identified teachers to remind them of the study. This combined with follow-up phone calls resulting in five more questionnaires being completed. The six individuals who did not return the questionnaires were either not teaching the relevant grade or chose not to take part in this study. In addition, there was another individual who left the profession during the time of this research and no replacement was made by the time of the collation of the data.

In conclusion, 63.5% of the IT teachers in the Free State responded to the questionnaire. From the schools that qualified, by having Grade 10 learners and being available (14), the relevant percentage of teachers responded was 78.5%. Delport (2002:172) notes that a response rate of 60% is deemed to be good and 70% to be excellent. It could therefore be said that this phase of the study is clearly representative of Grade 10 IT teachers in the Free State.

Related to the data collection process in Figure 5.2, the process followed with the teachers questionnaires can be represented by Figure 5.3.

FIGURE 5.3 Teachers' questionnaire data collection process
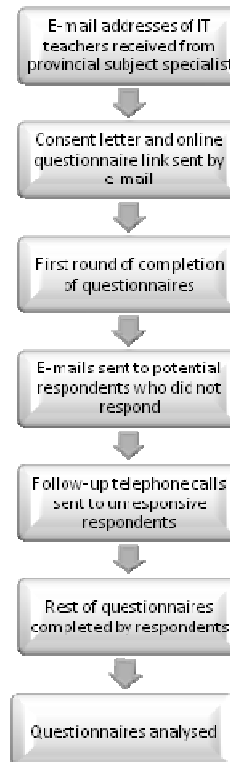
5.8.3 Analysis of the teachers' questionnaires

This section deals with a discussion of the responses supplied by the teacher respondents. In terms of the discussion of the findings from this part of the research, the following symbols will be employed:

n   -   This refers to the number of respondents who gave a particular answer or chose a particular item as response to a question.

%   -   This refers to the percentage of respondents who chose a particular response for a particular question.

The results obtained from the questions will now be summarized in tables as frequencies and percentages. Conclusions will be provided after each table and graph.

Question 1. Teachers' mother tongue/home language

TABLE 5.2 Teachers' mother tongue/home language

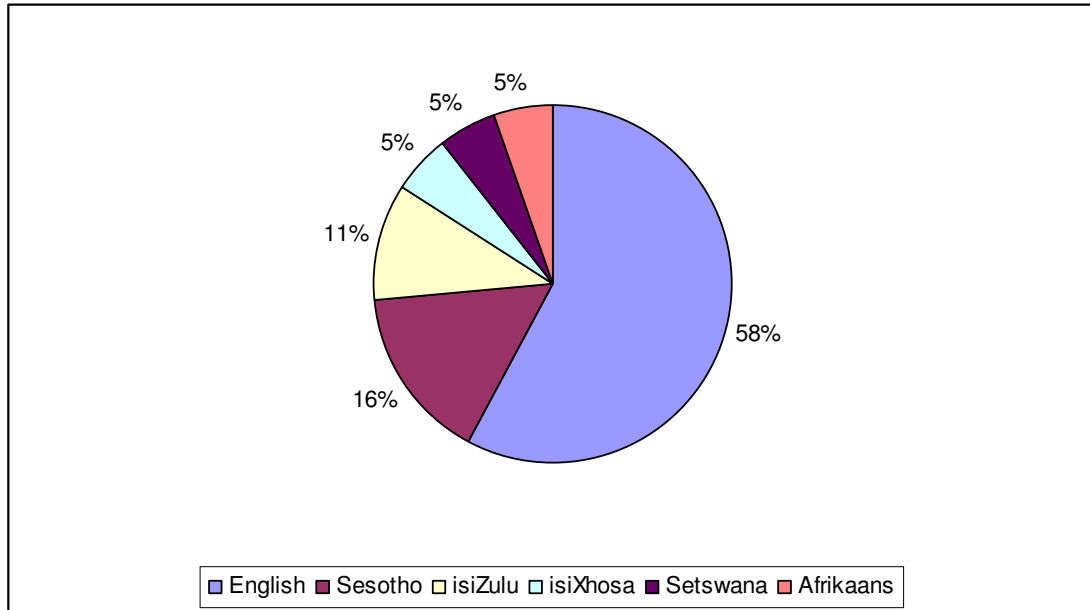| Language	n	%
Afrikaans	8	73
Southern Sotho (Sesotho)	2	18
Tswana (Setswana)	1	9
Number of respondents	*11*	*100*
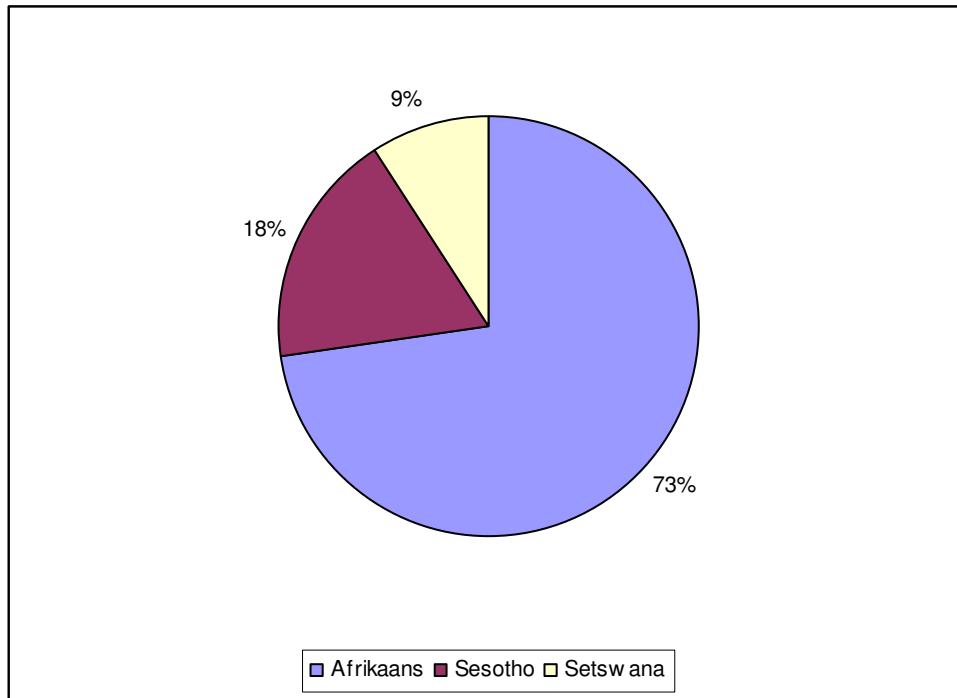
In terms of the teachers' mother tongue/home language, a clear majority (73%) of Afrikaans mother tongue speakers can be identified from the first question relating to language diversity. This is followed with a 27% total of mother tongue African language speakers. Clearly, none of the IT teachers in the Free State has English as a home language, despite the prominence of the language as medium for learning and teaching (Question 10). However, English is used by the teachers as an additional language (Questions 2 to 5). Furthermore the importance of Afrikaans and Sesotho as provincial languages is affirmed. This data provide an indication of the mother tongue diversity of teachers, yet it does not account for their knowledge of other languages (only handled in Questions 2 to 5). As such, it can only be used to describe the respondent population.

Questions 2 – 5. Other languages spoken by teachers

TABLE 5.3 Other languages spoken by teachers

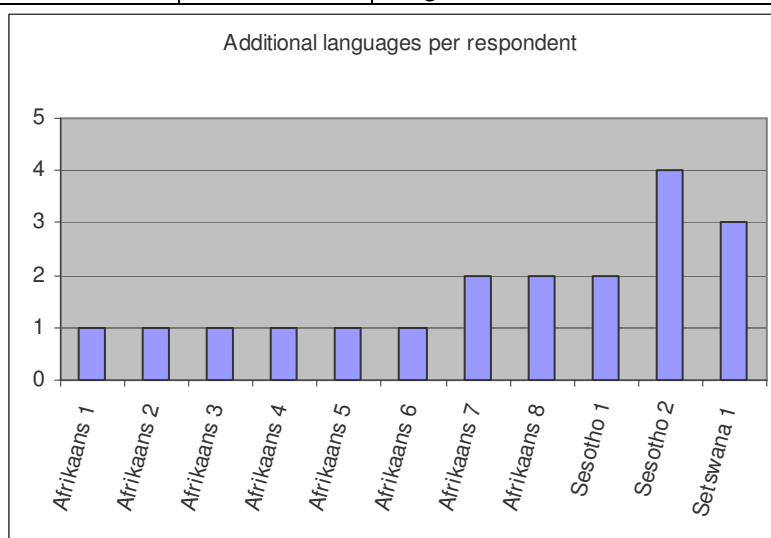| Language	n	%
English	11	58
Southern Sotho (Sesotho)	3	16
Zulu (isiZulu)	2	11
Xhosa (isiXhosa)	1	5
Tswana (Setswana)	1	5
Afrikaans	1	5

In these open-ended questions, teachers could list any four additional languages they command. From the responses the prominence of English is evident as all respondents listed it as an additional language spoken by them. This importance attached to English echoes the findings of the literature (cf. 2.3.2, 2.5.1.3, 2.6.2, 2.7.1). Furthermore, some African languages were also listed, with Sesotho and isiZulu entered by most respondents. The fact that Sesotho is spoken as an additional language by at least three respondents in addition to the two mother tongue respondents (Table 5.2) can be traced to the fact that, geographically, Sesotho is an important language in the Free State province. This finding supported the choice of Sesotho together with Afrikaans to facilitate the accommodation and promotion of multilingualism in this study. The presence of isiZulu, isiXhosa and Setswana just emphasizes the fact that even the teacher population in the Free State is multilingual in nature. Finally, it is noticeable that only one respondent indicated that Afrikaans is used as an additional language. If the data from Question 1 is taken into account, it is clear that three respondents (Sesotho and Setswana mother

tongue speakers) could potentially have indicated that they speak Afrikaans. Being teachers within a South African historical context, it could be assumed that they could have been exposed to Afrikaans in their training or at least in their schooling. These responses could therefore potentially imply an intentional decision to omit Afrikaans. Based on the aforementioned data (Questions 1 to 5) it is possible to compare the individual respondents in terms of the number of additional languages indicated by them.

TABLE 5.4 Number of additional languages per respondent

| Respondent mother tongue	Number of Additional languages	Additional languages
Afrikaans speaker 1	1	English
Afrikaans speaker 2	1	English
Afrikaans speaker 3	1	English
Afrikaans speaker 4	1	English
Afrikaans speaker 5	1	English
Afrikaans speaker 6	1	English
Afrikaans speaker 7	2	English, Sesotho
Afrikaans speaker 8	2	English, Sesotho
Sesotho speaker 1	2	English, isiZulu
Sesotho speaker 2	4	English, Setswana, isiZulu, isiXhosa
Setswana speaker 1	3	English, Afrikaans, Sesotho

English is clearly the most prominent additional language as this was listed by all the respondents. The Afrikaans-speaking respondents indicated that they are bilingual and are proficient in both Afrikaans and English. However, from this graph it is clear that knowledge of more than one additional language tends to be more prevalent with mother tongue speakers of African languages, than Afrikaans speakers, with the

exception of two Afrikaans speakers who have indicated that they have knowledge of Sesotho. None of the African language speakers knew fewer than two additional languages. Unfortunately this question – despite the data obtained from Question 6 – does not account for the proficiency of the languages or the extent of use of these languages. This issue warrants further investigation, yet for the sake of this study, this data confirms the multilingual skills of some of the teacher population, but it also confirms the need for alternative ways in which multilingualism can be accommodated and promoted in classrooms, as not all the teachers apparently have the language skill to do this.

Question 6 and 7. Languages spoken by teachers in terms of proficiency

TABLE 5.5 Language proficiency of languages spoken by teachers

Respondent language	Very good	Good	Fair	Poor
Afrikaans	7	1	1	0
English	6	5	0	0
Sesotho	2	1	1	1
Setswana	1	1	0	0
isiXhosa	0	0	1	0
isiZulu	0	1	1	0
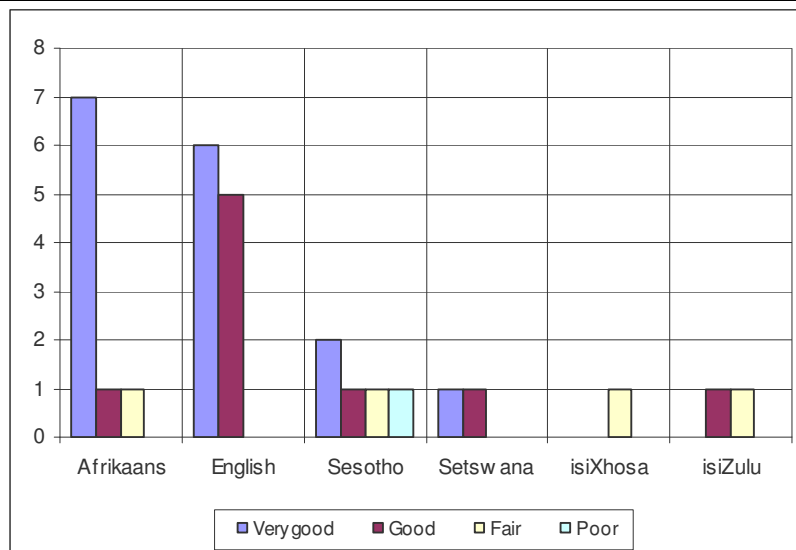
Questions 6 and 7 relate to the language proficiency of teachers in general and in class. Very good proficiency in Afrikaans and English is noticeable, though this should be seen within the context of 73% of the respondents being Afrikaans mother tongue speakers (cf. Table 5.2). The respondents also indicated that their mother tongue proficiency was very good, with second, third and even fourth additional languages scoring fair and poor responses. Furthermore, the multilingual nature of

the teachers is emphasized with this graph through distribution of knowledge over the different languages recorded from the responses.

It should be noted that the concept of language proficiency is quite problematic as answers may be influenced by the perceived language ability of the respondents. Posel and Casale (2010:6) define language proficiency as "the self-reported ability to read and write 'very well' in the specified language". Posel and Casale (2010:6) furthermore add that in international literature the focus is on the self-assessed ability of being able to speak a language. Hughes (1989:9) states that being proficient "means having sufficient command of the language for *a particular purpose*". [Italicization from the original text.] In the reported data, the result is determined according to the opinion of the respondents and points to the fact that something like language proficiency should rather be tested with a standardized language test. Yet, for the sake of determining the level of multilingualism among teachers, this data seems sufficient.

Question 8. Do the learners at your school speak more than one language at school?

TABLE 5.6 Learners speaking more than one language at school

| Other language usage	n	%
Yes	10	91
No	1	9
Do not know	0	0
Number of respondents	*11*	*100*
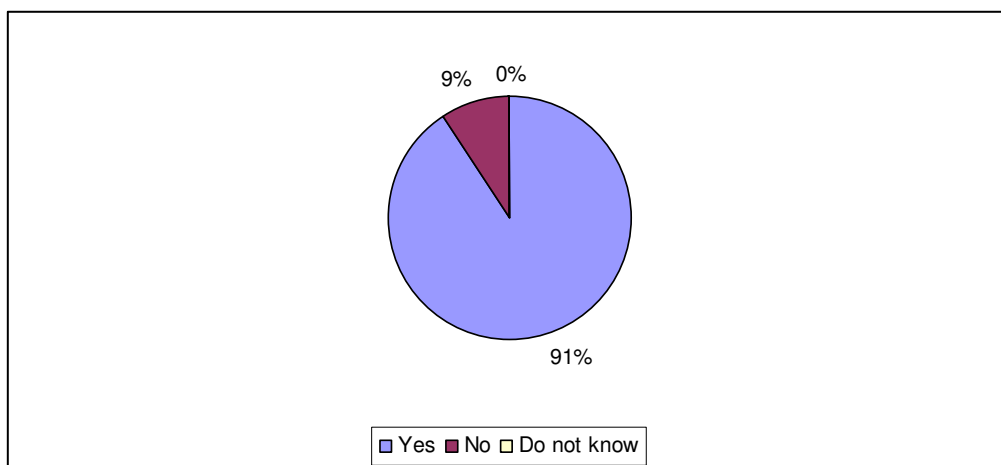
The multilingual nature of the learner population of IT learners across the Free State province is evident from this graph. A possible reason for this response is the fact that for most of the IT learners (63.5%) (cf. Table 5.7) in the Free State, their mother tongue is Sesotho and their classes, as well as assessment, is done through the medium of English (cf. Question 9). Only one respondent, from a former Model-C school, indicated that only Afrikaans was used at that school and no other language. This seems to be an exception rather than the rule, as all other respondents from both former Model-C and township schools indicated that learners use more than one language at school. Nevertheless, this does indicate the independence of Afrikaans as language of learning and teaching whereas other speakers depend on English for these purposes. This result is furthermore a comment on the extent of linguistic integration in the sense that the majority of schools (91%) where IT is presented as a subject are multilingual in nature. In addition the use of more than one language observed, shows at least a degree of language accommodation by the respondents.

Question 9. Indicate the number of learners in the Gr. 10 class according to their home languages

TABLE 5.7 Number of Grade 10 IT learners in the Free State per home language

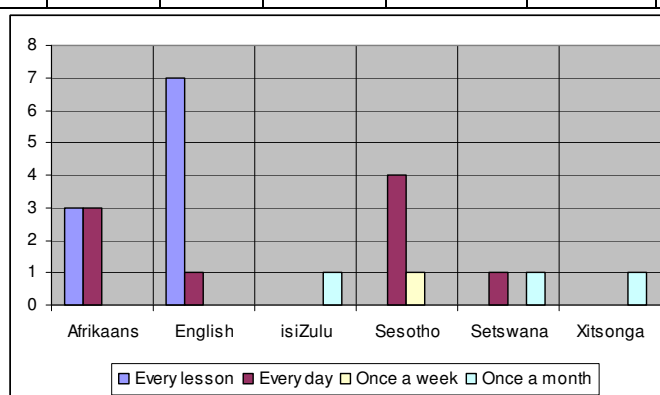| Language	n	%
Sesotho	235	63.5
Afrikaans	63	17
English	33	8.9
isiZulu	25	6.8
Setswana	7	1.9
isiXhosa	3	0.8
Xitsonga	2	0.5
Greek	1	0.3
Hindi	1	0.3
Number of learners	*370*	*100*
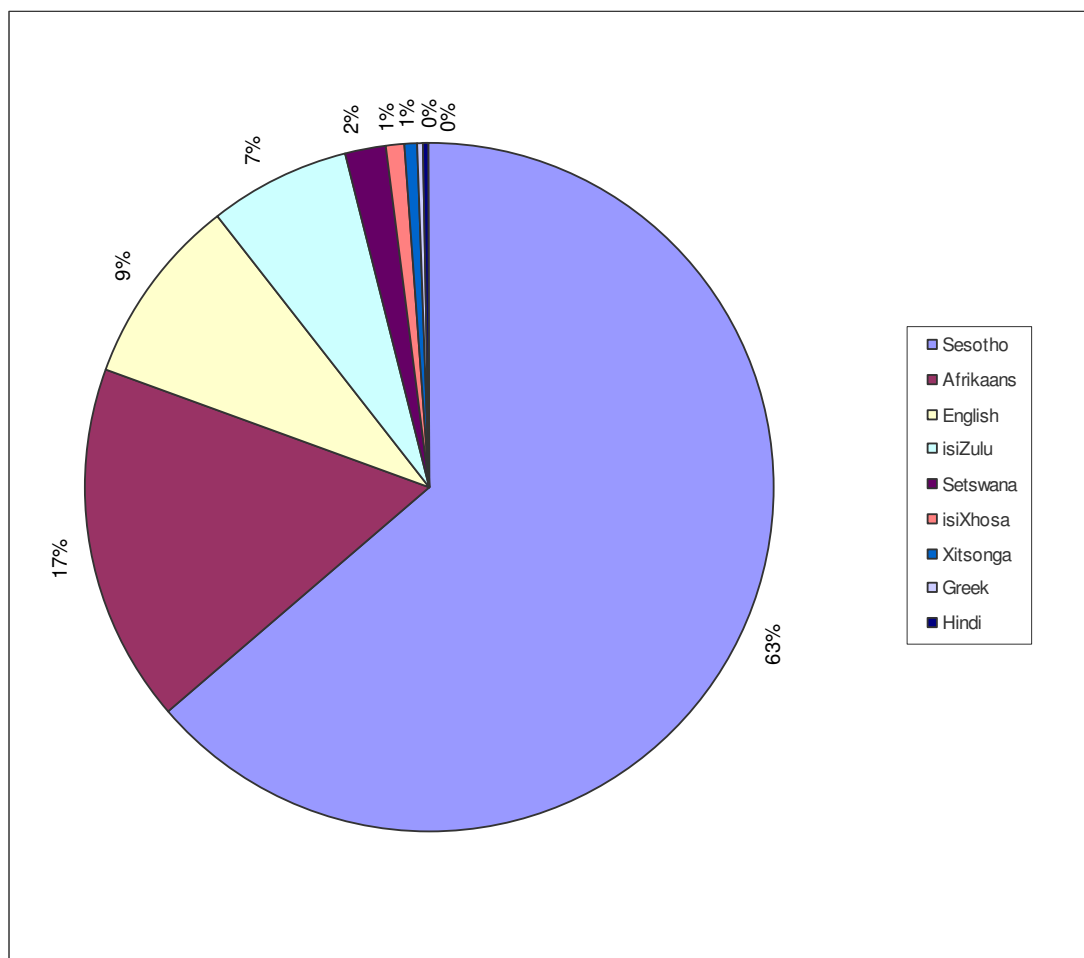
This data show the total learner population for the schools that took part in this study. The presence of a variety of languages among the Grade 10 IT learners in the Free State is evident. With 63.5% of the learners using Sesotho as home language, this shows the importance of this language for the subject IT. With regard to the Free State province it is essential to be able to accommodate the language needs of 63.5% of the learner population where Sesotho must be considered in the teaching of a subject such as IT. Furthermore, this language is followed with Afrikaans that constitutes just over 17% of the learner population. This is, in turn, followed by English with 8.9% and isiZulu with 6.8%. Other languages with a lower substantial number of speakers include Setswana, isiXhosa, Xitsonga, Greek and Hindi. From this data the complexity of the languages at schools is evident. Moreover, the complexity is further emphasized with the presence of Greek and Hindi – both languages that are not recognized as official languages. From the responses it is clear that the province is truly multilingual in nature, yet in terms of the data collected, apparent prominence should be given to Sesotho, Afrikaans and English as languages of learning and teaching for IT in the Free State.

The data obtained from this question should be read within the context of the languages used for learning and teaching as discussed in Question 10.

Question 10. The frequency of the languages mentioned in the previous question as used by learners in the class.

TABLE 5.8 Language use in class by learners and frequency thereof

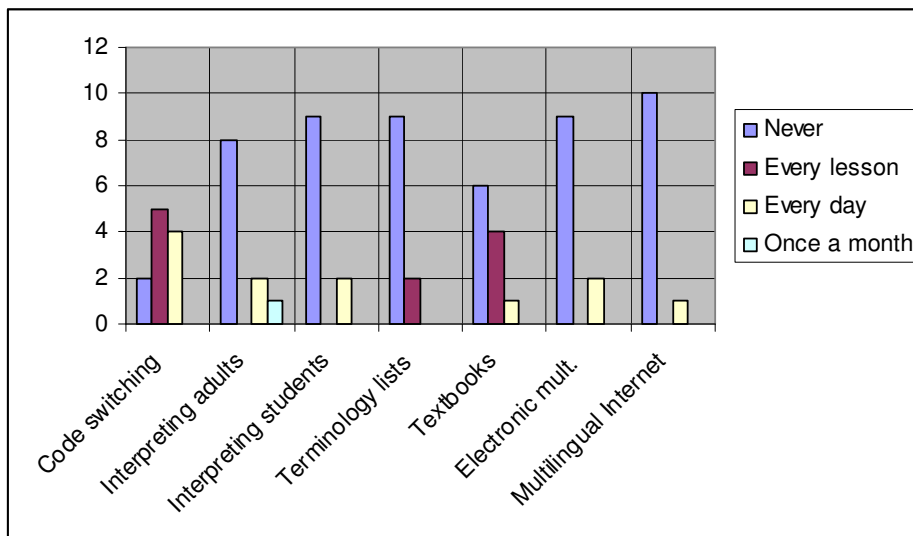|	Afrikaans	English	isiZulu	Sesotho	Setswana	Xitsonga	isiXhosa	Greek	Hindi
Every lesson	3	7	0	0	0	0	0	0	0
Every day	3	1	0	4	1	0	0	0	0
Once a week	0	0	0	1	0	0	0	0	0
Once a month	0	0	1	0	1	1	0	0	0

Through the analysis of the results of Question 10, the prominence of English as a language of learning is clear, as seven respondents noted that this language is used in every lesson. Afrikaans is the next most frequently used language with three respondents listing the language as used in every lesson. Looking at languages used every day, Sesotho was listed by most (four) respondents, followed by Afrikaans (three). Apart from the single listing of English and Setswana every day, the fairly low usage of other languages makes their presence not so noticeable.

Combined with the previous question (Question 9), the multilingual reality of South African schools, as explained in the literature (cf. 2.2.2), is confirmed with these results. Hence it is clear that despite the majority of learners having African languages and Afrikaans, in this instance, as home languages, most learning takes place in English. The prominence of Afrikaans is shown to a degree, but English is clearly the most notable language. In terms of this study these findings support the need for the accommodation and promotion of languages other than English and hence multilingualism in IT classrooms.

Question 11. Methods to accommodate and promote multilingualism by frequency

TABLE 5.9 Methods used to accommodate multilingualism in class and frequency of use

|	Code switching	Interpreting – adults	Interpreting – learners	Terminology lists	Textbooks in other languages	Electronic multilingual resources	Multilingual resources on the Internet
Never	2	8	9	9	6	9	10
Once a month	0	1	0	0	0	0	0
Every day	4	2	2	0	1	2	1
Every lesson	5	0	0	2	4	0	0
Totals	*11*	*11*	*11*	*11*	*11*	*11*	*11*

Since this study aims at accommodating and promoting multilingualism through blended learning it is necessary to determine which methods, if any, are currently used in this regard. A Likert scale was used in terms of how often different strategies are used. For the sake of this study, a strategy used for **every lesson** is regarded as being quite noteworthy, followed by **every day** which also implies repeated usage. The most prominent methods used to accommodate and promote multilingualism in classes by IT teachers include code switching, the use of textbooks in different languages (in terms of Table 5.10 this refers to Afrikaans and English textbooks only), as well as terminology lists. If the multilingual language capabilities of the

teachers (Questions 6 and 7) are taken into account, it is to be expected that code switching can be accommodated in the majority of the classrooms. However, the effectiveness of code switching prompts concern in terms of how it would directly influence the performance of the learners, yet this falls outside the focus of this study. To a lesser degree – therefore used every day – the following strategies for accommodating and promoting multilingualism are employed: interpreting by other adults in the classroom, interpreting by learners, electronic multilingual resources and multilingual resources on the Internet. Important to note is the fact that despite the focus being on an IT class, very few respondents indicated that they use electronic multilingual resources and multilingual resources on the Internet. This could be traced back to the fact that little multilingual material exists online.

Question 12. The language of the learning and teaching support-material

TABLE 5.10 Learning and teaching material per language

	Afrikaans	English	Sesotho
Textbooks	6	9	0
Notes and additional printed material	0	4	1
Electronic presentations	0	3	0
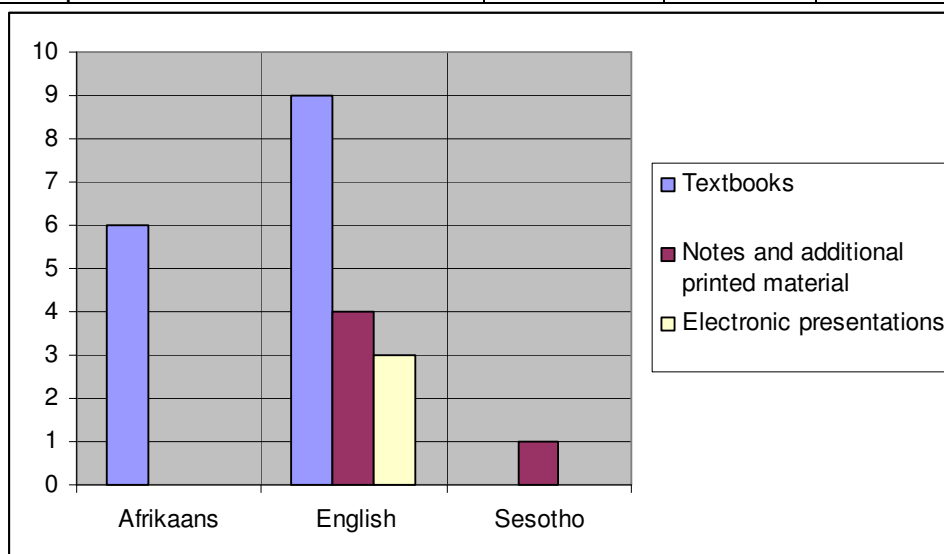
As before, English is most prominent in terms of language and teaching material. The absence of any textbooks in any other language than Afrikaans and English is noticeable from the responses. The absence of notes and additional printed material as well as electronic presentations in Afrikaans is clear in that this implies that – at least in terms of learning and teaching support-material – the focus is undoubtedly

on English despite it not being the home language of most IT learners or any of the teachers in the Free State. The notion of notes and additional printed material may prove problematic as it is not clear from the questionnaire whether this refers to material produced by the teachers or from other sources such as the Department of Education or publishers. It is therefore assumed that in this instance these materials refer to materials that originate from a combination of the mentioned sources.

Question 13. Elaboration of how multilingualism is accommodated and promoted

In terms of this open-ended question where respondents had to indicate how their respective schools accommodate and promote multilingualism through learning and teaching. Only four of the respondents reacted and their responses included the following:

- **Respondent 1:** *Classes are thought (sic) both in English and in Afrikaans where Afrikaans learners are present. Teachers are undergoing Sotho classes, to try and bridge the multi-cultural gap between teachers and learners.*
- **Respondent 2:** *Our school only uses Sotho/Tswana and English and all of these languages are known by all learners who register at our school.*
- **Respondent 3:** *I teach using English and Sesotho in class.*
- **Respondent 4:** *It is expected of teachers to teach in Afrikaans and English – shared equally as far as possible.*

These responses display a positive move towards actively accommodating and promoting multilingualism. Based on the above-mentioned responses, it is meaningful that only four of the respondents indicated measures taken at their schools for accommodating and promoting multilingualism. Significant is also the fact that a bilingual approach (cf. 2.5.1.3) is mostly used. In the case of Respondent 1, the importance of language training for teachers is emphasized which points to the fact that only by being exposed to an additional language by teachers multilingualism can be accommodated and promoted. However, knowledge of a language may not be the complete solution towards the bridging of the multicultural gap between teachers and learners. For the sake of this study, it is important to note the importance of the studying of additional languages as a contributing factor towards the accommodation and promotion of multilingualism. Respondent 2 refers to the languages being "known by all learners". This does not imply that the language of

learning and teacher is necessarily the mother tongue of the learners. Furthermore, the grouping of both Sesotho and Setswana as "Sotho/Tswana" indicate that some form of spontaneous **harmonization**[31] takes place in terms of combining related languages together. Respondent 3 indicated that both English and Sesotho are used in class, implying that a type of bilingual instruction is followed. Respondent 4 notes that in the usage of Afrikaans and English should be shared equally and, as such, declares that the two languages are considered to be equally important, and equal time is spent using both as languages of learning and teaching.

The responses to this question suggests that due to the fact that so few respondents reacted to the question that multilingualism is not necessarily accommodated and promoted at all the schools targeted with this research. However, in terms of the responses reported here it is evident there are some attempts at accommodating and promoting multilingualism even if it takes the form of bilingual instruction. With regards to this study it is clear that more needs to be done in order for all the schools of the respondents to be able to accommodate and promote multilingualism and, as such, this study provides a model which can aid in this process.

Question 14. Number of computers used at school

TABLE 5.11 Number of computers used at respondents' schools in terms of purpose

Respondent	Administration	Teachers (administration)	Teachers (teaching)	Learners	Total computers per school
1	4	2	2	65	73
2	17	8	8	100	133
3	10	3	8	160	181
4	4	6	6	60	76
5	4	0	0	25	29
6	3	7	2	60	72
7	4	13	3	0	20
8	10	4	4	60	78
9	2	0	2	34	38
10	7	3	3	40	53
11	5	10	8	100	123
Total	*70*	*56*	*46*	*704*	876

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[31] Harmonization refers to combining languages based on their similarities or being related as the Sotho or Nguni groups for example. The process can be traced to J.M. Nhlapo (1945) who called for the harmonization of some South African languages in terms of orthography and grammar. However, there is some criticism towards harmonization due to emotions around the independence of languages and the degree of similarity (cf. Kroes, 2005:237; Nhlapo, 1945:1-22; Olivier, 2003:110-113; Orman, 2008:157-163; Webb, 2002:31.)
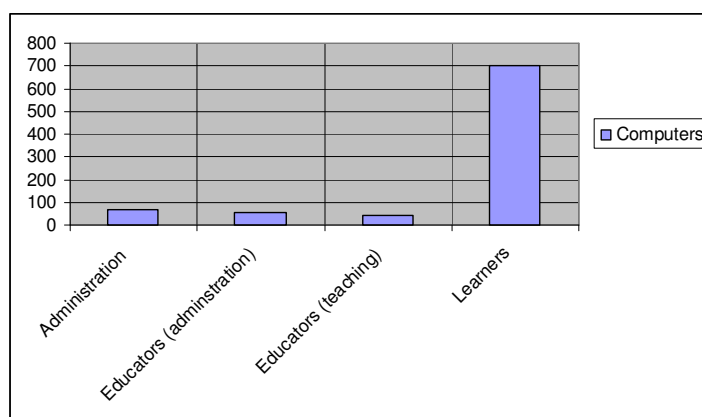
It is clear from Question 14's responses that there is a distinct difference in the amounts of computers available at the schools covered in this questionnaire. If the number of computers for Respondent 3 (188) is compared with Respondent 7 (20) the difference is quite clear. This fact also has an impact on the way in which blended learning can be implemented. With fewer computers, fewer learners can be accommodated and fewer subjects can be presented using computers. In terms of this research each learner should preferably have his or her own computer with Internet access in order to effectively accommodate and promote multilingualism through blended learning. If no contact can be made with online communities then members from minority languages (cf. 2.4.2) within the school can remain isolated despite access to technology.

Generally, this data provide evidence of the availability of computers and that they are sufficient to accommodate the relevant IT classes. The low number of computers available for teachers for teaching purposes is also evident and therefore impedes on the use of computers by all the teachers for different administrative and academic purposes. In terms of this study limited access to computers by teachers also implies that they may have limited opportunity to work online in order to retrieve and contribute to the creation of online content.

Question 15. Internet connectivity: the type of Internet activity available at schools

TABLE 5.12 Type of Internet connection present at school

| Internet connection type	n	%
None	0	0
One computer (mainly used for administration)	0	0
No more than 10 computers used by staff	4	36
Some computers (less than 10) available for staff and learners	0	0
All computers connected to the Internet	7	64
Number of respondents	*11*	*100*

251
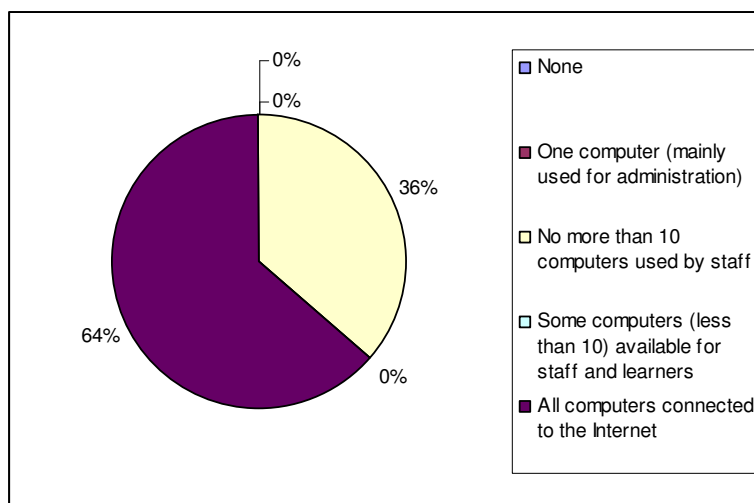
Most respondents (64%) indicated that all the computers at school are connected to the Internet, while in terms of schools where this is not possible, 36% of the respondents indicated that at least some (no more than 10) computers used by staff have access to the Internet. In this regard, teachers can download material from the Internet to be used in class. Because all the respondents have some form of access to the Internet, it appears as if blended learning can be implemented at all the schools that formed part of the research.

Question 16. Kind of electronic learning tools used at schools

TABLE 5.13 Electronic tools used in class

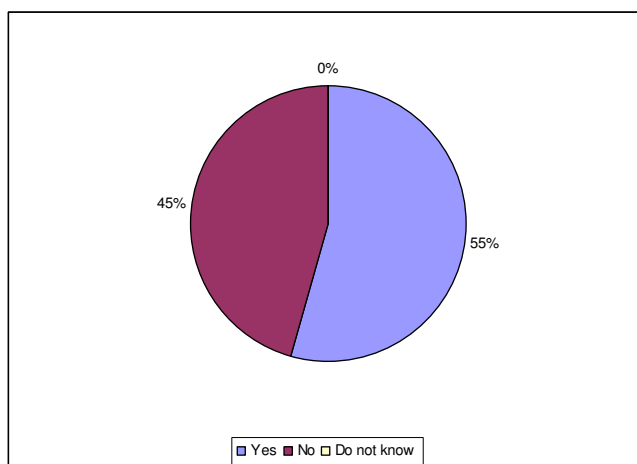| Electronic tools	n	%
None	0	0
PowerPoint presentations	10	31
The Internet	10	31
Subject specific portal	4	12.5
Wikis	6	18
Blogs	2	6
Podcasts	0	0
Learner created websites	0	0
Number of responses	*32*	*100*

252
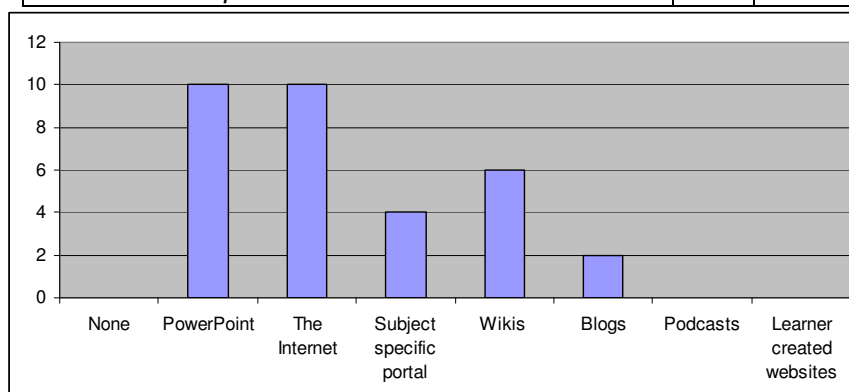
In this question the respondents could choose more than one of the listed electronic learning tools. MS PowerPoint presentation and the Internet seem to be the most prominent electronic resources used by the respondents. Yet it is noteworthy that the Web 2.0 type resources, like wikis and blogs that emphasize interactivity, are not used too frequently. This could be due to the fact that, despite sufficient Internet access (cf. Table 5.12), teachers are not trained to be able to use these technologies. None of the respondents indicated that they use no electronic tool at all. Furthermore, in terms of podcasts and learner-created websites, no responses were recorded.

The fact that the Internet is acknowledged as a tool used in class means that implementing blended learning would be easy for most of these respondents as they are at least familiar with the Internet environment. The challenge posed by this research is to enable the respondents to be able to follow a blended learning approach and, in doing so, accommodate and promote multilingualism. The fact that more than half of the respondents (six) indicated that they use wikis in class, supports the anticipation in the literature study (cf. 3.3.4.5.3) to choose this tool for the implementation of the conceptual model that forms part of this study.

Question 17. Do you use electronic tools for assessment?

TABLE 5.14 Use of electronic tools for assessment

|	n	%
Yes	6	55
No	5	45
Do not know	0	0
Number of respondents	*11*	*100*

Just over half (55%) the respondents use electronic tools for assessment. More detail would be required to be able to make further conclusions from this data. However, in terms of this study, it is clear that some respondents do use electronic tools for assessment. It is evident that the respondents already involved in doing assessment through electronic tools are in a way already applying a blended learning approach. However, for the respondents who do not do assessment through electronic tools (45%), training is required before blended learning can be implemented. In terms of this study, it is therefore clear that not all the schools are at the same level in terms of exposure and usage of blended learning technologies and the teachers from schools with little exposure to blended learning may require training in this regard.

Question 18. Do you employ blended learning techniques in your teaching?

TABLE 5.15 Employment of blended learning techniques in teaching

	n	%
Yes	5	45
No	6	55
Do not know	0	0
Number of respondents	*11*	*100*
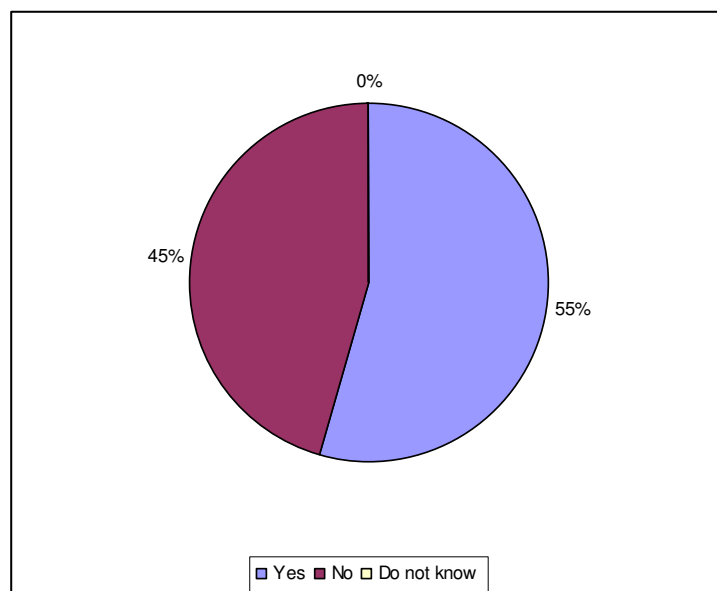
Five (45%) of the respondents indicated that they employ blended learning techniques – that is: blending traditional face-to-face teaching with electronic and online technologies such as online assessment and blogs. As can be seen in the

question, the concept of blended learning was explained. Just more than half (55%) of the respondents indicated that they do not employ any such techniques. From these responses it is clear that blended learning can still be developed to be implemented successfully within the Free State IT class context. In addition, the fact that there are schools that do not employ this approach supports the importance of this study as well as a need for training among teachers in this regard. From two previous questions (Questions 14 and 15) it is evident that the infrastructures at schools are sufficient towards the implementation of blended learning, yet there is clearly a need to facilitate the optimum use of the infrastructure.

Question 19. Examples of blended learning techniques in teaching

In the follow-up open question to Question 18 the respondents provided examples of blended learning techniques employed in their teaching. The following responses were recorded:

- **Respondent 2:** Information Technology Examination Assesment [sic] takes place on computers
- **Respondent 3:** Blogs / Skype (Amerika en Australia [sic]), FaceBook, Mxit, Bluetooth – huiswerk na selfone [Own translation: Blogs / Skype (America and Australia), FaceBook, Mxit, Bluetooth – homework to cellphones]
- **Respondent 8:** Powerpoint and other maths and fis. science [sic] programs
- **Respondent 10:** Powerpoint presentations are used. Only few teachers are doing this due to the lack of proxies and screens in clasrooms [sic].

Only four respondents supplied responses to this question. Firstly, Respondent 2 referred to the fact that in the subject IT computers are used for practical assessment of Learning Outcome 4 (cf. 4.3.3.4). However, doing programming on a computer does not necessarily imply blended learning. The assessment is often done on paper and even if assessment is done on-screen this still does not imply the blending of traditional methods such as paper-based assessment with online technologies. Respondent 3 emphasized the different mediums that are used in the classroom. Yet, it is unclear whether these mediums are actually used for teaching and learning throughout the subject or only as content as these mediums are actually also studied within the subject (cf. 4.3.3.2). Respondent 8 mentioned the use of MS PowerPoint as well as the usage of mathematics and physical science computer software. The relevance of the mathematics and physical science computer

software is unclear. Respondent 10 also noted the use of MS PowerPoint. Finally, Respondent 10 also indicated that blended learning is employed by few of the teachers as data projectors and screens are not available. In conclusion it is clear that the teachers that indicated that they use blended learning techniques in class do not necessarily exactly know what blended learning entails. It is evident that it cannot be assumed, due to the fact that the subject IT is computer-based and the subject content relates to computers, that blended learning is employed. In terms of this study this reinforces the need for the implementation of blended learning. The way in which blended learning is implemented by the respondents does not facilitate the construction of new content by learners (cf. 3.4.4), self-paced learning (cf. 3.6.1), personalized learning (cf. 3.6.1) or collaboration (cf. 4.5.3.2).

Question 20. Frequency of the use of blended learning techniques

TABLE 5.16 Frequency of the use of blended learning techniques

|	n	%
Every lesson	0	0
Every day	3	60
Once a week	1	20
Once a month	1	20
Totals	*5*	*100*
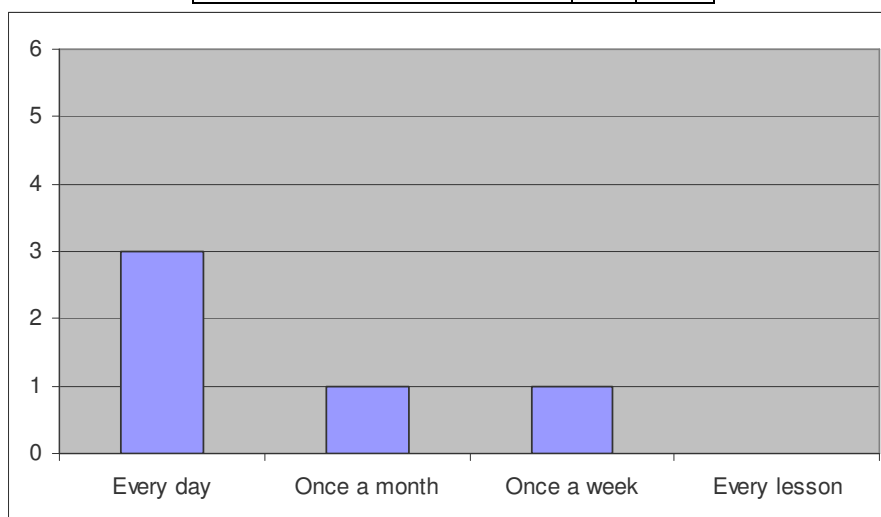
Of the respondents who indicated that they use blended learning (cf. Table 5.15), most of the respondents (60%) indicated that they use blended learning every day. However, none of the respondents employ it during every lesson. Fewer respondents employ these techniques once a month (20%) or once a week (20%). This result is important, as blended learning is only employed occasionally and is not fully integrated within every lesson. In order to gain all the benefits of blended learning it

should be regarded as an ongoing process and not as a sporadic addition to traditional face-to-face teaching. This practice also supports the need for this research and the model in order to support sustained use of blended learning.

Question 21. Do you think blended learning can accommodate and promote multilingualism in providing an additional resource in a language not spoken by the teacher?

TABLE 5.17 Blended learning accommodating multilingualism in providing an additional resource in a language not spoken by the teacher

	n	%
Yes	9	82
No	2	18
Do not know	0	0
Number of respondents	*11*	*100*
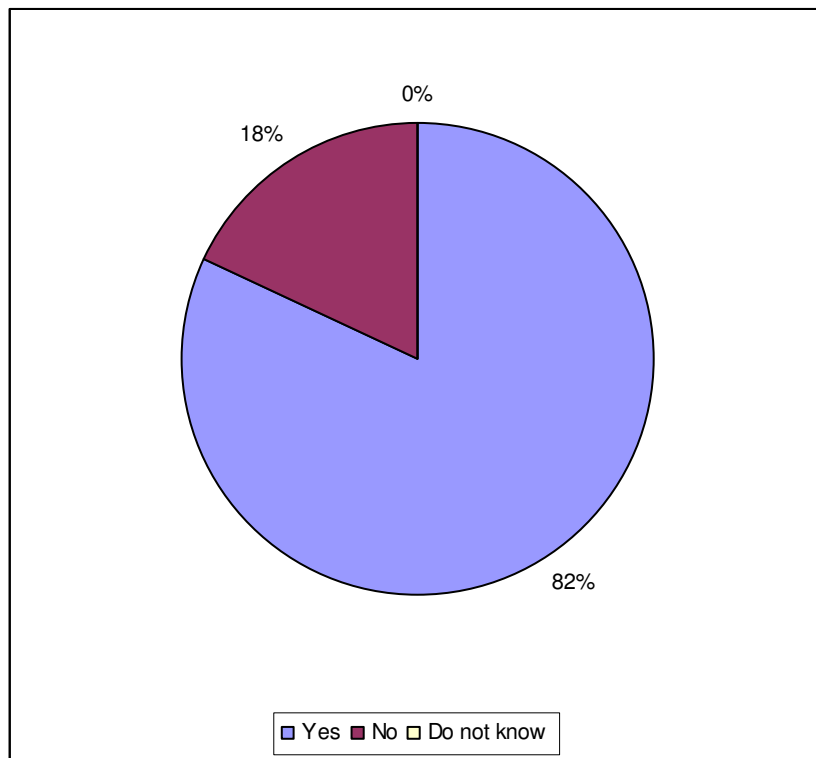
The aim of this question was to determine whether the respondents feel that blended learning could accommodate and promote multilingualism. Nine (82%) of the respondents indicated that blended learning could accommodate and promote multilingualism by providing an additional resource in a language not spoken by the teacher. This shows that the majority of the respondents are of the opinion that blended learning could indeed accommodate and promote multilingualism. Despite

current practices regarding blended learning, this poses an opportunity, as teachers are at least positive towards this approach.

Question 22. Substantiating the use of blended learning as additional source for a language not spoken by teachers

When asked to give reasons to the responses given in the previous question (Question 21), the following comments were provided by the respondents. Nine responses were recorded exactly as provided by the respondents without any corrections:

- *If resources are available in Sesotho, learners can definitely benefit, but in IT the common spoken language is English. My other concern is time, and whether the learners will be able to accommodate additional resources in their already full time schedules.*

- *Blended Learning can provide the resource of explaining and demonstrating work in the classroom environment where learners can communicate and understand in their own home language*

- *Ja want nou is elke leerling op 'n gelyke voet en word nie terug gehou deur sy taal.* [Own translation: Yes, because now every learner is equal and is not held back by his language.]

- *The learner can see on the other material what is meant by the teacher.*

- *Yes! For every lesson there can be an interpreter, or website for every language.*

- *Blogs can be in any language and if learners are suppose [sic] to get information on a blog they'll have to adapt to the language used and therefore promote/accommodate multilingualism.*

- *Helps the teacher with flaws in his language. Helps with the translation of terminology.*

- *Yes, because we find that there are some learners who can speak some languages that I don't know e.g. Xhosa and Zulu. If there is a relationship that we have with a certain in Eastern Cape we can then use Xhosa in that communication.*

- *Usually material is only available in English.*

The value of the above-mentioned comments for this study is to provide information on how the respondents perceive blended learning can be used to accommodate and

promote multilingualism. Firstly, it is clear that English is used as the common language for the material and the subject IT in general. Furthermore, accommodating and promoting additional languages could require more time, and resources need to be available in other languages. Since teachers are not always proficient in the languages spoken by their learners, multilingual resources can help in this regard. The accommodation and promotion of more languages makes learners equal since the resources can help in explaining what the teacher says. Whereas technologies such as blogs can accommodate different languages, blended learning could provide for communication and understanding in the learners' home language. The responses to this question therefore support the need for a way in which multilingualism can be accommodated and promoted. Furthermore the choice of blended learning as a way in which multilingualism can be accommodated and promoted is also supported.

Question 23. Would you be willing to allow me to do research with a grade 10 class at your school?

TABLE 5.18 Number of respondents willing to allow research to be conducted at their schools

	n	%
Yes	10	91
No	1	9
Number of respondents	11	100

259
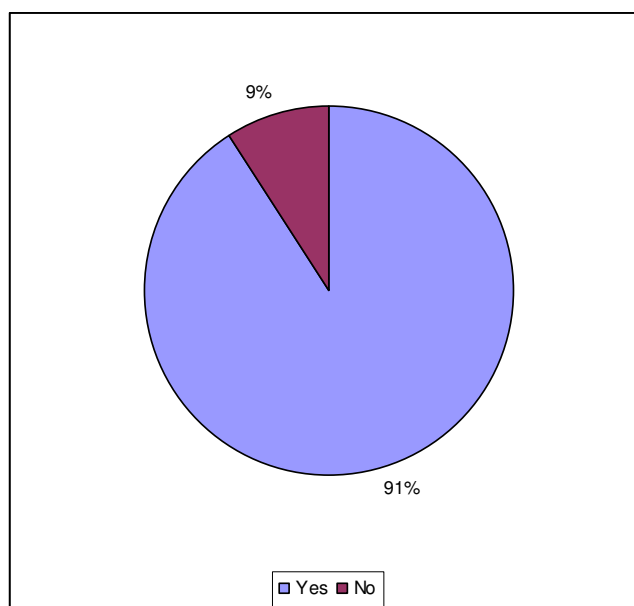
This question was posed in order to determine which schools could be used for the implementation of the conceptual model (cf. 5.8). Only one respondent indicated that research could not be done at their school. The positive reaction by the majority of respondents (91%) proves that the respondents are very positive towards the implementation of aim of this study in accommodating and promoting multilingualism through blended learning.

5.8.4 Summary of findings from the teachers' questionnaires

The teacher questionnaires used in this part of the empirical investigation provided the necessary context within which the rest of the research and implementation of the conceptual model could be executed. The following prominent findings, important to the rest of the study, could be identified:

- ✎ The limited multilingual skills of the IT teachers in the Free State are evident from this data (Questions 2 to 5).
- ✎ The importance of English as a distinguished additional language for learning and teaching is apparent (Questions 2 to 6 and 22).
- ✎ Despite the teacher respondents only having Afrikaans, Sesotho and Setswana as mother tongues, the data shows that the language profile of the learners is multilingual in nature (Questions 1 and 9).
- ✎ The majority of IT learners in the Free State speak Sesotho, followed by Afrikaans as a mother tongue (Question 9). Multilingualism is accommodated and promoted to some extent especially in terms of using Afrikaans, English, Sesotho and Setswana (Questions 6 and 7). This is done mainly through code switching, terminology lists and text books (Question 11).
- ✎ Despite the accommodation and promotion of some languages (Questions 6 and 7), many other languages used by learners are not accommodated or promoted, which leads to a number of languages (such as isiZulu, Setswana, Xitsonga, isiXhosa, Greek and Hindi) either rarely or never being used (Question 9).
- ✎ In terms of accommodating and promoting African languages such as Sesotho, this does not happen in classes where teachers have Afrikaans as a mother tongue (Questions 2 to 5 and 10).
- ✎ The research shows that, in terms of the availability of computers in the respective schools which formed part of the research, some infrastructure does exist (Question 14).

- Internet connectivity at most of the schools allows for all computers to be connected to the Internet, followed by some schools where no more than ten computers can be accessed and then only by staff (Question 15). Consequently, all schools have some form of access to the Internet, which allows at least for a degree of blended learning to take place, as teachers have access to online resources.

- In terms of electronic tools used in the class, PowerPoint presentations and the Internet were favoured, followed by some usage of wikis and a subject portal (Question 16).

- Only just over half (55%) of the respondents indicated that they use electronic tools for assessment (Question 17) and 45% of the respondents indicated that they use blended learning techniques in teaching (Question 18). Hence it is important to note that blended learning training might be needed in order to allow teachers to use technologies already available to them adequately.

- Aimed at the Grade 10 groups as it was the focus of this study, the majority of respondents who use blended learning indicated that they employ it every day although not in every lesson (Question 20).

- The majority (82%) of the respondents indicated that blended learning could accommodate and promote multilingualism (Question 21). This result and the responses to the follow-up open-ended question imply that teachers would seem positive towards the aims of this study.

- The respondents also seemed positive in terms of the implementation of a study where blended learning could accommodate and promote multilingualism (Questions 22 and 23).

As an extension on the findings from the teachers' questionnaire the next section reports on the qualitative investigation done through interviews aimed at provincial and national IT and blended learning experts.

5.9 QUALITATIVE INVESTIGATION: IT AND BLENDED LEARNING EXPERTS' INTERVIEWS

5.9.1 Introduction

To validate and extend the data gained through the literature study and the questionnaire completed by the IT teachers, an embedded qualitative investigation as part of the first phase of the study was done with provincial and national IT

subject and blended learning experts by means of interviews. Background is provided on the data collection procedures with the experts followed in this part of the study and a discussion of the findings.

5.9.2 Data collection procedures: experts

5.9.2.1 Data collection instrument

Cohen *et al.* (2000:461) note that multiple interpretations can be made from qualitative data. In this regard, setting out the purpose of the research is essential. In this section of the research the aim is to get more insight into the subject IT and blended learning in order to be in a better position to determine how multilingualism can be accommodated and promoted by means of blended learning in the IT classroom.

Van der Merwe (1996:291-292) notes that qualitative methodologies include direct observation, an overview of different documents and artefacts, cooperative observation and open-ended, unstructured interviews. Greeff (2002:292) notes that interviewing is the predominant mode in which data can be collected in qualitative research. According to Kumar (2005:123) an interview can be regarded as "[a]ny person-to-person interaction between two or more individuals with a specific purpose in mind". In this study a structured interview schedule was followed and responses were transcribed. With a structured interview, a set of predetermined questions are asked utilizing the same wording and in a specific order (cf. Greeff, 2002:302; Kumar, 2005:126).

This part of the research was conducted by means of face-to-face interviewing techniques and e-mail interviewing (cf. Cohen *et al.*, 2007:242; Flick, 2006:256-260; Leedy & Ormrod, 2010:188). The interviews used in this study can also be considered to be expert interviews, because unlike biographical interviews, the interviewees are not important and the focus is on their knowledge on a particular phenomenon. The purpose of expert interviews, as is the case with this study, is often to allow knowledge to be analysed and compared (cf. Flick, 2006:165).

5.9.2.2 Reliability and validity

Reliability, as defined earlier in this study (cf. 5.8.2.3), is not easily tested for qualitative research in the same manner as it is done with quantitative research.

Delport (2002:165) highlights the importance of the concept measurement, validity and reliability and levels of measurement in terms of quantitative data collection methods. Cohen *et al.* (2000:149) note that for qualitative research "reliability includes fidelity to real life, context- and situation-specificity, authenticity, comprehensiveness, detail, honesty, depth of response and meaningfulness to the respondents". Moreover, the dependability of respondents, in terms of whether their responses are trustworthy, tie in with this statement and should be kept in mind throughout the execution of the research.

Cohen *et al.* (2007:150) note that minimizing bias is a practical way in which validity can be ensured with interviews. Despite the fact that it is inevitable for the researcher to have an influence on the interviewee, however, by ensuring neutrality in the posing of questions this researcher has attempted at minimizing bias as far as possible.

Credibility is also an important factor to take into account. De Vos (2002b:351) defines credibility as "the alternative to internal validity, in which the goal is to demonstrate that the inquiry was conducted in such a manner as to ensure that the subject was accurately identified and described". Since a qualitative study, and specifically an interview aimed at exploring and describing a certain phenomenon the following statement of De Vos (2002b:351-352) is relevant: "An in-depth description showing the complexities of variables and interactions will be so embedded with data derived from the setting that it cannot help but be valid". The parameters of the research setting, population and theoretical framework need to be set in order for credibility to be achieved (De Vos, 2002b:352). In this part of the first phase of the research the setting refers to the national and provincial experts for the subject IT and e-learning, the population is discussed in the next section (cf. 5.9.2.3) and the theoretical framework relates to the research paradigm used in this research (cf. 5.3).

In the creation of the conceptual model it was necessary to triangulate the data accumulated with the teachers' questionnaire and the expert interview. Flick (2006:37) defines triangulation as a way in which several qualitative methods or a combination of qualitative and quantitative methods are used to complement each other. This, in turn, contributes to grounding the obtained knowledge, thereby

increasing the depth of the knowledge obtained (cf. Flick, 2006:390; Patton, 1990:187).

In the qualitative part of this phase of the study interviews were held with both provincial and national IT subject and blended learning experts in order to compare responses in terms of both provincial and national levels. The same interview schedule (questionnaire) was used at both provincial and national level for the respective experts as this set structure also contributes to the validity (trustworthiness) of this part of the study (cf. Cohen *et al.*, 2007:150). Apart from the preparations of the interview in terms of the analysis validity (trustworthiness) was ensured by providing detailed reporting of the responses (cf. Cohen *et al.*, 2007:155).

5.9.2.3 Profile of the research population: experts

Purposive sampling was done as participants were chosen because of particular characteristics they have or being knowledgeable about a certain issue (cf. Cohen *et al.*, 2007:114-115). In this instance, the chosen individuals are regarded as information-rich participants because of their knowledge in terms of IT and e-learning (an integral part to blended learning) (cf. 3.3.4). These individuals were chosen for their expertise in both e-learning in terms of the Free State and nationally, as well as the subject IT. Four participants were selected who have extensive experience and are currently still working in the fields of IT and e-learning. In this regard, Patton (1990:169) is of the opinion that the strength of purposeful sampling is in the selection of information-rich cases. Furthermore, Patton (1990:169) observes that "Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research, thus the term *purposeful* sampling." [Italicization from the original text.] The interview participants included a provincial e-learning specialist, a national e-learning specialist, a provincial IT subject specialist and a national IT subject specialist. The aforementioned interviews are discussed in the next subsection.

5.9.2.4 Data collection process: experts

The following figure (Figure 5.4) shows the data collection process followed with the experts.

FIGURE 5.4 Experts' questionnaire data collection process

5.9.3 Discussion of interview responses

The interview responses obtained from with a provincial e-learning specialist, a national e-learning specialist, a provincial Information Technology subject specialist and a national Information Technology subject specialist are summarized and discussed in this section.

5.9.3.1 Provincial e-learning specialist

The interview with the provincial e-learning specialist focussed on blended learning, in particular in the Free State. The statements relevant to this study made by the provincial e-learning specialist, are reported and discussed.

Currently the focus of the provincial Department of Education is more on developing infrastructure in terms of hardware and teacher training, as the provincial e-learning specialist observed: "The current framework for e-learning in the Department revolves around providing opportunities for learners, teachers and managers to develop their ICT skills, appropriate to their level of responsibility at the school." The provincial e-learning specialist further adds that "The focus is currently more on developing ICT skills and promoting usage among teachers." It is evident that the department does not address e-learning or even blended learning in any way and that these approaches should at least be placed in a continuum of development of teachers.

The participant remains positive in terms of the advantages of blended learning when making the following statement: "Blended learning offers teachers the

opportunity to expand their teaching strategies, and to provide a flexible environment for learning and teaching which caters for the diverse needs of learners." However, the actual implementation of blended learning according to this participant is lacking as it was noted: "I do not think many schools are applying blended learning in the classroom. Most schools do not have the financial means to implement a sustainable e-learning platform, and many teachers are resisting the use of technology in class." Here both the cost of infrastructure required to implement blended learning as well as teacher perceptions were emphasized. Only through training and exposure to blended learning can teacher perceptions be challenged.

In terms of developing blended learning, the provincial e-learning specialist envisaged it as follows:

> The White Paper on e-Education ensures a national focus on the integration of ICT into schools. There are however many constraints around the shift from traditional teaching to modern approaches such as blended learning. Schools will require much more support to overcome barriers to the implementation for blended learning, and a collaborative effort will be required from government departments, higher education institutions, the business sector and other initiatives to facilitate this shift.

An integral point raised was that support for schools and teachers is required in order for blended learning to be developed. The provincial e-learning specialist did note that although start-up costs for implementing blended learning would be high, "long term benefits will negate those costs".

In terms of the accommodation and promotion of multilingualism, the provincial e-learning specialist states that "English is the preferred medium of use at this point in time". Yet it was noted that with the necessary capacity, multilingualism could be promoted. When asked whether the implementation of blended learning in the South African school system should be multilingual in nature the following answer was provided:

> There are two schools of thought around this issue. Many believe South Africa needs to harness and preserve its diverse cultural heritage while others believe it is impossible to accommodate all languages in the schools system. I believe languages have a place in the curriculum, but it might be difficult to offer all subjects in all the official languages in the country.

The fact that it is believed that it could be difficult to offer all subjects in all the official languages in the country extends the perception that not all languages are capable of fulfilling the different roles of being used as a language of learning and teaching. With this context in mind, the need for alternative ways in which languages can be accommodated is once again affirmed.

It is therefore clear from the interview with the provincial e-learning specialist that the existing infrastructure in the Free State does not allow for blended learning to take place and that, in terms of teachers' perceptions it needs to be changed and training should be done. However, the respondent seemed positive in terms of implementing blended learning and the benefits it provides. In terms of language, the prominence of English was clear, yet there are some concerns in terms of offering all subjects in all the official languages. This concern supports the rationale behind this study where, potentially, additional languages other than English can also be accommodated in a classroom.

The next interview was concerned with a national e-learning specialist.

5.9.3.2 National e-learning specialist

According to the national e-learning specialist, the main tasks attached to this position include: "Primarily managing the front end of the Thutong education portal but also developing national guidelines including e-Safety for schools".

In terms of blending e-learning with a face-to-face approach, the following comment was made: "E-Learning is appropriate but depends on many factors e.g. school readiness, training, technical support. It furthers the philosophy of constructivism by providing access to ICT it does not however complement a poor teacher". Firstly, this statement supports the constructivist view followed in this study (cf. 3.4.3 and 3.4.4). Furthermore, as stated, it is important to make sure that schools have appropriate infrastructure in order to implement blended learning as well as adequate training and technical support. The latter two conditions will ensure sustainability of implementing a blended learning approach.

In terms of how blended learning has been implemented in South African schools, the participant noted that it has been done "minimally because of competing

priorities – if anything the digital divide widens exponentially." In terms of future developments, it was noted: "We are working to the White Paper on e-Education published in 2004 and this seeks to deliver on six pillars: content, infrastructure, professional development, connectivity, community involvement as well as research and development." As with the response of the provincial e-learning specialist, to this statement, the national e-learning specialist also affirms the importance of the White Paper on e-Education.

When asked about the cost effectiveness of implementing blended learning the following comment was made:

> One cannot argue against the advantages of improved access to information and communication, nor would one want to. It is however important to remember that many of our impoverished schools have yet to experience the value of ICT's in teaching and learning and we have a policy of redressing imbalances. Computer infrastructure is expensive and the total cost of ownership (TCO) cannot be underestimated – training should be a third of the cost. Donated computers engender different costs and technical support requirements normally beyond the capacity of the school.

In this response the need for proper infrastructure and training is once again mentioned, tying this response to that of other interviewees and the literature study.

With regard to teachers being ready to implement blended learning the national e-learning specialist made the following statement: "On the whole no – we are still grappling with delivering on the basics of an OBE methodology which is sound but resource hungry and unfamiliar to the majority of our teachers who were taught in an instructive environment."

The participant further notes the following in terms of using IT as a subject of implementing blended learning:

> It's not about the tool, it's about a philosophy and methodology – learning takes place in a variety of ways ranging from rote to higher order thinking and problem-solving. Access to ICT can enhance all of this including interactions on a global scale. We are moving towards independent life-long learners who can make sense of the world and make appropriate choices – including finding appropriate information. A school in Melbourne [Australia] is experimenting with allowing cell phones in the exam room so it's not about what you can cram into your head the night before.

The respondent therefore is of the opinion that blended learning does not necessarily need to be confined to the computer medium but should be seen in terms of wider teaching philosophy and methodology. In addition blended learning should be seen within the context of other newer approaches based around "independent life-long" learning. Notably, the respondent not only referred to the blended learning approach, but also mentioned the use of different technology such as the reference to mobile learning.

When asked whether multilingualism can be accommodated and promoted through blended learning, the national e-learning specialist responded: "Possibly in the future and would be recommended – English at present predominates both as a language of learning and on the Internet (blogs, forums etc). Global citizens need to participate using English." The following was added in terms of the Department of Education's role:

> There is a vast range of deliverables including skills for the 21st century and inclusive of the 11 official languages, the requirements of special needs schools and ICT infrastructure and content using devices accessible to all. We endeavour to meet the needs of the client base as best we can: given that to not do so further disadvantages our education community. ICT cannot replace sound teaching and it needs to be introduced in a thorough, methodical and sustainable way so as not to raise unrealistic expectations and arrive at disillusionment when computers don't work. E-Readiness is key to success.

The participant states that apart from accommodating and promoting the eleven official languages it is also still important to view this in terms of other requirements for special needs schools and ICT infrastructure. Key to any change in terms is the fact that the "education community" should not be disadvantaged. Furthermore, from this response the importance of a methodical and sustainable approach to the introduction of ICT and that this introduction does not replace "sound teaching" but should be seen as an additional medium. The importance of e-readiness is significant as this implies training in order for teachers to be prepared for e-learning. The concerns raised by this participant should be kept into consideration as contextual factors to any implementation of a conceptual model such as the one proposed by this study.

The next interviewee was the provincial IT subject specialist.

5.9.3.3 Provincial IT subject specialist

The interview with the provincial IT subject specialist was concerned with the subject of IT. The motivation for choosing this individual is based on the fact that IT was chosen as the subject in which this research was done.

From the interview with the provincial IT subject specialist it is clear that it is required from the person in this portfolio to visit the schools presenting the subject IT in the Free State. As such, the person is also tasked with establishing communication with schools and tending to schools with special needs concerning IT as a subject.

In terms of the application of blended learning in the classroom, the following observation was made: "This concept is and can be very useful to enhance the teaching ability of teachers and also the learning ability of learners. A large amount of information and theory as well as skill development can be done via blended learning". The provincial IT subject specialist also asserts that blended learning is the way in which any computer subject should be taught.

When asked about how often blended learning is approached in IT classes in the Free State, the participant responded with "Not so often in all the Free State schools. Schools that do have all the necessary equipment i.e. proper networked lab, data projector and Netop[32] type of software, use it with great success." This ties in with the concerns raised by the other interviewees in terms of infrastructure. Following from this statement it was asked whether teachers are trained to follow a blended learning approach, to which was replied "No, not all teachers are trained to implement this concept in full. There were some shorts bursts of discussion and demos about it, but no formal training has been done." The need for teacher training is clearly a very important issue. According to the provincial IT subject specialist, only about 40% of the schools that offer IT are well equipped to offer subjects including IT with this approach. The number of 40% does not correspond with the 64% of the schools that could have blended learning capabilities as indicated by the responses of the teachers (Question 15 under 5.8.3). The reason for this discrepancy could be the fact that this study did not cover all the schools that present IT as a subject (cf.

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[32] Netop is a brand of classroom management software – found at http://www.netop.com/

5.8.2.5). Moreover, it is also not clear which criteria the participant used to arrive at this percentage.

In terms of multilingualism, the provincial IT subject specialist made the following observation: "There are barriers to learning especially with learners from disadvantaged communities. The mother tongue language is mostly Sesotho and the language of instruction is then mostly English. With learners where Afrikaans or English is the major language of the mother tongue speakers there is no major barriers at all." This statement is very similar to the responses recorded in the teachers' questionnaires (Question 2 to 5 under 5.8.3). The participant also confirmed that not much is being done in terms of multilingualism. When asked about the 63.5% of the learners speaking Sesotho, but classes being done through the medium of English, the following observation was made: "I do agree that this fact can lead to many problems and misconceptions in the classroom. Learners will not be able to comprehend all the technological facts as well as most of the problem-solving effects and concepts used when programming is done." The disparity between mother tongue and medium of instruction is clearly a concern, yet no solutions are presented by the respondent. In terms of programming language and medium of instruction it was noted that the "programming language can be seen as independent but all the coding words that are used in about all the programming languages are mostly English". This emphasizes the unique situation in terms of the subject IT where, regardless of the medium of instruction, some knowledge of English is still necessary. As such English cannot be disregarded in any teaching of IT. However, the effect of English knowledge on programming would require further research to confirm any substantial influence on the teaching of the subject.

With regard to blended learning being a solution to accommodating and promoting multilingualism the provincial IT subject specialist affirmed the situation with "Yes. The learners with a language barrier can benefit a lot because technological facts and concepts, as well as most of the problem-solving effects and concepts used when programming is been taught." Finally the participant made the following remark regarding blended learning: "I do think that blended learning with language in mind, could lead to study areas in other subjects as well. Maybe mathematics and/or physical science learners could also benefit from this approach." Hence the

respondent acknowledges the use of a blended learning approach not just for IT but also for other subjects.

From the provincial IT subject specialist interview it is clear that, in the Free State, even at schools that present IT as a subject, the infrastructure is not sufficient everywhere. Furthermore, it is evident that teachers are not trained well enough to be able to utilize a blended learning approach effectively. The language barriers are also noted and they could potentially be accentuated due to the fact that the programming language used is based on English. Yet it is evident that blended learning poses possibilities in terms of accommodating and promoting multilingualism.

The next interview was held with the national IT subject specialist.

5.9.3.4 National IT subject specialist

The fourth expert interviewed was the national IT subject specialist. This person was previously involved with Computer Studies HG and SG (as it was known in the old education dispensation), and later joined the Department of Education as Chief Education Specialist. The responsibilities of this portfolio include: curriculum policies, monitoring of implementation and maintenance of policies.

In terms of how often blended learning approaches are employed by IT teachers in South Africa, the national IT subject specialist indicated that it is done quite seldom and that "teachers focus on curriculum and to complete the curriculum, chases results and do not think much about innovation and e-learning". Furthermore, "many of them [teachers] are not very well qualified, just keep abreast with what is expected in the curriculum and do not have time to learn new things that they think they can do without". The participant also admits that teachers are not trained to implement blended learning, adding: "The Department's e-initiative has not really taken off. Furthermore, so many teachers need very basic computer and Internet skills before one could focus on this type of training." In addition it was indicated that many classrooms still lack resources such as Internet access. As stated with the first three interviews, this respondent also emphasizes teachers' perceptions, the need for training and the need for adequate infrastructure.

With regard to the handling of multilingualism in the classroom, the national IT subject specialist noted that it is handled quite easily because of the "English nature" of IT. Yet when confronted with the fact that over 63.5% of the IT learners in the Free State speak Sesotho as a mother tongue and the participant was asked what effect this would have on the teaching of IT, the participant noted: "In terms of the learners' language command, it could have a big effect. Language is the basis of all learning and if a learner does not have a good command of the language of learning and teaching it definitely affects understanding and comprehension and will have an effect on the learning and teaching." The national IT subject specialist does, however, agree that blended learning "could be helpful to overcome the language barrier".

In terms of this study, it is important to note that there is a process of replacing subject policy documents existing at the time of the completion of this study. In terms of the programming outcomes listed in the draft document for IT the content used in this study is still relevant (DoE, 2010:17-24). With regard to the new developments in the subject and the usage of Scratch, the participant added that the Scratch[33] language is available in different languages and may hold potential for the South African languages. The participant also notes: "Scratch does not have the 'overheads' of other high level programming languages as well. Maybe that will help to ground some good principles that will help learners when dealing with the high level language."

In conclusion, the national IT subject specialist confirmed that blended learning is not used very often and that teachers are not adequately trained to follow this approach. In addition it is also apparent that the infrastructure at schools, in terms of Internet access, is not sufficient. This respondent affirmed the importance of language as the basis of learning. In addition the special role of English for the subject IT was confirmed, however, the respondent stated that a blended learning approach could help to overcome language barriers. Finally, the respondent also confirmed that this study remains appropriate regardless of changes being made to the subject IT through the revision of the curriculum.

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[33] Scratch refers to a simplified graphical programming environment that can be used to teach basic programming skills. The use of scratch has been suggested in the Draft Curriculum and Assessment Policy Statement (DoE, 2010:12, 13, 15).

5.9.4 Summary of findings from the experts' interviews

According to Cohen *et al.* (2000:461) qualitative data analysis involves "organizing accounting for and explaining the data, in short, making sense of data in terms of the participants' definitions of the situation, noting patterns, themes, categories and regularities".

Concluding the findings obtained from the interviews the following commonly mentioned patterns of information emerged:

↳ The Department of Education is currently focusing on developing hardware and teacher ICT skill training **without specific focus on e-learning or blended learning**. To an extent very little has been done by the Department of Education as many teachers still require basic computer and Internet skills.

↳ **Blended learning offers advantages** to teachers and learners in terms of learning and teaching abilities.

↳ Blended learning is not applied by schools due to **lack of proper infrastructure** as it is necessary in order to implement blended learning. Schools do not have the financial means to implement sustainable e-learning platforms as infrastructure is expensive. However, the benefits of blended learning outweigh the costs.

↳ Teachers are not necessarily adequately qualified and committed to exploring new technologies. **Support and training** will be required for teachers in order for blended learning to be implemented. Blended learning will also not complement poor teachers. Training should be considered to take up a third of the cost of ownership.

↳ **English is very prominent** in schools and on the Internet and despite the fact that all languages could be accommodated and promoted it may be difficult to do so in all subjects.

↳ **Instruction in a language other than the mother tongue creates a barrier to learning.** Accommodating and promoting multilingualism through blended learning can attend to some of the concerns in terms of language related learning barriers.

↳ The **new developments in the subject IT, as set out in the Draft Curriculum and Assessment Policy Statement**, may have a positive impact on the accommodation and promotion of multilingualism as languages other than English could be used with adequate development.

Derived from the summarized information, seven distinct themes are thus identifiable which the researcher should consider for the remaining part of the study:

- No current focus on the promotion of blended learning.
- Acknowledgement of the advantages of blended learning.
- Lack of infrastructures at schools.
- Support and training of teachers.
- The prominence of English as LoLT
- Acknowledgement of the importance of instruction in Home Languages.
- Curriculum developments.

In the next section the conceptual model that has been developed, based on the literature study and responses obtained through the first phase of the empirical study, is discussed.

5.10 CONCEPTUAL MODEL FOR ACCOMMODATING AND PROMOTING MULTILINGUALISM THROUGH BLENDED LEARNING

5.10.1 Introduction

According to De Vos (2002a:38), in the social sciences a model "consists mainly of words, a description of a social phenomenon, abstracting the main features of the phenomenon without attempting to explain it or predict anything from the description". In addition, De Vos (2002a:38) also notes that models spring from theories. A model is used to simplify and abstract and not postulate relationships between phenomena or variables as is the case with a theory (De Vos, 2002a:43). Hergenhahn and Olson (1993:23-24) note that models are used to understand an unknown entity compared to something that is known. Furthermore, models are used to simplify processes and make them more understandable. In this study the concept of a model is used to represent a twelve step process towards accommodating and promoting multilingualism through blended learning.

The term *model* is used widely for different concepts and there are several diverse opinions in the literature. Furthermore, setting an encompassing definition of a model has proved problematic (cf. Mentz, 2000:219). Fincher and Petre (2004:13) define models as "generalized, hypothetical descriptions of something that is not directly observable". Mentz (2000:219-220) states that a model sets general guidelines that should be followed in order to reach a certain goal or solve a certain

problem. Mentz (2000:221) maintains that a model should make reality manageable so that it can be reduced to the most important components of reality. Furthermore, Mentz (2000:221) is of the opinion that these components should include all the essential elements of reality and should be placed in perspective so that they are sensible and application is possible.

In terms of this study, a conceptual model refers to a structure in the form of certain steps or procedures. These steps or procedures allow for the creation of a context within which multilingualism can be accommodated and promoted through the use of blended learning. The conceptual model provides processes through which a context can be assessed, content and methods be adapted, instruction be given and evaluation be done of the completed processes. It should furthermore be noted that that the term *conceptual model*, as a twelve step process, is used in this study since it makes provision for conceptualizing the processes and procedures applicable to the implementation of blended learning for accommodating and promoting multilingualism within contexts other than that of IT.

5.10.2 Requirements for the implementation of the conceptual model

Based on the literature, the teachers' questionnaires and the experts' interviews, it is evident that certain requirements need to be met prior to the implementation of the conceptual model.

Firstly there are some requirements in terms of the accommodation and promotion of **multilingualism** that need to be taken into consideration. In terms of the *Constitution* (1996) no learner may be discriminated against in terms of their language and every learner has the right to receive education in the official language or languages of their choice in public educational institutions where that education is reasonably practicable. If it is within the means of a teacher to accommodate more languages through blended learning then this approach should be used where necessary. In terms of language related requirements the following must be taken into account:

- ✇ All learners, teachers, parents and the wider community should be aware of their language rights (cf. 2.4)
- ✇ All learners, teachers, parents and the wider community need to be made aware of the language related content of the *Constitution* (1996) (cf. 2.4.3).

- All learners, teachers, parents and the wider community need to be made aware of the advantages of mother tongue education and the choices that are available (cf. 2.5.1).
- Teachers, parents and the community should make use of language resources found among them in order to develop multilingual materials.
- Language status and corpus planning (cf. 2.7.5) should be done in order to both develop the language structurally as well as in terms of its status within society.

From the literature study as well as the questionnaires completed by the teachers and interviews held with relevant experts a number of requirements can also be suggested in terms of **blended learning**:

- The infrastructure in schools in terms of adequate computer hardware, software and Internet access need to be established.
- The mentioned infrastructure should be maintained and upgraded as necessary.
- Teachers need to be trained to be able to use blended learning The following continuum of blended learning training could be implemented by a school or even in the wider context of the Department of Education:

FIGURE 5.5 Continuum of blended learning training
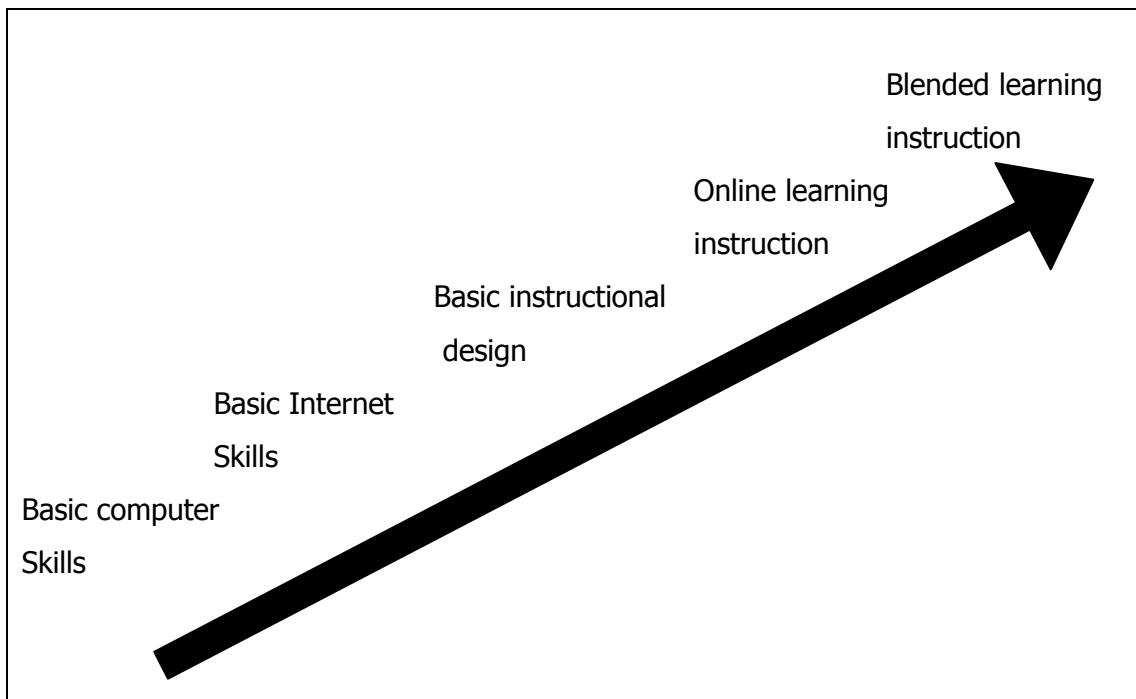
The aim of this continuum (Figure 5.5) is to indicate how computer literacy skills should be scaffolded for teachers. Initial training should be based around basic computer literacy skills. The next step would be to introduce Internet skills followed by basic instructional design skills. This does not require advanced command of HTML coding or programming, but at least skills in terms of the development of blogs and wikis. Teachers should then be introduced to online learning instruction where teaching through the use of online tools such as websites, blogs and wikis can be handled. Finally, teachers should be instructed on how to combine the previously learned skills effectively with traditional strategies such as face-to-face teaching.

- Online resources should be coordinated centrally through links on sites like the national DoE portal: Thutong. This could potentially be done by the national Department of Education or even independently by teachers or tertiary institutions.
- Online content should constantly be evaluated and adapted to the needs of both teachers and learners. Furthermore, evaluation of content will ensure adequate standards of content. To this end Web 2.0 type technologies (such as wikis) are appropriate as they allow more than one individual to be able to contribute and adapt content.
- Where necessary, restrictions can be put on who may be able to adapt which content.
- Finally multilingual content should be accommodated and actively promoted through the use of online tools.

5.10.3 Construction of the conceptual model

In order to accommodate and promote multilingualism through the use of blended learning this study proposes the use of a conceptual model. The complete construction process of this model is presented schematically in Appendix I.

The processes followed in the construction of the conceptual model are synoptically presented in the flow diagram (Figure 5.6) followed by a brief description of the accompanying steps which are also representative of the implementation process.

FIGURE 5.6 Flow diagram of the construction of the conceptual model
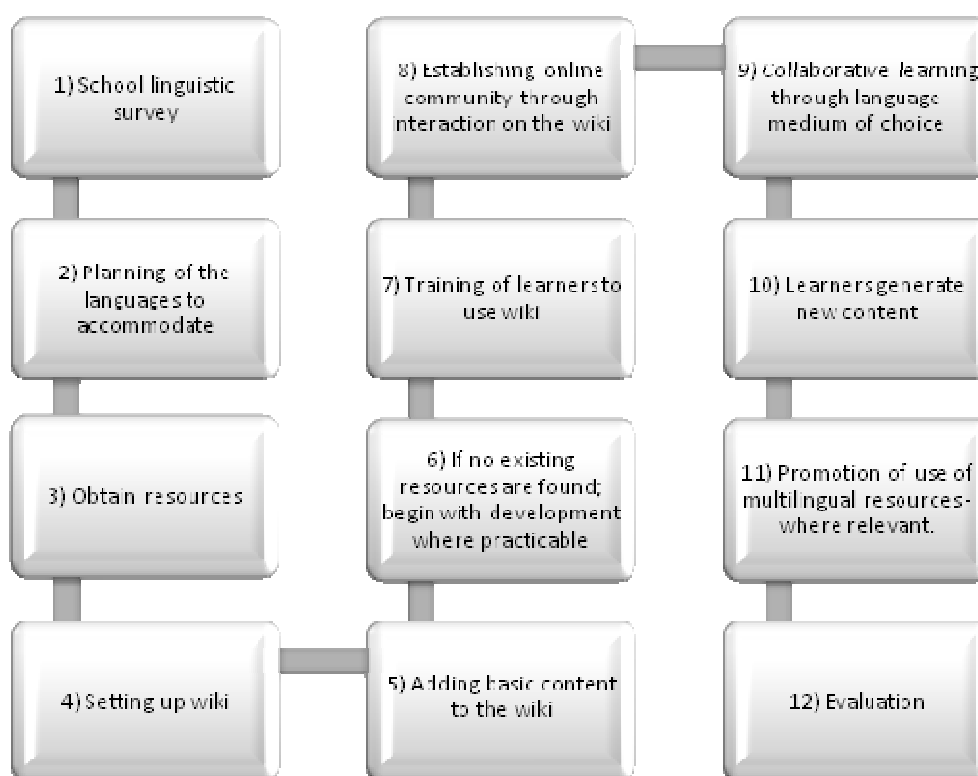
Step 1:   A linguistic survey of the class needs to be undertaken to determine the home language, but, more importantly, the language in which learners are most proficient.

Step 2:   Planning of blended learning experience done around language(s) that needs to be accommodated.

Step 3:   Resources need to be obtained (online) or be generated. Learning content can be translated into languages that are relevant to the class. To this end other teachers or learners – especially those in higher grades – can also be utilized if only for quality control. In this step it is important that standardized terminology[34] be used.

Step 4:   A learning environment, such as a wiki, is set up.

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[34] Using a web page such as http://term.teachitza.com can be useful as it contains a number of terms used in programming in English, Afrikaans and Sesotho. As more content is translated more terms can be added.

Step 5:   Basic content is added to the wiki. This includes the setting of certain outcomes to be reached by learners at the end of a set period of time.

Step 6:   If no existing multilingual content is available online or as printed resources then new content must be generated. (See Appendix D for the content used in this study.) This is done while taking concepts such as copyright and plagiarism into consideration.

Step 7:   Learners are instructed on how to use the wiki (or other learning environment). To this end notes on how to use wikis can be provided as listed in this study (cf. 3.3.4.5.3).

Step 8:   The online community is introduced through creation of opportunities where learners introduce each other online, discuss the tasks done and ultimately complete tasks online.

Step 9:   Collaborative learning takes place after the online community has been established. Here the usage of any language chosen by the learners is encouraged. Learners can form spontaneous groups or learners can be allocated to groups. Collaborative learning does not need to be confined to one school and learners who use languages that may make them a minority in one school can link up with related language speakers in other schools.

Step 10:   After the completion of some tasks, learners are encouraged to generate their own content. In this regard the usage of more than one language is accommodated and promoted. The teacher and the learners are responsible for quality control of the generated materials. This cooperative review process is made possible through wikis that allow for editing and the recording of changes made.

Step 11:   The newly generated material is then used and reused. Ideally this content can be used by different classes and schools. Content should also be benchmarked against other existing sources of information:

text books, other related online material, teachers and even expert knowledge outside of schools.

Step 12:   Finally, evaluation must be done on the content by the learners and teacher. The blended learning experience should also be viewed retrospectively. Through reflection learners can determine whether they have reached the outcomes set at the start of the blended learning period. Furthermore, teachers can improve on the content and blended learning process.

Following the above-mentioned steps some additional remarks are made in terms of the final preparation for implementing the conceptual model (cf. Appendix I).

5.10.4 Final preparation for implementing the conceptual model

From the literature study it is evident that wikis can be used effectively as a teaching tool (cf. Parker & Chao, 2007:57). The choice of this resource is also based on the fact that wikis can be used to implement a communal or social constructivist approach and facilitate collaborative learning (Parker & Chao, 2007:58-59). A wiki site can be set up with multilingual content and areas where learners can interact. For this purpose a wiki can be set up using DokuWiki an open source alternative for creating wikis. The wiki can be used for three purposes: storing of information, learner interaction and co-operative knowledge generation. Therefore, three different distinct areas are created in the wiki. Firstly, there are the resources that could be supplied by the teacher or can even be collated from previous' years work. This resource section contains basic terminology, explanations, examples and summaries of the content to be learned. Secondly, learners must have separate wiki pages where they can introduce themselves and post their individual tasks or contributions. Finally, a common discussion forum or page should be created in order to facilitate discussion but co-operative knowledge generation as well. In this regard discussion pages can also be group according to language or other groupings as required by the relevant classes. The learners and class context will determine the nature of the groups and how they are used in the wiki. The grouping of learners can also lead to interaction between learners from other schools if the wiki is available online and user registration is set up in such a way as to allow for new users to register

themselves. Although this approach could potentially lead to security issues as without proper control any individual could then register and be part of the wiki.

It is necessary for the teacher to fulfil an administrative as well as facilitator role throughout the usage of a wiki in the blended learning process. Learners should be encouraged to use the medium, but the teachers should also continuously assess the progress made on the wiki. Only through constant dialogue between the learners and teacher – regardless of whether this is done face-to-face or online – can learners be guided towards effective usage of the wiki medium.

Despite the wiki software having a GNU General Public License, written permission was obtained from Andreas Gohr, the creator of the software, to be able to publish screenshots of content stored on the DokuWiki used in this study (cf. DokuWiki, 2010; Gohr, 2010). Multilingual content (cf. Appendix D) was placed on the wiki. The screenshot on the next page (Figure 5.7) shows Sesotho content published on the wiki.

FIGURE 5.7 Screenshot of wiki page with Sesotho content

[[**sesotho_notes**]]

Edit this page | Old revisions

Trace: » discussion_forum » start » see_english_notes » sesotho_notes

Recent changes | Search

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Information Technology: Tsebiso ho diLoop

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Tlhaloso ya mantswe Terminology

See English notes

Algorithm/[Algorithm]: khoutu ya khompyutha e ngotsweng hape ka puo e tlwaelehileng.

khoutu/[Code]: ditaelo tsa puo ya khompyutha.

Karolo/[Component]: sebopeho se tshwarehang se beilweng hodima [Form] jwalo ka [Button] kapa [Edit].

sebadi/[Counter]: sebadi se fapafapaneng se sebediswang ho bala dintho kapa diphetopheto.

Mofuta wa data/[Data type]: mofuta wa dikahare tse amangwang le karolo kapa sebadi se fapafapaneng, ho fana ka mohlala: [String] (text values), [Real] (decimal numbers), [Integer] (whole numbers), [Char] (characters) and [Boolean] (true or false values).

Mofuta o odinal wa data/[Ordinal data type]: mofuta wa data o latelang tlhophiso e beilweng jwalo ka [Integer], [Char] kapa [Boolean].

Motsamaisi wa ketsahalo/[Event handler]: khoutu e amangwang le ketsahalo e itseng (jwalo ka ho tlanya hodima [Button]) e etsahalang le karolo hodima [Form].

Lenaneo/[Program]: sete ya ditaelo tse kopantsweng ho rarolla bothata. Ho Delphi mananeo a bolokwa ka yuniti/[unit].

Kgetho/[Selection]: dibopeho tse tshwanang le polelo ya IF/[IF statement] kapa polelo ya CASE/[CASE statement] that allow for decisions to be made based on some condition or conditions

Syntax/[Syntax]: melao ya puo ya khomphyutha e hlakisang hore ditaelo di ngolwe jwang.

Tafole ya ho tatelo/[Trace table]: tafole e sebediswang ho latela boleng ba diphetophetoho le sephetho sa lenaneo le tswelapele.

Phetophetoho/[Variable]: motshwari wa sebaka kapa peho bakeng sa boleng bo ka fetohang.

DiLoop (pheto)

Edit

Loop e sebediswa ho pheta ditaelo khomphutheng. Dibopeho tsa taolo di ka sebediswa ho dumella mosebedisi kapa khomphutha ho kgetha hore na ke dipheto tse kang tse lokelang ho etswa.

Ho ka sutjwa mefuta e mmedi ya diloop:

- diloop tse felletseng: FOR/[FOR] loop
- diloop tse sa fellang: HA/[WHILE] loop le PHETA/[REPEAT] loop

FOR LOOP

Learners should be encouraged to introduce themselves both on their own wiki pages, but also in the discussion forums. In Figure 5.8 below is an example of an early introduction and algorithm writing task performed by a learner (the learner's name has been removed):

FIGURE 5.8 Screenshot of wiki page with learner introduction and content

In terms of subject specific content the conceptual model was planned to be implemented in the following way:

FIGURE 5.9 Implementation of the conceptual model
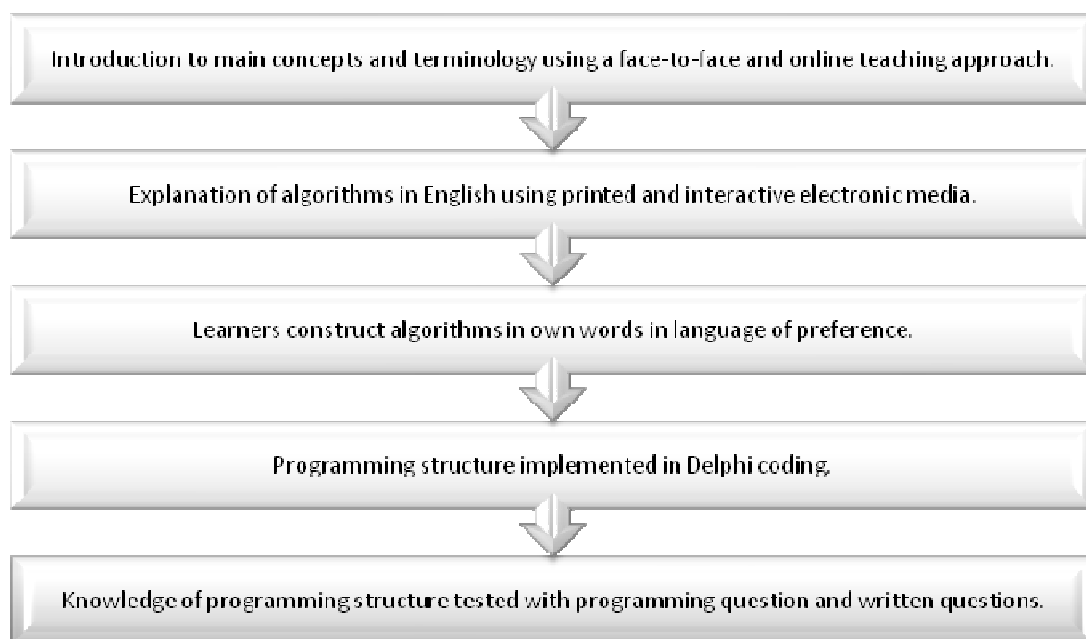
The above-mentioned content was used within steps 3 to 9 of the proposed model (cf. 5.10.3). In this implementation a gradual process will be followed from the introduction of main concepts (linking with prior knowledge), introduction to an algorithm that introduces the learner to the programming structure, construction of algorithms by the learners, application through coding as well as assessment of learning.

5.10.5 Implementation and testing of the conceptual model

5.10.5.1 Introduction

The conceptual model was tested in the second phase of the empirical research through a quasi-experimental research design based on a non-equivalent group pre-test-post-test control group design. The design was based on the IT Grade 10 assessment tasks on content used in the relevant classes. The implementation was done in five lessons over a two week period.

Another factor which guided the quasi-experimental design was the fact that the random assignment of the research participants into control and experimental groups at the respective schools was not possible since the researcher was not in the position to move learners from one class to another. Random assignment only took place by assigning a class to represent the control group and another to represent the experimental group at the respective schools.

5.10.5.2 Objective of quantitative testing

The objective of the quantitative testing of the conceptual model through analysis of the scores achieved in the pre- and post-tests for both the control and experimental groups was to determine whether there is any statistically significant difference between the results of the experimental group exposed to the conceptual model, in contrast with that of the control group.

5.10.5.3 Profile of research group

The two schools used in this part of the research were selected by means of convenience sampling (McMillan & Schumacher, 2006:125). The first school (**School A**) was a former Model-C school situated in the Fezile Dabi district, while the second (**School B**) was a so-called township school situated in the Motheo district. The Grade 10 IT classes from both schools were separated into two groups of 22 learners

per school (n=44). This resulted in having an experimental (n=11) and control group (n=11) for both schools. A random sampling procedure was used to determine which of the Grade 10 IT classes from the selected schools formed the experimental group and which were in the control group. The research design can be illustrated as follows (cf. Cohen *et al.*, 2007:283; Creswell, 2003:167-171; Fouché & De Vos, 2002:147):

Experimental group (School A)	R	O_1	X	O_2
- -				
Control group (School A)	R	O_1		O_2
Experimental group (School B)	R	O_1	X	O_2
- -				
Control group (School B)	R	O_1		O_2

In this design, the letter R refers to the use of a randomized group, the O refers to some type of measure and the letter X to some treatment or experience. In this case, the X refers to exposure to the conceptual model proposed in this study. The dashed line refers to the use of non-equivalent groups.

5.10.5.4 Variables

The variables and concepts that are important for this study include: the actual home language of learners, learners' knowledge of their home language, the language of teaching and learning at the selected schools, learners' computer literacy, computer and network resources, frequency of computer use and Internet connection/facilities. Another important variable that needs to be taken into account is concerned with people's perceptions about language, especially of the use of multilingualism and the status of English.

Being aware that some or all of these variables could act as confounding variables (Leedy & Ormrod, 2010:225), provision for ensuring internal validity was made in the form of random assignment of the experimental and control groups, as well as for the implementation of a pre-test.

A control group was used, as this served to determine the impact of extraneous variables on dependent variables. In this regard, it is necessary to note that an independent variable refers to any variable that causes change. In addition, the dependent variable denotes the outcome of the change that is caused by the introduction of the independent variable, while the extraneous variables refer to any external factors that may be found in the real-life situation and that may have an affect on the dependent variable (cf. Kumar, 2005:60, 86).

It is therefore evident that in this study the independent variable, that could cause change, is the introduction of the conceptual multilingual blended learning model. The dependent variable would be the degree of change found in the results of the experimental group's assessment. Furthermore, the independent variables should also be considered, although they apply to both the experimental and control groups.

It is also necessary to determine whether any changes in the results of the experimental group or, in other words, the dependent variable are due to chance variables, extraneous variables or the model itself. This problem was countered by using the same person, the researcher, to conduct the classes in similar physical situations based on the same content. The researcher also ensured that the interval period between the pre- and post-tests were of such a nature that its effect on the outcome of the research was minimalized (see also 5.10.5.6). In addition, Kumar (2005:86) notes that in most cases the effect of chance variables causing chance or random errors are negligible, yet for the sake of the research process, cognisance should be taken of the phenomenon.

5.10.5.5 Measuring instruments

A quasi-experimental research based on a non-equivalent group pre-test-post-test control group design was followed in this part of the study as this can be used to measure change in a situation. Kumar (2005:95) describes this design as "two sets of cross-sectional data collection points on the same population to find out the change in the phenomenon or variable(s) between two points in time". Therefore the change can be measured by comparing the difference in either the phenomenon or variables before and after some kind of intervention (Kumar, 2005:95).

The above-mentioned design was combined with a control-group design where two comparable groups from two different schools (four groups in total) were used. The two experimental groups were exposed to an intervention through the use of the conceptual model (cf. Kumar, 2005:95).

The *t*-test was done using SPSS with data acquired from a pre- and post-test based on the programming content relevant to the Grade 10 IT subject. The standard of these tests were confirmed by a provincial IT subject specialist. According to Leedy and Ormrod (2010:282), a *t*-test is used "[t]o determine whether a statistically significant difference exists between two means". The two tests were completed by an experimental group exposed to a conceptual model accommodating and promoting multilingualism through blended learning and a control group exposed to a traditional face-to-face English medium class.

5.10.5.6 Reliability and validity

According to Kumar (2005:153), validity is "the ability of an instrument to measure what it is designed to measure" (cf. 5.8.2.3, Leedy & Ormrod, 2010:28). In this regard, the standard of the tests was verified by an external authority. Hence, the provincial IT subject specialist confirmed the standard of the content. The pre- and post-tests were conducted with both the control and experimental groups at both schools. Furthermore, Cohen *et al.* (2007:133) make the following observation with regard to validity: "[i]n quantitative data validity might be improved through careful sampling, appropriate instrumentation and appropriate statistical treatments of the data". Cohen *et al.* (2007:133) state that "[q]uantitative research possesses a measure of standard error which is inbuilt and which has to be acknowledged". This was kept in mind in the execution of this research. Validity was further ascertained because the researcher conducted the classes during the research process in similar physical situations based on the same content. The researcher also ensured that the interval period between the pre- and post-tests were of such a nature that its effect on the outcome of the research was minimalized.

5.10.5.7 Data collection process

The data collection process was followed in this part of the research covers five lessons over a two week period. This content that related to looping structures, in particular the FOR loop in Delphi (cf. Appendix D; Bezuidenhout, Gibson, Noome &

Zeeman, 2004:101-130), could be introduced adequately within this time frame and was sufficient for this research. The collection processed is summarized below (Figure 5.10).

FIGURE 5.10 Data collection process during the implementation of the model
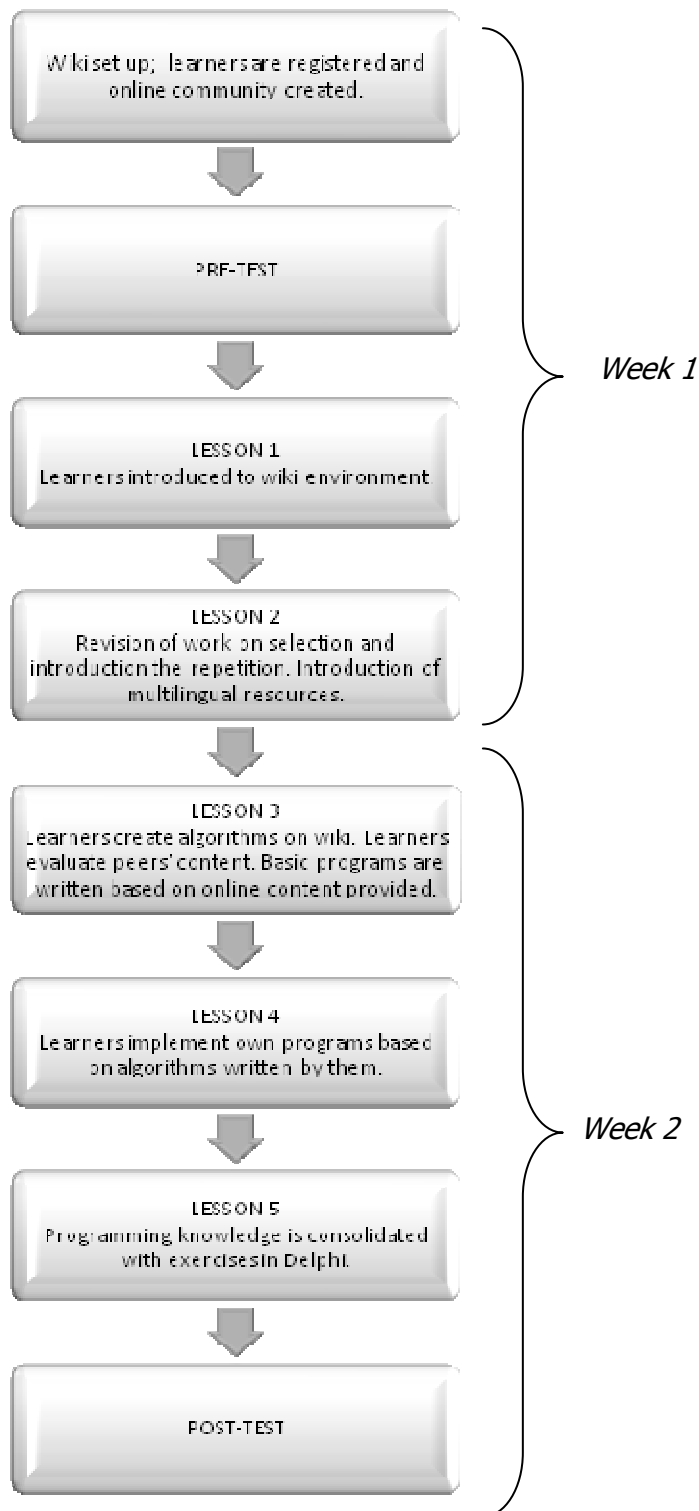
5.10.5.8 Results

A t-test was used to determine whether there was a statistical significant difference between the results of the pre-test and post-test of the combined control and experimental group and then compared separately in terms of the two different schools.

Elliott and Woodward (2007:9) make the following observation with regard to the p-value: "The p-value is the probability of obtaining results as extreme or more extreme than the ones observed given that the null hypothesis is true. Thus, the smaller the p-value, the more evidence you have to reject the null hypothesis". Here the assumption is that the null hypothesis states that there is no difference between the means.

According to Elliott and Woodward (2007:9, 68), the paired t-test can be used to "compare two means based on samples that are paired in some way". This is relevant, as in this study measurements are taken from two groups before and after the implementation of a conceptual model in the case of the experimental group. In terms of the control group, measurements are taken after completion of lessons in a traditional face-to-face manner without accommodating and promoting multilingualism.

A paired t-test was used to compare the pre-test and post-test for all data. In the test, alpha (α) is set at 0.05 and consequently any p-value that is less than the alpha value denotes a difference between variables compared.

5.10.5.8.1 Combined control and experimental groups

The following **hypotheses** were set for this part of the research:

> H_0 The implementation of an intervention through a blended learning model to accommodate and promote multilingualism will not lead to a significant change in academic performance in a standardized test.

> H_1 The implementation of an intervention through a blended learning model to accommodate and promote multilingualism will lead to a significant change in academic performance in a standardized test.

In terms of the experimental group the following data were retrieved:

TABLE 5.19 Paired test output for the experimental group

	Paired Differences		
	Mean	Std. Deviation	Std. Error Mean
Pre – Post	-16.364	23.411	4.991

In the experimental group, a mean of -16.364 was identified. Furthermore, the standard deviation was 23.411.

TABLE 5.20 Experimental group t-statistic

	t	df	Sig. (2-tailed)
Pre – Post	-3.279	21	.004

In terms of paired samples correlations, the t-statistic is given as -3.279 and a p-value of 0.004 was found, which means that a statistical significant difference exists between the pre- and post-tests done by the experimental group. The degrees of freedom are denoted by df and have the value 21.

The same test was done on the pre- and post-test results of the control group.

TABLE 5.21 Paired differences test output for the control group

				95% Confidence Interval of the Difference	
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Pre – Post	0.000	30.394	6.480	-13.476	13.476

In the control group a mean of 0.000 was identified. Furthermore, the standard deviation was 30.394.

TABLE 5.22 Control group t-statistic

		t	df	Sig. (2-tailed)
Pair 1	Pre – Post	.000	21	1.000

With the control group, the t-statistic is given as 0.000 and a p-value of 1.000 was determined, which implies that there is no difference between the pre- and post-tests done by the control group. The degrees of freedom are denoted by df and has the value 21. This proves the hypothesis (H_1) as true in terms of the intervention of the model leading to a significant difference and the null hypothesis (H_0) as false.

5.10.5.8.2 Control and experimental groups separated by school
The two schools used in this research were also compared in terms of the means of the marks from the standardized tests.

TABLE 5.23 Comparison of school means

	School	N	Mean	Std. Deviation
Pre	A	22	64.09	24.623
	B	22	29.09	11.509
Post	A	22	56.82	20.327
	B	22	52.73	17.233

In the pre-test the learners in School A displayed a mean of 64.09 with a standard deviation of 24.623, while School B displayed a mean of 29.09 and a standard deviation of 11.509. In the post-test, however, School A had a mean of 56.82 and a standard deviation of 20.327 and School B had a mean of 52.73 and a standard deviation of 17.233.

TABLE 5.24 Equality of school means by t-test

	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Pre	.000	-35.000	5.795
Post	.475	-4.091	5.682

In terms of the pre-test a p-value of 0.000 was found with a mean difference of -35.000. While with the post-test the p-value was 0.475 and the mean difference was determined as -4.091. Therefore because the p-value of the pre-test is less than alpha it is clear that that there is a statistical significant difference between the two schools in terms of the pre-test. This result could be ascribed to the fact that School

B's learners had insufficient background to the content and had been instructed mainly in English, yet during the observation of the this study they showed problems in terms of English proficiency (cf. 5.10.6.1.2).

The pre-test and post-test values were also compared by school in terms of the experimental and control groups.

TABLE 5.25 Comparison of school means in terms of the experimental group

	School	N	Mean	Std. Deviation
Pre	A	11	66.36	25.406
	B	11	30.91	11.362
Post	A	11	70.00	15.492
	B	11	60.00	14.832

Considering the experimental group the pre-test for School A shows a mean of 66.36 and a standard deviation of 25.406, while the pre-test for School B shows a mean of 30.91 and a standard deviation of 11.362. The post-test for School A shows a mean of 70.00 and a standard deviation of 15.492, while the post-test for School B shows a mean of 60.00 and a standard deviation of 14.832.

TABLE 5.26 Equality of experimental group means by t-test

	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Pre	.001	-35.455	8.391
Post	.138	-10.000	6.467

The pre-tests for the experimental group showed a p-value of 0.001 with a mean difference of -35.455 and the post-test showed a p-value was 0.138 with a mean difference of -10.000. Therefore, because the p-value of the pre-test is less than alpha it is clear that that there is a statistical significant difference between the two schools in terms of the pre-test, but not with the post-test.

With the comparison of the control groups from the two schools the following details were retrieved.

TABLE 5.27 Comparison of school means in terms of the control group

	School	N	Mean	Std. Deviation	Std. Error Mean
Pre	A	11	61.82	24.827	7.486
	B	11	27.27	11.909	3.591
Post	A	11	43.64	15.667	4.724
	B	11	45.45	16.949	5.110

The control group from School A showed a mean of 61.82 with a standard deviation of 24.827 in the pre-test. While the control group from School B showed a mean of 27.27 and a standard deviation of 11.909 in the pre-test. In terms of the post-test School A had a mean of 43.64 with a standard deviation of 15.667 and School B had a mean of 45.45 and standard deviation 16.949.

TABLE 5.28 Equality of control group means by t-test

	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Pre	.001	-34.545	8.302
Post	.797	1.818	6.959

The pre-tests for the control group showed a p-value of 0.001 with a mean difference of -35.545 and the post-test showed a p-value was 0.797 with a mean difference of 1.818. Therefore, because the p-value of the pre-test is less than alpha it is clear that that there is a statistical significant difference between the two schools in terms of the pre-test, but not with the post-test. There could be speculated that this difference is due to the researcher's presence School B may have improved regardless whether the model was used.

5.10.5.9 Conclusion

From the results of the pre-test and post-test analysis of both the experimental and control groups' results, it is clear that there is a statistically significant difference in the test scores favouring the intervention of the conceptual model and hence the hypothesis set has been proved. With regards to the schools both the experimental and control groups there is a difference in terms of the pre-test but not with the post-test. It can be deduced that the conceptual model as intervention strategy for

accommodating and promoting multilingualism through blended learning did have a positive effect on the understanding of the content used in the study.

For further validation, observations during the implementation of the model by an external observer were recorded followed by a quantitative survey with the learners in the experimental groups. These will be discussed in the following sections.

5.10.6 Evaluation of the conceptual model

Through testing the learners, the effectiveness of the implementation of the conceptual model was measured. However, further evaluation of the proposed conceptual model is essential; firstly in order to possibly adapt the application for meeting the needs of every particular school or class and secondly, to gather a holistic perspective on which the success of the model could be founded. Embedded in the second phase of the application of the model in this study, observations were made.

In a preliminary evaluation of the aforementioned model, the following remarks can be made:

- The model does not account for complex multilingual language situations where a particular language of learning and teaching might be chosen by the learner or parents due to particular socio-economic reasons.
- The model furthermore also does not deal with perceptions based on the status of African languages and the usage thereof. Consequently the status of the language within a school or community may also impact on the success of the implementation model.
- The implementation of the model requires infrastructure in terms of computer hardware, software and Internet access to be of such a nature that communication can take place between learners. Ideally all computers should have Internet access.
- Computer access should be controlled through the use of operating system based network security or software such as Netop that allows for teachers to have control in terms of learner computers, learner Internet access and learner access to software.
- Ongoing upkeep of learning environments should be done in terms of the software as well as content.

↳ Online content should be evaluated and altered if necessary.

5.10.6.1 Observations made during the implementation of the conceptual model

This section deals with observations made at the two schools used in this part of the research where five lessons over two week period were presented and observed.

5.10.6.1.1 Observation method

According to Cohen *et al.* (2007:396), observations can be used to "gather 'live' data from naturally occurring social situations". Two types of observers can be identified: participant and non-participant observers. Participant observers take part in the activities being observed while non-participant observers stand outside the activities (cf. Cohen *et al.*, 2007:258-259, 397-408).

During the execution of the research, use was made of a non-participating external observer (cf. Cohen *et al.*, 2007:259, 397; Flick, 2006:216-219). This person was a knowledgeable language teacher with some computer background. This external observer was responsible for making video recordings as the research progressed. In addition, a research journal was kept by the researcher. After every class session, the notes and experiences of both the researcher and observer were discussed and compared. The combined experiences were then recorded on paper.

5.10.6.1.2 Observations at School A (former Model-C school)

The experimental group was exposed to the multilingual blended learning intervention while the control group only used computers for programming in the class with merely the aid of English text books and MS PowerPoint presentations provided by the researcher. Therefore the experimental group had the same resources as the control group, but with the added advantage of actively using the class wiki throughout the observed period. At this school the installed online wiki was easily used and with the help of the school's computer technician, access to the Internet was allowed for the classes where it was necessary. This type of controlled access created through network privileges was observed to be very useful and effective.

Great enthusiasm was observed among the learners in using the wiki technology and a part of the first lesson was spent trying out the new technology. Since the learners had been exposed to computer programming they very soon started playing around with the coding.

Despite being encouraged to use any language they prefer on the wiki, only one learner used some Polish (even though he is the only Polish speaker in the class) and another one used Afrikaans for her algorithm and introduction. The rest of the learners (despite having different mother tongues) opted for using English throughout their usage of the wiki. It was observed that a number of the learners did view not only the English content, but also the Sesotho and Afrikaans content placed on the wiki.

Unfortunately it is easy for learners to get distracted with the technology, yet this can be circumvented by allowing them to explore, and actually basing a task around utilizing as many features as they can. This was successfully done by letting learners create an introduction page of themselves.

5.10.6.1.3 Observations at School B (township school)

At this school, the experimental group was once again exposed to the multilingual blended learning intervention while the control group only used computers for programming in the class with merely the aid of English text books and MS PowerPoint presentations provided by the researcher. Therefore the experimental group had the same resources as the control group, but with the added advantage of actively using the class wiki throughout the observed period. Despite having indicated on their questionnaire that the school has dedicated Internet access on all their computers, it transpired that only some computers have this capability. At the time of conducting this research, a web server (supporting PHP) was set up by a person responsible for the technical upkeep of the school's computers. Therefore the learners only had access to the wiki created in class without being able to use other Internet sites.

The learners at this school did not display the same level of computer literacy in terms of using wiki as was the case with School A. Yet the learners also displayed a lot of enthusiasm in using this technology. Code switching was observed a number of

times where the teacher spontaneously explained instructions in Sesotho after they were given in English by the researcher. Learners also spoke Sesotho when they were busy with the task.

Similar to School A, the learners at this school also favoured English above using Sesotho (the mother tongue for nearly all participants) in the completion of tasks. No interaction in the wiki took place in Sesotho although one learner did ask at the start of the study whether she could use Sesotho. She was assured that any language could be used, but at the conclusion of the study it was observed that all the content created by the learners was in English. It is important to note that, in terms of language, a number of grammar and spelling errors were recorded. This included the following errors:

- Verb agreement ('This programme have to repeat the maths calculation');
- Incorrect tense ('our integer is multiply by number', 'My program will be counting from 1 to 10 then display the numbers...');
- Incorrect preposition use ('display the answer on the richedit');
- Spelling errors (comand, declear, declaire, vareable, interger, asign, defaut, desplay, disply, coponents and compenent)
- Incorrect word choice ('based into' instead of 'stored as': 'iCount is based into integer'; whereby instead of where: 'whereby the answer is going to be displayed'; and the instead of to: 'I got the multiply it')

These types of language problems were not observed at School A and the extent and widespread occurrence throughout of the above-mentioned problems among the participants is cause for concern. Although this falls outside the scope of this study, the level of language proficiency is questionable, since assessment for these students does take place through the medium of English.

5.10.7 Conclusion

The implementation of the proposed conceptual model does require certain criteria in terms of ideally having full internet access for all computers used in the classroom and certain skills in using wikis by the teacher and learners. Furthermore, the multilingual nature of a class will determine whether the language found in a class can be accommodated and promoted. Ideally this can be done for all the languages, yet as determined in the empirical investigations, this is a complex matter and sometimes may not be possible. From the observations made during the

implementation of the conceptual model, it was evident that the learners from both schools were positive and engaged in using the new technology. In this regard implementing blended learning is successful. Yet in terms of multilingualism there is a distinct difference in the way in which it is utilized at different schools. At School A (former Model-C school), the learners spoke only in English, with some individuals writing in their mother tongues. While at School B (township school), the learners spoke English with a lot of code switching bordering on whole discussions in Sesotho while strictly writing in English. Yet it can be concluded that following the steps allowing for a conceptual model to be implemented could potentially lead to the accommodation and promotion of multilingualism through blended learning.

5.11 QUANTITATIVE SURVEY: LEARNERS

5.11.1 Introduction

In the third phase of the study (cf. Figure 5.1 under 5.5), the learners who formed the experimental groups of the quasi-experimental investigation on the conceptual model for accommodating and promoting multilingualism through blended learning, were required to complete a questionnaire after their exposure to the said model. Subsequently the aim with the survey will be highlighted, followed by a profile of the research group, variables relevant to this part of the study, the measuring instruments used, the questionnaire design and a discussion on the general findings based on the questions posed to the learner respondents.

5.11.2 Aim of the survey

The purpose of this quantitative survey was to gather information on the learners' impressions of the conceptual model which could be used for future references. In addition the survey could be helpful for determining learners' language preferences and to gauge their opinion in terms of blended learning and multilingualism.

5.11.3 Profile of research group

With the quantitative testing of the conceptual model, two schools were used. The first school (School A) was a former Model-C school situated in the Fezile Dabi District while the second was a so-called township school situated in the Motheo District (School B). Both districts are situated in the Free State province. In both instances Grade 10 classes were used consisting of 22 learners (n=44). The learners were randomly divided into two groups: an experimental and a control group. The

respondents for this part of the study came from the experimental group (n=11) of each school. Out of the 22 possible respondents only 19 (8 respondents from School A and 11 from School B) agreed or were, due to time constraints, available to complete the questionnaire.

5.11.4 Variables

As before, the variables and concepts that are important for this study include: the actual home language of learners, learners' knowledge of their home language, the language of teaching and learning at the selected schools, learners' computer literacy, computer and network resources, frequency of computer use, and Internet connection/facilities. Another important variable that needs to be taken into account is concerned with people's perceptions about language, especially about the use of multilingualism and the status of English.

5.11.5 Measuring instrument

The measuring instrument for this part of the study was a questionnaire consisting of structured closed questions that "prescribe the range of responses from which the respondent may choose" (Cohen *et al.*, 2000:254). This type of questions were used since it was necessary to gather quantitative data with regard to how learners perceive multilingualism and blended learning. The questionnaire was completed just after the completion of the post-test.

5.11.6 Questionnaire design

The following questions were put to the learners that formed the experimental groups of both schools used in this study:

TABLE 5.29 Learner questionnaire summary

Question	Type	Purpose
1. What is your home language?	Open-ended	Determines the language profile of the IT learners.
2. What other languages can you speak?	Open-ended	Determines the language profile of the IT learners.
3. Answer these questions by indicating whether you strongly agree, agree, disagree or strongly	Likert scale	Determines:

disagree:		
3.1 Classes only need to be in English.		opinion on English;
3.2 Using more than one language in class will contribute to my learning.		opinion on the contribution of using more than one language in class;
3.3 Having material in other languages available in class helps me to understand the work better.		opinion on effect on understanding in having material in more than one language;
3.4 I use languages other than English to discuss the work in class.		language use in class;
3.5 Learners have the right to use any language they want in class.		opinion on language rights;
3.6 Online resources (such as websites, blogs and wikis) can be used to accommodate different languages in class.		opinion on whether online resources are able to accommodate different languages;
3.7 I use online resources for learning outside the classroom.		online resource use;
3.8 I use my mother tongue communicating on the online resource.		language use on online resources; and
3.9 I used the multilingual resources provided during the lessons.		use of multilingual resources provided in the lesson.

5.11.7 General findings

This section deals with the responses provided by the respondents (learners) and are presented in table format followed by graphs and a discussion of the main issues pertinent to this study.

The responses to Question 1 and 2 will be discussed together in order to present a combined picture of the language abilities of the respondents.

Question 1. What is your home language?
Question 2. What other languages can you speak?

TABLE 5.30 Learners language distribution

Language	School A Home Language	School A Additional Language	School B Home Language	School B Additional Language
Afrikaans	2	6		6
English	2	6		11
Greek	1			
Hindi		1		
IsiXhosa		1		5
IsiZulu		2		6
Polish	1			
Sepedi				3
Sesotho	2		10	1
Setswana		1	1	6
SiSwati				1
Tshivenda				1
Xitsonga				1
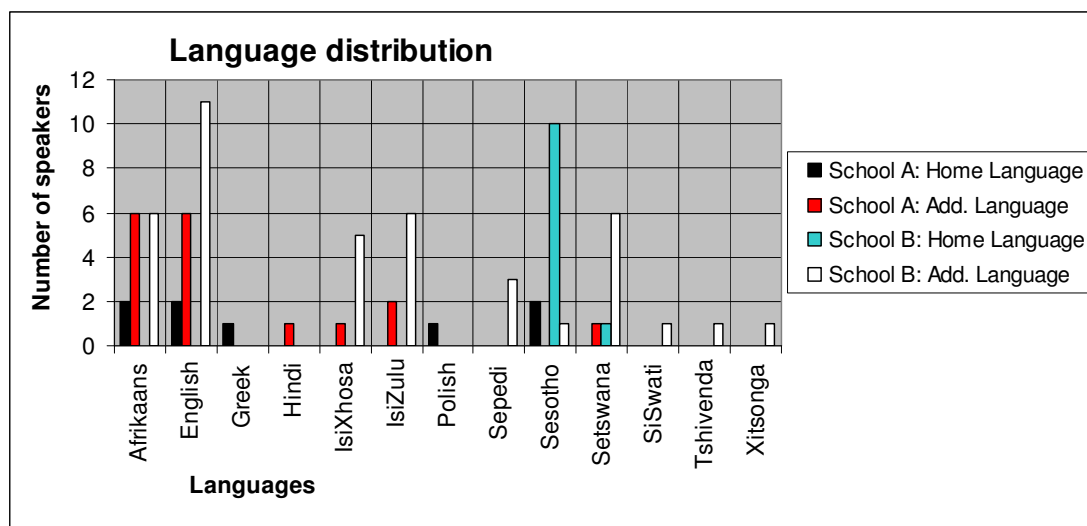
The language distribution of the learners shows greater diversity in terms of home languages at School A, while at School B the prominence of Sesotho as a home language is quite evident. The number of additional languages at both schools shows the very complex language situation prevalent at the schools, yet the degree of proficiency may be questioned. Although proficiency does not fall within the scope of

this study, it may have implications in terms of the usage of multilingual resources. It is also noticeable that at School A, a number of non-official languages are spoken by the respondents, which proves a problem as accommodating these languages (Greek, Hindi and Polish) may be difficult within a South African context as they are not necessarily represented as widely as the official languages (cf. 2.3.2). However, there may be resources available on the Internet from which these learners can draw if they are proficient enough to use these languages effectively.

The following tables report the results from the responses of School A and School B as provided in the questionnaires.

Question 3. Indicate: strongly agree, agree, disagree or strongly disagree:
Question 3.1 Classes only need to be in English.

TABLE 5.31 Classes only need to be in English

	School A	School B	n	%
Strongly agree	3	2	5	26
Agree	2	4	6	32
Disagree	3	4	7	37
Strongly disagree	0	1	1	5
Totals	*8*	*11*	*19*	*100*
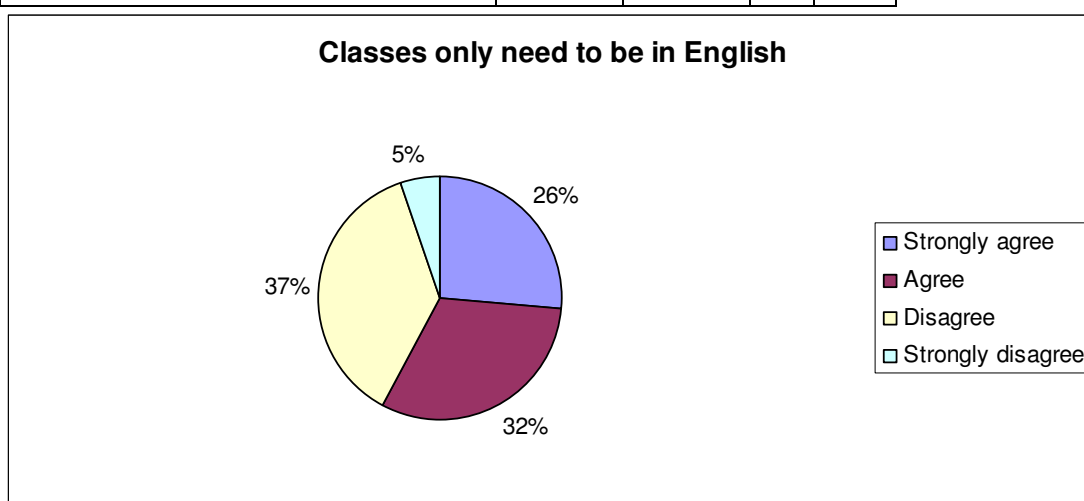
In terms of whether classes should only be in English, 26% of the respondents strongly agreed and 32% agreed, while 37% disagreed and only 5% strongly disagreed. If combined, more than half of the respondents (58%) lean towards

having classes only in English. Taking into consideration that English is mainly used officially in both classes and that examination take place through English and Afrikaans at School A and only through English in School B, this choice may have merit. This view was shared between the two schools with School A having 63% (n=5) of the respondents indicating they agree or strongly agree and School B having 54% (n=6) of the respondents agreeing.

Question 3.2 Using more than one language in class will contribute to my learning.

TABLE 5.32 Using more than one language in class will contribute to my learning

	School A	School B	n	%
Strongly agree	0	5	5	26
Agree	2	6	8	42
Disagree	4	0	4	21
Strongly disagree	2	0	2	11
Totals	*8*	*11*	*19*	*100*

Using more than one language in class will contribute to my learning

11%
26%
21%
42%

- Strongly agree
- Agree
- Disagree
- Strongly disagree
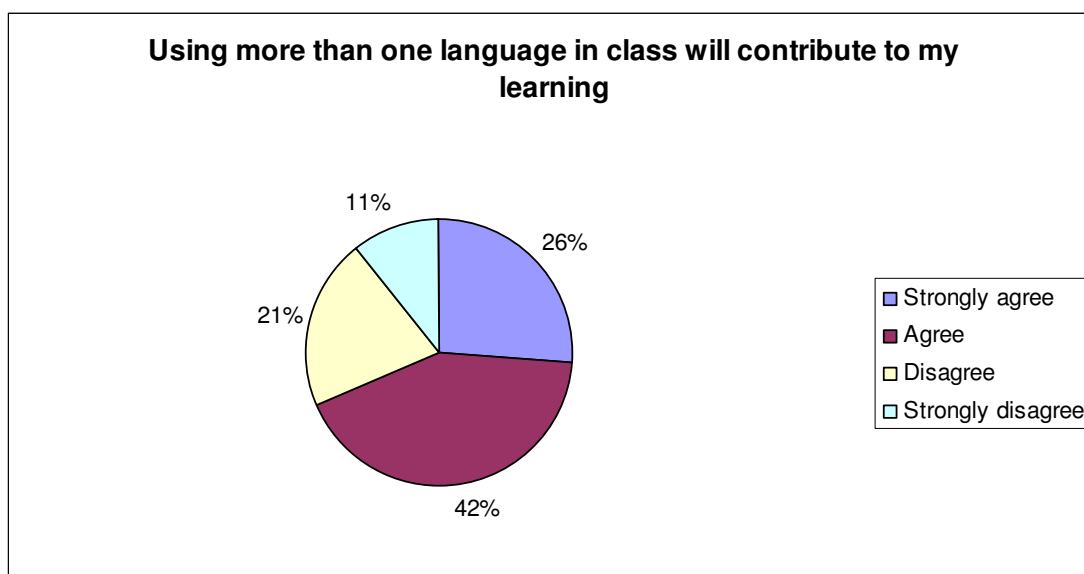
The responses clearly show that the majority of the respondents (68%) are of the opinion that using more than one language in class will contribute to their learning. Yet it is notable that all the respondents (n=11) from School B (100%) indicate that they agree or strongly agree that this is the case, while the majority of the respondents (n=6) of School A (75%) indicate that they disagree or strongly disagree. This response can be linked to the fact that the respondents from School B are used to classes where there is code switching between English (language of

learning content and assessment) and Sesotho (the mother tongue of 86% of the class and 91% of the respondents).

Question 3.3 Having material in other languages available in class helps me to understand the work better.

TABLE 5.33 Having material in other languages available in class helps me to understand the work better

	School A	School B	n	%
Strongly agree	0	5	5	26
Agree	2	6	8	42
Disagree	4	0	4	21
Strongly disagree	2	0	2	11
Totals	*8*	*11*	*19*	*100*

Having material in other languages available in class helps me to understand the work better
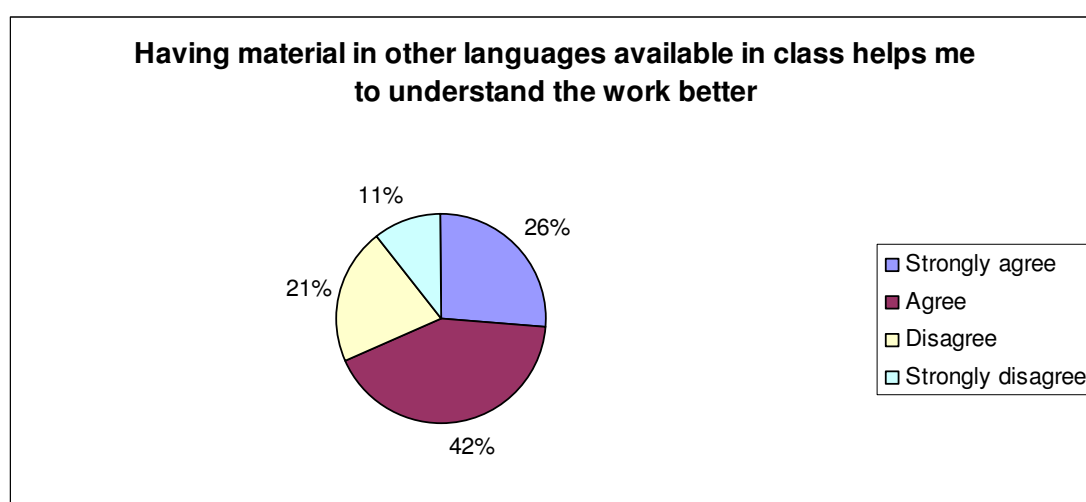
The results of the responses for this statement relate to the ones discussed for Table 5.33. Again all the respondents (n=11) from School B (100%) indicate that they agree or strongly agree (yet not all the respondents answered exactly in the same way as before) that this is the case, while the majority of the respondents (n=6) of School A (75%) indicate that they disagree or strongly disagree – these answers were consistent in terms of the responses given to the statement for Table 5.32. It can be deduced that, in terms of the respondents, there is no real difference between usage of an additional language and having materials available in other languages.

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Question 3.4 I use languages other than English to discuss the work in class.

TABLE 5.34 Using languages other than English to discuss the work in class

	School A	School B	n	%
Strongly agree	0	4	4	21
Agree	5	5	10	53
Disagree	2	2	4	21
Strongly disagree	1	0	1	5
Totals	8	11	19	100

I use languages other than English to discuss the work in class

- Strongly agree
- Agree
- Disagree
- Strongly disagree
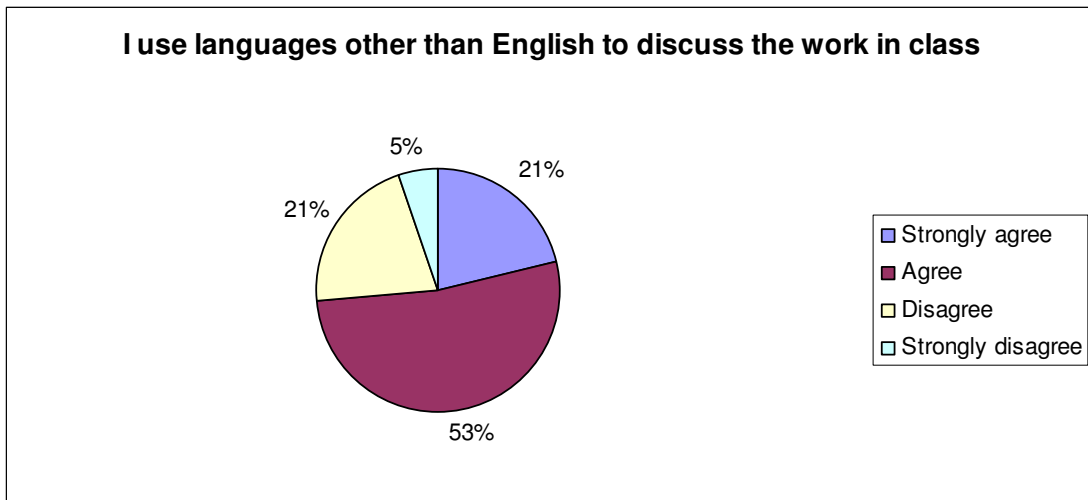
The majority of the respondents indicated that they use languages other than English to discuss work in class. This response is shared between the two schools where both schools indicate that they agree or strongly agree with this statement: School A with 63% of the respondents (n=5) and School B with 81% of the respondents (n=9). This result ties in with the fact that only 11% of the respondents have English as a home language (cf. Question 1).

Question 3.5 Learners have the right to use any language they want in class.

TABLE 5.35 Learners have the right to use any language they want in class

	School A	School B	n	%
Strongly agree	2	2	4	21
Agree	4	4	8	42
Disagree	2	3	5	26
Strongly disagree	0	2	2	11
Totals	8	11	19	100

Learners have the right to use any language they want in class

- 21% Strongly agree
- 42% Agree
- 26% Disagree
- 11% Strongly disagree
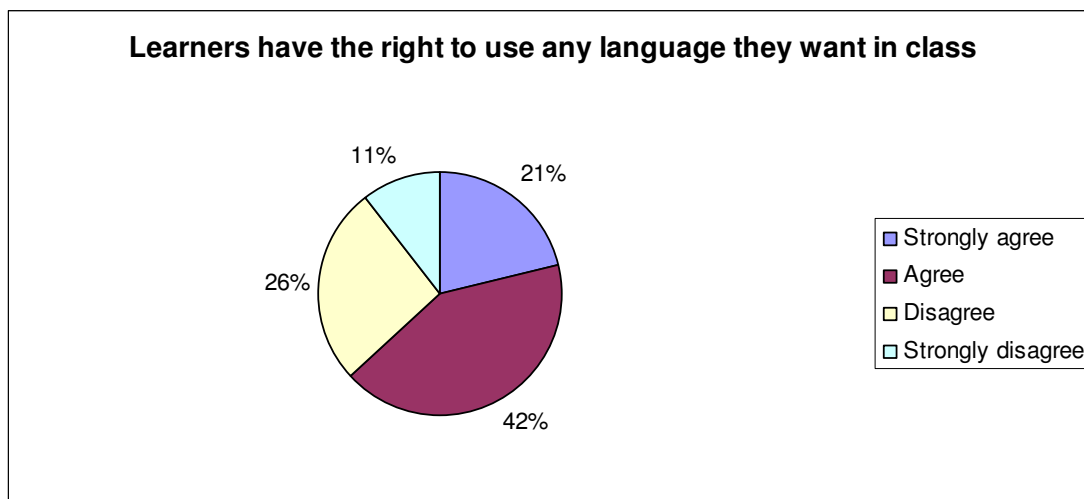
Most respondents agree that learners have the right to use any language they want to in class. In terms of the two schools, it was clear that 75% of the respondents (n=6) from School A indicate that they agree or strongly agree and from School B (n=6) the majority, but with a smaller margin, of 54% indicate that they agree or strongly agree with this statement. The fact that there are some respondents who disagree and strongly disagree shows that not all the respondents are aware of their language rights and the fact that they may use any language they want to in class.

Question 3.6 Online resources (such as websites, blogs and wikis) can be used to accommodate different languages in class.

TABLE 5.36 Online resources can be used to accommodate different languages in class

	School A	School B	n	%
Strongly agree	1	2	3	16
Agree	6	1	7	36
Disagree	1	6	7	37
Strongly disagree	0	2	2	11
Totals	*8*	*11*	*19*	*100*

Online resources can be used to accommodate using different languages in class

11%   16%
37%   36%

- Strongly agree
- Agree
- Disagree
- Strongly disagree
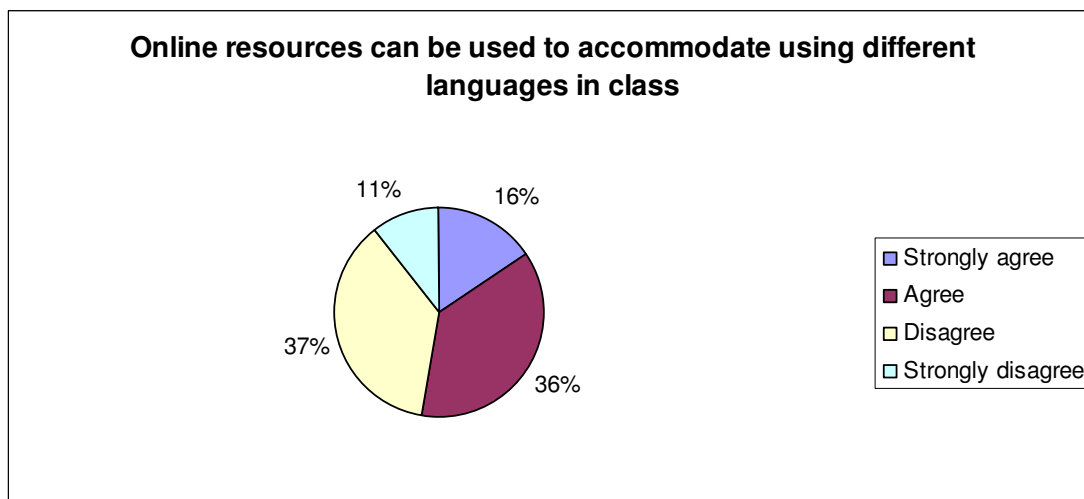
It is clear from the combined responses from both schools that the opinion is divided on the issue of whether online resources can be used to accommodate different languages in a class and this relates to the different schools used in the study. The majority (88%) of the respondents (n=7) from School A indicated that they agree or strongly agree, while the majority (73%) of the respondents (n=8) from School B indicated that they disagree or strongly disagree. This result could be due to the fact that the learners at School B may not recognize the fact online resources may accommodate different languages due to little exposure to the online environment.

Question 3.7 I use online resources for learning outside the classroom.

TABLE 5.37 Using online resources for learning outside the classroom

	School A	School B	n	%
Strongly agree	2	8	10	53
Agree	5	3	8	42
Disagree	1	0	1	5
Strongly disagree	0	0	0	0
Totals	*8*	*11*	*19*	*100*

I use online resources for learning outside the classroom
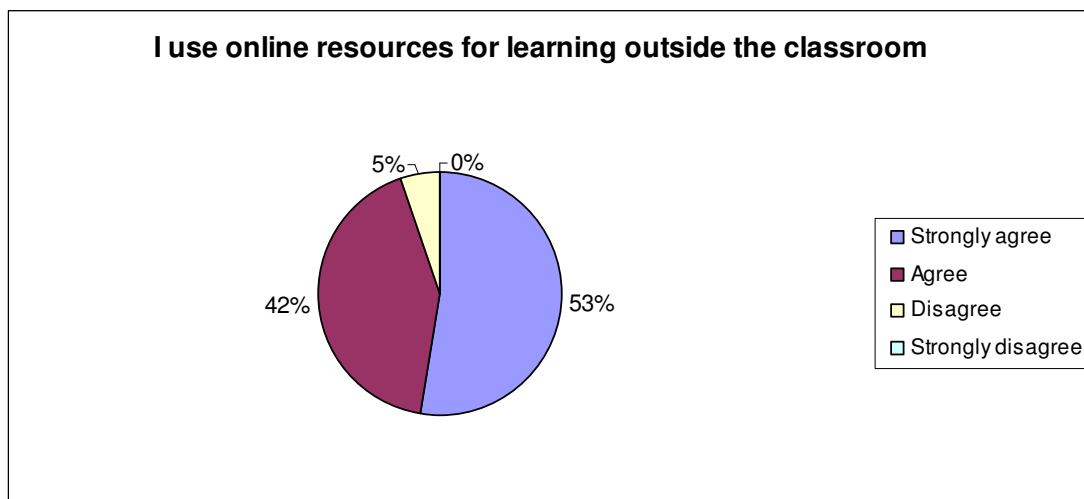
An overwhelming majority of the respondents indicated that they either strongly agree or agree that they use online resources for learning outside the classroom. In this regard the 88% of the respondents (n=7) from School A indicated that they either agreed or strongly agreed. At School B 100% of the respondents (n=11) either agreed or strongly agreed that they use online resources outside of the classroom. This contradicts the response from School B's respondents in the previous question (Question 3.7), however, this could refer to general usage of Internet resources by mobile phone or even at Internet cafés.

Question 3.8 I use my mother tongue communicating on the online resource.

TABLE 5.38 Using a mother tongue communicating on the online resource

	School A	School B	n	%
Strongly agree	2	1	3	16
Agree	1	2	3	16
Disagree	4	4	8	42
Strongly disagree	1	4	5	26
Totals	*8*	*11*	*19*	*100*

I use my mother tongue communicating on the online resource

- 16% Strongly agree
- 16% Agree
- 42% Disagree
- 26% Strongly disagree
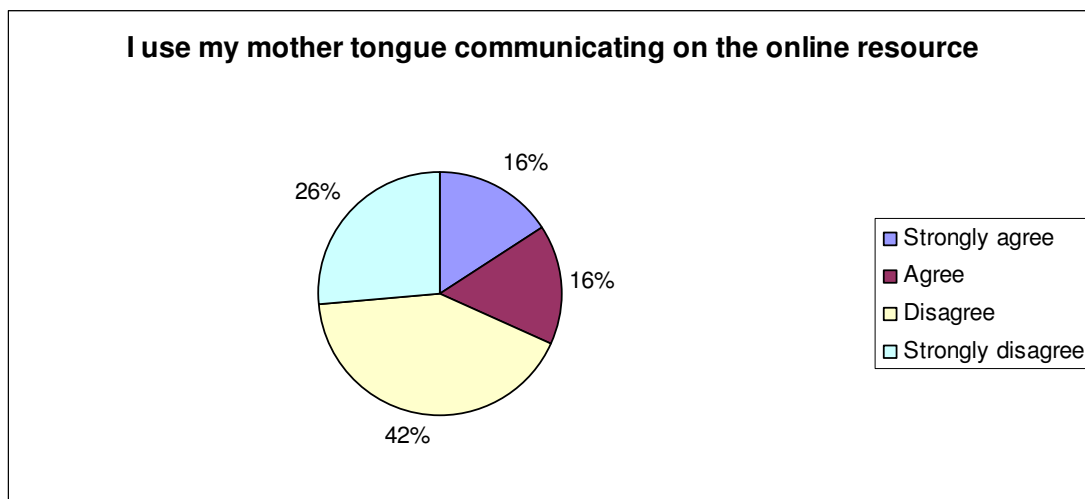
The majority of respondents of both School A (n=5; 63%) and School B (n=8; 72%) indicated that they disagree or strongly disagree that they use their mother tongues to communicate on online resources. This is related to the findings from the literature in terms of English being prominent within the online environment (cf. Crystal, 2001:216, 223). Since the respondents indicated that they do not use their mother tongues for communication on online resources this proves that there is a need in accommodating and promoting the usage of languages other than English in online environments.

Question 3.9 I used the multilingual resources provided during the lessons.

TABLE 5.39 Using the multilingual resources provided during the lessons

	School A	School B	n	%
Strongly agree	0	2	2	11
Agree	2	9	11	57
Disagree	4	0	4	21
Strongly disagree	2	0	2	11
Totals	*8*	*11*	*19*	*100*

I used the multilingual resources provided during the lessons
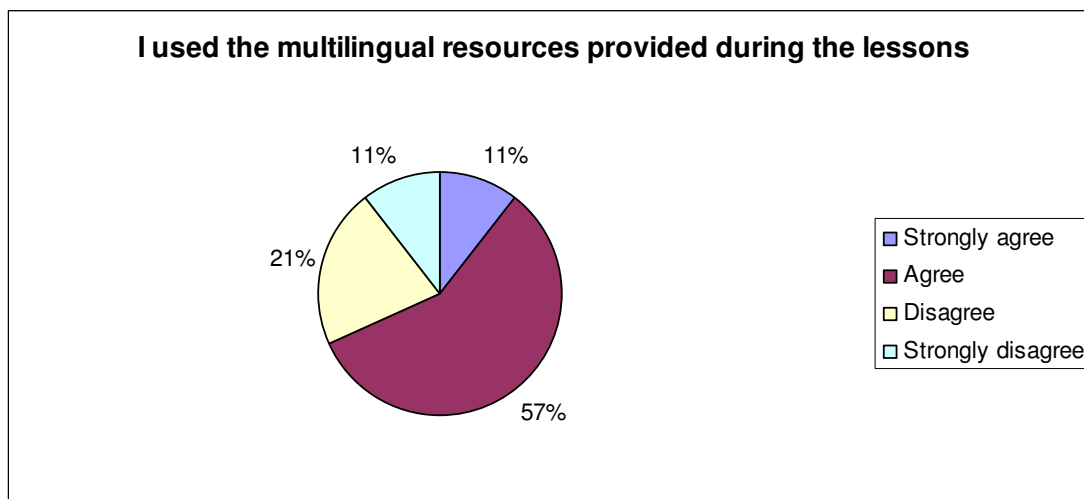
Most of the respondents used the multilingual resources provided during the lessons. Yet only 25% of the respondents (n=2) of School A agreed that they used the resources and 50% (n=4) disagreeing and 25% (n=2) strongly disagreeing. While all the respondents in School B indicated that they either agreed or strongly agreed that they used the multilingual resources. This result can possibly be traced to the fact that School A has more languages represented and materials were only available in English, Afrikaans and Sesotho. Classes in School A are presented mainly in English and some code switching with Afrikaans. Moreover, the learners in School B are used to classes being presented mainly in Sesotho with some English code switching and these learners are mainly Sesotho mother tongue speakers (91%) (cf. Question 1).

5.11.8 Summary of questionnaire results

The learner questionnaires affirmed the multilingual nature of the respondents belonging to the respective experimental groups (cf. Questions 1 and 2). This is similar to the profile determined by the teacher questionnaires and therefore shows some relation to the profile of the wider IT learner population in the Free State. This contributes to support further generalization of conclusions made from research done with the samples used in the testing of the conceptual model. Noticeably more than half of the respondents indicate that they prefer teaching being done through the medium of English, affirming the preference of English as noted in the literature (cf. Question 3.1). In addition, mother tongues other than English, are rarely used with online resources and the respondents are divided on whether blended learning can be used to accommodate and promote multilingualism. Here, noticeably, respondents from the former Model-C school (School A) indicated that blended learning can be used to accommodate and promote multilingualism while the township school

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(School B) respondents did not agree (cf. Question 3.6). Yet, the majority of respondents did indicate that they do use online resources in addition to what was done in the class – therefore using blended learning (cf. Question 3.7). Finally, the majority of respondents indicated that they did use the multilingual content provided (cf. Question 3.9). In conclusion, there are some minor disagreements in terms of how language is viewed (cf. Question 3.8). This statement relates to the status of languages which, in turn, requires status planning on the part of the teacher, school, community, Department of Education and government. Finally it is clear that in terms of the learner population exposed to the conceptual model, the context is perceived positively.

5.12 CONCLUSION

The use of the teacher questionnaires (cf. 5.8) together with the expert interviews (cf. 5.9) provided sufficient background to allow for validation of certain important concepts identified in the literature study. These combined elements led to the development of a conceptual model (cf. 5.10) that can be used to accommodate and promote multilingualism through the use of blended learning. With the aid of a pre-test and post-test used with control and experimental groups at two schools it was found that the result of the experimental group was statistically significant. Therefore it is clear that the intervention through the aid of the conceptual model was successful. It was also found that the schools differ in terms of the pre-test but not in terms of the post-test, this possibly relates to the difference in IT knowledge and background of the learners at the two schools. Finally, a questionnaire completed by respondents who were part of the experimental group affirmed the success of the conceptual model and some contextual factors also found in the literature (cf. 5.11).

This leads to the next chapter that will provide general conclusions and recommendations based on the research done in this study.

CHAPTER 6: Conclusions and recommendations

6.1 INTRODUCTION

This study aimed at creating a conceptual model as a twelve step process through which multilingualism could potentially be accommodated and promoted with the use of blended learning in the subject IT.

Firstly, an overview will be given on the way in which this study was completed (6.2). Furthermore, the conclusions based on the research will be discussed, based around the research questions posed at the start of this study (6.3). This is followed by general recommendations (6.4) as well as recommendations for further research (6.5). Certain limitations of the study will also be identified (6.6). Finally, a conclusion to the research is provided (6.7).

6.2 OVERVIEW OF THE STUDY

The first part of the study consisted of a literature study on multilingualism and how it is realized in the South African context and blended learning in terms of its origins, related theories, and standards in the field of teaching and learning. In terms of how blended learning could accommodate and promote multilingualism, an association between multilingualism and blended learning was drawn and tentative conclusions were made for developing a conceptual model to be implemented in the school subject IT. The second part of the study was aimed at conducting an empirical research which is founded on a sequential embedded mixed methods design and which could be categorized into different phases. The first phase of the empirical research was quantitative in nature and was based on a non-experimental survey. By means of a self developed, semi-structured questionnaire aimed at IT teachers, the researcher wanted to determine the context of language use and application of blended learning in IT classes within the Free State province. By means of an embedded qualitative survey in which experts in both the subject IT and blended learning (specifically the e-learning part thereof) were interviewed; the findings of the questionnaire were validated and extended. Based on the data obtained in the first phase of the empirical research and the literature study a twelve step conceptual model was developed through which multilingualism could potentially be accommodated and promoted with the use of blended learning. In the second phase

of the empirical research this conceptual model was implemented and tested by means of a quasi-experimental design: a non-equivalent group pre-test-post-test control group design, in two different schools in the Free State province. During this phase the effectiveness of the conceptual model in terms of accommodating and promoting multilingualism was tested. Embedded in this phase were observations for ensuring consistency amongst groups and to certify the reliability of the process of implementation. The empirical research was concluded by a third phase in which the learners of the respective experimental groups completed a questionnaire on the experiences of the model.

6.3 GENERAL CONCLUSIONS

The conclusions made after the completion of this study are based on the research questions posed at the start of the research. Consequently an overview of the conclusions will be discussed in terms of the aforementioned questions.

> *What is multilingualism and how is it realized in South African schools?*

From the literature study it is evident that multilingualism is a common phenomenon in of South Africa, but also internationally. The concept is closely related to multiculturalism due to the link between language and culture (cf. 2.1 and 2.2). The historical background to language use within education is also of particular interest as the current language situation in South Africa can be traced to the colonial past where English and Afrikaans (initially Dutch) enjoyed a privileged position. This has been extended through the hegemony of English as strong international language and lingua franca in South Africa (cf. 2.3 and 2.6). Yet, in South Africa, due to the *Constitution* (1996), South Africans have a legal foundation to their language rights. Sachs (1994:110) identifies these rights: as the right to use one's own language, the right to develop one's own language and the right to be understood and to understand other languages (cf. 2.4).

In terms of this research it is important to view language within the context of education. The historical background to language in education in South Africa was investigated. Concepts such as mother tongue education, education in a non-mother tongue as well as bilingual and multilingual education were also explored. The multilingual nature of classrooms can be handled in different ways, yet from the

literature study it was clear that within a framework of pluralism and multicultural education the concept of additive bilingualism was found to be effective (cf. 2.5). Notice should be taken of current attempts to accommodate and promote multilingualism in classrooms through parallel- and dual-medium instruction, code switching and educational interpreting. Furthermore the language situation implies some degree of language planning in order for the accommodation and promotion of multilingualism to take place (cf. 2.7). In addition, the existing policies and legislation were reviewed and it was found that despite South Africa having sufficient regulations to allow for the accommodation and promotion of multilingualism this does not take place as English as language of learning and teaching is emphasized (cf. 2.8 to 2.10). The need for a way in which the accommodation and promotion of multilingualism could be facilitated was therefore confirmed.

➱ *What does blended learning entail?*

Blended learning refers to a blend of both traditional forms of learning and teaching such as face-to-face instruction and the usage of computer based instruction and e-learning (cf. 3.2 and 3.3). Within this study the roles of different learning theories such as behaviourism, cognitivism and constructivism were acknowledged. Yet the focus is on socio-constructivism and communal constructivism where learners not only construct their own knowledge through activities, but also construct knowledge that can be used by others (cf. 3.4). This is of particular relevance for blended learning as the Internet as medium can facilitate the distribution of knowledge generated by learners.

➱ *Why is blended learning a possible solution for accommodating and promoting multilingualism?*

From the literature, the historical background of learning delivery technologies was discussed. For the sake of this study, the focus was then placed on the different Internet-related learning technologies. In terms of asynchronous learning tools, the following technologies were discussed: blogs, forums, wikis, online published content, podcasting and screencasting, e-mail and websites. In terms of synchronous learning tools, the following were discussed: application sharing, audio tools, polls and feedback, synchronized web browsing, text chat, video conferencing, virtual

spaces and whiteboards. Finally it was established that, within the context in which the research was conducted, a combination of web sites and wikis were sufficient in order to facilitate the online part of blended learning (cf. 3.3).

The different models and categories of blended learning were discussed. This included e-learning; self-study; instructor led; live e-learning; on-the-job training and simulations. The field of instructional design also needs to be considered as this provides guidelines in terms of designing the environment in which learning should take place. Finally some blended learning standards were discussed in order to determine the parameters within which the research model could be implemented. The standards were based on the requirements of blended learning, relevant criteria and assessment, problems encountered with blended learning, access and layout of computers, the setting up of web teaching and standards for blended learning as found in the relevant literature (cf. 3.5 to 3.8). Blended learning could therefore be a possible solution for the accommodation and promotion of multilingualism within the subject IT (cf. 4.2 to 4.5)

ᶂ *How effective is the conceptual model, proposed by this study, in facilitating the accommodation and promotion of multilingualism in IT through blended learning?*

In answering the abovementioned research question a conceptual model, as a twelve step process, was developed through a mixed method approach combining both quantitative and qualitative research design (cf. 5.2 to 5.7). Initially a survey of quantitative nature was conducted amongst IT teachers in the Free State (cf. 5.8). This was followed up with qualitative research in the form of interviews aimed at provincial and national experts in terms of the subject IT, within which this study was done, as well as blended learning and related issues such as e-learning (cf. 5.9). Based on the literature and these two investigations a conceptual blended learning model for accommodating and promoting multilingualism was developed. The conceptual model's effectiveness was tested through utilizing a t-test based on pre- and post-test results. In this regard a quasi-experimental design was used and Grade 10 IT learners at two different schools in the Free State were selected to participate in the control and experimental groups of the research. Embedded in this phase of the research were observations to warrant the findings of the pre- and post-test

results (cf. 5.10). Lastly a questionnaire was also completed by the learners who made up the experimental groups at the respective schools after the completion of the quasi-experimental research (cf. 5.11). The results of the *t*-test determined that a statistically significant improvement was gained by learners exposed to the steps of the conceptual model. This was determined by comparing the pre-test and post-test scores of both control and experimental groups at two different schools. Furthermore it was found that there was a statistically significant difference between the schools in the pre-test but not the post-test.

6.4 RECOMMENDATIONS

The following general recommendations can be made based on the outcomes of this research:

- ✎ Based on the constitutional responsibility of the South African government to provide for education through the medium of all the official languages, a definitive effort is required towards the development of all South African languages for the purposes of education.

- ✎ Failure to acknowledge the language needs for individuals in South Africa implies an infringement on the human rights of these individuals.

- ✎ Teachers and learners should be made aware of their language rights, multilingualism, as well as the different ways through which multilingualism can be accommodated and promoted.

- ✎ At school learners should be encouraged to use all the languages they are proficient in and which they feel appropriate to use.

- ✎ Status and corpus planning should be promoted through governmental bodies as well as through the Department of Education.

- ✎ Scientific terminology, in all subjects, need to be developed and standardized. To this end a harmonized approach can be followed in terms of related languages in order to share expertise in the development of terminology.

↳ Terminology and content should be made available freely and be promoted through electronic means.

↳ Learning and teaching support-materials should be provided electronically instead of as printed texts so that they can be updated regularly.

↳ Adequate computer infrastructure should be established and maintained at schools. The introduction of infrastructure should be accompanied by sufficient computer literacy training.

↳ Initially infrastructure should be extended at district level in order to facilitate training and then by school. The extension of infrastructure should be an ongoing process as technology progresses.

↳ Computer literacy among teachers should be extended and the focus placed on both e-learning and blended learning strategies. To this end a national survey should be done to establish the computer literacy among teachers to identify the extent of the needs and where training should be done.

↳ Online national and provincial education portals should be extended and with content for all subjects. Provincial subject specialists can be encouraged to facilitate the creation of such portals at provincial level.

↳ Online content developed by teachers and learners should be encouraged and linked to national and provincial education portals.

↳ The advantages of a multilingual blended learning approach should be promoted through training and sharing of resources.

↳ New teachers should be exposed to more than one language and to this end knowledge of at least three official languages (including English) should be a requirement for education students.

↳ Online-based formative assessment should be considered, especially in terms of accommodating more than one language.

- The important role of languages other than English should be emphasized in IT as well as other subjects.

- A blended learning approach to the use of online technology should be advocated and promoted.

6.5 RECOMMENDATIONS FOR FURTHER RESEARCH

The following topics can be recommended for possible further research:

- How multilingualism can be accommodated and promoted through blended learning in other subjects.

- The extent to which multilingualism is accommodated and promoted at former Model-C schools versus township schools.

- How multilingualism can be accommodated and promoted at school level through methods such as interpreting through the use of online mediums.

- How multilingualism can be accommodated and promoted at school level through methods such as multilingual printed materials.

- The effectiveness of the creation of multilingual content by learners and educators for reuse by others.

- The effectiveness of teaching subjects multilingually with the aid of multilingual Internet-based resources.

- Alternative methods of implementing blended learning through the use of mobile phones and other electronic devices such as iPads.

- The usage of technologies such as MXit in order to accommodate and promote multilingualism in a blended learning situation.

✠ Exploring the difference between asynchronous and synchronous technologies in accommodating and promoting multilingualism through blended learning.

✠ The effect of language proficiency on programming skills for non-English speakers.

6.6 LIMITATIONS OF THE STUDY

The following limitations of this study were identified:

✠ The results obtained in this study could only be generalized with caution as the focus was on two schools and only within the Free State province. Other schools in the province and even other studies in other provinces may show different results.

✠ The study covered only five lessons over two weeks and more lessons might be necessary to be able to have a greater impact in terms of accommodating and promoting multilingualism.

✠ The schools used in this study had appropriate infrastructure and facilitated the implementation of the proposed model. The study, therefore, does not account for how implementation should be done with less appropriate or infrastructure of a lower standard.

✠ Furthermore, only a very small part of the IT curriculum was covered and this could be extended to set up multilingual resources covering all aspects of the curriculum adequately. Yet, due to scope of the study, the limited content was sufficient.

✠ Language profiles of learners and teachers are very complex and sensitive issues. This study cannot account for the way in which respondents perceive language proficiency and what is perceived as a mother tongue or home language.

⮚ This study was applied at schools with multilingual learner profiles. The study therefore does not account for a school in which a single language is used as a home language by the learners as well as a LoLT at school.

⮚ The use of wikis is restrictive in terms of the fact that learners need to learn basic wiki coding. For wider implementation simpler environments could be considered. However, in terms of a subject like IT the use of wikis seems appropriate.

⮚ Due to the fact that the subject IT focuses on computers in terms of theoretical content (LO1 to LO3) and as a learning medium for programming (LO4) it does imply that computers should be used in the teaching and learning thereof. Other subjects could, therefore, need further development in terms of blended learning.

6.7 CONCLUSION

This chapter concluded the study in providing an overview of how the research was completed. General conclusions were made in terms of the research questions posed at the start of the study. The main conclusions, as they were realized in the relevant chapters, were subsequently summarized in terms of these questions. Some general recommendations were made, as well as recommendations for further studies. Finally, some limitations of the study were listed.

In conclusion, this study has shown that, through the use of the proposed conceptual model executed in a twelve step process, multilingualism could potentially be accommodated and promoted through the use of blended learning.

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APPENDIX A: Teacher questionnaire

NORTH-WEST UNIVERSITY
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Fellow IT Teacher,

I am currently busy with my PhD studies in Education at the North-West University (Vaal Triangle Campus) and would like to use your feedback for empirical research. This research aims at establishing a model through which multilingualism can be accommodated and promoted through the use of blended learning within the FET subject Information Technology.

Permission has been granted by the Free State Department of Education (Quality Assurance Directorate) for this research to take place.

I am seeking your help with my research and request you to complete the attached questionnaire. A stamped addressed envelope is also included so the complete questionnaire can be sent back to me.

The questionnaire will take about 10 minutes to complete - you will need numbers of your grade 10 learners and their language capabilities.

The second part of the research will be done with learners at certain selected and available schools.

Feedback will be provided to the school after the research has been completed. For any further information or questions please feel free to contact me at the number or e-mail address stated below.

Jako Olivier

Questionnaire

Please enter your mother tongue or additional language(s) for questions 1 to 5 by writing down the language name: Afrikaans, English, Zulu (isiZulu), Xhosa (isiXhosa), Northern Sotho (Sepedi), Southern Sotho (Sesotho), Tswana (Setswana), Ndebele (isiNdebele), Swati (SiSwati), Venda (Tshivenḓa), Tsonga (Xitsonga).

1. Teacher mother tongue/home language

_____

2. Other language spoken by teacher - language 1

_____

3. Other languages spoken by teacher - language 2

_____

4. Other languages spoken by teacher - language 3

_____

5. Other language spoken by teacher - language 4

_____

6. Languages spoken by teacher – indicate proficiency:
Tick the appropriate box.

	Poor	Fair	Good	Very good
Mother tongue	☐	☐	☐	☐
Language 1	☐	☐	☐	☐
Language 2	☐	☐	☐	☐
Language 3	☐	☐	☐	☐
Language 4	☐	☐	☐	☐

7. Languages spoken by teacher in CLASS – indicate proficiency
Tick the appropriate box.

	Poor	Fair	Good	Very good
Mother tongue	☐	☐	☐	☐
Language 1	☐	☐	☐	☐
Language 2	☐	☐	☐	☐
Language 3	☐	☐	☐	☐
Language 4	☐	☐	☐	☐

8. Do the learners at your school speak more than one language at school/home?
Tick the appropriate box.

Yes	No	Do not know
☐	☐	☐

9. Indicate the number of learners in the Gr. 10 class according to their home languages:

LANGUAGE	NUMBER OF SPEAKERS
Afrikaans	
English	
Zulu (isiZulu)	
Xhosa (isiXhosa)	
Northern Sotho (Sepedi)	
Southern Sotho (Sesotho)	
Tswana (Setswana)	
Ndebele (isiNdebele)	
Swati (SiSwati)	
Venda (Tshivenḓa)	
Tsonga (Xitsonga)	
Other 1	
Other 2	
Other 3	
Other 4	

10. Indicate the frequency mentioned in the previous question as used by learners in the class by ticking the appropriate boxes:

	Once a month	Once a week	Every day	Every lesson
Afrikaans	☐	☐	☐	☐
English	☐	☐	☐	☐
Zulu (isiZulu)	☐	☐	☐	☐
Xhosa (isiXhosa)	☐	☐	☐	☐
Northern Sotho (Sepedi)	☐	☐	☐	☐
Southern Sotho (Sesotho)	☐	☐	☐	☐
Tswana (Setswana)	☐	☐	☐	☐
Ndebele (isiNdebele)	☐	☐	☐	☐
Swati (SiSwati)	☐	☐	☐	☐
Venda (Tshivenḓa)	☐	☐	☐	☐
Tsonga (Xitsonga)	☐	☐	☐	☐
Other 1	☐	☐	☐	☐
Other 2	☐	☐	☐	☐
Other 3	☐	☐	☐	☐
Other 4	☐	☐	☐	☐

11. Indicate which of the following methods you facilitate/use to accommodate and promote multilingualism in class by also indicating its frequency:

	Never	Once a Month	Every day	Every lesson
11.1 Code switching (mixing languages)	☐	☐	☐	☐
11.2 Interpreting (other teacher/adult in class)	☐	☐	☐	☐
11.3 Interpreting (other learners)	☐	☐	☐	☐
11.4 Terminology lists in different languages	☐	☐	☐	☐
11.5 Textbooks in different languages	☐	☐	☐	☐
11.6 Electronic multilingual resources	☐	☐	☐	☐
11.7 Multilingual resources on the Internet	☐	☐	☐	☐

12. Indicate the language of the following learning and teaching materials, used by you:

	Textbooks	Notes and additional printed material	Electronic presentations
Afrikaans	☐	☐	☐
English	☐	☐	☐
Zulu (isiZulu)	☐	☐	☐
Xhosa (isiXhosa)	☐	☐	☐
Northern Sotho (Sepedi)	☐	☐	☐
Southern Sotho (Sesotho)	☐	☐	☐
Tswana (Setswana)	☐	☐	☐
Ndebele (isiNdebele)	☐	☐	☐
Swati (SiSwati)	☐	☐	☐
Venda (Tshivenḓa)	☐	☐	☐
Tsonga (Xitsonga)	☐	☐	☐
Other 1	☐	☐	☐
Other 2	☐	☐	☐
Other 3	☐	☐	☐
Other 4	☐	☐	☐

13. If the school accommodates and promotes multilingualism through learning and teaching, please elaborate. (For example: tutors are used who can speak languages that teachers do not understand)

_____

_____

_____

_____

_____

_____

14. Enter the number of computers used at school in terms of purpose:
14.1 General Administration _____
14.2 Teachers only (administration) _____
14.3 Teachers (teaching) _____
14.4 Learners (in class) _____

15. Internet connectivity – please indicate the type of Internet activity available at school:
☐ None
☐ One computer (mainly used for administration)
☐ No more than 10 computers used by staff
☐ Some computers (less than 10) available for staff and learners
☐ All computers connected to the Internet

16. What kind of electronic learning tools are used at school (Tick the appropriate boxes)?

☐ None
☐ PowerPoint presentations
☐ The Internet
☐ Subject specific portal
☐ Wikis (like Wikipedia or own created wikis)
☐ Blogs
☐ Podcasts
☐ Learner created websites

17. Do you use electronic tools for assessment? (Tick the appropriate box.)

☐ YES ☐ NO

18. Do you employ blended learning techniques in your teaching (i.e. blending traditional face-to-face teaching with electronic and online technologies such as online assessment and blogs for example)? (Tick the appropriate box.)

☐ YES ☐ NO ☐ DO NOT KNOW

19. If you answered YES to the previous question, please give examples:

_____

_____

_____

_____

_____

_____

_____

_____

_____

20. If you use blended learning techniques – how often do you use them?

	Once a month	Once a week	Every day	Every lesson
Blended learning techniques	☐	☐	☐	☐

21. Do you think blended learning can accommodate and promote multilingualism in providing an additional resource in a language not spoken by the teacher?

☐ YES ☐ NO ☐ DO NOT KNOW

22. Please explain your answer to the previous question.

_____

_____

_____

_____

_____

_____

_____

23. Would you be willing to allow me to do research with a grade 10 class at your school?
      ☐ YES   ☐ NO

Thank you!

APPENDIX B: Interview permission letter

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
VAAL TRIANGLE CAMPUS

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South Africa, 1900

Tel: (016) 910-3111
Fax: (016) 910-3116
Web: http://www.nwu.ac.za

Dear (Name)

RE: INTERVIEW

I am currently busy with my PhD studies in Education at the above-mentioned institution and would like request your input through an interview for my empirical research. The research aims at establishing a model through which multilingualism can be accommodated and promoted through the use of blended learning within the FET subject Information Technology.

Application has also been made for this research to be done with the Free State Department of Education.

Could you please confirm whether you would be available for an interview? For any further information or questions please feel free to contact me at the number or e-mail address stated below.

I, _____ _____, hereby give consent to be
(signature)

interviewed for the above-mentioned research. Signed at _____ on

_____.

Kind regards

JAK Olivier

APPENDIX C: Interview question schedule

E-learning specialists

1. What is your title and job description?

2. What does your work and responsibilities in terms of e-learning entail?

3. How long have you been involved in e-learning and what is your background in this field?

4. What is your opinion on using a blended learning teaching approach where e-learning approaches are combined with more traditional teaching methods such as face-to-face teaching?

5. To the best of your knowledge, to what extent has blended learning been implemented in South African schools?

6. How do you visualize the future implementation of blended learning in South Africans schools?

7. Would implementing e-learning (and blended learning) be cost effective? Why?

8. In your opinion, are teachers equipped to accommodate blended learning in their classrooms? Elaborate.

9. Would you consider the subject IT to be a good place to implement e-learning (and blended learning)? Why?

10. Are any resources being developed for blended learning purposes by the Department? Explain.

11. Elaborate on the current situation in terms of language use in e-learning?

12. How do you think can multilingualism be accommodated and promoted through e-learning?

13. Will any implementation of e-learning (and blended learning) in the South African school system be multilingual in nature?

14. How do you feel about learners generating content in their own languages and such content being reused in other schools?

15. Do you have anything to add to the questions asked or any remarks in terms of e-learning, blended learning or multilingualism?

IT Subject Specialists

1. What is your title and job description?

2. How long have you been involved in IT and what is your background in this field?

3. What does your work and responsibilities in terms of IT entail?

4. What is your opinion on the usage of e-learning in IT classes?

5. What is your opinion on the usage of blended learning (e-learning combined with traditional learning methods such as face-to-face teaching) by IT teachers:

   5.1. How often do you think is it done?

   5.2. Are teachers trained to implement it? Explain.

   5.3. Are classes equipped to implement it? Explain

6. To what extent do you think the language used by the teacher and learners have an effect on the teaching of IT? Please elaborate

7. Is the learning of a 'programming language' independent from the language spoken by a learner?

8. In your view how is multilingualism handled in IT classes currently?

9. In the Free State over 64 percent of the learners speak Sesotho as a mother tongue yet most classes are presented in English. What is your opinion regarding the effect this may have on the teaching of IT?

10. How do you think a blended learning approach can accommodate and promote multilingualism in IT classes?

11. Would changes in the subject with the revision of the curriculum have any impact on the implementation of blended learning in IT classes?

12. Would changes in the subject with the revision of the curriculum have any impact on the accommodation and promotion of multilingualism in IT classes?

13. How do you feel about learners generating content in their own languages and such content being reused in other schools?

14. Do you have anything to add to the questions asked or any remarks in terms of IT, blended learning or multilingualism?

APPENDIX D: Multilingual IT content

<u>**ENGLISH CONTENT**</u>
<u>**Information Technology: Introduction to Loops**</u>

Terminology

Algorithm: computer code rewritten in normal language.

Code: computer language instructions.

Component: physical structure placed on a [Form] like a [Button] or [Edit].

Counter: variable used to count items or repetitions.

Data type: type of contents associated with a component or variable for example:
[String] (text values), [Real] (decimal numbers), [Integer] (whole numbers), [Char]
(characters) and [Boolean] (true or false values).

Event handler: code associated with a certain event (such as clicking on a [Button])
that takes place with a component on the [Form].

Ordinal data type: data type that follows a set order like [Integer], [Char] or
[Boolean].

Program: a set of instructions combined to solve a problem. In Delphi programs are
saved in a [unit].

Selection: structures like the [IF statement] or [CASE statement] that allow for
decisions to be made based on some condition or conditions

Syntax: computer language rules that determine how instructions should be written.

Trace table: table used to track the values of variables and output as a program is
executed.

Variable: place keeper or container for a value that can change.

Loops (iteration)

A loop is used to repeat instructions on the computer. Control structures can be used
to let the user or the computer decide how many repetitions must be executed.

Two types of loops can be identified:
- Unconditional loops: [FOR] loop
- Conditional loops: [WHILE] loop and [REPEAT] loop

THE FOR LOOP

- This loop repeats an instruction (or instructions) for a set amount of times.
- This loop is unconditional as no conditions are tested to end the execution of the
loop.

- The programmer determines how many times the loop is executed.
- This loop uses an Integer (whole number) variable (a place keeper) that acts as counter.

If for example you want to display the word 'computer' seven times in a [RichEdit] component, the following code could be used:

```
begin
  RichEdit1.Lines.Add('computer');
  RichEdit1.Lines.Add('computer');
  RichEdit1.Lines.Add('computer');
  RichEdit1.Lines.Add('computer');
  RichEdit1.Lines.Add('computer');
  RichEdit1.Lines.Add('computer');
  RichEdit1.Lines.Add('computer');
end;
```

This could be rewritten using the [FOR] loop in the following manner:

```
var
  iCount : Integer;
begin
  for iCount := 1 to 7 do
    RichEdit1.Lines.Add('computer');
end;
```

The basic syntax for this loop can be written as:

```
for <Loop Counter> := <Starting Value> to <End Value> do
begin
  <Statements>
end;
```

The <Loop Counter> variable acts as counter for the [FOR] loop. This variable can only be of an ordinal (countable) type such as [Integer] or [Char] and may therefore not be a [Real] or [String] value. Furthermore the number or character stored in the <Loop Counter> variable may be used within the program. To display counting from 1 to 10 can be done in this way:

```
var
  iCount : Integer;
begin
  for iCount := 1 to 10 do
    RichEdit1.Lines.Add(IntToStr(iCount));
end;
```

The <Starting Value> refers to the first value that is assigned to the <Loop Counter>.

The <End Value> must be reached to be able to end the loop. The <Loop Counter> is automatically increased by one value every time the loop is executed.

Create an algorithm (computer language code rewritten in normal language) for a program that will show the times table from 1 to 5 for a number entered.

Example answer:
- Get number from user
- Repeat ten times
  - Entered number multiplied by counter
  - Display answer

Example coding:

Line	

	```var```
	``` iCount, iInput, iMult : Integer;```
	```begin```

1	``` iInput := StrToInt(Edit1.Text);```
2	``` for iCount := 1 to 5 do``` ``` begin```
3	``` iMult := iInput * iCount;```

4	``` RichEdit1.Lines.Add(IntToStr(iMult));```
	``` end;```
	```end;```

To track the values and check for mistakes during the execution of this loop trace tables can be used, for example (assume the number 2 has been entered by the user):

Line	iInput	iCount	iCount > 5	iMult	Output
1	2				
2		1	No		
3				2	
4					2
2		2	No		
3				4	
4					4
2		3	No		
3				6	
4					6
2		4	No		
3				8	
4					8
2		5	No		
3				10	
4					10
2		6	Yes		

Inligtingstegnologie: Inleiding tot lusse

Terminology
Algoritme/[Algorithm]: rekenaarkode wat in normale taal geskryf is.

Kode/[Code]: instruksies in 'n rekenaartaal.

Komponent/[Component]: fisiese structure soos ''n [Button] of [Edit] wat op 'n [Form] geplaas is.

Teller/[Counter]: veranderlike wat gebruik word om items of herhalings te tel.

Data tipe/[Data type]: die soort inhoud wat met 'n component of veranderlike geassosieer word, byvoorbeeld: [String] (teks waardes), [Real] (desimale getalle), [Integer] (heelgetalle), [Char] (karakters) een [Boolean] (waar of vals waardes).

Gebeurtenishanteerder/[Event handler]: kode geassosieer met 'n bepaalde gebeurtenis (soos om op 'n [Button] te klik) wat plaasvind met 'n komponent op die [Form].

Ordinale datatipe/[Ordinal data type]: datatipe wat vasgestelde volgorde het soos [Integer], [Char] of [Boolean].

Program/[Program]: 'n stel instruksies wat gekombineer kan word om 'n probleem op te los. In Delphi word programme in 'n eenheid/[unit] gestoor.

Seleksie/[Selection]: structure soos die IF-stelling/[IF statement] of CASE-stelling/[CASE statement] wat toelaat dat besluite geneem kan word gebaseer op 'n bepaalde voorwaarde of voorwaardes.

Sintaks/[Syntax]: reëls van die rekenaartaal waat bepaal hoe instruksies geskryf moet word.

Naspeurtabel/[Trace table]: tabel wat gebruik word om die waardes van die veranderlikes en afvoer na te gaan soos die program uitgevoer word.

Veranderlike/[Variable]: plekhouer of houer vir 'n waarde wat kan verander.

Lusse (herhaling)

'n Lus word gebruik om instruksies op 'n rekenaar te herhaal. Kontrolestrukture kan gebruik word om die gebruiker of die rekenaar te laat besluit hoeveel herhalings uitgeoefen moet word.

Twee soorte lusse kan geïdentifiseer word:
- Onvoorwaardelike lusse: FOR-lus (VIR)
- Voorwaardelike lusse: WHILE-lus (TERWYL) en REPEAT-lus (HERHAAL)

FOR-LUS
- Hierdie lus herhaal 'n instruksie (of instruksies) vir 'n bepaalde aantal kere.

- Hierdie lus is onvoorwaardelik aangesien geen voorwaardes getoets word om die lus se uitvoering te beëindig nie.
- Die programmeerder bepaal hoeveel keer die lus uitgevoer gaan word.
- Die lus gebruik 'n Integer (heelgetal) veranderlike (plekhouer) wat as teller optree.

As jy byvoorbeeld die woord 'rekenaar' sewe keer in 'n [RichEdit]-komponent wil vertoon, kan die volgende kode gebruik word:

```
begin
  RichEdit1.Lines.Add('rekenaar');
  RichEdit1.Lines.Add('rekenaar');
  RichEdit1.Lines.Add('rekenaar');
  RichEdit1.Lines.Add('rekenaar');
  RichEdit1.Lines.Add('rekenaar');
  RichEdit1.Lines.Add('rekenaar');
  RichEdit1.Lines.Add('rekenaar');
end;
```

Dit kan as volg herskryf word deur die [FOR]-lus te gebruik:

```
var
  iCount : Integer;
begin
  for iCount := 1 to 7 do
    RichEdit1.Lines.Add('rekenaar');
end;
```

Die basiese sintaks vir hierdie lus kan as volg geskryf word:

```
for <Lusteller> := <Beginwoorde > to <Eindwaarde> do
begin
  <Stellings>
end;
```

Die <Lusteller> veranderlike dien as teller vir die [FOR]-lus. Hierdie veranderlike kan slegs ordinal (telbaar) wees, byvoorbeeld [Integer] of [Char] en mag nie 'n [Real] of [String] waarde wees nie. Verder kan die getal of karakter wat in die <Lusteller> gestoor is ook in die program gebruik word. Om te tel van 1 tot 10 en dit te vertoon kan as volg gedoen word:

```
var
  iCount : Integer;
begin
  for iCount := 1 to 10 do
    RichEdit1.Lines.Add(IntToStr(iCount));
end;
```

Die <Beginwaarde> verwys na die eerste waarde wat aan die <Lusteller> toegeken word.

Die <Eindwaarde> moet bereik word om die lus te beëindig. Die <Lusteller> word outomaties een meer elke keer as die lus uitgevoer word.

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Skep 'n algoritme (rekenaartaal geskryf in normale taal) vir 'n program wat die maaltafels van 1 tot 5 vir 'n ingesleutelde getal sal bereken.

Voorbeeldantwoord:
- Kry die getal van die gebruiker
- Herhaal tien keer
  - Maal ingesleutelde getal met teller
  - Vertoon antwoord

Voorbeeldkode:

Line	
	var
	iCount, iInput, iMult : Integer;
	begin
1	iInput := StrToInt(Edit1.Text);
2	for iCount := 1 to 5 do
	begin
3	iMult := iInput * iCount;
4	RichEdit1.Lines.Add(IntToStr(iMult));
	end;
	end;

Om die waardes na te speur en te kyk vir foute met die uitvoer van die lus kan naspeurtabelle gebruik word, byvoorbeeld (neem aan dat die getal 2 deur die gebruiker ingesleutel is):

Lyn	iInput	iCount	iCount > 5	iMult	Afvoer
1	2				
2		1	Nee		
3				2	
4					2
2		2	Nee		
3				4	
4					4
2		3	Nee		
3				6	
4					6
2		4	Nee		
3				8	
4					8
2		5	Nee		
3				10	
4					10
2		6	Ja		

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Information Technology: Tsebiso ho diLoop

Tlhaloso ya mantsweTerminology
Algorithm/[Algorithm]: khoutu ya khompyutha e ngotsweng hape ka puo e tlwaelehileng.

Khoutu/[Code]: ditaelo tsa puo ya khompyutha.

Karolo/[Component]: sebopeho se tshwarehang se beilweng hodima [Form] jwalo ka [Button] kapa [Edit].

Sebadi/[Counter]: sebadi se fapafapaneng se sebediswang ho bala dintho kapa diphetopheto.

Mofuta wa data/[Data type]: mofuta wa dikahare tse amangwang le karolo kapa sebadi se fapafapaneng, ho fana ka mohlala: [String] (text values), [Real] (decimal numbers), [Integer] (whole numbers), [Char] (characters) and [Boolean] (true or false values).

Motsamaisi wa ketsahalo/[Event handler]: khoutu e amangwang le ketsahalo e itseng (jwalo ka ho tlanya hodima [Button]) e etsahalang le karolo hodima [Form].

Mofuta o odinal wa data/[Ordinal data type]: mofuta wa data o latelang tlhophiso e beilweng jwalo ka [Integer], [Char] kapa [Boolean].

Lenaneo/[Program]: sete ya ditaelo tse kopantsweng ho rarolla bothata. Ho Delphi mananeo a bolokwa ka yuniti/[unit].

Kgetho/[Selection]: dibopeho tse tshwanang le polelo ya IF/[IF statement] kapa polelo ya CASE/[CASE statement] that allow for decisions to be made based on some condition or conditions

Syntax/[Syntax]: melao ya puo ya khomphyutha e hlakisang hore ditaelo di ngolwe jwang.

Tafole ya ho tatelo/[Trace table]: tafole e sebediswang ho latela boleng ba diphetophetoho le sephetho ha lenaneo le tswelapele.

Phetophetoho/[Variable]: motshwari wa sebaka kapa peho bakeng sa boleng bo ka fetohang.

DiLoop (pheto)

Loop e sebediswa ho pheta ditaelo khomphyutheng. Dibopeho tsa taolo di ka sebediswa ho dumella mosebedisi kapa khomphutha ho kgetha hore na ke dipheto tse kang tse lokelang ho etswa.

Ho ka sutjwa mefuta e mmedi ya diloop:
- diloop tse felletseng: FOR/[FOR] loop
- diloop tse sa fellang: HA/[WHILE] loop le PHETA/[REPEAT] loop

[FOR] LOOP
- Loop ena e pheta taelo (kapa ditaelo) bakeng sa makgetlo a badileng.
- Loop ena e feletse ka ha ho maemo a lekwang ho qetela tshebetso ya loop.
- Mongodi wa lenaneo o kgetha hore na loop e etswa makgetlo a makae.
- Loop ena e sebedisa Intheja (nomoro e felletseng) phetophetoho (motshwari wa sebaka) e sebetsang jwalo ka sebadi.

Ho fana ka mohlala, ha o batla ho hlahisa lentswe 'khomphyutha' makgetlo a supileng ka karolo ya [RichEdit], ho ka sebediswa khoutu e latelang:

```
begin
  RichEdit1.Lines.Add('khomphyutha');
  RichEdit1.Lines.Add('khomphyutha');
  RichEdit1.Lines.Add('khomphyutha');
  RichEdit1.Lines.Add('khomphyutha');
  RichEdit1.Lines.Add('khomphyutha');
  RichEdit1.Lines.Add('khomphyutha');
  RichEdit1.Lines.Add('khomphyutha');
end;
```

Sena se ka ngolwa hape ho sebediswa loop ya [FOR] ka tsela e latelang:

```
var
  iCount : Integer;
begin
  for iCount := 1 to 7 do
    RichEdit1.Lines.Add('khomphyutha');
end;
```

Syntax ya motheo bakeng sa loop ena e ka ngolwa jwalo ka:

```
for <Sebadi sa Loop> := <Boleng wa qala> to <Boleng ba ho Qetela> do
begin
  <Dipolelo>
end;
```

<Sebadi sa Loop> phetophetoho e sebetsa jwalo ka sebadi bakeng sa loop ya [FOR]. Phetophetoho ena ke ya mofuta o odinal (o kgonang ho balwa) jwalo ka [Integer] kapa [Char] mme kahoo e ka se be boleng bo [Real] kapa [String]. Ho feta moo nomoro kapa kharekethara e ho phetophetoho ya <Sebadi sa Loop> e ka sebediswa kahare ho lenaneo. Tlhahiso ya ho bala ho tloha ho 1 ho isa 10 ho ka etswa ka tsela ena:

```
var
  iCount : Integer;
begin
  for iCount := 1 to 10 do
    RichEdit1.Lines.Add(IntToStr(iCount));
end;
```

<Boleng bo Qalang> e bolela boleng ba pele bo fuwang <Sebadi sa Loop>.
<Boleng ba ho Qetela> bo lokela ho fihlelwa hore phello ya loop e fihlelwe. <Sebadi sa Loop> se ikeketsa ka bosona ka boleng bo le bong nako e nngwe le e nngwe ha loop e etsahala.

Theha algorithm (khoutu ya puo ya khomphyutha e ngotsweng hape ka puo e tlwaelehileng) bakeng sa lenaneo le tla bontsha tafole ya keketso ho tloha ho 1 ho isa 5 bakeng sa palo e kentsweng.

Mohlala wa karabo:
- Fumana palo ho mosebedisi
- E phete makgetlo a leshome
  - Palo e kentsweng e eketswa ke sebadi
  - Hlahisa karabo

Mohlala wa ho etsa khoutu:

Line	
	`var`
	`  iCount, iInput, iMult : Integer;`
	`begin`
1	`  iInput := StrToInt(Edit1.Text);`
2	`  for iCount := 1 to 5 do`
	`  begin`
3	`    iMult := iInput * iCount;`
4	`    RichEdit1.Lines.Add(IntToStr(iMult));`
	`  end;`
	`end;`

Ho latela boleng le ho lekola bakeng sa diphoso nakong ya phethahatso ya loop ena, ho ka sebediswa ditafole tsa tatelo, ho fana ka mohlala (dumela hore palo 2 e kentswe ke mosebedisi):

Line	iInput	iCount	iCount > 5	iMult	Output
1	2				
2		1	No		
3				2	
4					2
2		2	No		
3				4	
4					4
2		3	No		
3				6	
4					6
2		4	No		
3				8	
4					8
2		5	No		
3				10	
4					10
2		6	Yes		

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APPENDIX E: Learner permission letter

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PO Box 1174, Vanderbijlpark
South Africa, 1900

Tel: (016) 910-3111
Fax: (016) 910-3116
Web: http://www.nwu.ac.za

Dear Parent/Guardian

RE: RESEARCH REQUEST

I am currently busy with my PhD studies in Education at the above institution and would like to include your child - as part of his/her school's IT class - in my research. The research aims at establish a model through which multilingualism can be accommodated and promoted through the use of blended learning within the FET subject Information Technology.

Application has also been made for this research to be done with the Free State Department of Education.

Could you please confirm – by completing the slip below – whether your child would be available for five (5) lessons during which he/she will complete certain tasks on the computer. The work to be done relates to the content of the subject: Information Technology and will not interfere with the school's planned learning programme.

Feedback will be provided to the school after the research has been completed. For any further information or questions please feel free to contact me at the number or e-mail address stated below.

Kind regards

JAK Olivier

Cell phone: 076 377 1424
E-mail: olivier@teachitza.com

✂--
Please complete the following slip and return to your IT teacher.
I _____ parent/guardian of _____ (child's name) hereby give permission for him/her to take part in five (5) IT lessons as part of the research as explained in the attached letter.

_____   _____
Signature   Date

APPENDIX F: Learner questionnaire

In conclusion to your involvement to the research done with your class could you please complete the questionnaire below. The questionnaire should be completed anonymously.

1. What is your home language?

_____

2. What other languages can you speak?

2.1 Language 1

_____

2.2 Language 2

_____

2.3 Language 3

_____

2.4 Language 4

_____

3. Answer these questions by indicating whether you strongly agree, agree, disagree or strongly disagree:

	Strongly agree	Agree	Disagree	Strongly disagree
3.1 Classes only need to be in English.				
3.2 Using more than one language in class will contribute to my learning.				
3.3 Having material in other languages available in class helps me to understand the work better.				
3.4 I use languages other than English to discuss the work in class.				
3.5 Learners have the right to use any language they want in class.				
3.6 Online resources (such as websites, blogs and wikis) can be used to accommodate different languages in class.				
3.7 I use online resources for learning outside the classroom.				
3.8 I use my mother tongue communicating on the online resource.				
3.9 I used the multilingual resources provided during the lessons.				

Thank you!

APPENDIX G: NWU Ethics application

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
VAAL TRIANGLE CAMPUS

Privaatsak X6001, Potchefstroom
Suid-Afrika, 2520

Tel: (018) 299-1111/2222
Web: http://www.nwu.ac.za

Navorsingsfokusarea Onderrigleerorganisasies
Tel: (018) 018 299 4780
Faks: (018) 018 293 5245
E-pos: monty.monteith@nwu.ac.za

8 September 2009

Me Marietjie Halgryn

ETIEKAANSOEK

Etieknommer: NWU-00050-09-S2
Projekhoof: Prof. Kobus Lombard
Projektitel: Accommodating and promoting multilinguism through blended
                      learning

Die aansoek is deur die etiekkomitee geëvalueer en word goedgekeur. Volle magtiging word
aan die projek verleen. Die etieknommer kan dus gewysig word na

NWU-00050-09-**A**2

Dankie en vriendelike groete

JLdeK Monteith
Voorsitter: Etiekkomitee Fakulteit Opvoedingswetenskappe

APPENDIX H: Department of Education permission letter

education
Department of
Education
FREE STATE PROVINCE

Enquiries: Malimane IM
Reference: 16/4/1/32-2009

Tel: 051 404 8662
Fax: 051 447 7315
E-mail: malimane@edu.fs.gov.za

2009 – 08 – 21

Mr. JAK OLIVIER

UNIVERSITY OF NORTH WEST, VAAL TRIANGLE CAMPUS

FEZILE DABI DISTRICT

Dear Mr. Olivier
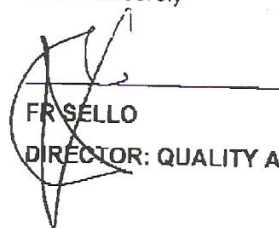
REGISTRATION OF RESEARCH PROJECT

1. This letter is in reply to your application for the registration of your research project.

2. Research topic: **Accommodating and promoting multilingualism through blended learning.**

3. Your research project has been registered with the Free State Education Department.

4. Approval is granted under the following conditions:-

4.1 Educators and learners participate voluntarily in the project

4.2 The names of all schools and participants involved remain confidential

4.3 The questionnaires are completed and the interviews are conducted outside normal tuition time.

4.4 This letter is shown to all participating persons

4.5 A bound copy of the report and a summary on a computer disc on this study is donated to the Free State Department of Education.

4.6 Findings and recommendations are presented to relevant officials in the Department.

5. The costs relating to all the conditions mentioned above are your own responsibility.

6. **You are requested to confirm acceptance of the above conditions in writing to:**

The Head: Education, for attention: DIRECTOR : QUALITY ASSURANCE
Room 401, Syfrets Building, Private Bag X20565, BLOEMFONTEIN, 9301

We wish you every success with your research.

Yours sincerely

FR SELLO
DIRECTOR: QUALITY ASSURANCE

Directorate: Quality Assurance, Private Bag X20565 Bloemfontein, 9300
Syfrets Center, 65 Maitland Street, Bloemfontein
Tel: 051 404 8750 / Fax: 051 447 7318   E-mail: quality@edu.fs.gov.za

APPENDIX I: Conceptual model for accommodation and promotion of multilingualism through blended learning

Online collaboration outside of school boundaries can also be facilitated. Learner groups with common languages can be formed.

9) Collaborative learning through language medium of choice

Learners can be grouped (planned or spontaneously) according to language preference.

10) Learners generate new content

Multilingual content can be created, edited and evaluated as necessary.

11) Promotion of use of multilingual resources – where relevant.

Multilingual online content is used for teaching and learning

12) Evaluation

Multilingual content must be evaluated for reuse. This process can also be done online and by individuals from different schools.

Generated content can be placed online for sharing

8) Establishing online community through interaction on the wiki

Groups are created. This can be done from outside of the online environment.

7) Training of learners to use wiki

Learners practice using wiki code. Learners introduce themselves and create own wiki pages.

6) If no existing resources are found; begin with development where practicable

If necessary own created core content is extended

5) Adding basic content to the wiki

Core content is placed online.

Outcomes are set.

The process can be repeated with subsequent usage of learning content

1) School linguistic survey

Teachers Language(s) ⇕ Learner Language(s)

2) Planning of the languages to accommodate

Languages that will be accommodated and promoted are identified

3) Obtain resources

Electronic learning environment set up based on available infrastructure.

4) Setting up wiki

Wiki software is installed or wiki is registered at wiki site. User roles are assigned and users are registered

Preparation for conceptual model could be done outside of the online environment or before implementation of the wiki learning environment.

Online resources provided externally from DoE, NGOs or businesses

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APPENDIX J: Statistical consultation letter

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
VAAL TRIANGLE CAMPUS

PO Box 1174, Vanderbijlpark
South Africa, 1900

Web: http://www.nwu.ac.za

To whom it may concern

Tel: (016) 910 3320
Fax (016) 910 3326
EMail Aldine.Oosthuyzen@nwu.ac.za

19 November 2010

This letter is to confirm that I did the data capturing and data analysis for the research done by Jako Olivier

Yours sincerely

Aldine Oosthuyzen
MSc (Statistics and Operational Research)

APPENDIX K: Language editor's letter

TO WHOM IT MAY CONCERN

This is to certify that the undersigned has done the language editing for the following candidate:

SURNAME and INITIALS: _Olivier, J.A.K._

DEGREE: ~~MEd dissertation~~ / PhD thesis

D.Kocks   Date: _11 Nov. 2010_

Denise Kocks

Residential address: 29 Broom Street

                             Arcon Park

Postal address: P.O. BOX 155

                             Vereeniging 1930

Tel: 016 428 4358

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