The use of the Information Skills Process as a teaching methodology: a case study at the Cape Peninsula University of Technology

By

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Declaration

This thesis has been proof-read for language purposes, and passed as correct. The proof-reader was the student himself who has a BA, majoring in English and a Higher Diploma In Education with English, and was an English subject teacher at Huguenot High School from 1977 to 1994. As a librarian with a BBibl degree, he has also checked the references and style.

…… ……

Supervisor: Dr H Steyn Date

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Abstract

Becoming information literate has been an educational concern that has been spurred by the change in information technology in the last twenty years. The school has been seen as the main player in allowing the learner to achieve this state of information literacy. Nonetheless, within the teacher-training offered at pre-service level (PRESET) in South Africa, information literacy has become to be seen as something needed by the student teachers for their own studies. This study looks at how the student teachers can be brought to an understanding of the relevance and importance of information literacy and the Information Skills Process, not only as a means of attaining the educational goals and aims as expressed in prescribed curricula, but also as a teaching methodology.

A look at the literature on information literacy and its applicability in schools places particular emphasis on the process as described in key models. The rationale for choosing the Big6 model of Eisenberg and Berkowitz as the vehicle for the research is explained, and the Revised National Curriculum Statement (RNCS) as well as the Curriculum and Assessment Policy Statement (CAPS) of the South African national department of education (initially the Department of Education, but later changed to the Department of Basic Education) analysed in terms of information literacy. This analysis, together with interviews of lecturers involved in the training, was followed by an action research process with six students.

The results of the analysis of the documents, together with an analysis of the answers by the lecturers in the interviews of the lecturers, and an analysis of the students' reflections on the process, enabled conclusions and recommendations to be made. In particular, they confirmed the important place that information literacy, the information literacy skills and the Information Skills Process should play in both school-based education, and the training of student teachers.

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My wife and daughters.

Dedication

This work is dedicated to the memory of the family members I lost during its completion

My father, Jan Erik Moll, who passed away in July 2008

My nephew, Joshua David Moll, who passed away in February 2009

and

My eldest daughter, Jessica Robin Moll, who passed away on 1 January 2010

Table of contents

List of Figures

List of Tables

Chapter 1: Introduction and background to study

1.0. Introduction

Information explosion and information overload are terms commonly used. The amount of information available in modern society has moved the main problem facing users from one of finding information to one of being able to find the correct information. Relevance has become a common factor in the presentation of results.

When teaching in Namibia in 1977 and 1978, this was not the case. Few information resources were available and those that were available in schools were carefully preselected. The same was true while teaching at what was later described as a Model C High School in South Africa from 1979 to 1994. Learners at that time used the access to school libraries in order to obtain the resources needed. In the schools of the white Departments of Education in the provinces a specified post was created for teacher-librarians. They were expected to take all pupils (at that stage there was no talk of learners) for one period a week for what was originally known as “Book Education” and later “Media Education”.

In this time they were taught to use card catalogues to access material in the library, about different kinds of media, parts of a book, literature to read and note-taking. During this period pupils doing projects involving the use of information in subjects were assisted by the teacher-librarian in cooperation with the subject teacher or, in the case of the primary schools, the class teacher. However this all changed when teacher-librarian posts were incorporated into the rest of the staff and principals given the option to use them for subject teaching. Ironically, this coincided with the release of the first syllabus for Information Literacy by the Western Cape Education Department in 1994.

Having moved to the Boland College of Education at the beginning of 1995, the training of primary school teachers came into focus. At that stage all the teachers had “Library” as one of the subjects which they were required to pass in their first year. In this subject the syllabus for Information Literacy as described in the Western Cape Education Department curriculum was dealt with. This, too, changed in 2000 with the take-over of Education Colleges in South Africa by Higher Education Institutions (Moll, 2010). Library was no longer a subject and Information literacy training became something done with the students to enable them to cope with their studies.

A strong realization grew that for South Africa to produce a generation capable of handling the information needs of modern society there would need to be a generation of teachers capable of understanding, using and inculcating information literacy in their pupils. However, this would need to be something that was not an add-on or separate from subject teaching, but something that would be integrated with the subject. But going further, it was felt that the advantages, disciplines, skills and critical thinking engendered by the use of the Information Skills Process would prove to be the vehicle to achieve success in many of the curricular goals that were not normally seen as being part of information literacy

1.1. Research context and aim of the study

The teaching of library skills in schools in South Africa was a feature of education under all the various Departments of Education in the apartheid era. However, with the advent of the technological revolution of the 1980’s and the so-called information revolution, this emphasis was changed to the teaching of information skills. So important was this seen, that an interim syllabus was already issued by the new National Department of Education in 1994 (Western Cape Education Department, 1994). At the same time a proposal for school library provision, based on what was seen as a critical need, was issued.

These documents were overshadowed and overtaken by the change to outcomes-based education in South Africa through the National Department of Education's adoption of Curriculum 2005 and the Revised National Curriculum Statement (RNCS). In Curriculum 2005, the entire information skills interim syllabus was placed within the Learning Area of Languages, Literacy and Communication as a separate outcome. Nonetheless, within the other learning areas and even the Critical and Cross-Field Outcomes there was an emphasis on resource-based learning, lifelong learning and the ability to work with information. Simultaneously the information revolution, particularly in the field of information communications technology, has led to an increased emphasis on the training to use this new technology.

In the South African Higher Education context this has led to the inclusion of compulsory training in Computer Literacy in many courses, including teacher-training such as that offered by the Cape Peninsula University of Technology at their Mowbray and Wellington Campuses. The previous component of Library that was offered at these campuses while they were still Education Colleges (until 2000) was removed as a separate entity and subsumed into Professional Studies in the pre-service training of teachers (PRESET) B. Ed. offering. Within Professional Studies, the training in information skills is dependent on the curriculation and attitude at an institutional, faculty, local or even course level. Where it is being done, such as at Wellington, the emphasis is usually on the student's own ability to learn and use information skills and in particular the Information Skills Process for success in studies.

As education students, however, they should also be trained in the teaching of information skills so as to ensure that their learners gain an adequate level of proficiency in information skills. Further, they should also be trained in the use of the Information Skills Process as a teaching methodology in order to better reach the outcomes as envisaged in both Curriculum 2005 and the RNCF. This

methodology has a generic component but can also be contextualized within each learning area and subject.

Central to this training and the place of information skills is the cooperation in the training of the education students between the subject lecturers (particularly those responsible for subject didactics), the Education and Professional Studies lecturers, the Computer Literacy lecturer and the Library, (again, in particular, the Librarian able to assist with Information Skills Process training).

It is hoped that arising from this study student teachers in the B. Ed. Intermediate and Senior Phase will benefit from a more studied and focused approach to the use of information skills, and that lecturers responsible for their training will also benefit by being able to incorporate within their subject didactics a more uniform and structured approach to information skills. Finally, it is hoped that the use of the Information Skills Process will also find a place in the Education and Professional Studies curriculum, so that it can inform the general basis of the teacher-training.

1.2. Research questions

In order for the main aim of this research, the training of teachers in the use of the Information Skills Process during PRESET, to be achieved, three questions were raised that needed to be answered:

1. How are information skills reflected within the prescribed South African curriculum for the Intermediate and Senior Phases of the General Education and Training Band?
2. How are student teachers trained in order to facilitate learners' acquisition and use of these skills within the specific Learning Areas and subjects?
3. Can student teachers be led to an understanding of the generic applicability of the Information Skills Process as a teaching method?

These questions are firmly placed within the context of the outcomes-based nature of the South African education system implemented since 1994. The research is also essentially concerned with the understanding of the use of the phenomenon of information skills by students. The qualitative nature of this research is thus due to its enquiry into the qualities, properties and characteristics of this phenomenon (Henning et al., 2004:5).

Finding the answers to these questions would enable the objectives of the research to be met. These objectives were derived from the overall aim of the research as expressed in the title, as well as from the research questions, and can be stipulated as follows:

- To determine the place of information skills and the Information Skills Process within the framework of the Senior and Intermediate Phases of the General Education and Training band as stated by the National Department of Education in the Revised National Curriculum Statement (RNCS) and the Curriculum and Assessment Policy Statement.
- To determine the understanding of student teachers in their final year of training of the appropriate use of information skills, including its use as a methodology through the Information Skills Process.
- To gauge the value placed on the practical use of the Information Skills Process as a teaching methodology by student teachers trained in its use.

The research, then, focuses closely on the development of an understanding of the phenomenon of the use of information skills by the students. The process of personal transformation of each student was important (Campbell, 1997). The significance of the study thus also lies in each student's move to independence in the teaching profession (Golden-Biddle, 2007:31).

1.3. Assumptions

At the outset of the research it was already felt by the researcher that there were certain underpinning assumptions that were made that impacted on the research itself. These included:

- There is a lack of understanding of the role that information literacy plays in the educational process, both in schools and in teacher-training. The effects of poor information literacy training are sometimes ascribed to other factors, such as socio-economic background.
- Trainee teachers are capable of understanding both the use of the process and its value in education if properly trained. This component, as shown above, had been previously part of the teacher-training but had been removed.
- Current educational policy on the provision of libraries in schools does not address the fundamental problem of lack of understanding of correct use of the library as a teaching resource. The Information Skills Process which is necessary for the optimum use of the library for informational work is lacking.
- The role of a teacher-librarian can be played by a teacher trained correctly insofar as the integration of information skills in teaching is concerned.

1.4. Limitations

The limitations of this research included the sampling that was used. The students were all taken from the Wellington Campus of the Cape Peninsula University of Technology (CPUT); the lecturers interviewed were all at the same campus. Therefore it might not be appropriate to generalise the results for all teacher training, whether in South Africa or elsewhere. However, more on this is found in chapter 3 in the discussion on the methodology.

The research also was conducted mainly in Afrikaans as this is the language of the education students at Wellington. In this regard they came from a specific cultural and linguistic background, and results from this group might not be applicable to other linguistic or cultural groups. There was no language barrier, however, as the researcher is qualified in both Afrikaans and English and equally fluent in these languages.

The choice of students was also limited in their having to be approved by the lecturing staff. This, however, did have some advantages as pointed out in chapter 3, in that it helped meet potential ethical concerns.

Finally, a limitation occurred during the research process in that the researcher, who had been in full-time employ at the Wellington Campus, moved to a full-time position at the Bellville Campus of CPUT. However this was overcome to a certain extent by the management of CPUT Libraries allowing the researcher the time needed to be at the Wellington Campus to meet with the students, as well as giving the opportunity to see the lessons at different schools.

1.5. Chapter outlines

The thesis is divided into 6 chapters. For each of these an outline is given.

1.5.1. Summary of chapter 1

Chapter one is the introductory chapter. The rationale that led the researcher to undertake the research is followed by a discussion of the educational context in which the research took place. The research questions and aims are expressed, as well as the assumptions made and limitations of the research.

1.5.2. Summary of chapter 2

This chapter studies the literature on information literacy and related concepts, including the terms information, knowledge and data. Definitions of these terms as used in the study are given. The development of the importance of information within the management of organizations is outlined, with its implications for the growth of the concept of information skills and importance of information literacy.

This is followed by the development of information skills and information literacy within the educational sphere, particularly as seen in the accepted definition of the skills needed by an information literate person in the 1989 American Library Association Presidential report. The development of the use of these skills into a process is outlined in different formulations. However there is a concentration on the Big6 formulation by Eisenberg and Berkowitz (1988) which is used as the main vehicle in the research.

Each of the steps in their definition of the process is discussed, to see how they link within different formulations, how each is defined in terms of standards and what the key terms within each of these steps are.

The use of elements of the Information Skills Process, as well as the process itself in the South African Department of Education's Curriculum 2005, Revised National Curriculum Statement and their successor, the Curriculum and Assessment Policy Statement is then analysed. This analysis shows the pervasiveness of these skills in the curriculum and underpins the importance of South African teachers having an understanding of information skills, the Information Skills Process and their use in teaching.

1.5.3. Summary of chapter 3

The methodology of the research is outlined in this chapter. The methodological underpinnings as found in the post-modernist paradigm with its lack of reliance on either a pure qualitative or pure quantitative paradigm are explained. The overall place of the research in the field of action research is outlined, as seen by Zeichner (2009:26) as part of a recent growth in research by tertiary education staff “who inquire into their own practice as teachers and teacher-educators.”

The different phases of the research are laid out. The first is the analysis of the curriculum documents in terms of the information skills. The second phase is that of interviews structured on the basis of a questionnaire with the lecturers involved in the teaching of Intermediate and Senior Phase students.

The third and most important phase of the research is Action Research with a group of students. The basis of their selection is described as well as the training of the six students chosen. The means of eliciting responses from the students through the lessons they gave, as well as their reflection is outlined.

This chapter also looks at the ethical considerations that were seen as being relevant to the research.

1.5.4. Summary of chapter 4

The answers given by the lecturers concerned with the training of the students in the Intermediate and Senior Phase in their interviews are analysed both quantitatively and qualitatively. Results for each question are looked at separately. The overall consensus is of the importance and presence of information skills and the Information Skills Process in the curriculum. Similarly, that the knowledge of this by the students is important.

However the place and agency of the training of the students in the Information Skills Process was not clear – the answers clearly reflecting the attitude found by Gordon (2009:116) that lecturers felt that they were overloaded and had an overfull curriculum.

1.5.5. Summary of chapter 5

Using a system of coding the evidence from the students, with an emphasis on their reflection, is done to provide rich evidence to answer the three research questions that were formulated. This analysis covers the students' perception of the Big6, including its linkages to the curriculum, and the ability to use it in teaching. The students' perceptions on linkages to the general curriculum, as well as to specific subjects were also analysed.

Further the students' initial understanding with regard to certain concepts, as well as their overall teaching and methodological views were considered. As this understanding could often only be derived from reflections done after the process, these understandings and views had to be deduced.

Following on this, the analysis of their position after the research process showing the new views and understanding with regard to the concepts as well as methodologies, and philosophy of teaching was covered. The chapter finishes with a look at the students' ideas of the place of the training, as well as the methodology used during the training, involving both group work and active learning by all the participants.

1.5.6. Summary of chapter 6

Having completed the analysis of the curriculum documents, interviews of the lecturers, and the students' reflection on the research process together with associated documents, findings are made with regard to all three research

questions. The place of information skills in the school curriculum, Information Skills Process training in the teacher education curriculum, and the potential for understanding by students after focused intervention are all addressed.

Based on these findings and current research, recommendations for implementation in the teacher education curriculum, as well as recommendations for further research are made. These recommendations fall into two broad categories: those relating to the content of the curriculum, and those relating to the organization of teacher training.

Specific recommendations with regard to the inclusion of the Information Skills Process within the curriculum, both as a vehicle for encouraging critical thinking as well as a teaching methodology are looked at. In addition recommendations for further analysis and research into the present teacher education curricula's approach to enabling students' critical reflection as well as ability to cope with change are also considered.

Finally recommendations are made with regard to the organization and presentation of the curriculum. These include the lecturers' own understanding and use of the Information Skills Process, including its use as a teaching methodology, the increased focused use of group work and greater cooperation and coordination within the course as well as implications for serving teachers.

Chapter 2 Literature study

2.0. Introduction

The literature on information literacy and related concepts is vast. However, allied to this literature much literature and discussion on the interrelationships between the terms information, knowledge and data is found. In particular, these terms inform much thinking about the application of information literacy skills in the workplace, whether these skills are being related to ability in the IT industry (Du Plessis & Koen, 2005:38), or in a broader context of knowledge strategies embedded into business (CILIP, 2002:9).

For education there needs to be clarity on these concepts, but also how they relate to the curriculum. In this regard the discrete skills are identified, but are more commonly seen as part of a process. The idea of information literacy being founded on the ability to use skills within the process has been widely accepted within the library world: however in education these concepts are, more often than not, used tacitly rather than explicitly. In the South African context this process has taken us from the *Core Teaching programme for Information Skills Grade 1 to Standard 10,* issued by the Western Cape Education Department in 1994, to a far more hidden and subtle statement of the importance of the skills and Information Skills Process within the latest Revised National Curriculum Statement and their successors, the National Curriculum and Assessment Policy Statement.

2.1. information skills and related terms

Clarity is needed on the concepts which are often addressed within these skills. These concepts include those of data, information and knowledge which, in themselves, are sources of debate. However, there is also the need to look at

how these concepts are related to skills, not only within the education environment, but also within a wider societal context.

2.1.1. Data, information and knowledge

Terms central to the idea of information skills include the concepts data, information and knowledge. Although information skills and information literacy are the concepts usually discussed, the difference and relationship between the concepts of data, information and knowledge are of cardinal importance.

Data can be seen as raw facts, such as someone's name, or the number of learners in a specific class. Data can also be found in different formats. One type is alphanumeric data. These are expressed in terms of numbers and/or letters, either separately or together, such as names (John), numbers with numerical value (150), numbers with other meanings attached (Dewey numbers, for example: 155.4) and mixed expressions (such as addresses: 10 James Street). A second form of data is imagery. This can include actual images such as photographs, or created images such as drawings. A third form of data is found in video recordings (Stair & Reynolds, 2003:5). Data can therefore be quantitative in nature, but also qualitative because it is often the representation of events as selected by the data collection mechanisms or persons involved in the collection, through a process often described as the collection of truths (Styhre, 2003:58).

In this thesis data is defined as uninterpreted representations of fact, irrespective of the format.

Information is extracted from the data in order to give meaning to the data. By looking at the different relationships between the different data elements meaning can be given to the data which transcends and eclipses the value of the data itself. Form and functionality are thus added to the data which were collected as truths (Styhre, 2003:59). The ability to create this form and functionality is limited

to the extent that each person has the necessary ability to perceive the relationships and patterns in the data that can lead to the mutation of data into information (Styhre, 2003:58).

In this thesis information will be taken to mean data to which meaning has been given.

The ability to do this is usually described as knowledge. However in some literature, as Morrow (2003:66) warns, there is a false synonymy between information and knowledge. Knowledge should be seen as the realization of and understanding of the ways in which data can be mutated into information within a given situation so that the data can become useful, and undergo the transformation to create information (Stair & Reynolds, 2003:6). The process whereby data is changed into information requires the application of analytical and synthetical abilities so that a valuable and useful product is created. It is not important as to where the data was obtained, or even how it is processed, but that it is transformed into a form that has value within the context in which it is required.

2.1.2. Information and knowledge ages

The concept of information as the basis of the modern era can be traced back to Alvin Toffler's *The third wave* which was published in 1980, in which he postulated that the agricultural age and industrial ages are now being followed by an information age with an:

> Emerging … info-sphere [that] makes that of the Second Wave era – dominated by its mass media, the post office, and the telephone – seem hopelessly primitive by contrast. (Toffler, 1981:183)

Libraries responded well to this, seeing their role as helping students to "survive in the information age" (Johnston, 1999:105).

Various factors contributed to this universal presence and importance of information of which the most important were the rise of new technologies that enabled communication between individual users, the mass market and each other. These technologies have collectively been described as Information Technologies (IT) (Behrens, 2000:6). The changes led particularly to the traditional forms in which information were found, such as the printed media, now being replaced. Digitization of content has taken place on a large scale and in many cases the traditional printed environment has been changed into an electronic environment, such as electronic publishing of books in the form of e-books, and journals in the form of online or e-journals (Lasic-Lazic, 2002:1). With the availability of data in electronic formats, the manipulation of the data into different formats creating information also became much easier.

Based on the idea of a change in the very basis of an era, there is already a move away from the idea of an 'information age' to that of a 'knowledge age' or 'knowledge society' (Bonanno, 2002). It is not the information, created from the data, which is seen as the key to improved production but the possession of knowledge to enable this transformation. Thus information in the Western philosophy was seen not as a goal but a tool, used by knowledge (Badke, 2002:62). This led to the rise of great interest in knowledge during the 1990's and in particular in the way knowledge is managed within an organization (Styhre, 2003:7). There has even been the development of a whole field of study in the creation of information systems that can be designed in order to facilitate the process of enhancing the data so as to create information.

2.1.3. Information management

These changes in the appreciation of the importance of information and knowledge have also found reflection in the traditional ways of looking at management. With Frederick Taylor's publication of *The principles of scientific management* in 1911 and Henri Fayol's *General and industrial management* in

1925, the scientific study of management was started (Van der Westhuizen, 1990:68-70). These original works looked at division of functions in an organization and, as an example, Fayol (Van der Westhuizen, 1990:68) suggested that these functions could be delimited as:

- Technical activities (Production and processing).
- Commercial activities (Purchases and sales).
- Finances (optimal use of capital).
- Security activities (safety of property and persons).
- Bookkeeping (stock control and financial statements).
- Management (Planning, organising, supervision, coordination and control).

The role of information was therefore not spelled out in these earlier management theories, but because data and information were seen as parts of each of these separate functions, it was a long time before there was a realization of the centrality of information. As has been indicated earlier, however, with the growth of understanding of the central role of information, the ability of business managers to manage data, create information and possess the knowledge to do so also became an important topic of study. In the *Presidential Committee on Information Literacy: Final report* (American Library Association, 1989) it was stated that:

> The need for people in business who are competent managers of information is important at all levels, and the realities of the Information Age require serious rethinking of how businesses should be conducted.

The management of information in a business is therefore no longer seen as a secretarial job, but as a branch of the management skills required by all business managers. Together with the management of the systems that need to be in place so as to facilitate the change of data into information (‘information systems management’), and the management of knowledge in the organization in such a way as to enable this process to take place (‘knowledge management’) there is also a special branch of management concerned with the management of the actual data and information itself.

For the purposes of this study a detailed analysis of the differences and similarities, as well as detailed definitions, of each of these three facets of management are not necessary. What is important is to realize that one of the goals of enskilling people with information skills is to enhance management of businesses and organizations. There is a definite link in that it is the application of these information skills that enables management to perform the three roles of information management effectively.

2.1.4. Information literacy

It is therefore the ability to work effectively with data in the creation, manipulation and use of information rather than the mere ability to use information technology which forms the basis of information skills (Behrens, 2000:7). These skills are seen not only as a means to achieve the immediate goals within the context in which they are taught but, more importantly, as vital skills that are needed in order to be able to adapt to the changing circumstances which form the very basis of modern society – a society in a constant state of change (American Association, 1988:4; Behrens, 2000:8; Bonanno, 2006:5). These skills also go beyond those needed to find information but address the idea that students should be able to “think, evaluate, interpret and question” (Foote, 2010:1).

The concept of information literacy was formulated with the original definition of being able to use information skills effectively. This linked very closely to the realization of the value of information and the necessity for the possession of the skills needed to function effectively within the information era (Boekhorst, 2004). This original, fairly straightforward view of information literacy has developed over time into a more dynamic concept of information literacy and the role that information skills play within information literacy (Langford, 1999:5). The *Presidential report* (American Library Association, 1989), in words that have become widely accepted, stated it as follows:

> To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information.

This original concept of information literacy was linked to the workplace, but it grew and expanded to include a capacity with a more universal application. There is, in fact, a strong link between the idea that deficiency in information literacy leads to a limited ability to access and use relevant information effectively, and the idea that this places people in the global economy in a very unfavourable position (Boekhorst, 2004:63). In West Pennsylvania a group was tasked with developing 'Information Literacy Tools for the 21st Century'. Their definition of information literacy stated in addition to the aspects contained in the ALA definition that it is "For the purpose of the investigation, education and solving real world problems" (Canning, 1999:1).

Particularly on tertiary educational level a change has occurred from the traditional idea that students should be trained to use the library, or in library use, to one where students need to be trained in information management and handling. Teaching information literacy has thus become more than teaching bibliographic instruction (De Jager & Nassimbeni, 2002:167). At Iowa State the traditional library course taught core library skills, but it was realized that there needed to be a greater emphasis on the research process, leading to a reconsideration of their instruction. This resulted in a far more comprehensive approach, with the interesting title of the "Instruction Commons" (Gregory & Nixon, 2003).

This view of the increased importance of information skills was reflected internationally, for example Hadengue (2004) in France and Harrison and Rourke (2006) in Canada. In South Africa at the University of Natal the course that was designed and implemented in 1997 to enable students to use the library and reference systems more effectively, was changed in the same year to a course to enable students to understand the information environment and give them the capacity to work within this environment (Leach, 1999:58). The library at the

Technikon Natal saw as a goal a “library and information instruction module” (Rawlins et al., 1999:54) and from Cape Town, De Jager and Nassimbeni (2005:37) point out that librarians are also paying attention to traditional academic literacy concepts such as communication and critical thinking.

Becoming information literate is not, however, a finite process which occurs only once, similar to gaining a motor-car driver’s license. It should rather be seen as a dynamic process that continues throughout a person’s lifetime (Brandtman, 1999:15; Langford, 1999:3; Campello & Abreu, 2005:57). In South Africa the concept of lifelong learning and the demands that all education allow people to develop skills outside their particular discipline has led to “an institutional recognition of the need for everyone to acquire an understanding of how information is used” (Underwood, 2002:12). Again, as expressed in the *Presidential Report* (American Library Association, 1989):

> Ultimately, information literate people are those who have learned how to learn…They are people prepared for lifelong learning.

As such, national governments and education departments have a particular role to play as they essentially create the content and paradigm of any system of education that is applied in a country. In the United Kingdom CILIP (2002:27) sees as part of its role working with the government to ensure that basic information skills become a “Core competence of all members of the society and part of the national curriculum.”

This is the system that will, according to them, be responsible for preparing their citizens to be productive and effective participants in the community (Boekhorst, 2004:63). The modern citizen will need to be able to “Handle vast amounts of information, be able to sort out and evaluate what is found” (Flöög, 2004:1).

In the South African context, this content and paradigm is found in various documents, but particularly in the documents outlining the content as expected at school level. The “key challenge confronting schooling” is “empowering learners

to be creative, critical and constructive users of information (Todd, 1998:18). How the curriculum documents address this in terms of incorporating information literacy into the curriculum is found in section 2.2 onwards.

2.1.5. information skills and the Information Skills Process

As is clear from the previous discussion, although possession of information skills is not synonymous with being information literate, to be information literate the necessary skills have to be learnt. These skills have also been linked to other concepts such as project-based learning (Abdullah & Zainab, 2006) and resource-based learning (Australian School Library Association, 1993; Campbell et al., 2002; Spence, 2006). This last linkage is illustrated by the comment that:

> Teacher-librarians have advocated resource-based teaching and learning. They have drafted whole-school information literacy policies, emphasizing process as against exclusively subject content. (Wake 1999:13)

In other fields these skills have been linked to academic literacy seen as "the literate processes of locating, interpreting, and applying ideas gained from reading" (Peterson et al., 2003:38). However, more commonly when they are being learnt individually or collectively, they are known as information skills.

In the *Presidential report* (American Library Association, 1989) there are clear signs of what these skills should be. This is found in the description of information literate persons as being those who "recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information." This formulation includes skills that fall into two distinct levels: basic, more technical skills, of searching for information, gaining access to information and developing strategies to do this; and the more advanced cognitive skills of evaluation, organization and synthesis (Lonsdale & Armstrong, 2006).

However, these skills, as is common with most skills, should be seen as best learnt when they are taught as part of content areas in a classroom (Johnson, 1999:26), or integrated into the curriculum (Bonnano et al., 2006:6). It is not a

separate item, delivered by the library, but “It is the responsibility of the whole school community to ensure that information skills are a part of the school curriculum” (Rushton & Kloeden, 2000:5).

These skills, although being able to be seen as discrete skills, are also seen as being essentially part of a process. Even the acquisition of these skills is seen as being through a learning process in which the skills are learnt through a process which goes these various stages (American Library Association, 1989).

Different formulations of this process exist, and have been compared by various authors (Eisenberg et al., 2004:43; Van der Walt et al., 2007:85-87). Eisenberg and Berkowitz (1988) formulated the Big6 model as a process with specific stages in 1988. It is one of the most widely accepted (particularly in schools), and also one of the most typical of the information literacy process models. This consisted originally of the following stages (Webber & Johnston, 2003:3):

1. Task definition.
2. Information Seeking Strategies.
3. Location and access.
4. Use of information.
5. Synthesis.
6. Evaluation.

The move towards the concept of information literacy as a process that had to be taught and learned was led by formulations such as the one outlined above. In 1991, Norman Beswick (1991:92) emphasized the librarian as being responsible in education for “a methodology of enquiry”. There was a movement away from this vague formulation and that of “effective research strategies” within academic literacy, to a realization of the nature of information literacy (Braine, 2002:59). This led to an increased importance of the types of formulations as in the Big6 as information literacy became the “buzz concept in education” during the 1980’s (Langford, 1999:4).

The two key moments for the formal acceptance of information literacy as a subject for formal education can be traced back to two events. These were the formulation of the American Library Association's unit standards for information literacy, and the approach to information literacy acquisition through the Big6 model, as formulated by Eisenberg and Berkowitz in 1988. It was particularly the latter that led to a growing realization that information literacy was to be seen as something more than the ability to find and use a source of information; it was rather the ability to use a process involving information skills (an Information Skills Process) to satisfy an information need (Boekhorst, 2004:64).

The Big6 model, and similar Information Skills Process models, were able to be used to integrate information literacy into subjects such as history (Eaton, n.d.; Eisenberg & Berkowitz, 1998; Chen & Horng, 2007). Farmer (2006) provides a list of websites with lessons from different subjects that all use the Big6 approach to information literacy.

Although there are other formulations of the information skills model, the essential similarity was that they were founded on a process with different steps which find resonance in the ALA definition quoted above. Comparisons between the different models exist in the literature (Eisenberg et al., 2004:43; Van der Walt et al., 2007:85-87). However, the Big6 has been described as "The choice information technology literacy process model for use in schools" (Mokhtar et al., 2009:91). For the purposes of this study, then, the Big6 model is used as being not only typical, but also the preferred model for use in schools.

For clarity it is important that each of the steps are looked at in detail so as to determine what is needed within each stage of the process so that the user of the process can move forward to the next step. In particular, the focus will be on the relationship of the information literacy standards as formulated in the Association of College and Research Libraries *Information Literacy Competency Standards*

for Higher education (2000) and the Big6 model as formulated by Eisenberg and Berkowitz (1988). However, reference will be made to other formulations' vision of particular stages in the process.

2.1.5.1. Task definition.

In the Association of College and Research Libraries *Information Literacy Competency Standards for Higher education* (2000) the first standard is given as:

> The information literate student determines the nature and extent of the information needed.

They further divide this into four sections, described as Performance Indicators:

- The information literate student defines and articulates the need for information.
- The information literate student identifies a variety of types and formats of potential sources for information.
- The information literate student considers the costs and benefits of acquiring the needed information.
- The information literate student reevaluates the nature and extent of the information need.

In the Big6 formulation which, unlike the ACRL standards which are designed for higher education, is aimed mainly at schools, this is divided into two steps, under a single general heading (Eisenberg et al., 2004:40):

1. Task definition.
   1.1. Defining the problem.
   1.2. Identifying the information requirements.

In problem definition a prerequisite is that the student is aware that an information need exists (Johnson & Eisenberg, 1996:14). The ALA definition (1989) referred to earlier points out that an information literate person "Must be able to recognize when information is needed."

This recognition can be triggered and refined through communication with the person providing the task, such as a teacher, or by brainstorming among a group, either physically or even using technology such as listservs or newsgroups to generate problems. In higher education, it is often tacitly understood that the need for information arises from assignments given to students – which may be specifically geared to harness information skills. In the University of Stellenbosch

these are referred to as “Inligtingsopdrag” (Information assignment) (Steyn & Maritz, 2003:2).

Other facets regarding the definition of the problem that can affect the students’ ability to define the problem can include an assessment of earlier assignments (Chapman & Marien, 1999:30), the use of scenario’s by the person giving the assignment (Gray, 1999:8) and even school-to-work partnerships requiring learners to work with people who deal with these problems in real life so as to understand them (Eisenberg et al., 2004:101).

The level of skills required to identify the problem can be rated on a scale. One such scale is that by McKenzie (2005). He differentiates the ability to recognize decisions in three levels for learners, with the following rating:

> 5 - Discovers independently an issue or problem which needs a decision or solution after exploring a topic.
> 3 - Formulates questions about topics with adult help to elevate the question to focus on issues and problems.
> 1 - Relies upon adults to state questions and topics.

The emphasis on the independent finding is supported by Eisenberg (1998:7) in finding that the assignment can be given in such a way that the student should be “Clear that it’s their job to find out what’s to be done.”

A further facet of “Defining the problem” is “Defining the form of answer required”. Answers could range from creative answers (from asking why a certain place is the capital to a new ending of a story), an explanation, analysis or judgment (such as should the death penalty be abolished), to a decision or plan of action (Murray, 2007:38). The physical format of the answer is also needed as part of the definition of the problem. The length required (Murray, 2007:36), as well as the actual physical format (e.g. a PowerPoint presentation) need to be identified (Darrow, 1999:10).

This last leads directly to the second part of task definition: identifying the information requirements. Johnson (2006) specifies four levels of research

question in a rubric: it is significant that the information requirements also show an escalation and are specified. The following is an adaptation showing specifically the information requirements:

- Level One: I can complete the assignment by using a general reference source such as an encyclopedia.
- Level Two: … may mean that I need to go to various sources to gather enough information to get a reliable answer.
- Level Three: To answer this question I may need to consult not just secondary sources such as magazines, newspapers, books or the internet, but use primary sources of information such as original surveys, interviews or source documents.
- Level Four: My research … contains information that may be of use to decision-makers. (Murray, 2007:40)

A similar distinction by McKenzie (2005) rates the source of information identification as:

5 - Selects high quality sources independently and efficiently.
3 - Selects sources with mixed success.
1 - Wanders from source to source without questioning which would be most helpful.

In England the Standing Conference of National and University Libraries (SCONUL) (2003) has presented their own synthesis of skills. The first, recognising the ability to recognise a need, is identical to the first one discussed above, but their second shows an increase in complexity of the idea of identifying sources of information. They include not only knowledge of appropriate resources and selection for best fit (both of which can be related to the above two) but also an “ability to understand the issues affecting accessibility of sources”. It must be borne in mind, however, that SCONUL refers specifically to students of Higher Education and this complexity might not be required of learners at school.

The “Information requirements” also require that learners identify the key terms with regard to their topics (Darrow, 1999:10). For the next stage (Information seeking), it is important that the correct terms be searched for. In library catalogues the lack of Internet type-searching has led to suggestions of enhancing the catalogues for educational use by expansion of the searchable terms, with some evidence that this leads to improvement of access (Colson, 1994:19). However, the opposite is true in that with an increased searching

capability and availability of information, learners need to think deeper so as to avoid information overload (Murray, 2007:37).

2.1.5.2. Information seeking strategies

In the Association of College and Research Libraries *Information Literacy Competency Standards for Higher education* (2000) the second standard is given as:

> The information literate student accesses needed information effectively and efficiently.

Again, this is divided into Performance Indicators:

- The information literate student selects the most appropriate investigative methods or information retrieval systems for accessing the needed information.
- The information literate student constructs and implements effectively-designed search strategies.
- The information literate student retrieves information online or in person using a variety of methods.
- The information literate student refines the search strategy if necessary.
- The information literate student extracts, records, and manages the information and its sources.

From this it can be seen that this standard covers both this part of the process (the first two and fourth Performance Indicators) and the next (Location and access) in Performance Indicators 3 and 5.

In the Big6 formulation the difference between school and tertiary levels expectations are clearly seen. This formulation is given as (Eisenberg et al., 2004:40):

2. Information-seeking strategies.
   2.1. Determine range of sources.
   2.2. Prioritize sources.

The ACRL standards are more extensive and analytical of the means of determining the sources and, in particular, the design of effective search strategies. In an analysis of different formulation of the process (Eisenberg et al., 2004:40) the Stripling/Pitts Research process also places emphasis on the formulation of questions to guide research before finding sources. In the University of Stellenbosch the differentiation is made between effectiveness of

the search strategy and the actual evaluation of sources and information in terms of validity and reliability (Steyn & Maritz, 2003). Similarly, SCONUL (2003) typifies the ability to locate and access information as including the ability to develop appropriate searching techniques.

The examples that are school-based show why there is this difference. Gray (1999, 9) indicates that the Information-Seeking Strategy used in one case was the brainstorming of ideas by students. Similarly, Murray (2007:46-47) indicates that the determination of the range of sources can be done by the teacher showing the students alternative sources, and also indicates that teachers can suggest appropriate websites. This range can be very limited. Baker (2003) describes the use of selected stories and Jansen (1998:6) goes so far as to describe a Big6 lesson in which there was only one copy of one book available as the source. The teacher can also play the role of content manager by creating indexed collections of information sources (Abdullah & Zainab, 2006:35). In Australia, where electronic resources are used, this role is even seen as being the responsibility of the teachers so as to prevent unsafe use of the Internet (McLellan, 1999:38; Australian Government, 2004:15).

In all these examples the search strategy is largely guided by the teacher in terms of determination of the range of sources. In addition the selection of the most appropriate method or system (as in ACRL's first Performance Indicator) is also left to the teacher. In McKenzie's (2005) rubric for assessing information skills the highest category is given to a student who "Collects and organizes important information for retrieval independently" showing an assessment of product rather than the process of actually setting up a search strategy.

The second part of the Big6 formulation in which sources are prioritized, is also partially linked to the fourth Performance Indicator of the ACRL. In this regard, however, the ACRL has a far more iterative process, with the Big6 being more linear, leaving much evaluation which the iterative process uses throughout to a

phase at the end. Nonetheless, there is an emphasis on selection of the source seen as being most correct for use. In this regard the learner needs to evaluate the source and the information contained in the source.

Murray (2007:52-55) provides various examples of what needs to be evaluated and also exercises and rubrics that can be used with learners to determine the usefulness of a particular source. The dichotomy of the placement of this part of the process by the Big6 before the process of Locate and Access, shows clearly in this. In Johnson's use of the Big6 he also has students first assessing the value of different types of electronic resources, and then using them. It is not clear how the students are expected to be able to evaluate these resources without first having tried them (Johnson & Eisenberg, 1996:14), but the answer could lie in the emphasis shown by the narrator in the Big6 video that the Big6 is not a purely linear sequence, but also has iterative properties (Weitz, 1999:6).

Chapman (1999:31) reconceptualizes this phase into a more useful definition typifying it as "Planning my time". In the RNCS Grade 7-9 context this is seen as identifying resources and locations and planning the work agenda to meet the deadlines. In many cases this is what will happen in practical school applications of the process, including the Big6. As early as 1991 Evans (1991:28) was concerned about students' lack of ability to search and the idea of preselecting sources merely exacerbates the problem. Preselecting of sources is only appropriate when selection and evaluation of materials is not part of the actual objective of the lesson, and it is catered for at other times and other lessons (McGregor, 1999:11).

The problem is expressed clearly in McDowell's (2002:264) study:

> Some lecturers…realised that their own well-intentioned practices designed to support students might in fact reduce the likelihood that they would develop as independent information users.

It is in this phase of the process, then, that these practices would be most likely to hinder a student's development into a fully information literate user.

2.1.5.3. Location and access

As stated above the Association of College and Research Libraries *Information Literacy Competency Standards for Higher education* (2000) has as the second standard:

> The information literate student accesses needed information effectively and efficiently.

The first, second and fourth Performance Indicators of this standard have been discussed under the previous heading as they are applicable to that stage. For this stage, then, the applicable Performance Indicators are:

- The information literate student retrieves information online or in person using a variety of methods.
- The information literate student extracts, records, and manages the information and its sources.

Much of the literature prior to the late 1990's concentrated on this aspect (e.g. Colson, 1994; Evans, 1991), together with final product presentation. This concept of the process is unfortunately still found in much material used in schools (READ, 2003), and is often seen as the core of instruction necessary for students at tertiary level (Boyd-Byrnes & Rosental, 2005:217; Thompson, 1999:36 ;Walton & Archer, 2004).

In the Big6 Location and Access are also divided into separate processes:

1. Locate sources.
2. Find information within sources (Eisenberg et al., 2004:40).

The location of sources is seen as including finding the mechanisms for locating the sources, using them and then physically finding the sources themselves. The mechanisms for locating the sources range from the traditional card catalogue, to the now more common search interfaces for information electronically available. These latter were already listed in 1996 by Johnson (1996:14) as including

“Online catalogs, periodical indexes, full-text sources, multimedia computer stations, CD-Rom stations, online terminals, scanners, [and] digital cameras.”

In this list the mechanisms have various functions. Some are for creation of information (digital cameras), some for duplication/transformation of information (scanners), some are hardware for hosting both information and information seeking programs (CD-ROM stations, online terminals, multimedia computer stations), some mechanisms to access information (online catalogs, periodical indexes) and one is the information source itself (full-text sources).

The mechanisms that are now commonly seen as being the means of accessing information are the online catalogs and periodical indexes, or databases, originally named by Johnson. But access to these requires proximity to a library (Brammage, 1997:4) or to Internet-based hardware and connection, which is still unavailable in many rural areas and poorer schools. South Africa’s overall 10,5% Internet penetration (Internet World Stats, 2009) shows the extent of the problem in South Africa, but there are only 47 out of 271 territories in the world with more than 50% access, and the overall international percentage is 21,9%.

The primacy of libraries in providing this access lies not only in the library’s actual capacity, but in the perception of the role of the library, as typified by the comments in one research project amongst scholars and teachers where libraries were seen as where learners “get resources” with the library expected to “put them out on tables” (Hart, 2006).

In the context of the process, then, the information literate person needs to be able to identify the sources of the sources that are typical of their information horizon (Sonnenwald et al., 2001:10). Within each of these, typically, would be different formats of access mechanisms, both physical such as cabinets and workstations, and also subsumed within the mechanism, such as card order and search engines. Information literacy thus does need to address the use of search

mechanisms, but within this broader context of access to resources and sources of resources.

In most cases the access from the tools also needs to be addressed. Much of this was done in traditional context where books and other printed material were concerned; in many cases the same type of access from the search mechanism needs to be looked at in the virtual environment where the issue of links and, with the increasing tendency to provide only bibliographic detail, right to access is concerned. At a school level this is often restricted to what is immediately available either physically in print, or on-line (McGregor, 1999:11).

The second part of this section of the process as seen in the Big6 is the actual location of information within the source. This is critical to the actual use of the source. A bigger problem is that with the actual location done, there is often little engagement with the content (McGregor, 1999:14), and this is further addressed in the next stage of the process.

The finding of the information within the source has also extended to a more critical approach to the actual selection of source – this in particular to the role of search engines and other discovery tools. This in-between stage is triggered by the appearance of two factors within discovery tools results that have become common: ranking, and tagging. Ranking refers to the order in which results appear and much research has been done into the effects of ranking on selection of resource (Pan et al., 2007). Tagging refers to the actual abstract section that appears with the result. The above study showed that ranking has a greater effect than tagging. The process of training users to refer rather to the abstract so as to access the most relevant information has therefore become a part of the information literacy training so as to enable more success in this part of the process.

This training is linked to the idea that access is not only about physical access, which has been discussed in greater detail above, but also about intellectual access (Barton, S.a). In this way the whole Information Skills Process is seen as the foundation on which an understanding of access is to be built – thus providing intellectual access to information through an understanding that a process is needed to get access beyond the merely physical. Information literate students are expected to be the master of their own learning (Barton, S.a). Due to the recursive nature of the Big6 skills, during the "Location and Access" stage the student can practice all the elements of the Big6 (Murray, 2007:66-67).

2.1.5.4. Use of information

In the Association of College and Research Libraries *Information Literacy Competency Standards for Higher education* (2000) the third standard is given as:

> The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.

Again, this is divided into Performance Indicators:

- The information literate student summarizes the main ideas to be extracted from the information gathered.
- The information literate student articulates and applies initial criteria for evaluating both the information and its source.
- The information literate student synthesizes main ideas to construct new concepts. *(This Performance Indicator is dealt with in the next section*)
- The information literate student compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.
- The information literate student determines whether the new knowledge has an impact on the individual's value system and takes steps to reconcile differences.
- The information literate student validates understanding and interpretation of the information through discourse with other individuals, subject-area experts and/or practitioners.
- The information literate student determines whether the initial query should be revised.

The importance of the critical interaction with the information obtained during the Locate and Access phase is found in both the above and in the Big6 formulation of the phase which is described as "Information use", with two aspects:

1. Engage with the information.

2. Extract information (Eisenberg et al., 2004:40).

It is the phase of engaging information which can be extended in two ways. Firstly, it can apply to the actual means of interacting with the information so as to connect to the information contained within (Murray, 2007:68), and, secondly, to understand the context within which the information has been offered (SCONUL, 2003:5).

The interaction with information has traditionally been through analysis of the printed texts, including the use of such aids within the source as tables of contents, indexes, headings, summaries and using reading techniques such as skimming and scanning text. In Bruce's (1999) analysis of the different ways people experience information literacy, one of the recommendations is that more emphasis should be placed on conceptual skill and intellectual agility rather than the mere ability to locate information. The location of sources is seen as only a pre-requisite for information literacy. Whilst acknowledging the need for training in Information Technology, she pre-supposes, the type of media literacy that is essential to move from the location stage to the stage where they feel that they can "Control information through establishing and mapping or formalising relevant connections" (Bruce, 1999:46).

In the work of Kuiper, Volman and Terwel (2005:309) on the use of the Web for information by children, they see the searching phase as separate from information literacy – for them information literacy is "the ability to critically assess the information that they find."

The skills needed to move from the location stage are, as indicated, skills to unlock meaning from a technical perspective. The reading skills have been outlined above, but there are also skills in terms of verbal engagement, both in terms of listening as well as arranging the verbal engagement in a format so as to enable the information to be elicited. It has been pointed out that it is easier for most people to learn conceptual information from spoken communication than

from a written source. The social context of the spoken interaction also leads to a greater degree of learning information, due to evolved human psychology (Charlton, 2006:1262).

There is also the important facet of extracting information from visual sources, known as media literacy. The definition of media literacy used by the Alliance for a Media Literate America also includes the terms “access, analyze, evaluate and communicate information” which is found in the definition of information literacy, but now within the context of video and other multimedia presentations (Murray, 2007:68). This explains why it can be said that information literacy includes the many literacies found in education, including media literacy, and visual literacy (Barton, S.a). Schools have recognized this and included the use of various forms of media within their practice of information literacy (Chapman & Marien, 1999; Charlottesville City Schools, 2004; Washington Library Media Association, 2004).

A further problem with interpretation occurs within the context of online sources, particularly those that are not subject to traditional publishing paradigms. Although there are various critiques of the value of traditional publishing sources, particularly as carriers of quality, the use of traditional academic criteria for reliable information needs to be understood before the truth claims are questioned (Junion-Metz, 1998; Walton & Archer, 2004:180). However it has been found that while participants might be skeptical of electronic sources, they often have a reliance on them and this could be partially explained by the perception that accessing the information within the source is easier on the Web due to the searching tools available (Maybee, 2006:82). Nonetheless even the ease of searching of the Web is not enough to expedite this facet, as it is limited by the student’s knowledge and skills in the area, which are linked to the context within which the information search is taking place (Hepworth & Wema, 2006:6).

All the above literacies are contained in the ARCL Performance Indicator:

> The information literate student summarizes the main ideas to be extracted from the information gathered.

Significantly the actual summarization of the main ideas is not seen as the extraction of information; in line with our earlier definitions of “data”, “information” and “knowledge”, it is by applying knowledge to these main ideas that information is extracted, both in the ACRL definition and that of the Big6.

The ARCL recognizes that these ideas have to be placed within a context. The context within which the information is found is often crucial, particularly due to the often unregulated nature of the information available to the student. Thus further Performance Indicators state

- The information literate student compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.
- The information literate student determines whether the new knowledge has an impact on the individual’s value system and takes steps to reconcile differences.
- The information literate student validates understanding and interpretation of the information through discourse with other individuals, subject-area experts and/or practitioners.

SCONUL (2003:17) also emphasizes this critical placement of what is obtained within a field of existing knowledge by recognizing as an essential skill:

> Ability to compare and evaluate information obtained from different sources
> - awareness of bias and authority issues
> - awareness of the peer review process of scholarly publishing
> - appropriate extraction of information matching the information need.

This process of placing the information found within the source while being aware of authority and bias, as well extraction of what is appropriate, is dependent on the knowledge of the individual so as to be able to engage the data from which information is to be extracted. This uses the third stage of the Bruce model of Information Literacy: applying the experience to new contexts and thus enabling transfer of learning (Andretta, 2004:104). Barton (S.a.) takes this further and states that the student who is information literate is capable of creating new information through the process known as knowledge creation.

The idea of this creation which becomes part of a personal knowledge base is reflected in the ARCL idea of comparing the new information to existing

information and thus placing it within a personal context. Bruce (1999:40) sees this as the “fifth face” in which information literacy is seen as building up a personal knowledge base.

The effects of this stage of the process are therefore controlled to a certain extent by the student’s prior knowledge and this must be seen in the broader context not only of knowledge of content, but also the knowledge contained in the social context within which the student operates, the area described by Sonnenwald (1999:8) as the “information horizon”. It is this “Information horizon” that in the South African context leads to a lack of access to the information within the sources obtained for the poor majority (Brammage, 1997:5), a finding that is echoed in Maloney’s 2003 study of what she calls “At-risk” students in New York.

Although Murray (2007) sees citing sources as part of this process, it should rather be dealt with under the next Big6 stage, “Synthesis”, as done by Johnson and Eisenberg (1996:15). It is an essential part of the communication of the product. In all the rubrics shown as examples for evaluation of both process and product, Murray (2007:92-96) fails to include any assessment of the ethical use of information. However, in a tertiary setting this has become far more important and, again, is usually seen as being part of the stage “Synthesis” (ARCL, 2000; SCONUL, 2003).

2.1.5.5. Synthesis

In the Association of College and Research Libraries *Information Literacy Competency Standards for Higher education* (2000) the fourth standard is given as:

> The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.

Again, this is divided into Performance Indicators:

- The information literate student applies new and prior information to the planning and creation of a particular product or performance.

- The information literate student revises the development process for the product or performance.
- The information literate student communicates the product or performance effectively to others.

In addition, in section 2.1.5.4 it was shown that the third standard also contains the Performance Indicator

- The information literate student synthesizes main ideas to construct new concepts.

In the SCONUL (2003:17) listing of skills there are two that are appropriate to this phase:

- The ability to organise, apply and communicate information to others in ways appropriate to the situation.
  To cite bibliographic references in project reports and theses.
  To construct a personal bibliographic system.
  To apply information to the problem at hand.
  To communicate effectively using appropriate medium.
  To understand issues of copyright and plagiarism.

- The ability to synthesize and build upon existing information, contributing to the creation of new knowledge.

Similar to the SCONUL emphasis on citation, the final standard (number five) of the Association of College and Research Libraries *Information Literacy Competency Standards for Higher education* (2000) is given as:

> The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information legally and ethically.

The Performance Indicators for this standard:

- The information literate student understands many of the ethical, legal and socio-economic issues surrounding information and information technology.
- The information literate student follows laws, regulations, institutional policies, and etiquette related to the use and access of information.
- The information literate student acknowledges the use of information sources in communicating the product or performance.

In the Big6 model this stage, like all the others, is divided into two sections:

1. Organize.
2. Present (Eisenberg et al., 2004:40).

During this stage of the process, then, the user transfers and transforms the information obtained into a product that is suitable for the task at hand. This transformation requires three elements:

- Organization of the obtained material into the form required.
- Ethical and legal requirements are met.
- The product is made available to the intended audience.

The form required of the product can be a traditionally written paper, but it can also take many other forms. It is recommended by Johnson (2006) as one of the strategies to decrease the chance of plagiarism that the final product take the form of a narrative rather than expository style. Similarly Murray (2007:81-82) mentions forms such as three-dimensional posters and dioramas and Barton (S.a.) gives examples of brochures, websites and menu's – again supporting another one of Johnson's strategies that projects should be in a form that uses multiple senses.

Although the form itself can be said to give new meaning to the information, as in some of the product examples mentioned above such as websites, brochures and three-dimensional objects, synthesis can also give insights through the organization of newly acquired knowledge, which Bruce (1999:41) calls the "sixth face" of information literacy. This also reflects the ACRL Performance Indicator from the third standard:

> The information literate student synthesizes main ideas to construct new concepts.

In addition it also reflects the SCONUL descriptor:

> The ability to synthesize and build upon existing information, contributing to the creation of new knowledge.

However, the organization of the information can also be in a form that can be used to produce a variety of final products: the organized information can therefore also be seen as not the final product, but a vehicle to provide the product which is then communicated (Darrow, 1999:11). Further examples of this are when the organized information is in a format that then requires action – such as an action plan (Gray, 1999:9). In that case the actual carrying out of the plan is the presentation to the audience, as discussed below. The same is true of the

use of synthesis to provide the material for a performance, whether dramatic or musical.

In the last-named cases the organized information might even be in a format that is not the usual written format: for example, a page of sheet music produced using music composition software (Johnson, 1996:15).

Both ACRL and SCONUL place greater and broader emphasis on the legal and ethical use of information than is common with authors discussing school level work, although, as shown earlier, both Murray (2007) and Johnson and Eisenberg (1996) do mention the importance of citing sources. In the Charlottesville City Schools (2004) curriculum, Grades 1 to 3 are expected to follow copyright guidelines, and in Grade 4 learners are expected to understand the meaning of plagiarism and copyright as well as cite sources. However, SCONUL goes further and places citing as an essential part of communication, and also gives emphasis to the understanding of the issues in both copyright and plagiarism with one of their identified skills being:

> The ability to organise, apply and communicate information to others in ways appropriate to the situation.
>
> To cite bibliographic references in project reports and theses.
> To construct a personal bibliographic system.
> To understand issues of copyright and plagiarism.

Similarly the ACRL (2000) in their final standard, number five, state that:

> The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information legally and ethically.

The Performance Indicators for this standard again specifies both action, in the form of citing, and understanding of the issues:

- The information literate student understands many of the ethical, legal and socio-economic issues surrounding information and information technology.
- The information literate student follows laws, regulations, institutional policies, and etiquette related to the use and access of information.
- The information literate student acknowledges the use of information sources in communicating the product or performance.

The seriousness with which higher education institutions view the correct referencing can be discerned in the policies they have to address plagiarism.

This is probably due to the fact that plagiarism is a universal problem in higher education (Hepworth & Wema, 2006:7) and is also perceived as having become more prevalent with the advent of electronic information (Wood, 2000:71; McDowell, 2002:262). As an example of how seriously tertiary institutions view citation and its relationship to potential plagiarism the Cape Peninsula University of Technology (2005) views “Unintentional plagiarism” as occurring when users “Do not use correct referencing techniques”.

The form in which the final product has to be organized has already been discussed, but the product also needs to be presented to the intended audience. Often the intended audience is the person who will be evaluating the assignment and the presentation will be merely in the way of handing in the final product. However, Andretta (2004:104) gives the example of presenting orally to a target group and in writing to a separate group. Other examples of taking already synthesized information a step further occur when the synthesized product is an action plan which can be successful or not (Gray, 1999:9), or in the form of a performance.

Synthesis of information, therefore, usually leads to a product that is capable of being presented or actionated, with the ethical issues clearly dealt with. However, information literacy requires that a further step be taken, in which not only the product, but also the user’s own performance in the process are evaluated.

2.1.5.6. Evaluation

In the Big6 the evaluation is seen as being, again, in two parts:

1. Evaluate the product.
2. Evaluate the process (Eisenberg et al., 2004:40).

In neither the ACRL standards nor in the SCONUL list of headline skills is the user’s own evaluation of process or product mentioned, both ending with the synthesis stage and presentation or creation of the product.

However for the Information Skills Process to be a vehicle to create independent users on their way to lifelong learning, which SCONUL (2003:4) states as one of its aims, it is important that an understanding of the process, as well as a user's realistic evaluation of own ability with regard to the different skills needed in the process and the subsequent developmental needs, plays an important part and needs to be part of any information skills program (Maybee, 2006:84). Without this component users will not be able to internalize the process (Johnson, 1999:11). For this reason, courses offered at tertiary level often include a feedback component, such as that of the University of Pretoria (Thompson, 1999) and the University of Dar es Salaam pilot study (Hepworth and Wema, 2006).

This feedback, though, is often in relation to the students' perception of the course itself with assessment, particularly of specific skills, being done by presenters (Walton & Archer, 2004:175). This assessment can, of course, lead to feedback on the skills and is also one of the ways in which e-learning can be harnessed as immediate feedback is available, usually programmatically, as well as more structured feedback from analysis by the lecturer (Lima, 2004:1).

In some instances this assessment could be done by library staff in relation to the skills which are seen as library related (Jantti, 2008:3; Walton & Archer, 2004:175). This, too, is designed to aid in identifying developmental needs of the user and is commonly fed back to the presenter of the course itself. As librarians are seen to be the "process experts" (McGregor, 1999:13) it is logical that they should assist in the evaluation of the process, whether during the process, or together with the user and/or presenter after the process has been completed.

Although this evaluation is seen within the Big6 process as being part of the final stage, analysis and evaluation of different stages can also be undertaken. The choice of sources to be used, for example, can be studied so that the users themselves can appreciate what they tend to use. This concept of the

“Information Horizon” (Sonnenwald et al., 2001) can then be used to show the users what other sources could be considered for obtaining the information. This form of evaluation is thus limited to evaluating skills in the Location and Access phase of the Big6 process.

Evaluation of the product of an Information Skills Process is closely related to the information need that is being satisfied. Within an educational context, whether school or tertiary, this need is often to satisfy a course requirement for an assignment that is to be assessed by the lecturer concerned. Lecturers see their role as being assessors apart from the students and standing alone in the judging of the final product (McDowell, 2002:262). However, evaluation, particularly of product, can be given to a wider grouping – a grouping which can include classmates, teachers, staff, parents or other subject specialists (Eisenberg & Johnson, 1996:16).

However, as lifelong learners, users are also exposed to the Information Skills Process such as the Big6 as a problem-solving model. As such the product, as discussed earlier, could be in the form of a plan or in a format that would still need to be carried out. Evaluation of these products would best be done after the actionising of the product and then usually by the participants. In these cases the emphasis would be firstly on the product evaluation and then on the process evaluation so as to determine how a better product could have been arrived at (Gray, 1999:9; Schmuhl, 2007).

The use of evaluation, then, is in both product and process and can be done by various role-players. However if critical literacy – the ability to reflect on strengths and weaknesses, is to be part of information literacy, then the user needs to be central in this process of evaluation (Bagnole & Miller, 2003:5). For this reason, the process evaluation is often seen as continuing throughout all the stages of the Information Skills Process. The acquisition of information literacy skills thus

becomes an ongoing process of improvement, rather than a finite process that can be completed.

2.2. Curriculum links to Information Literacy

The availability of Information Skills Processes such as the Big6, and of descriptor standards such as those of the ACRL has made possible the linking of information literacy skills to curricula. The call for integration of information literacy into the curriculum in educational settings has been particularly evident in tertiary education. In South Africa Scheepers (2007) from the University of Pretoria, Walker (2001) from the University of the Witwatersrand and in Lockhart (2011) from the Cape Peninsula University of Technology, discussions of the integration of information literacy in the curriculum and the modalities used in those three institutions are found.

However for teacher training it is the curriculum within the schools that is important. In South Africa this is found in the curriculum documents as issued by the departments of education. Prior to 1994 the South African school education scene was divided on racial grounds, with separate departments for what were known as blacks, coloureds, Indians and whites. For whites each of the four provinces had their own department; special education had a National Department of Education and each self-governing bantustan had its own department. Although an analysis shows that 80% of the secondary school syllabi of these different departments in that period showed some reference to independent study and the use of the school library (Vermeulen, 1991:152), it was not until the formation of a new democratic South Africa with a centralized system of education that curriculum documents for the whole country can be analysed to determine the role of information literacy and the information literacy skills.

The first of these documents was issued in 1994, but the important documents that need to be considered are those that have informed both the present education system since 2001, and also the training of the teachers at the Cape Peninsula University of Technology. These documents, originally known as the Revised National Curriculum Statement, were changed to the National Curriculum Statement (NCS) and succeeded in 2010 by the Curriculum and Assessment Policy Statement (CAPS). It is these statements that need to be interrogated, then, to find where the information literacy skills and the Information Skills Process are integrated into them.

2.2.1. Standards movement

Section 2.1.5 shows the correlations between the standards generated with regard to information literacy as stated variously by the ACRL and SCONUL on the one hand, and the Information Skills Process as set out by Eisenberg and Berkowitz on the other.

In American education there has been a strong move towards standards-based education, which has been echoed in South Africa's curriculum. Most observers see the American model arising as a response to a 1983 report called *A nation at risk* (National Commission on Excellence in Education, 1983). The concerns in that report were about the rise of what was seen as acceptance of mediocrity and led to a national education summit in 1989. This summit agreed upon six broad goals, and implicit (and even explicit in places) in these goals was a mandate to identify standards expressed in terms of knowledge and skills (Marzano & Kendall, 1998:1).

This mandate led to various subject-matter groups, many of them funded by the U.S. Department of Education, mobilizing to establish content standards in their academic areas. However, far from clarifying issues, this has led to a plethora of documents containing standards. Researchers at Mid-continent Research for Education and Learning (McREL) found 116 documents containing standards –

and these between them had 200 standards to which education was meant to conform, which, in their opinion, would take 22 years of schooling (Marzano & Kendall, 1998). Despite this plethora, the standards movement is not under debate but what is significant is the way it impacts on pedagogy, and the link this makes to information literacy.

Research on the effects of trying to adhere to standards has been carried out extensively. Sixteen studies that addressed the relationship between standards-based instructional guidelines and standards-based pedagogy had been identified by 2005 (Lauer et al., 2005). General conclusions in these studies included that teachers more familiar with standards being more likely to ask their students to do problem-solving activities, and that at high implementation sites students spent more time explaining reasoning than basic computation (Lauer et al., 2005:69-71).

The difference between teachers' own opinions of pedagogic change and observations by researchers in the qualitative studies' assessment of the teachers' pedagogy was significant. It was observed that some teachers organized their rooms and talked about them as if they were standard-aligned, but practiced basically teacher-centred instruction (Lauer et al., 2005:72). This was born out further in several studies that indicated that the change to standards-based instruction would take considerable time and teacher learning (Lauer et al., 2005:73).

2.2.1.1. Link of standards to information literacy

The change of pedagogy envisaged to cope with standards-based instruction is broad but the use of information skills to approach the demands of higher-level thinking required by standards has already been the subject of much writing, much of which has been summarized by Murray (2008). Her book contains focused examples of the use of the Big6 skills, which is Eisenberg and Horowitz's model of an information literacy skills process. The use of a process such as the

Big6 also aids well-designed instructional strategies as it “Prompts or motivates the learner to actively make these connections about what the learner already knows and the new information” (Morrison et al., 2004:150).

Some of the examples by Murray show how this is done while using the skills to achieve subject standards. In one example (Murray, 2008:31-32), the standard lesson to be used in primary schools to compare how different people spend Christmas uses the Big6 approach to deepen and broaden the activity with:

- Step 1: Task definition. The task can be variously defined, such as “How have other cultures affected the way we celebrate Christmas?”, or “What similar celebrations are held by other communities in our society?".
- Step 2: Information Seeking Strategies. Pupils can be asked to look wider than the usual “The Internet” answer when asked where they are going to find out. Community resources can be explained as well as the importance of oral information.
- Step 3: Location and Access. A variety of sources can be used, including websites and printed media.
- Step 4: Use of Information. Now the way the question was phrased in the task Definition guides the way the students use the material.
- Step 5: Synthesis. Again, this step enables teachers to go beyond the normal "report”. Nontraditional products can be used to show students’ new understanding.
- Step 6: Evaluation. The product and the process can be evaluated.

Other examples indicate how each of the Big6 skills can be used to support particular standards. In writing on the characteristics of tasks that have a low probability of plagiarism, Johnson (2006) points out the importance of allowing students to reflect, revisit, revise and even improve the final project. The project itself is not the goal, it is a vehicle to allow the students to learn how to solve problems and systematically engage in higher level thinking skills so as to make decisions (Murray, 2008:89).

Although not expressed in terms of standards in the same way as the US or South Africa, the implementation of the National Curriculum on school level in the United Kingdom also required information literacy skills to support the cross-curricular skills as expressed (Kinnell, 1994:6). Similarly, in New Zealand information literacy has been part of the National Curriculum since 1993, but “not in those exact words”. The separate elements can be found in the Essential

Learning Areas and these are the “mandated responsibility of every New Zealand teacher” (Moore, 2001:9).

The Big6 “6.1 Evaluate the process” step, is reflected in standards of other bodies such as the National Educational Technology. Their Standard 5c expects students to “demonstrate personal responsibility for lifelong learning” (International Society for Technology in Education, 2007). The skills are therefore a vehicle that can be used to attain individual standards, as well as a process that can be used extensively in planning which is standards-based.

2.2.2. Standards in South Africa

In South Africa many changes have taken place in the school curriculum since the 1994 watershed political changes. Information literacy, too, has been an integral part of these changes. The first document on the position of information skills in the curriculum appeared in 1994 as the “Core Teaching Programme for information skills” (Moll, 1999). In this document the process model of information skills was adopted and schools were expected to replace the existing “Media Guidance” with this new curriculum.

However in 1997 the Heads of Education Departments National Curriculum Committee recommended the Draft Revised National Curriculum Statement for Grades R-9 for Ministerial Approval (known as Curriculum 2005). This was then published in terms of Government Notice 1445 in October 1997 (DoE, 2002g:5), with the Assessment Policy being introduced in December 1998, although the curriculum had already been introduced into schools as from January 1998.

After the first two years of implementation the Department appointed a review committee to look at, inter alia, the structure and design of the curriculum. This committee presented its report in May 2000, which led to the appointment of a team to revise the National Curriculum Statement. This process culminated in the

introduction of the Revised National Curriculum Statement (RNCS) (now known as the National Curriculum Statement) from 2004 (DoE, 2002g:6).

The Department of Education was divided into the Department of Higher Education and Training (DoHET) and the Department of Basic Education (DoBE) in 2010. The latter now became responsible for school-based education. This department then issued a National Curriculum Statement Grades R – 12: Curriculum and Assessment Policy (CAPS) which replaced both the National Curriculum Statement R – 9 of 2002 and the National Curriculum Statement Grades 10 – 12 of 2004 (DoBE, 2010a:2).

Although these latter documents were issued after the interviews and action research were undertaken, their content is still analysed in term of the curricular place of information literacy, as they now inform the practice in the schools.

2.2.2.1. Main elements of the Curriculum 2005, RNCS and CAPS

The Revised National Curriculum Statement is thus a revision of the original Curriculum 2005 and is not seen as a new curriculum. To this end there are obviously many elements that remain the same, and are based on the curriculum tools developed by the National Department of Education:

- Critical Cross-Field Outcomes (later known as Critical and Developmental Outcomes).
- Specific Outcomes.
- Range Statements.
- Assessment Criteria.
- Performance Indicators.
- Notional Time and Flexi-time.
- Continuous assessment, recording and reporting.
- Phase organizers.
- Programme organisers.

- Expected levels of performance.
- Learning programmes (DoE, 2002g:5).

In CAPS many of these elements remained, but often with changed names:

- Critical Cross-Field Outcomes became expressed in terms of aims.
- Specific Outcomes were expressed in terms of specific aims.
- Range statement became an outline of what is to be taught.
- Learning Areas now became Subjects.

The Curriculum 2005, RNCS and NCS documents were a linear progression, with changes made not being major. The layout of the documents, and terminology used was also similar. However the CAPS documents signaled a major change. This was not only in terminology, but also in the presentation of the curriculum documents that were more focused on being prescriptive.

There are two main training bands known as the General Education and Training (GET) Band and the Further Education and Training (FET) Band. The first is seen as the band that is the responsibility of schools and was envisioned as ending in a General Education and Training Certificate (DoE, 2002g:3); it is the subject of both the original Curriculum 2005 and the RNCS. Separate curricula have been devised for the Further Education and Training Band which is also seen as the province of FET colleges as well as schools. This thesis deals with the curriculum of the General Education and Training Band, often referred to in the documents as Grades R-9 (schools) (DoE, 2002g).

There are eight Learning Areas in the National Curriculum Statement. These Learning Areas are:

- Languages.
- Mathematics.
- Natural Sciences.
- Technology.
- Social Sciences.

- Arts and Culture.
- Life Orientation.
- Economic and Management Sciences.

It is within each of these that the link to the American idea of standards is found in that assessment is seen as being related to specific Assessment Standards, each linked to a learning outcome and “Designed down from the critical and developmental outcomes” (DoE, 2002g:11).

These learning outcomes and Assessment Standards are divided into requirements and expectations in three phases: Foundation Phase (Grades R-3), Intermediate Phase (Grades 4-6) and Senior Phase (Grades 7-9). The learning outcome will describe what the learner should know, be able to do and to demonstrate at the end of each appropriate period; the assessment standard describes the extent to which the learner should be able to do this, and in what way they can demonstrate this. This means that “the learning outcomes can and will, in most cases, remain the same from grade to grade while Assessment Standards change from grade to grade” (DoE, 2002g:14).

2.2.2.2. Critical and Developmental Outcomes

With all subject outcomes being derived from these, it is clear that they form the basis of the new curriculum. The critical outcomes are phrased in the type of abilities learners are expected to be able to demonstrate, so that learners should be able to:

- Identify and solve problems and make decisions using critical and creative thinking.
- Work effectively with others as members of a team, group, organization and community.
- Organize and manage themselves and their activities responsibly and effectively.
- Collect, analyse, organize and critically evaluate information.
- Communicate effectively using visual, symbolic and/or language skills in various modes.
- Use science and technology effectively and critically, showing responsibility towards the environment and the health of others.

- Demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation. (DoE, 2002g:11)

It is clear from these outcomes that they include all the elements of information literacy envisaged in the "Core Teaching Programme for information skills" of 1994. In that document these were the skills that underlay a learner's ability to

- Define the goal of an information task.
- Find sources of information.
- Select appropriate resources.
- Interpret the sources.
- Use the information to communicate the results. (Moll, 1999:2)

Information literacy was therefore explicitly recognized as a critical outcome of schooling (Hart, 1999). The Critical Outcomes were not seen as a separate curriculum or subject, but were to inform the curriculation of each of the Learning Areas.

2.2.3. Learning Area Outcomes

So it is the individual Learning Area Outcomes that need to be looked at to see where learners are expected to show these abilities. In particular the presence of the following Critical Learning Outcomes (with the key elements for information literacy in bold) needs to be looked for:

- **Identify** and solve problems and make decisions using critical and creative thinking
- **Collect, analyse, organize and critically evaluate information**
- **Communicate effectively** using visual, symbolic and/or language skills in various modes.

In the original Curriculum 2005, the subjects were described as having Specific Outcomes – this has been changed to Learning Outcomes in the RNCS. In the original Curriculum 2005, it was, on the face of it, easy to find where learners were expected to demonstrate their information literacy, as the Core Syllabus was kept as Specific Outcome 4 of the Learning Area then known as Language, Literacy and Communication, which was expressed as follows:

> Learners obtain access to, process and use information from a variety of sources and in a variety of situations. (Moll, 1999:2)

Further analysis of this outcome in Curriculum 2005 showed that it contained the entire syllabus as laid out in the Core Syllabus, merely expressed in other terms. However, this Specific Outcome was not repeated as such in the Revised National Curriculum Statement, as it was felt that information literacy was being seen as the domain of language teachers, and not as an underlying outcome of all learning. All the Learning Areas' Outcomes need to be looked at in order to see where the elements shown above in the Critical Outcomes now appear.

In the Curriculum and Assessment Policy Statement (CAPS) the reference to outcomes has been removed and they are rather indicated as the skills present in the curriculum. As indicated, there were other major changes in the documents, but the analysis that follows shows that there are still elements of the Information Skills Process present.

2.2.3.1. Language

The Learning Outcomes of Language as expressed in the RNCS are:

1. Listening.
2. Speaking.
3. Reading and Viewing.
4. Writing.
5. Thinking and Reasoning.
6. Language Structure and use. (DoE, 2002c:7)

These are expressed in the CAPS as skills with the subjects of Home Language as well as First Additional Language in the Senior Phase having the skills of

1. Listening and speaking.
2. Reading and viewing.
3. Writing and presenting.

4. Language Structure and Use. (DoBE, 2010d, 5; DoBE, 2010e, 5)

In the Intermediate Phase the skills of viewing and presenting are not present in the home language (DoBE, 2010f, 5); but viewing is present in the First Additional Language (DoBE, 2010c, 5).

Key to information literacy in the RNCS are the Outcomes 3-5. These are expanded as follows (bold indicating linkages to information literacy):

- Outcome 3: Reading and Viewing. The learner will be able to **read and view for information** and enjoyment, and respond critically to the aesthetic, cultural and emotional values in texts.
- Outcome 4: Writing. The learner will be able to **write** different kinds of **factual** and imaginative **texts** for a wide range of purposes.
- Outcome 5: Thinking and Reasoning. The learner will be able to use language to think and reason, as well as **to access, process and use information.** (DoE, 2002c:11-14)

As shown above the CAPS documents do not use the term “Outcomes”, but rather talk about “skills”. Similarly the skills are not expanded as the Outcomes were in the RNCS. However the CAPS do include a section explaining what learners will be expected to do in the subject. For Languages this includes:

- Develop tools for thinking and reasoning, and **to provide access to information.** (DoBE, 2010e, 6)

In looking at the Assessment Standards for Home Language, Outcome 3 includes, inter alia, the following as specific skills that are to be used as evidence of the ability to read and view for information. It is expected that the learner in Grade 4:

- Reads independently using…comprehension strategies.
- Skims for general ideas.
- Scans for specific details.
- **Understands** and responds appropriately to **information texts**:
    - Identifies main and supporting ideas.
    - Scans for specific details.
    - Follows short printed instruction.
- Selects relevant texts for own information needs.

The learners in Grade 5 and 6 expand on these by:

- Using previous knowledge or textual clues to determine meaning.
- **Notes** key points to track comprehension.
- Summarizes information.

- **Selects** relevant reading material and **applies research skills** to find information in dictionaries, reference books … (grade 5), or from a wide variety of resources (Grade 6). (DoE, 2002c:72-77)

In the Senior Phase, this is expanded to include:

- Showing an **understanding of information texts** (Grades 7, 8) or a wide range of information texts (Grade 9). (DoE, 2002c:106-107)

Similarly, the Assessment Standards for Outcome 4 indicate a learner able to:

- **Write informational texts** expressing ideas clearly, with the Grade 4 example a short report, Grade 5 a report and Grade 6 a research report. (DoE, 2002c:78-79)
- Produces research project reports (Grade 8). (DoE, 2002c:109)

Outcome 5's Assessment Standards include:

- Uses language to **investigate** and explore.
  - Formulates questions to assist in **obtaining information** (Grade 4), formulates relevant questions to guide **search for information** (Grade 5), asks critical questions that challenge and seek alternative explanations (Grade 6).
  - **Identifies relevant source** of information (Grade 4), **searches for informatio**n from other relevant sources (Grade 5), discusses the validity of information by **comparison with other sources** (Grade 6). (DoE, 2002c:84-86)
  - **Identifies information** (Grade 8).
  - Works on integrated projects across Learning Areas (Grade 7)**,** does **independent research** across the curriculum (Grade 8), works on increasingly complex projects across Learning Areas (Grade 9).
  - Uses appropriate **referencing techniques** (Grade 7).
  - Locates and **accesses information** from a wide variety of sources (Grade 8). (DoE, 2002c:112 – 113)
- **Processes** information (all Grades from 4–9). (DoE, 2002c:84-86, 114-115)

In the CAPS documents no Assessment Standards are stated. However teaching approaches are formulated. In the Intermediate Phase Home language these include text-based and communicative approaches (DoBE, 2010f, 7). These are augmented in the Senior Phase Home Language document to show that there are language processes. These are expanded and in the expansion the following are found:

- Speaking includes the stages of:
  - Planning and **research**.
- Reading includes:
  - **Making an outline** of key ideas and supporting details.
  - **Write a summary.**
  - **Evaluate** bias, accuracy and quality.
- Writing includes:

- **Consult relevant sources, select relevant information and organise ideas.** (DoBE, 2010e, 5)

2.2.3.2. Mathematics

The Learning Outcomes for Mathematics in the RNCS are:

1. Numbers, Operations and Relationships.
2. Patterns, Functions and Algebra.
3. Space and Shape (Geometry).
4. Measurement.
5. Data handling. (DoE, 2002e:6)

In the CAPS these are referred to as “Content Areas”, with both the Intermediate and Senior Phases having the same five areas as indicated as Learning Outcomes in the RNCS (DoBE, 2010i, 9; DoBE, 2010j, 9).

Although within each of the RNCS Mathematics Outcomes opportunities are given to use information that learners are expected to source (for example, it is suggested under Outcome 3 to “use national flags to demonstrate transformation and symmetry in design”) (DoE, 2002e:10), it is Outcome 5 that is most important. Expanded it as follows (again with bold indicating information literacy linkages):

> Learning Outcome 5: Data handling. The learner will be able **to collect, summarize, display and critically analyse** data in order to draw conclusions and make predictions, and to interpret and determine chance variation. (DoE, 2002e:12)

Looking at the Assessment Standards for this outcome they include:

- Critically reads and interprets **data presented** in a variety of ways including the **media** (Grades 5, 6).
- Selects **appropriate sources** for the collection of data including books (Grade 7), the Internet (Grade 8, 9). (DoE, 2002e:58-59, 90-91)

In the CAPS documents the “General content focus” of the Data Handling Content Area includes:

- …the skills to **collect, organise, display, analyse** and **interpret** this information.

The Intermediate Phase specific content focus includes:

- …the skills to **gather** and **summarize** data. (DoBE, 2010i, 5)

The Senior Phase specific content focus includes:

- **Posing of questions** for investigation.
- **Gathering, summarising and representing** data. (DoBE, 2010j, 5)

2.2.3.3. Natural Sciences

The Learning Outcomes for Natural Sciences in the RNCS are:

1. Scientific investigations.
2. Constructing Science knowledge.
3. Science, society and the environment (DoE, 2002f:6).

In the CAPS the Intermediate Phase has both Natural Sciences and Technology, whereas in the Senior Phase both Technology and Natural Sciences have their own documents. In the Intermediate Phase and the Senior Phase Natural Sciences there are three broad aims:

- Knowledge or content.
- Doing Science and Technology or practical work.
- Understanding the applications of Natural Sciences in everyday life/the interrelationship of Natural Sciences and Technology and the relevance for the environment and the community (DoBE, 2010l, 7; DoBE, 2010m, 8).

The curriculum designers of the RNCS themselves noted the linkages of the Learning Outcomes to the critical outcome on information use as follows: Learning Outcome 2 was seen as most clearly representing it, but during the pursuit of Learning Outcome 1, learners will build on it. These two Learning Outcomes in more detail (again with bold emphasis) are as follows:

> Learning Outcome 1: Scientific Investigation. The learner will be able to act confidently on curiosity about natural phenomena, and **to investigate** relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standards for this outcome include:

- **Identifies a testable question** among a set of possible questions (Grade 7).

- **Suggests sources** of information (Grade 9).
- **Uses** indexes and glossaries in **books and catalogues** (Grade 7).
- **Considers possible bias in sources** of information (Grade 9). (DoE, 2002f:48-51)

Learning Outcome 2: Constructing Science Knowledge. The learner will know and be able to interpret and apply scientific, technological and environmental knowledge. The learners' competence in this Learning Outcome can be seen in the ability **to collect** or extract **information from various sources** and then **to organize and analyse that information** (DoE, 2002f:9).

The Assessment Standards for this outcome include:

- **Finds information** in science texts by using glossaries, indexes and tables of contents (Grade 6). (DoE, 2002f:39)
- **Creates headings** for paragraphs (Grade 7).
- **Reconstructs texts** (Grade 7).
- Creates word-webs and mind-maps by **previewing** chapters of text (Grade 9). (DoE, 2002f:54-55)

In the CAPS documents the first of the three broad aims has skills stated that are needed in both phases:

- **Access information** from a variety of sources.
- **Select** key ideas obtained from **resources**.
- Recall and **describe knowledge.**
- **Analyse** acquired knowledge.
- **Evaluate** acquired knowledge.
- **Synthesise** knowledge.
- **Analyse** and **evaluate knowledge** and **apply** this to new and unfamiliar contexts. (DoBE, 2010l, 8; DoBE, 2010j, 9)

In addition the Intermediate Phase has in its second and third aim:

- **Access information** from a variety of sources (teachers, reference books, textbooks, the internet, experts, peers, parents, etc.).
- **Select key ideas** obtained from resources.
- Recall and **describe knowledge** of the Natural Sciences and Technology.
- **Select key ideas** to construct the history of scientific or technological discoveries. (DoBE, 2010m:11,16)

The Senior Phase has as its Specific Aim 3 the societal use of Natural Sciences and in this aim they include the mandate for learners to:

- **Access relevant information** from appropriate sources.
- **Select key ideas** to construct the history of specific discoveries.
- **Describe** the history of specific discoveries from past and present cultures.
- **Evaluate** the relevance or importance. (DoBE, 2010l:10)

In addition the document includes a discussion on the acceptable types of formal assessments and in this list includes projects, with the note that possible projects are suggested in the curriculum (DoBE, 2010l:14).

2.2.3.4. Technology

The Learning Outcomes for Technology in the RNCS are:

1. Technological Processes and skills.
2. Technological knowledge and understanding.
3. Technology, society and the environment (DoE, 2002i:6-9).

In some regards Technology has the closest linking reflection of information skills, as it employs a design process which has the skills of: “investigate, design, make, evaluate, communicate” (DoE, 2002i:6). This is seen as part of Learning Outcome 1: Technological processes and skills, which is expanded as: The learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies. The linkages to information literacy are made clearer in the discussion on this Outcome where the following is said (again with bold emphasis):

> One of the features of a rapidly changing world is the accumulation of vast amounts of information and data. This has an impact on all aspects of modern life. **Learners need to be equipped with knowledge and skills to be competent and confident in accessing and working with various forms of information** and data.(DoE,2002i:7)

These skills are included in Learning Outcome 1 as Assessment Standards related to investigating (e.g. **information gathering**, storing, **processing**, management) and communication skills (e.g. **presenting information, identifying sources**) (DoE, 2002i:7).

In a similar way the two CAPS documents dealing with Technology also describe the Technological Process in detail. In the Intermediate Phase this is spelled out as part of Aim 2, which is seen as applying the design process to solve problems.

This is stated in term of performance expected from learners that includes the following abilities:

- **Investigates** a situation.
- Design a solution.
- Construct the final solution.
- **Evaluate** the final solution.
- **Communicate** the process. (DoBE, 2010m:12-15)

These same abilities are described In the Senior Phase document as “The Design Process Skills” and in the document’s section on teaching methodology this is described as forming:

> The *backbone* of the subject and should be used to structure the delivery of all learning aims. (DoBE, 2010p:9)

Looking at the Assessment Standards in the RNCS these show firm linking to information skills, with a progressive level of use expected:

- **Finds out**, with assistance about the context (Grade 4), **finds out** about the background context (Grades 5, 6), **investigates** the background context (Grades 7, 8), **identifies and explains a problem** and **investigates** the context (Grade 9). (DoE, 2002i:20 -21, 34-35)
- **Finds out** about existing products (Grade 4, 5, 6). (DoE, 2002i:20-21)
- **Plans a strategy for collecting** data and **information** that includes:
  - Considering the **source**, resources, **copyright laws.**
  - **Extracts** relevant data (Grade 7).
  - **Collects** data from different sources or resources.
  - **Uses information** to justify and support ideas (Grade 8).
  - **Locates** (e.g. use library referencing system, indexes, database searches).
  - **Collect** (e.g. literature surveys, information searches).
  - Compare.
  - Sort.
  - Verify.
  - **Evaluate** (e.g. cross-checking different sources).
  - Store information (Grade 9). (DoE, 2002i:36-37)

In the CAPS document for the Senior Phase the section on assessment reinforces the importance of the Design Process, with learners expected to present the full design process once in each Grade. Even in the description of the written tests teachers are expected to allow the learners “to **investigate** using a variety of sources” (DoBE, 2002o:42).

In the Intermediate Phase Technology and Natural Sciences are combined. Nonetheless the document states that “learners should complete two projects: one for each subject component, one in each semester.” Further “the teacher

should provide the learners with the necessary **relevant resources** or instruct the learners to **collect** and bring to school the resources (DoBE, 2010m:61).

2.2.3.5. Social Sciences

The Social Sciences Learning Area in the RNCS is actually divided into two sections, each with its own Learning Outcomes. For History they are:

1. Historical enquiry.
2. Historical knowledge and understanding.
3. Historical interpretation.

For Geography they are:

1. Geographical enquiry.
2. Geographical knowledge and understanding.
3. Exploring issues (DoE, 2002h:7).

In both the Intermediate and Senior Phase documents of CAPS History states their specific aims as including a “rigorous process of enquiry” to enable learners to:

- Understand the range of **sources of information.**
- **Extract** and **interpret information** from different sources.
- **Evaluate** the usefulness of sources.
- Organise evidence to substantiate an argument. (DoBE, 2010n:8; DoBE, 2010o:8)

Similarly the documents in both phases for Geography indicate the following as aims, expressed in terms of what Geography “involves”:

- **Identifying** and **extracting relevant information** from photographs and other visual sources.
- Working with **data**.
- **Extracting information** from an atlas.
- **Cross-referencing information** using **different sources.** (DoBE, 2010n:10; DoBE, 2010o:10)

In both History and Geography in the RNCS the first Learning Outcome is closely linked to information literacy and is expanded as follows (again with bold

emphasis), the only difference being in the use of history or geography depending on the section:

> Learning Outcome 1: Historical/Geographical enquiry. The learner will be able to use **enquiry skills** to **investigate** the past and the present/geographical and environmental concepts and processes. (DoE, 2002h:7)

This in turn is expanded as including the following processes needed for the Learning Outcome(History first and then Geography where they differ):

- **Finding sources/finding sources** relevant to the enquiry.
- Working with sources – asking questions, **finding information, and organising, analysing and synthesizing information.**
- Writing a piece of history (answering a question)/answering questions and considering practical actions where possible.
- **Communicating** historical knowledge and understanding (communicating an answer)/**reporting** on the findings of the enquiry process using different communication skills. (DoE, 2002h:9,22)

As to be expected, the Assessment Standards in the RNCS expand and include most of the information literacy skills. For History, these include:

- With guidance, **selects sources** (Grade 5), **identifies sources** (Grade 6,7,8), investigates a topic by asking key questions and **identifies a variety of relevant sources** [finds sources] (DoE, 2002h:42-43, 64-65).
- **Records and organises information** from a variety of sources (grade 4), **Records and categorises information** (Grade 5), **selects** and **records relevant information** (Grade 6), compiles and organises from a **variety of sources** (Grade 7), **evaluates** the **sources** used (Grades 8,9) [works with sources] (DoE, 2002h:42-43, 64-65).
- **Uses information** from sources to answer questions (grade 4,5), **Arranges information logically** in answering questions (Grade 6), **uses information** from sources to present well-thought our answers (Grade 7) [answers the question] (DoE, 2002h:42-43, 64-65).
- **[Communicates the answer**]. (DoE, 2002h:42)

The Assessment Standards for geography are virtually identical, even to wording, and therefore contain the same elements as the history standards (DoE, 2002h:52 – 53, 74-75).

In the CAPS both phase documents include examples of assessment tasks which would require the use of different information skills to do. These include:

- Writing up a small piece of **research**.
- Writing about an issue.
- Doing a **presentation**.
- Participating in a structured, prepared discussion, debate or role play. (DoBE, 2010n:40; DoBE, 2010o:40)

2.2.3.6. Arts and Culture

The Learning Area Arts and Culture in the RNCS has four Learning Outcomes:

1. Creating, interpreting and presenting.
2. Reflecting.
3. Participating and collaborating.
4. Expressing and communicating (DoE, 2002a:10).

In the CAPS the name of the Learning Area was changed to Creative Arts. In the Senior Phase, it is suggested that learners take only two of the Art Forms; Dance, Drama, Music or Visual Art. Each of these has separate aims and skills, but the topic of Critical Reflection, including research into Careers in the art form are standard in each (DoBE, 2010a). The Intermediate Phase components now became part of the Life Skills subject in the Intermediate Phase. In this phase learners were expected to be exposed to all four art forms (DoBE, 2010h:6).

As with the Natural Sciences, in the RNCS Arts and Culture sees the Learning Area statement linking to the critical and developmental outcomes and, in particular, for Critical Outcome 4, through requiring (with bold emphasis):

- The **appropriate selection of materials** and the arrangement of different elements into meaningful wholes.
- The **collecting and organising of information** about artists, art history, art careers, heritage and cultural practices.(DoE, 2002a:5)

This is also seen particularly in Learning Outcome 2: Reflecting (again with bold emphasis):

> The learner will be able to reflect critically and creatively on artistic and cultural processes, products and styles in past and present contexts. The learner must **acquire knowledge** and understanding of history of the Arts, concepts, aesthetics, culture and heritage. (DoE, 2002a:10)

In the Assessment Standards this is expanded in the different sections:

In Dance:

- **Researches** the background of dances (Grade 6). (DoE, 2002a:52)
- Describes a traditional dance (Grade 7). (DoE, 2002a:80)

In Drama:

- **Researches** human rights and environmental issues (Grade 8).

In Visual Arts:

- **Gathers information** from field trips and other sources (Grade 7).

In Composite:

- **Finds out** about a South African artist (Grade 7).
- **Identifies sources** of cultural information (Grade 9). (DoE, 2002a:78-82)

In the CAPS suggestions are found in various places that **resources** are used for information and that **research** be undertaken. For example:

- Grade 8 Term 1, Dance suggests in Topic 3 Dance Appreciation that dance **magazines** and dance **books** are used. (DoBE, 2010a:21)
- Grade 8 Term 3 Drama suggests **pamphlets, books** on careers and **Internet** for Topic 4 Careers. (DoBE, 2010a:27)
- Grade 8 Term 2 Music in Topic 2 Appreciate and Reflect suggests **research materials.** (DoBE, 2010a:31)
- Grade 8 Term 4 Visual Arts in Topic 4 Visual Literacy suggests **research skills**, with the learners asked to **research** and **share information** using various sources: These are listed as interviews, case studies, **books, libraries, internet**, etc. (DoBE, 2010a:38)

In the Life Skills Intermediate Phase learners are expected to do a project which will involve "**collecting, interpreting** and **presenting** findings into a written product" based on "**data/resources/information**" that learners will collect. This could be in any of the components, including the Creative Arts (DoBE, 2010h:22).

2.2.3.7. Life Orientation

In the RNCS Life Orientation has five Learning Outcomes, of which Learning Outcome 5 is only applicable in the Senior Phase (Grades 7 – 9):

1. Health promotion.
2. Social development.
3. Personal development.
4. Physical development and movement.
5. Orientation to the world of work (DoE, 2002d:9).

In CAPS the subject is known as Life Skills in the Intermediate Phase and includes Religion Education, Physical Education and Creative Arts (as shown in

the previous section. In the Senior Phase it is again known as Life Orientation and is divided into five topics, which have been reworked from the five RNCS Outcomes:

- Development of the self in society.
- Social and environmental responsibility.
- Constitutional rights and responsibilities.
- Physical education.
- World of work (DoBE, 2010g:6).

In the RNCS links to the skills required for information literacy can be found in Learning Outcome 1: Health Promotion. In the Foundation Phase, the learner is expected to have knowledge about health matters (DoE, 2002d:9) but by the Intermediate Phase use **"investigative skills"** (DoE, 2002d:25).

In addition the Assessment Standards for Learning Outcome 5 include:

- **Investigates** career and study opportunities related to own interests and abilities (grade 8).
- **Researches** study and career funding providers (Grade 9). (DoE, 2002d:49)

In CAPS, as with the Creative Arts Senior Phase, the Life Orientation Senior Phase suggests the use of information resources in various places in the outline. Examples include:

- Grade 8 Term 1 Topic Social and environmental responsibility: **health books, magazines** and **brochures**.
- Grade 8 Term 2 Topic Constitutional rights and responsibilities: **newspaper articles**; Bill of Rights; **resources** on religions.
- Grade 8 Term 3 Topic World of work: **newspaper articles**, **resources** on careers. (DoBE, 2010g)

In both the Life Orientation Senior Phase and the Life Skills Intermediate Phase learners are expected to do a project which will involve "**collecting, interpreting** and **presenting** findings into a written product" based on "**data/resources /information**" that learners will collect. This could be in any of the components, including the Religion Education, Physical Education or Creative Arts (DoBE, 2010g:23; DoBE, 2010h:22).

2.2.3.8. Economic and Management Sciences

In the RNCS there are four Learning Outcomes:

1. The economic cycle.
2. Sustainable growth and development.
3. Managerial, consumer and financial knowledge and skills.
4. Entrepreneurial knowledge and skills (DoE, 2002b:5-6).

In CAPS Economic and Management Sciences as a separate subject are found only in the Senior Phase. The main topics are now:

- The economy.
- Financial literacy.
- Entrepreneurship (DoBE, 2010b:6).

Again, in the RNCS the Intermediate Phase is limited – this time to only the first two Learning Outcomes (DoE, 2002b:6). As with Life Orientation the links to information literacy are best found in the Assessment Standards for each Learning Outcome. For learning Outcome 2, this includes, in Grade 6:

> **Researches and analyses** standards of living and patterns of consumption. (DoE, 2002b:25)

In Grade 7:

> **Collects information** on the influence.

In Grade 8:

> Investigates **and describes** how the national budget is used … ; **Investigates** how the RDP could have been used … . **Investigates and reports** on how technology can improve productivity … .

In Grade 9:

> **Investigates** and debates. (DoE, 2002b:38-39)

In the CAPS the notes at the end of Grade 7 Term 3, Grade 8 Term 2 and Grade 9 Term 1 all refer to a **project** (with Grade 9 referring to a **research project**). In

the discussion on assessment teachers are asked to consider the **resource needs** and to allow time for learners to “go to a **library**” (DoBE, 2010g).

2.2.4. Implications of analysis

The above analysis shows very clearly the role of the information literacy skills in the different Learning Areas’ Assessment Standards. What is thus needed by teachers is an understanding of the Information Skills Process, with the Big6 being used as a convenient vehicle, as well as an understanding of how to use these in lesson planning in order to achieve the Assessment Standards in the different subjects in the South African curriculum. This is very similar to the work of Murray in which teachers are trained to use the Big6 to achieve national technology and information literacy standards as well as state, and/or national content standards (Murray, 2008:101).

The questions are, therefore, whether students are being consciously trained to do this, and where in their curriculum does this take place. In order to answer these questions it is not enough to merely look at the curriculum, as there is often a disparity between what is written and what is taught. A process was therefore developed to try and determine where this instruction takes place within the context of teacher training at the Wellington Campus of the Cape Peninsula University of Technology.

2.3. Summary of chapter

The literature on information literacy and related concepts is vast. However, allied to this literature, much literature and discussion on the interrelationships between the terms information, knowledge and data is found. Although there are differences in the literature, for the purposes of this study it is considered that information is extracted from data by using knowledge. The primacy of

knowledge has led to the concept of the ‘knowledge age’, where the manipulation of data to form information is considered of cardinal importance.

Although the management of knowledge within an organization (knowledge management) has therefore developed, the management of information is of more concern, although from the definition of knowledge management, many of the information skills are used, and theorists even see information skills as being the means by which knowledge manipulates data into information (Behrens, 2000:7). The need for these skills to be evident led to the formulation of the idea of information literacy, originally linked to the workplace, but increasingly seen as having a universal application.

This found resonance in the education sphere, with libraries at the forefront of seeing the importance of these skills being in the curriculum. These skills were seen as inevitably being used in a linear process, as seen in the accepted definition in the 1989 American Library Association Presidential report and then taken up by several authors in formulating the stages of the process. The process most used in schools was that formulated by Eisenberg and Berkowitz in 1988, but various formulations are known, with very similar steps.

Typically these steps are (Webber & Johnston, 2003:3):

1. Task definition.
2. Information Seeking Strategies.
3. Location and access.
4. Use of information.
5. Synthesis.
6. Evaluation.

Each of these steps has been discussed, to see how they link within different formulations, how each is defined in terms of standards and what the key terms within each of these steps are.

Examples of how this process is used practically show how the steps can be integrated practically into lesson planning. In South Africa, the information literacy skills were interrogated as they appeared within the different curriculum documents. Initially this was straightforward as they appeared in direct process form in the Western Cape Education Department *Core teaching programme for information skills Grade 1 to Standard 10,* issued in 1994, and in Specific Outcome 4 of the Learning Area known as Language, Literacy and Communication (Moll, 1999:2).

However, in the Revised National Curriculum Statement and their successor, the Curriculum and Assessment Policy Statement, this outcome was removed and the information literacy skills and process are found in different places in the different Learning Areas. As there is still a Critical Outcome (phrased in the CAPS documents as an aim) that states that all learning needs to include the capacity to:

> Collect, analyse, organize and critically evaluate information. (DoE, 2002g:11; DoBE, 2010a:3)

Each Learning Area's curriculum statement showed elements of this. These elements were identified and listed so as to emphasize the impact of information skills and the use of the Information Skills Process in order to achieve the curricular aims of the NCS and CAPS.

Chapter 3: Methodology

3.0. Introduction

The study of the literature and original thought behind the research process led to the adoption of a research process that involved different research instruments. These included documentary analysis, interviews and action research. Together they formed the tools with which it was hoped that the research would be able to answer the research questions and reach the research objectives as extrapolated from the topic of the research.

3.1. Research questions and objectives

The previous chapter has already explained the role and relevance of information skills within the curriculum as applied to the Intermediate and Senior Phases of the General Education and Training Band in South Africa. In undertaking this study this was seen as the first research question to be answered, as without an understanding of information skills, the Information Skills Process, its use in education and, in particular, the role it plays in the present curriculum it would be impossible to determine the place of it within teacher training.

At the outset of this study three questions were raised that needed to be answered:

1. How are information skills reflected within the prescribed South African curriculum for the Intermediate and Senior Phases of the General Education and Training Band?

2. How are student teachers trained in order to facilitate learners' acquisition and use of these skills within the specific Learning Areas and subjects?

3. Can student teachers be led to an understanding of the generic applicability of the Information Skills Process as a teaching method?

These questions are firmly placed within the framework of outcomes-based education. To this extent this research is concerned with the understanding of the use of the phenomenon of information skills by students, and is therefore characteristic of the type of research which Henning (Henning et al., 2004:5) describes as:

> Qualitative research…the term that denotes the type of inquiry in which the qualities, the characteristics or the properties of a phenomenon are examined for better understanding and explanation.

As the study is therefore aimed at determining the understanding of the phenomenon it falls directly within one of the main traditions of qualitative research - phenomenology (Cohen et al., 2000:23; Henning et al., 2004:16).

By looking closely at the objectives of the study which are also framed in terms of understanding the phenomenon, it reinforces the place of the research within this tradition lies. These objectives are derived from the overall aim of the research as expressed in the title, and can be stipulated as follows:

- To determine the place of information skills and the Information Skills Process within the framework of the Senior and Intermediate Phases of the General Education and Training band as stated by the National Department of Education in the Revised National Curriculum Statement (RNCS) and the Curriculum and Assessment Policy Statement.

- To determine the understanding of student teachers in their final year of training of the appropriate use of information skills, including its use as a methodology.

- To gauge the value placed on the practical use of the Information Skills Process as a teaching methodology by student teachers trained in its use.

The research, then, focuses closely on not only an understanding but on a process of personal transformation (Campbell, 1997) and thus shows the significance of the study seen in context against the present position of the student in the learning process and the student's move to independence in the teaching profession (Golden-Biddle, 2007:31).

3.2. Post-modernist paradigm

As the traditional research paradigm was closely linked to an approach that was seen as objective, neutral and dominated by a need for measurement and validity, it is deeply critical of any approach that can be construed as being too open, with the researcher too involved and thus with a perceived bias of subjectivity (Campbell, 1997). The traditional research paradigm, often characterized as the scientific method (Cohen et al., 2000:14-16) or the positivist approach (Campbell, 1997; Cohen et al., 2000:8; Henning et al., 2004:17) is not only concerned with objective but is also rigorous in the processes that it saw as being essential for research to be valid (Cohen et al., 2000:10).

Although used in the early 20th century disciplines including education, the social sciences and humanities, there were always questions that this approach was unable to answer. In the past forty years a parallel system of enquiry has arisen which is equally valid as research. This has been called 'Postpositivism' as explained by Hesse-Biber and Leavy (2006:37-38) and Cresswell (2009:6-7).

However this led to what have been called the 'paradigm wars' of the 1980's in which research had to be seen as being of either a qualitative or quantitative nature. More recent theorists (De Vos et al., 2005:75; Gorard, 2004:4) question

this rigid division and rather see that both quantitative and qualitative methods are tools to be used when appropriate. In education this has been extended to the idea that research should rather look at developing practical uses for research knowledge, focusing on the development side of research and development, rather than only on the research (Viadero, 2009).

The research undertaken in this study is then not based on a single paradigm of quantitative or qualitative research, but rather on a practical decision as to the method best suited to answer the specific research question being asked. This is also closely linked to the theoretical or conceptual framework against which the study is being undertaken. The phenomenon that is being looked at in this study is that of the use of the Information Skills Process as a teaching methodology. It is this framework of both the Information Skills Process as defined in the second chapter and the outcomes-based nature of education as shown in the third chapter that underpin the nature of the research, rather than a specific research paradigm or approach (Anfara, 2006:xxvii).

3.3. The phases of the research

The research questions and the research objectives led naturally to this research being undertaken in phases. These results of each phase helped inform the planning for the next phase. Three phases were suggested by the research questions, these being:

- Phase 1: An analysis of the Revised National Curriculum Statement (RNCS and NCS), as well as the Curriculum and Assessment Policy Statement(CAPS).
- Phase 2: An investigation into the current state of practice in teacher-training in Wellington with regard to the elements of the Information Skills Process.

- Phase 3: Action research undertaken with students to determine a growth of understanding of the Information Skills Process and its value in teaching.

Final findings and recommendations would only be possible once all the phases had been completed and the comparative analysis of data from each phase done.

3.4. Documentary analysis

The first phase therefore consisted of an analysis of the Learning Areas and subjects of the Intermediate and Senior Phases in South Africa as outlined in the Revised National Curriculum Statement read together with the Departmental support documentation, to determine the extent to which information skills, and in particular, the Information Skills Process, as defined within the registered SAQA standards, were present within these documents.

The phase then corresponds to the first phase of what is seen as a mixed-method approach using an explanatory design. Specific quantitative results are first determined, and then followed up with qualitative methods to produce explanations (Fraenkel, 2006:443). In this research, however, the quantitative data was used to build on in the later phases in order to ground the subject's perception of the phenomenon.

This analysis was done to determine to what extent learners are expected to be able to use information skills to reach the outcomes as envisaged within the curriculum in general, as well as within each Learning Area in particular. It therefore creates a framework that can be used to determine the extent to which teachers could and should be using information skills, and/or the Information Skills Process, as a teaching methodology within each Learning Area.

This also enabled the training of the student teachers in these skills in the third phase to be correctly aligned to each student's subject-based teaching as based on the curriculum statements. Finally, this analysis enabled a measure as to the relative importance placed on these skills within each Learning Area. Although the core of this analysis is concerned with the actual Revised National Curriculum Statement as issued by the National Department of Education, cognizance was also taken of documentation made available by the National Department as well as the Western Cape Education Department in support of both this and Curriculum 2005, as it is often within this supporting documentation and material that matters of methodology are addressed.

The results of this analysis, together with an analysis of the new Curriculum and Assessment Policy Statement that superseded them in 2010, have already been presented in chapter 2, as they naturally both informed and complemented the review of the literature surrounding information skills.

3.5. Interviews with lecturers

Having analysed the position within each subject of the Revised National Curriculum Statement, an investigation was undertaken into the position currently pertaining to training in information skills, the Information Skills Process and the use of these in teaching and as a methodology. This study was restricted to the training as happening at the Wellington Campus of the Cape Peninsula University of Technology which, in many ways, could be seen as typical of teacher-training in South Africa. The unitary state of teacher education in South Africa is well expressed by Robinson and Christie (2008:149) as having a single "comprehensive set of policies and frameworks…around the institutional location of teacher education, as well as the qualifications framework and curriculum requirements."

As the emphasis is on the training of teachers for the Intermediate and Senior Phases of the General Education and Training Band, the research was confined to all the lecturers responsible for this group of students. In particular those lecturers responsible for each subject didactic, as well as Education and Professional Studies were targeted. Within these interviews lecturers were firstly asked the extent to which the training satisfies the demands as analysed in phase 1, and, secondly, as to their knowledge of information skills in general, and the use of the Information Skills Process as a methodology within the Learning Area/subject. Finally, lecturers were asked their opinion on the actual place and importance of information skills within the training of students.

As the size of this population is reasonable, it was felt that they could all be interviewed. This could be seen as convenience sampling in that these lecturers were conveniently available at an accessible location (Cohen et al., 2000:102; Fraenkel, 2006:101). On the other hand, there is also a case to be made that these lecturers are chosen on the basis of purposive sampling, in that they are deliberately chosen as typical of a faculty responsible for the training of student teachers in the Intermediate and Senior Phases. The danger of this type of sampling is that it is inherently selective and biased (Cohen et al., 2000:104) and to that extent the findings are not typical of all lecturers in all locations, but merely typify the training at the one site. This point will be looked at again when general recommendations are made.

It was decided to interview the lecturers as this would enable a better idea of their personal opinions, thoughts and experiences to be revealed. This enabled the researcher to see the problem from the participants' point of view. As all interviews are interactional (Greeff, 2005:287), the interview could not only produce a description but also an attitude during the giving of the description. Analysis of the interviews, presented in chapter 4, included both the actual answers given, as well an analysis of the attitude of the interviewees.

This analysis enabled a determination of the extent to which student teachers are exposed to the concepts of and use of information skills and the Information Skills Process within their training. The use of interviews supported by the analysis of the Revised National Curriculum Statement was essential and necessary as dependence on the material only would not enable a determination of the actual knowledge of the lecturer, nor of what he imparted to the class. Simultaneously it would enable a determination as to the actual use of the curriculum documents as a basis for the subject didactic, i.e. to what extent the student is actually exposed to the RNCS documents. The ensuing analysis of the importance placed on information skills by the lecturer within teacher training as a whole was also important. This formed a primary source of didactic methodology within the subject for the student.

3.6. Training of students in the Information Skills Process as a teaching method

During the interviews with the lecturers they were asked whether students should be trained in the use of the Information Skills Process as a teaching methodology. This received strong endorsement from the responsible lecturers, but there was no similar agreement on where in the curriculum this training should take place.

Lecturers were also asked to say during which stage of the student's training this should take place. Again there was no consensus as to the answer, with most of the lecturers ignoring the question. However, based on the strong endorsement by the lecturers and the strong showing of the necessity for these skills to be used in the different subjects at the school shown by the analysis of the appropriate curriculum documents, it was clear that student teachers should be aware of what using the Information Skills Process as a teaching method should encompass. Therefore an action research project followed, whereby students would be actively engaged in learning this application and be able to reflect not

only on the learning experience but also what they perceived as the didactic value.

3.6.1. Choice of students

The third phase of research was therefore one of action research with a selected group of students. The strength of this approach was that it enabled the use of different methods, and led to the reality of the situation being able to be constructed in the findings

> through individual and collective conceptualizations and definitions of the particular situation. (Pine, 2009:30)

Although not directly in the teaching profession and thus not eligible to be seen as a typical practitioner-researcher (Costello, 2003:19), the students' training was done as part of a curriculum subject, in cooperation with the lecturer concerned. During the students' fourth year, the subject Professional Studies includes a component of educational research. With the cooperation of the lecturer, and the consent of the students concerned, the students' participation in the research project was deemed to be satisfying this part of the syllabus as far as the practical application of research was concerned.

Although from the interviews with the lecturers no clarity was obtained as to a preference for the actual place of the training during the students' four years of study, it was decided to use only final year B. Ed. students in the Intermediate and Senior Phase as the target population. As explained above, it is during the fourth year of study only that students are expected to do a small-scale research project in the subject Professional Studies. With participation in the research project counting as this research portion of Professional Studies, the ethical problem of creating extra work for students was prevented.

From the interviews with the lecturers, and also the analysis of the subjects, it was clear that the use of information skills was not limited to a single subject in

the curriculum. It was therefore important that the students chosen be well versed in a variety of subjects, and also specialize in them. This was also important in that during the practice teaching phase the students would use the subjects they were most familiar with. It was also expected that during the practice teaching phase the students would concentrate on teaching the school curriculum subjects that were linked to their choice of major subject. The fourth year students had all chosen their major teaching subjects at the end of their second year and so already had a full year of training in that subject's didactics. This also facilitated the selection of students whose majors covered a range of subjects.

As the use of information skills is not restricted to a single phase of the school programme it was felt that it was important that the students be able to experience the use in different educational settings. Unlike the previous years' practice teaching, the fourth year students did practice teaching in the Senior Phase in high schools (Grades 8, 9) in April and in the Intermediate and one year of Senior Phase (Grades 4–7) in the primary schools in July. This enabled the students to use the training not only with two different levels of learners, but also in two different educational environments.

It was also important that the group be accessible to the researcher. The agreement with the lecturer, as well as the researcher's employment on the Wellington Campus facilitated this. Despite the researcher moving away from the campus during the course of the year in which the action research was conducted, support from the institution enabled the research to be continued with the researcher coming to the campus at the appropriate time.

Having identified the target population, participants were selected in a two phase process. Firstly, the research project was explained to the group as a whole (120 students) during the first lecture of the Professional Studies class for research. Through this not only would the participants be clear as to what the research entailed, but it would also enable the group as a whole to be aware of the project,

which would explain any differences between their research as part of the course, and the research project the chosen students would do.

This explanation was cleared beforehand with the lecturer concerned who approved not only the explanation but also the course of the study. After this session students were given a week in which to apply in person in writing to be part of the project. The application in writing (see Appendix D for application form) was not only for administrative reasons, but was also in part in response to ethical concerns that participation might be seen as detrimental to their studies by participating students. The application was done with the conscious participation of the student, and also served to give ethical consent as participant in the project. Further, as explained above, it was important that a range of subjects be available, so the form could be used to make certain that the students chosen had different majors, thus giving the desired spread.

The application was also useful in allowing wide consultation with not only the lecturer of Professional Studies, but also the course coordinator. Again, this was done so as to prevent any ethical problems arising from the participation in the project. The course coordinator would thus be aware of the participation and also be able to factor it into any discussion of the students' work in other subjects. It would, and did, also facilitate the researcher's access to the students during the practice teaching period as the course coordinator, together with the lecturer in charge of practice teaching for the course, allowed the researcher to attend the necessary lessons.

This structured sampling could be seen as being biased and selective and therefore not representative (Cohen et al., 2000:104) but in the context of the type of action research, planned random sampling would not have been acceptable as the spread of subjects was important. The structured sampling could also be labeled as dimensional sampling as the students were chosen from all Education students based on certain characteristics that they showed, being:

- Fourth-year teacher-trainees at the Wellington Campus of CPUT.
- Studying B. Ed. Intermediate and Senior Phase.
- Voluntary participants.
- Giving a variety of subjects (Cohen et al., 2000:104).

This sampling is also characterised by Strydom and Delport (2005:330) as volunteer sampling, which can have the disadvantage that those who volunteer are usually those that are more motivated, trained and skilled. In this research project this could actually be seen as an advantage as any differences or improvements expressed by the students would be due to the new experiences and not based on a lack of knowledge or understanding of previous training. The better skills and training of the volunteer students would therefore obviate any dichotomy between the training actually given by lecturers in other subjects (including Didactics and Education), and an expressed lack of knowledge of that training.

Eight students applied to become part of the research group. As each application was in person, the students could be interviewed to make certain that they were aware of what their participation would mean, particularly in the context of the subject Professional Studies. The final selection was done together with the lecturer of the subject as it was important that no at-risk students be considered. As Professional Studies is a major subject for the student teachers in their fourth year, the risk of any student failing and trying to place the blame for failure on the research project could not be taken.

A structured selection could now take place so as to ensure both maximum coverage of Learning Areas/subjects by the different students, and also a spread of student abilities and understanding of the use of information skills so as to ensure validity and reliability. It was important that, while no at-risk students be allowed to participate, the students also displayed a varied level of ability so as to

further minimize the effects of volunteer sampling as outlined by Strydom and Delport (2205:330).

After consultation with the lecturer, six students were selected. There was one male and five female students and the students' majors included Technology, Biology, Mathematics, History, Geography, Music, Human Movement Science and Physical Science. This covered six different Learning Areas of the curriculum for learners in the Intermediate and Senior Phases – Mathematics, Technology, Natural Sciences; Social Sciences, Arts and Culture and Life Orientation. For sake of anonymity these students will be referred to as S1 to S6. The following table shows the range, and overlap of the major subjects as well as their place in the different curricular Learning Areas.

Table 3.1 Student subject choice

Student	Main subjects	Learning Area
S1	Technology Music	Technology Arts and Culture
S2	Biology Physical Science Mathematics	Natural Sciences Natural Sciences Mathematics
S3	Human Movement Science Technology Physical Science	Life Orientation Technology Natural Sciences
S4	Technology Geography	Technology Social Sciences
S5	Mathematics Biology Technology	Mathematics Natural Sciences Technology
S6	Biology History Mathematics	Natural Sciences Social Sciences Mathematics

During the ensuing phases the choice as to which subject(s) they would concentrate on was left to the students themselves and this led to certain subjects being overused, and others neglected. Nonetheless the mix as enabled by the choice of students did give a chance for them also to learn from each other and the different didactic approaches that they were taught in the different Learning Areas, as will be seen when looking at their working together through

the different phases of the training that they underwent in the following three sections.

3.6.2. Initial orientation and training of students

Having chosen the participants, a specific course of action was followed. The ultimate aim of this was the improvement of the student teachers' understanding and their reaction to the learning of and use of the Information Skills Process as a teaching methodology. Although the specific objectives of the research, as explained in section 3.1, were the reason for the research, action research has the added advantage of making the "participants richer" and gives them "significant gains" (Freebody, 2003:85).

As this course of action involved both the students' inputs as well as criticism of each other's inputs and works, the entire course was conducted using learning approaches that were friendly and welcoming to the student. Students have expressed the opinion that having increased responses to their work was desirable (Hyde-Clark, 2005:15). A formal classroom situation was avoided and a specific relationship created between the researcher and the students. This enabled the students to have repeated contact and feedback on their work. The importance of these regular meetings was also emphasized (Freeman, 1998:229).

A specific and welcoming relationship between the students themselves was also encouraged. This, as explained by Marbach-Ad (2004:289), enabled comments and suggestions to be given, received and reacted to positively, constructively and productively. Support for one another (Freeman, 1998:230) was found by the students themselves to be one of the positive aspects of the research. The learning that took place through socially negotiated meaning was therefore seen as an important facet of the training (Jonassen et al., 1998:29).

During the training of the students the following problematic areas were expected:

- Poor self-assessment and reflective competencies (Andretta, 2005:1; Wilson, 1997:72).
- Fear of presentation (Andretta, 2005:1).
- Lack of awareness of the issues of information literacy as a basis for all education (Andretta, 2005:1; Bundy, 1997; Wilson, 1997:72).
- Information Skills Process as a means of achieving teaching for individual learning styles (Wilson, 1997:63).

The training of the students then commenced in small group format. The use of this small group was commented on favourably by the students. This enabled not only the researcher but also the students themselves to understand the experiences that each was going through from the perspective of all the participants. This, then, was also designed to facilitate understanding by each of the individual students (Butler-Kisber, 2010:52). The first session was then designed to address the issues the students themselves might have had with the course of the research process, and also to set housekeeping rules.

In the second session, as a means of introducing the students to the use of the Information Skills Process, certain key concepts were looked at in the initial meeting, and then placed into context with information literacy and the Information Skills Process. These concepts included:

- Differentiation.
- Multi-grade education.
- Individualization.
- Resource-Based Learning.
- Multiple intelligences.
- Learning styles.
- The Technology process as outlined in the curriculum for Technology (DoE, 2002i).

- The Big6 as outlined in Eisenberg (2004).

These concepts were chosen after the interviews with the lecturers in phase 2. With the exception of the Big6 Information Skills Process model of Eisenberg, according to the lecturers these concepts had all been treated in their curriculum for Education in the first three years, and were also a key-note of the fourth-year curriculum for both Education and Professional Studies.

Students were then provided with basic reading material on information literacy, information skills and the Information Skills Process. They were asked to not only read the material for understanding of these concepts, but also asked to consider how they could be applied to teaching in order to achieve maximum differentiation and application of the concept of individualization. Although treated extensively and seen as a framework for the approach to teacher education at Wellington (Kruss, 2009:170), constructivism was not dealt with directly. In this regard the Information Skills Process is a constructivist methodology. Information itself, as it is constructed from data, is a constructivist human-centered concept (Hart, 2000). It was expected that through the research process the students would be able to understand this.

Two sessions followed in which the concepts, their relationship to teaching and the use of the Information Skills Process in teaching were discussed. The continuous nature of the need for these skills, as reflected in the curriculum documents and espoused in the literature was also looked at. As these students had done an information literacy course in their first year, the multi-level nature (Gawith, 1991:3) was important. Equally so was the ability to use the Information Skills Process as a vehicle for being ”fluid to cater to student needs and learning styles” which is at the core of a constructivist teaching style (Mishra, 2009:4).

Before the first practice teaching session in April, during which the students would plan and present a lesson using the Information Skills Process, a final

session was held during which the researcher presented the session in the form that a lesson using the Information Skills Process would take, using the topic of teaching with information skills. Students had to work within their particular major to identify the problem, determine what was needed, gather the resources, find the answers and then give meaningful feedback. This session concluded the introductory training part of the research.

3.6.3. Lesson planning and presenting

The actual use of information skills as a teaching methodology was then planned through guidance in the drawing up of lesson plans and actual practical teaching. These lessons were planned by the students using both the standard lesson plan as used by the faculty for practice teaching lessons, but also a rubric as to the use of the Information Skills Process (see Appendix C).

The standard lesson plan was familiar to the students as they had used this particular form, as supplied by the Professional Studies Department and supported by all the lecturers in the Education Faculty, from their second year on. In the second year of training all the students had done one lesson in front of lecturers in their July practice teaching, and this lesson had to be planned on the prescribed form. This was repeated in the third year when two lessons were given. In both cases extensive follow-up and training in the use of the lesson plans was given by both the Professional Studies lecturers as well as the subject specific didactics lecturers. Therefore, by the time these students were asked to prepare a lesson using the lesson plan, there was no need to train them in its use, and in how to plan a lesson according to the criteria on the lesson plan.

The structure of the fourth-year of the B. Ed.. allows for two separate occasions on which students are placed at schools in order to do practice teaching for a period. The first of these is in April, at the beginning of the schools' second term, and lasts for three weeks. For the April practice teaching the students were also

given the stages of the Information Skills Process to use as the basis of the lesson plans.

As explained in the previous section, at this point there had been training in the general applicability of the Information Skills Process to education and its use as a means of differentiation in the classroom, particularly with regard to learning styles and multiple intelligences. Students were therefore asked to take the idea of differentiation into their lesson planning, and the steps in the process were given as a means whereby they could do this. These steps (as outlined in Appendix C), asked the students not only to include the steps of the Information Skills Process in the planning of the lesson, but also to look at three separate aspects for each step:

- The action taken by the teacher.
- The action expected of the learner.
- The means of assessment of that particular step.

These lessons were then given at the various schools at which the students were doing their practice teaching. In five cases these were all high schools from Grades 8 to 12, with the schools ranging from co-educational schools in Paarl, Malmesbury and Wellington (2 students) to a girls' only school in Paarl. One student was at a school that catered for Grades 1 to 9 in Vredenburg. In the cases of the schools in Paarl, Malmesbury and Vredenburg, the lessons were observed by the researcher, with a brief feedback immediately afterwards at the school itself. In the case of the Wellington school two students were at the same school and were therefore able to observe each other's lessons and give immediate feedback.

On return from the three weeks of practice teaching, classes resumed as normal, and the group met together to share their experiences with the use of the Information Skills Process as a methodology, and receive further guidance as to what could have been improved. This session proved valuable in that it gave the

students insight into both their and their fellow students' experiences and they were able to reflect on their own experience with more objectivity.

The second phase of lesson planning and preparation now took place with all the students once again preparing lessons, this time for the practice teaching cycle in July. This second session of practice teaching takes place at the beginning of the schools' third term, and lasts for four weeks. As with April, the students were at different schools in July, this time including a rural school in Wellington, a school in Bellville, 2 different schools in Wellington and 2 different schools in Paarl. However, unlike April, these schools were all primary schools, with pupils at the schools being in Grades 1 to 7.

The planning now required students to prepare a specific lesson using the Information Skills Process as an underpinning for the lesson. These lessons, unlike those in April, were now discussed in advance with the researcher, so that input into the planning could take place. The lessons would be evaluated based on the standard lesson evaluation, but also on the evaluation form (Appendix C), specifically aimed at looking at the use of the Information Skills Process within the planning and presentation of the lesson.

The researcher attended all these lessons and was able to give feedback to the students in a debriefing session immediately afterwards. This enabled the researcher to determine whether the theoretical input in the planning and the actual teaching in the lesson itself showed use of the elements of information skills and whether the Information Skills Process provided for in the lesson plan was actually realized.

Students were, therefore, able to build on their experiences in lesson planning and presentation in the April practice teaching. The discussion that had taken place as a group, and also the individual discussions of the lessons before the July practice teaching also helped the students focus on the use of the

Information Skills Process in their lesson planning. The presentations in July were therefore more focused on the Information Skills Process, and also showed better understanding of the use of the Process. However the critical part of the students' participation still lay ahead in that the students' own reflection on their experiences would be what would determine whether they were ready to accept the Information Skills Process not only as a means to learners being able to use these skills, but also as a general means of planning and presenting lessons that would strengthen these skills for each individual by allowing individualization of the learning experience.

3.6.4. Reflection

As a follow-up to the practical sessions in July, interviews were held with each student on which they were asked to reflect on the teaching and what they had learnt: The effect of this training on the understanding of the students of information skills and the process as methodological tools formed the main theme of these one-on-one interviews. The results of these interviews, correlated with the information obtained from the observation of the lessons during the practice teaching in July, as well as from the students' formal feedback was used to determine the growth that took place within each student's understanding.

In the interviews with the lecturers the feasibility of the training was raised as one of the issues on which their feedback and opinion was requested. However, the answers to this were seen as being more in an administrative and cooperative context, particularly seen from the viewpoint of the lecturers responsible, and within the parameters of the B. Ed. program as offered. Only by determining the growth in understanding of the students themselves, could the essential value of the training to the students be understood, as well as the value that newly-qualified teachers could place on information skills and the Information Skills Process as a methodology within both their general teaching, and within specific subjects.

To this end, the group was asked to prepare a presentation as to their understanding of what they had learnt during the entire process and the value of what they had learnt for teaching and for student-training specifically. In addition to this presentation, which was given to a select group including the lecturer responsible for Professional Studies in the second year and for practice teaching placement, each student produced an individual summary of their own understanding, based on a diary model.

3.7. Analysis of students' work

These individual and group insights were then analysed to provide more accurate determination of whether the students were not only positive to the idea of information literacy and the Information Skills Process (which Hara (1999:8) gives as being positive in all cases), but also applied this in practice. The determination as to whether the students had internalized the use of the process to the extent that they had applied it in practice and were positive about this application, would prove that training in the use of the Information Skills Process, and its application in teaching, should be a necessary skill that would need to be included in their curriculum.

This analysis, described in chapter 5, used the system outlined by Butler-Kisber (2010, 60):

- The original documents were read and re-read.
- Significant statements were extracted.
- Meanings were attached to these statements to help bring out hidden meaning.
- Clustering into themes (using coding).
- Describing the participants' ideas and feelings under each cluster.

From this analysis, and that of the lecturers' interviews, together with the literature and analysis of documents, general findings were made, with recommendations based on the findings.

3.8. Ethical considerations

As with most educational research, this also involved activities that were within the usual procedures of teacher-training and falls into the category of research not really requiring any formal ethical review (Fraenkel, 2006:56). Nonetheless, with the main goal of ethical research being the prevention of harm to any during the research (Bak, 2004:28; Glatthorn, 2005:8) it was important to be aware of any potential ethical considerations in this study and two aspects were found to be particularly relevant:

1. The analysis of the lecturer's understanding.
2. The use of student teachers.

The first consideration has the problematic in that there could be seen to be implied infringement of the lecturers' academic freedom to work within self-imposed guidelines and curricula. By analyzing their opinions, methods and materials as seen through the eyes of the students, this could be seen as criticism of their methods and content, and, leading from that, criticism of their professionalism and knowledge of their own subject.

Further, by potentially recommending changes to their teaching methods and content, this could be seen as direct infringement of their autonomy in teaching.

This potential problem was bridged in two ways. Firstly, discussions in advance with the heads of department obtained their permission and support for the research. They were then able to sensitize their staff in advance as to the research that was to be undertaken and also handle any potential problems by communicating to the researcher if there were staff members that were uncomfortable with the idea. Fortunately, the staff proved supportive and there were no such problems. Secondly, during the interview phase, staff were asked for a time slot and the purpose and nature of the research to be undertaken were given in the e-mail making the appointment. This enabled staff that were reluctant

to take part to reply that they would be unable to give such interviews, without having to explain their reasons.

Again, this did not happen and all staff were supportive of the research and willingly gave of their time for the interviews, and also permission to ask the students about their training. Finally, during the interview itself, staff were asked whether there would be any problem with asking the students and/or making recommendations with regard to the training. Again, support given was unanimous and all staff willingly supported both the concept and the actual potential results of the research and its recommendations, with the most common rationale being the good of the students.

The second ethical consideration has two facets: firstly, the analysis of training already received, and, secondly, the actual training process undergone with the students in information skills application.

The first could give rise to a feeling by the students that the training that they had received was being criticized. This could be seen as not adhering to the principle of beneficence, whereby all research should be done to acquire knowledge and not primarily to be harmful or derogatory about existing practice (Mertler, 2006:81). During the course of the research, students did express feelings that they wished that aspects of the training done during the research had been part of their previous training; however, it was made clear that no criticism of any training, lecturer or subject was implied with this training. This reassurance was given both to the students in their individual interviews, as well as to the group at the end. In this way the students were led to being more secure in their opinion of their training.

As these students were withdrawn from the Professional Studies research class in order to form the specific group and were asked to do specific lesson formats during their practice teaching, it could be seen that participation in the research

interfered with their other studies and also prevented them from taking part in the Professional Studies research class.

This was overcome in three ways: firstly, the student participants were volunteers, secondly, the final choice of the participants was done in conjunction with the lecturer responsible for Professional Studies and, finally, during the interviews with the lecturers the use of the group was explained and their support obtained. Further, when the group met it was openly discussed and all participants given the opportunity to withdraw if they felt uncomfortable with the process. Fortunately this did not happen and not only did the participants take part throughout, but the lecturer responsible for Professional Studies was able to monitor the progress and gave full support.

3.9. Summary of chapter

The methodology of the research is based upon the research questions and the research objectives. The research falls strongly into the group of Action Research as expressed by Zeichner (2009:26):

> The recent growth of self-study research by college and university educators who inquire into their own practice as teachers and teacher-educators.

Basically looking at the phenomenon of the Information Skills Process and its use in teaching, there is no reliance on either a pure qualitative or pure quantitative paradigm. Instead the post-modernist paradigm whereby the best suited tools to answer the questions is used.

The research was designed to fit into three phases. The first was the analysis of the curriculum documents in terms of the information skills. The second phase was that of interviews with the lecturers involved in the teaching of Intermediate and Senior Phase students. These interviews were structured on the basis of a questionnaire (Appendix B) and analysed by hand.

The third and most important phase of the research was Action Research with a group of students. The basis of their selection was described. The final six students chosen were then taken through a training phase and then presented lessons in April and July. Throughout this time small group work was used, as well as frequent contact between the students and the researcher.

Finally the students were asked to reflect on the process, and their learning. This reflection took the form of both individual reflection as well as a group presentation of overall reflection. These reflections were then analysed using the standard coding techniques (see chapter 5). This analysis, together with the analysis of the interviews and the literature, enabled conclusions to be drawn and recommendations to be made in chapter 6.

As with all research, the ethical considerations were important. In this research this was largely in two aspects: possible discrimination against the students taking part in the research, and the relationship between students and lecturers that could be affected by the students' participation in the research. Different means were used to avoid these potential negative effects.

Chapter 4: Analysis of interviews with lecturers

4.0. Introduction

The interviews with the lecturers were designed to get an overall picture of the training of students in the Intermediate and Senior Phase. In particular the questions used (see Appendix B) concentrated on the Information Skills Process and its place in the training of student teachers, as seen by the lecturers. Their own knowledge and general feeling about the use of information skills in the school curriculum were also elicited. The use of interviews also helped the researcher determine the attitude of the lecturers when answering the questions.

The analysis of the answers given gives a picture of the overall exposure to information skills and the Information Skills Process that students had experienced from their lecturers. It also gave pointers as to the opinions that the lecturers had of the importance of this within the training.

4.1. Organization

The interviews with lecturers took place over a period of three weeks. Twenty lecturers were interviewed. The following table gives an indication of their subject disciplines as expressed within the subject areas of the RNCS. From these subjects students choose two majors in their third and fourth years, with all students also doing the two disciplines associated with teacher-training, namely Education and Professional Studies, which are thus both compulsory subjects. In the table below the total number is more than 20 as some lecturers are involved in more than one discipline:

Table 4.1 Subjects of lecturers

Education	2
Languages	5
Mathematics	2
Technology	1

Professional Studies	5
Natural Sciences	1
Arts & Culture	2
Social Sciences	2
Economic and Management Sciences	2
Life Orientation	3

The schedule for the interviews is found in Appendix A. These interviews took place in Afrikaans for the most part, except in four cases (indicated on the schedule). The questions, both in Afrikaans and English, are found in Appendix B.

4.2. Course structure

The exposure of the fourth-year education students to the above lecturers can be understood from their course structure which indicates the number of years students are exposed to the different Learning Areas, and therefore to the lecturers concerned.

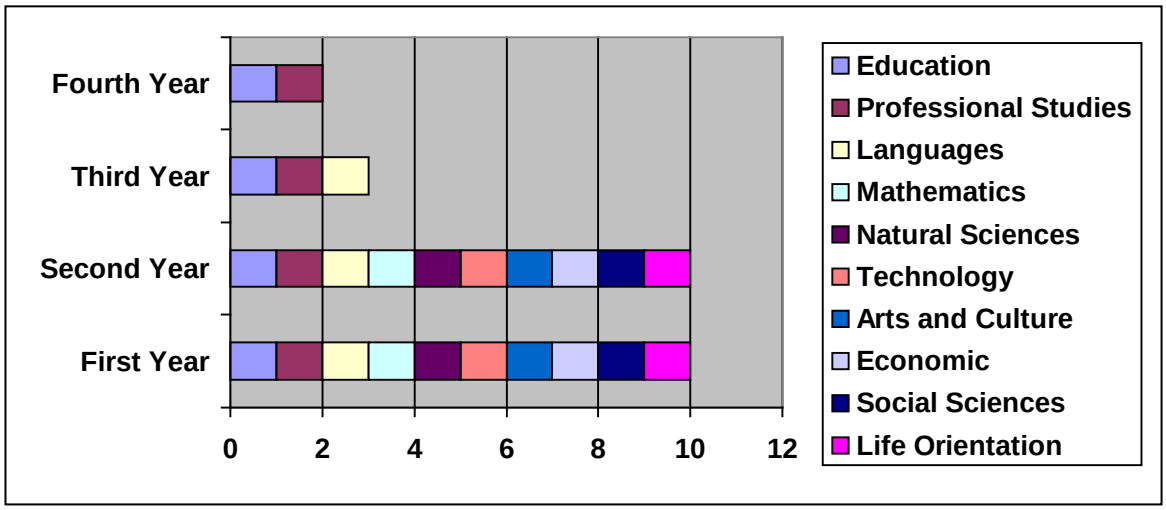

Fig 4.1 Subject choices for B. Ed..

The above graph showing the compulsory components of the course illustrates the exposure of students to the subject and is adapted from the original degree course outline (Onderwyskollege Boland, 2000). In the course structure there is a difference in name between certain subjects in the different years, but these are

still given by the same lecturer. Thus in the first year all students do Communication Language, but from the third year do the language as a subject, i.e. Afrikaans, English and/or Xhosa.

All students have exposure to all the Learning Areas in their first two years of study, and after that only Education and Professional Studies are compulsory for both years with one language compulsory for the third year. Three other subjects are taken in the third year and two in the fourth year. Although the Learning Areas as taken in the first two years cover the entire content, when offered as choice subjects in the third and fourth year these Learning Areas are often broken up into sub-disciplines, with students being able to take only one of the sub-disciplines in a Learning Area. In addition in the Language Learning Area a choice of languages is offered from the third year, with these languages being offered at different levels within the curriculum, something only the Languages Learning Area allows. The following table, again adapted from the original course outline, illustrates how the different Learning Areas have been sub-divided (or, in the case of Languages, the different languages offered), with the name of the choice subject or subjects as offered in the CPUT B. Ed.. curriculum.

Table 4.2 Subjects and Learning Areas

Learning Area	**Choice subjects**
Natural Sciences	Physical Science Biology
Social Sciences	History Geography
Arts & Culture	Drama Art Music
Life Orientation	Human Movement Science Life Orientation
Languages	Afrikaans English Xhosa

(Onderwyskollege Boland, 2000)

As a result, all the students taking part in the research had been exposed to all the lecturers for at least a year. The exception to this is in the case of lecturers in

choice subjects that had been appointed since the students' second year. In this case there was only one such lecturer, in the Economic and Management Sciences, as the other newly appointed lecturer (in Mathematics) was also involved in Professional Studies which meant that as this was a compulsory subject, all students have been exposed to this lecturer.

4.3. Results of the interviews

The interviews were analysed both quantitatively and qualitatively. For each question a quantitative value to the answers could be obtained and presented graphically. At the same, comments were asked for and recorded and these comments could be analysed using the coding techniques described earlier. This enabled the researcher to compare these coded responses with those of the students and come to overall conclusions and recommendations in chapter 6.

Throughout the analysis cognizance was taken of the fact that some of the lecturers were responsible for more than one subject, and that two of the lecturers were not responsible for subject based lecturing, but were responsible for the professional subjects of Education and Professional Studies.

4.3.1. Subjects and didactics

Of the lecturers interviewed 14 taught subject content as well as the subject didactics, 2 taught subject content without didactics and 2 taught the professional subjects with no separate didactic content.

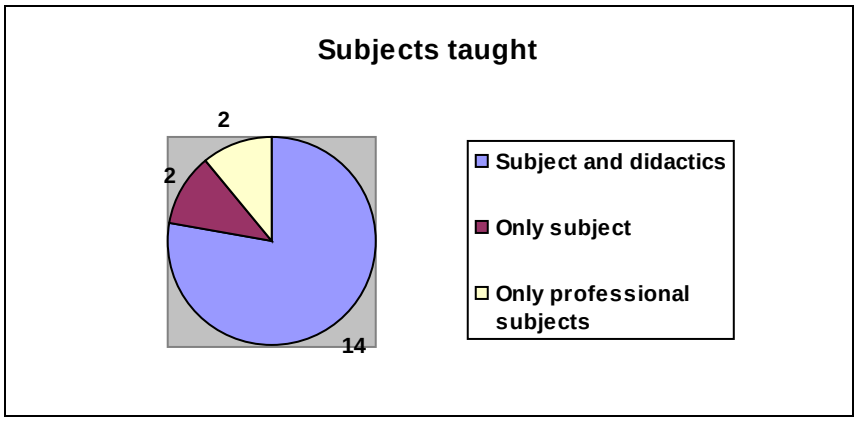

Fig 4.2 Division between subjects, didactics and professional subjects

4.3.2. The extent of training in information skills in the subject

This section was designed to specifically identify where information skills were covered in the particular subject during the teacher-training. The answers to this section can be divided into those specific to components of the process, and those looking at the process as a whole.

4.3.2.1. Specific components

In looking at answers to specific components of the process the following were given:

Identification of a problem: only one comment was given. In Mathematics students were expected to be able to answer a question by seeing what was asked.

Access to information: This section received the second most comments, with 7 being given. These comments can be divided into four groups: in three cases lecturers held short discussions in class as to how to find relevant sources; in 2 cases they took the students to the sources; in one case (Mathematics) they used given material for students to analyse how to get to the source of the

information, and in one case the comment was made that the students should have this skill already.

Evaluate a source: Only one comment was given: in Art students were taught how to analyse a source as to its value.

Use of information: Again only one comment was made: in Mathematics students were shown how to use the sources of information in order to make deductions, get and give the answer.

Legitimate use of information: Three comments were made about this part, with 2 lecturers stating that they taught a specific lesson on referencing and bibliography (in the 1st and 3rd years respectively), and one lecturer stating that although referencing was not taught in his subject, it was being assessed in assignments.

A further seven comments were given specifically on plagiarism. In five cases lecturers spoke seriously to their classes about plagiarism, in one case it was commented that students are known to commit plagiarism and in one case students who committed plagiarism were then told to redo the work in their own words.

4.3.2.2. General answers

Far more comments were made in general about the Information Skills Process and the teaching of the process. These comments can be divided into three categories: those claiming no training at all, those claiming partial training and those claiming complete training.

In eight cases the comments were that the lecturer taught no component of these skills. In one case this was expanded by stating that the students were still

assessed on these skills; in another case where the skills were not taught the lecturer claimed that these skills were not expected of the student, and in two cases the lecturer expected that these skills would be taught elsewhere (one in Education and one by the library).

In seven cases lecturers commented that these skills were taught either in a small way, or as incidental to other teaching. None of these commented on teaching the skill as part of a process, with one stating that they were seen and taught as individual skills rather than a process. One further comment was that the first three skills were taught specifically, but not the others. In this category, too, it was felt by two lecturers that these skills were being taught in other places or as part of other subjects.

In four cases lecturers commented that they taught all these skills, and as a process. It was commented on that the information skills and the Information Skills Process were part of the Learning Area for Languages and Communication and this was therefore taught as part of the didactics of the subject. The other subjects which commented that the students were taught the process as a whole were History (4th year), Technology (3rd year) and Education (3rd year).

One general comment worth noting was:

> Ons leef te wyd van mekaar om te weet wat gedoen word. Eenvormigheid is nie daar nie. (*Trans: We live too apart from each other to know what is being done. Uniformity is lacking.*)

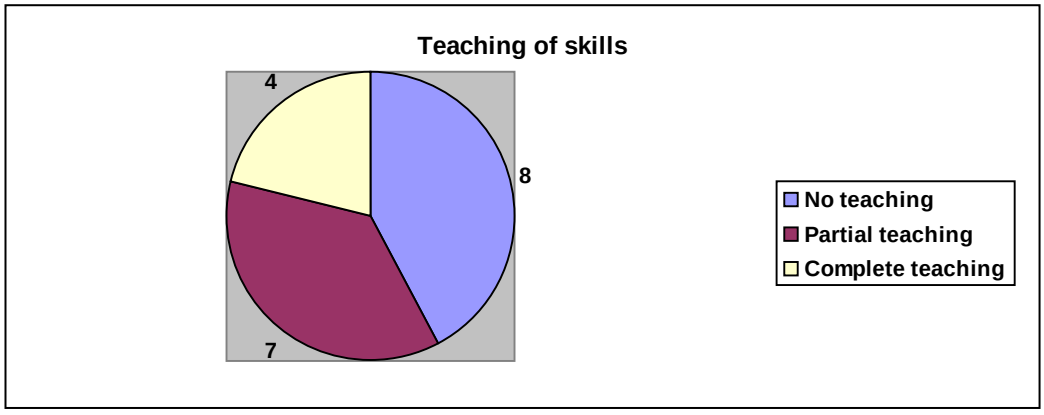

Fig 4.3 Teaching of skills

From the above it can be seen that in most cases (11 of 19) some or all of the skills are being taught, but also that in most cases (15 of 19) students are not being taught how to use the complete process within the subject.

4.3.3. Information skills in the school curriculum

Lecturers were asked this question in three parts. Firstly, they were asked what the school curriculum said about research or assignments in the subjects at school which corresponded to those that they were lecturing. In the case of the lecturers responsible only for Education and/or Professional Studies this question, as well as the one immediately following, did not apply.

The second question dealt with the way the component in the curriculum dealing with assignments/tasks is being dealt with in schools. Answers to this are the lecturers' opinion and based on their experience, including their experience seen in practice teaching visits to schools. Where lecturers answered the first part of the question negatively, this question became redundant.

The third question was again based on the lecturers' experience and was their opinion on actual classroom practice in the giving of assignments. Unlike the first two questions, however, lecturers were asked to treat this as a hypothetical question in the cases where the answer to the previous question was given as negative.

4.3.3.1. Tasks in specific subjects

In by far the majority of subjects there is awareness by the lecturer of the demands in the school curriculum for research assignments to be done in the school. Twelve of the twenty respondents identified this as being a need, with only 4 stating that this was not a requirement in the school curriculum of the

subject concerned. The two lecturers concerned only with Education replied, as expected, that this was not applicable and two lecturers were not certain of what the school curriculum for their subject required in terms of research assignments or tasks.

Where research assignments or tasks were in the curriculum, lecturers tended to be positive about this. A typical comment was: “I like this outcome, it incorporates research.”

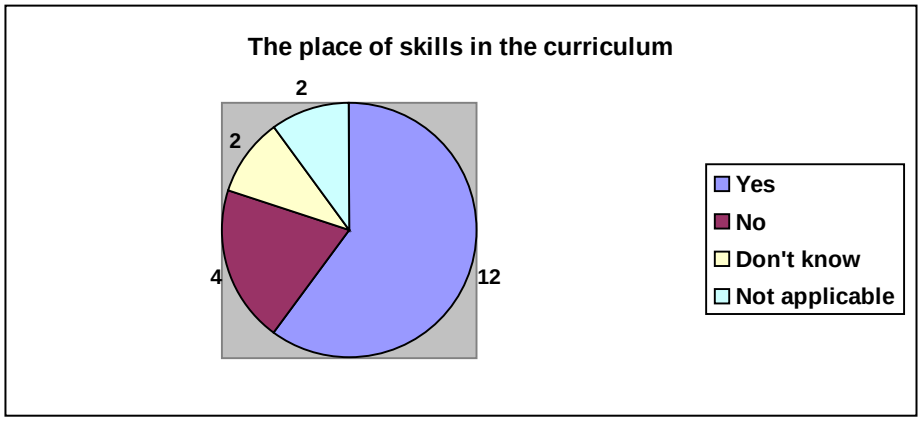

Fig 4.4 The place of skills in the curriculum

4.3.3.2. Tasks being done in the school

There was a far less positive response to the question as to whether these tasks were being done in the schools or not. The response to this and the next question was aimed at identifying the gaps in the training or practice of teachers already in the schools, and thus sensitizing the lecturer as to the need for this training to be done with the full-time students.

Only four indicated that these tasks were being done in schools generally, four more indicated that there were some schools doing the tasks and assignments, while others were not. Two of the four indicated that it was in “the better schools” or “the better teachers” that were doing the assignments. Four indicated that

these assignments were not being done, four that they did not know and one indicated that tasks were being done, but “in the old way”.

In summary, then, tasks were being seen to be done to some extent by nine of the respondents, whereas five were negative. Again, the two Education lecturers saw this as being not applicable.

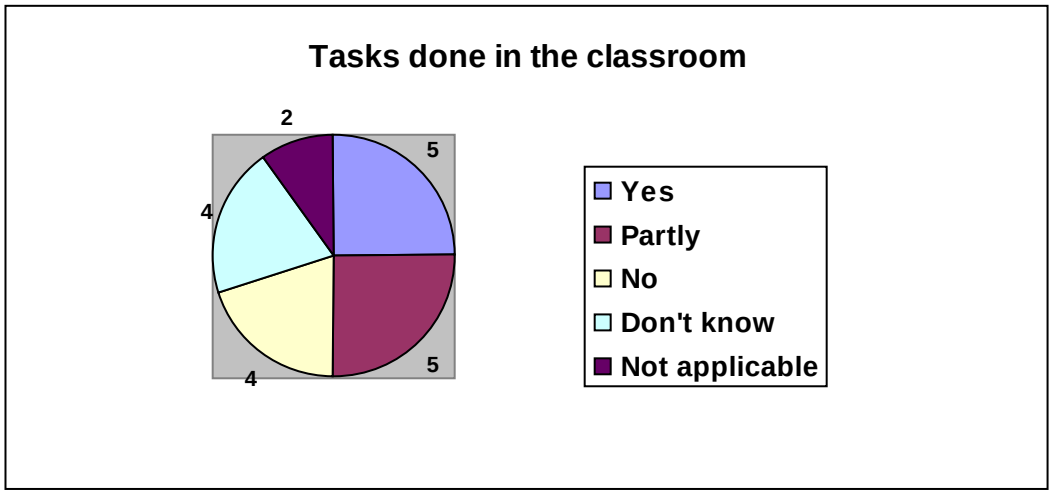

Fig 4.5 Tasks done in the classroom

4.3.3.3. Use of the process by teachers

The answers to this question were the most negative, with ten of the respondents stating that no process was used, one that the teachers were only interested in the product and only four that in some cases there was use of process. No respondent indicated that the process was used consistently.

In the four cases indicating some use, two indicated that the better teachers used the process model whereas the other teachers were only interested in the product. The guidance by the teacher was seen as being the important distinction as to whether learners followed a process or not. As one expressed it:

> Baie skole wil fantastiese produkte vir ouers wys, wat sinneloos is vir ontwikkeling. Die oomblik dat dit huis toe gaan, is daar moeilikheid, Die proses moet in die klaskamer geskied. *(Trans: Many schools wish to show fantastic products to the parents. The minute that it goes home there’s trouble. The process must take place in the classroom.)*

In the case of those lecturers who replied in the negative, the reasons given included the lack of time, the unpreparedness of the teacher, the rubric for assessment provided by the Department of Education that excluded process analysis and the difficulty of following a process.

Three respondents indicated that this question was not applicable, and two that they didn't know whether teachers used the process or not. Overall, then, only five indicated some use of the process and ten no use at all.

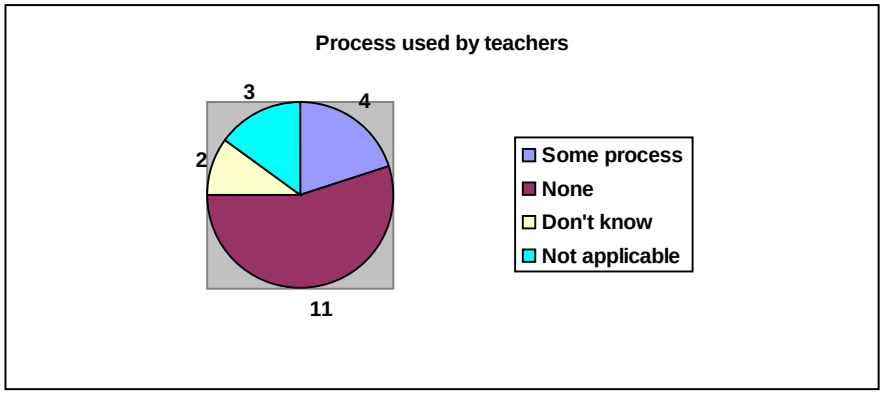

Fig 4.6 Process used by teachers

4.3.4. The Information Skills Process in the subject on tertiary level

This question was asked in two distinct parts. The first part was on the extent to which the lecturer considered the use of the Information Skills Process as important for the student's performance in the lecturer's subject. The second part, following on from this, was about the lecturer's idea as to where the training for these skills was to take place (in terms of subject placement), as well as who should be responsible and at what stage of the student's training this training should take place. As this was not bound to school subjects, but linked to the subjects taken at tertiary level, all respondents, including those responsible only for professional courses such as Education and Professional Studies, were able to respond.

4.3.4.1. The importance of the ability to use the Information Skills Process in the subject

As to be expected there was general consensus on the importance of the training of students in information skills and the use of the Information Skills Process in order to be successful in their studies at tertiary level. This consensus ranged from the mildly enthusiastic “Would help”, to a comment of this as being of “Cardinal importance”

The following table gives an indication of the way in which the comments indicated the extent of the importance of this training:

Table 4.3 Rating of importance

Comment	Number of times
Would help	1
Yes, it is needed	3
Important/got to be done	4
Very important	9
Absolutely important/cardinal importance/ Unequivocal	3

By rating these responses on a Likert scale of 1 to 11, with neutral being 6 the following graph can be produced.

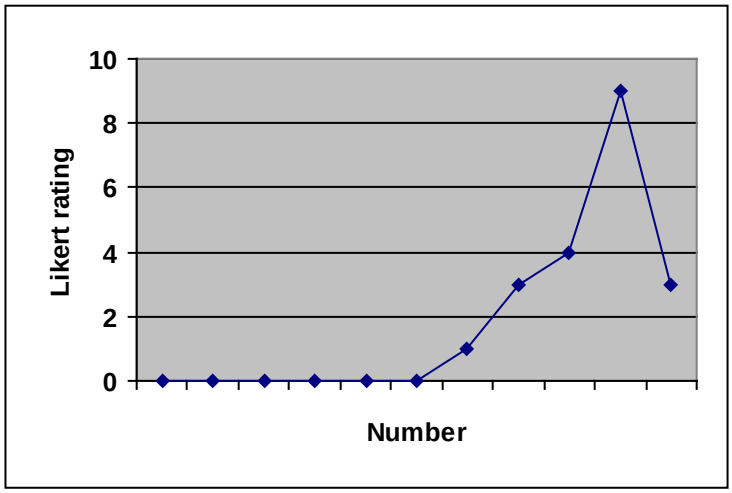

Fig 4.7 Graphical representation of rating

The perceived importance of this section of the training was stated by one respondent as being

> Uiters belangrik vir akademiese diepte en omgang wat kwaliteit gedrewe moet wees. *(Trans: Extremely important for academic depth and discourse which must be quality driven.)*

In two cases the importance was directly linked to the need for these skills to be not only taught, but also demonstrated within the subject itself and that it would be within this subject that the skills should be assessed and practiced. One other comment, however, linked the teaching of these skills to the course as a whole and saw them being of importance for the whole course and not only the lecturer's subject.

4.3.4.2. The place of the Information Skills Process within teacher-training

There was less consensus on the place and agent of the Information Skills Process. The answers to this fell into sections: those dealing with the agency of the training, and those dealing with the timing of the training within the students' four-year curriculum.

Most of the respondents indicated that this training should take place centrally. The majority (12 from 20) identified the subject Professional Studies as being the vehicle that should be used for this, whereas one merely indicated that it should be central and one that it should not be in the subjects as it is seen as a generic skill.

The agency seen by most as responsible for the training is linked to the place of training. Many did not indicate a person or grouping other than those responsible for Professional Studies as a subject. However there were several that indicated that this training should take place as a partnership between various role-players involved in student training. Three indicated that this partnership should include the library and two that it should be between the lecturers of Professional Studies

and those responsible for the different subjects (being the subjects linked to the school curriculum).

In two cases this partnership was seen as being responsible for ensuring that the lecturer (being the lecturer responsible for subjects linked to the school curriculum) and the student should undergo the training at the same time, or at least be kept abreast of what was being done in the training. This was seen as being important so that the lecturer could ensure that the assessment carried out in their subjects should cover the Information Skills Process as was taught to the students.

Not all respondents replied as to when the training should take place, as they felt that having placed it within the subject of Professional Studies it would be up to that subject to determine the timing. Opinions that were given as to the timing of the training within the students' curriculum fell within two broad groupings: those who considered that it should be at the beginning of the training, and those who considered that it should take place at different times.

Of those that considered the training should be early, six felt that it should be as early as possible in the first year, with one feeling that it should take place towards the end of the first year after the student had had a chance to adapt to tertiary education. One felt that it should take place within the second year, but five felt that it should take place in the first and other years. Of these, three saw this training as being progressive, with skills deepened throughout the course. One felt that it should take place in the first year and then again in the third when the students had chosen their major subjects, so that it could be applied then at a higher level.

The most interesting comment received, however, was from the lecturer who responded with some force to the question as to who would be responsible for this training: "Certainly not me!"

4.3.5. Information Skills Process as a teaching method

In this section there were again two questions, similar to those asked in the previous section. The first dealt with the extent to which it was felt desirable that students be taught how to use the Information Skills Process as a teaching method, and the second with where, when and by whom this instruction should take place. As with the previous section, these questions were not linked directly to subject teaching, but, unlike the previous questions, were not linked to performance while studying but rather at the essential preparation of teachers which is the core purpose of the training.

It is therefore understandable that this section elicited strong views and was enthusiastically answered by the participants. This, obviously, also included the lecturers concerned with Professional Studies and Education as these subjects are seen as being responsible for the professional preparation of teachers

4.3.5.1. The desirability of the Information Skills Process as a teaching method

As with the previous section the reaction to this was also very positive, ranging from comments such as “We should teach this skill” to “Essential”. Using the same division as in section 5.3.4.1 we can classify the reactions in the same five groupings ranging from the positive to extremely positive.

Table 4.4 The importance as a teaching method

Comment	Number of times
Would help	1
Yes, it is needed	5
Important/got to be done	4
Very important	3
Absolutely important/cardinal importance/ Unequivocal	6

Again, by rating these responses on a Likert scale of 1 to 11, with neutral being 6 the following graph can be produced.

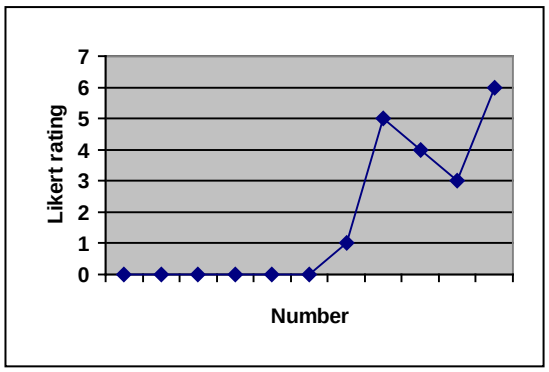

Figure 4.8 The importance as a teaching method

In four cases mention was made that this was essential. In 5.7.4.1 the use of these skills in the subject at tertiary level were dealt with; but in this question it was perceived that these skills needed to be taught to the students to use at the level of the learners that they would be teaching. Two of these made further mention of the importance of the teacher mastering this so that it could be transferred to the learner: “Anders weet die kind nie.” *(Trans: otherwise the child will not know.)*

A further answer showed how the Information Skills Process is seen as an essential life skill, linking it clearly to the critical cross field outcomes as expressed in the National Curriculum Statement (DoE, 2002g:11) and Curriculum and Assessment Policy Statement (DoBE, 2010a:3) list of aims:

> Dit is belangrik, want as die onderwyser weet [sal] die kind verstaan en kan dan die ouers vra. As hy eers die vaardigheid het, het hy dit vir altyd. *(Trans: It is important because if the teacher knows, the child can understand and ask the parents. Once he has the skill, he has it forever.)*

Different elements were also highlighted. One mentioned the skill of giving an assignment, and another the assessment of assignments. This was seen as something that was not being taught to students in the teacher training course, but was still expected to be present in lesson plans that students would need to prepare and, in the case of practice teaching in the schools, actually carry out. Another comment clearly linked this to the previous section, seeing the skills as

being self knowledge, but also that in the subjects the Assessment Standards required these skills as part of the teachers' preparation and methods.

4.3.5.2. The place of the training in using the Information Skills Process as a method

Unlike the previous section's similar question, there was little reaction as to when the training should take place. Respondents were more concerned with where it should take place and, in particular, between the relationship between the professional subjects (Education and Professional Studies) and the teaching subjects in this regard.

Eleven respondents placed the training as being central, usually seen as the responsibility of Professional Studies or Education. Of these, seven saw Professional Studies as the vehicle, three a combination of Education and Professional Studies, and one was unsure, but clear that it should be taught centrally. Significantly, in one case the library was mentioned as a potential partner in this process, despite this being about the training of the teacher rather than the student. One further response was phrased negatively in that the place wasn't identified but seen as being "Nie by die vakke nie." *(Trans: Not in the subjects.)*

On the other hand, three felt strongly that the training was aimed at being used for teaching in the subjects and should therefore be placed within the subjects. Two more saw this as being a combination effort, with a central component, but also an application within the subjects themselves: "Eerstens 'n oorkopelende kursus, dan moet dosente dit toepas." (*Trans: First an overall course, and then the lecturers must apply it.)*

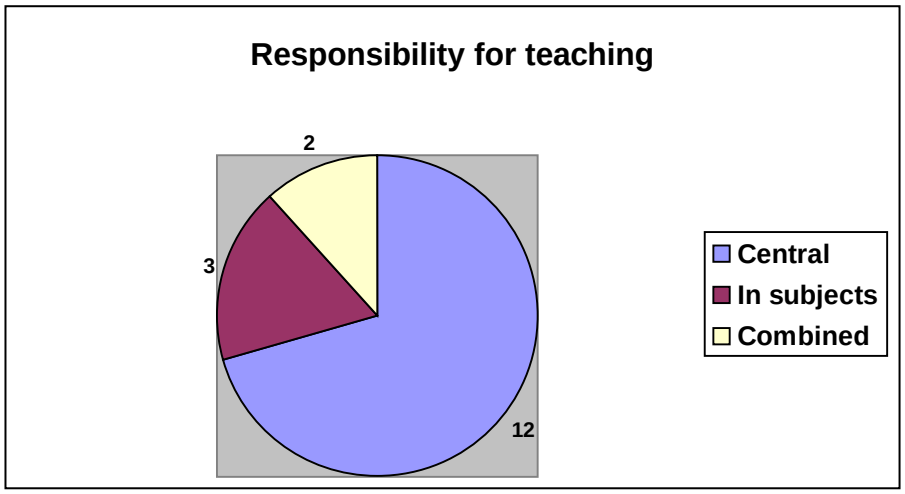

Figure 4.9 Responsibility for teaching

The barrier that was most commonly identified by respondents was that of organization and application. In one case it was clearly stated that the solution should be organizational. In two cases they were not certain as they were unclear as to the actual organization of what was in the different subjects. Probably the most telling comment came, however, when the responsibility was clearly placed within Education, even to the extent that it was seen as being part of the General Didactics part of this subject, but "(Ons) bied dit nog nie so aan nie." (Trans" *(We) are not yet offering it like this.)*

4.3.6. General answers

At the close of the interview an opportunity was given to respondents for any questions or general comments to be made. There were several strong themes that came out of this section and these can be summarized as

- Training of staff.
- Coordination within the course.
- Mutual understanding by staff of course content.

The training of staff to use the skills correctly, as well as how the Information Skills Process is to be applied as a teaching method was seen by four

respondents as important. In two cases this was tied to a concept of what was being done in the rest of the course: one saw the solution as training of staff so that there would be a consensus, another saw the training as being by staff to show what they were doing.

This thought was taken further by one staff member who saw the training as being similar to that which the students would receive, and which they, in turn, would use in their classes: “Wat ek vir kinders moet leer, moet ek kan belewe.” (*Trans: What I teach to children, I must be able to experience.)*

Coordination within the course was a theme that has appeared earlier, in the sections on the place of training, both of the students’ own information skills (4.3.4.2), and in the use of the Information Skills Process as a teaching method (4.3.5). The training of the staff was seen as one way of achieving this coordination: “Opleiding van personeel is nodig – elkeen loop sy eie paadjie.” (*Trans: Training of staff is essential – each is going his own way.)*

In particular, the themes of information skills, the Information Skills Process and the way they were being dealt with were seen as being themes that needed a global perspective and consensus by two staff members, with a further two emphasizing the importance of standardization with regard to the technical preparation of assignments.

The theme that took the most attention, however, was one of mutual understanding. In no fewer than eight responses the lack of mutual understanding and support was expressed. The ideas of a centralised meeting, including a day dedicated to staff involved in the B. Ed.. Intermediate and Senior Phase training, a training session where all staff could explain to others what they were doing or the creation of a course framework were mentioned as possible solutions to the problem. Other comments merely sketched what they saw as the

situation, with no suggested solution: “(I) have no idea what the others are doing.”

On a more positive note, one final comment was given that the process of these interviews was leading to a renewal in thinking, and this creates a progression within the training of teachers. Stated simply, it was said that it was “Goed om nuut te dink.” (*Trans: Good to think of new things.)*

4.4. Summary of chapter

Interviews were held with the lecturers concerned with the training of the students in the Intermediate and Senior Phase. The answers were analysed both quantitatively and qualitatively. The interviews confirmed that no lecturer taught all the skills individually, but that in many cases separate skills were considered as having been taught. In a limited number of cases lecturers did claim that they taught the process as a whole.

As far as the position in schools was concerned, there was a large majority that agreed that they were in the curriculum documents, but most felt that this was not happening in practice in the schools. At the same time they felt that it was important for students to know the Information Skills Process, both for their own growth as well as being able to use it as a teaching methodology.

Where and how this would take place in the curriculum was not clear – the answers were on the whole redolent of the attitude found by Gordon (2009:116) where she found that key issues included overload and a crammed curriculum. It was therefore not surprising that lecturers could agree on the value, but also not want to take ownership of something that they would see as adding to this overload.

Chapter 5: Analysis of students' teaching and reflection

5.0. Introduction

During the interventions with the students as described in the methodology, the students were asked to produce evidence of several types. This evidence included:

- Lesson plan for April practice teaching.
- Lesson plan for July practice teaching.
- Evaluation forms for the lesson in April.
- Discussion of the literature on individualization through a particular facet of the problem (including an annotated bibliography).
- An individual reflection on the year's experiences.
- A group reflection on the experiences.

In addition evidence was gathered by the researcher directly from observation and interaction with the students.

It is further important that the analysis of this evidence addresses the main themes dealt with in this research and expressed in the research questions. These themes are:

- The place of information literacy, the Information Skills Process and the different information literacy skills in the Curriculum.
- The understanding of the students of the process and the methodology of using the process as determined by their previous training.
- The understanding of the value of the skills after the research process.

In this regard it has been shown that analysis can produce a category of codes dealing directly with the above topics and that therefore address the main themes of the research itself. In this research these were found to include codes on understanding of concepts, value of information literacy, teaching and the process followed in the training of teachers. However, analysis can also produce

a category of codes that would appear to be separate from these and did not form part of the original planning. As these cannot be anticipated, they would need to be identified only after coding (Creswell, 2009:186-187). In this research such codes were found regarding the process followed in the training of the stduents during the research process.

Based on this analysis, the results should be able to be interrogated so as to be able to draw conclusions and to make recommendations regarding all three research questions. This is found in chapter 6.

5.1. Coding of responses

In order to achieve the above analysis the documents that have been generated need to be interrogated to determine specific types of coding that can be found in them. By coding the documents mentioned above, the different topics dealt with by the comments in the documents could be identified, and labeled. Once the documents had been gone through, it was possible to see which codes had been actually dealt with in the various documents.

Grouping the comments together gives the key topics that are dealt with in the different documents. These topics can also be seen as major topics (occurring more often), unique topics (only found in single instances) and disjointed topics (topics that do not fit into one distinct category). Thus for each of these a specific grouping of material is done so as to interrogate the documents more widely, and from within these groupings the results as determined through the students' and researcher's documents will yield valuable insights on the different topics dealt with.

The identification of the groupings provides a systemization of what is found in the documents and is heavily based on the researcher's previous knowledge of both the disciplines related to information literacy as well as teacher training. It is

from this knowledge base as well that the naming of the topics is derived. These groupings are then again interrogated iteratively so as to place them in larger categories, again derived from knowledge of the disciplines, and which form the themes of the research (Henning et al., 2004:105-106). There are, finally, also those that fall into the category that could not be anticipated, and could fall either in the knoweledge of the discipline, or even outside it (Cresswell. 2009:186-187).

The first anticipated theme within the groupings that was looked for, and that would therefore be part of the first category of codes mentioned in the previous section, is that dealing with the place of information literacy within the curriculum. Within that theme the following groupings of topics have been identified, each with the various topics that were coded:

1. Information Skills Process.
    - The Big6 as a process.
    - The Big6 as a basis for lesson planning.
2. Curricular linkage.
    - The linkage of information literacy to subject teaching.
    - Relationship between curriculum goals and information literacy.

The second theme addresses the students' understanding of the concepts contained within information literacy and its relationship to teaching at the beginning of the research process. Again, this theme was anticipated and falls into Cresswell's first category. Within that theme the following grouping of topics was identified:

1. Understanding of teaching terms and concepts.
    - Teaching knowledge.
    - Differentiation.
    - Multiple intelligences and learning styles.
2. Overall ideas in teaching as learnt.
    - Teaching methodology.
    - Teaching philosophy.

The third theme addresses how the students perceived the Information Skills Process after the research process had taken place. Again, this theme was anticipated and could be seen as falling into Cresswell's first category. The different groupings and topics for this theme were:

1. Changes in understanding.
    - Teaching knowledge.
    - Teaching methodology.
    - Teaching philosophy.
    - Big6 process.
2. Value perceived during teaching.
    - Learners' response.
    - Training in information skills in teacher training.

The fourth theme that was found was related to the way in which the students reacted to the training undergone as part of the research process. These fall into the second group of codes, as they were not anticipated before the research took place. Although not linked to one of the research questions, this theme was definitely linked to the "process of personal transformation" that was postulated as underpinning the methodology of this research. There was only one group, with two topics:

1. Process followed in the training of the research participants.
    - Group dynamics.
    - Perceived value of participation.

The comments made by the students and extracts from the documents mentioned above, are read together so as to gain insight into each of the topics. For each of the themes, then, the topics within each category are dealt with individually.

5.2. Place of information literacy within the curriculum

The first theme dealt with the place of information literacy in the curriculum. Although the analysis in chapter 2 dealt with this research question in some detail using an analysis of the curriculum documents, the comments from the documents showed the actual insight which the students had with regard to this. In this context there were two specific categories of topics – those in which they looked at the process itself, and those in which they looked at the subjects within the context of information skills.

In the first category, that of the Information Skills Process, two topics were identified:

- The Big6 as a process.
- The Big6 as a basis for lesson planning.

In the second category, that of curricular linkage, there were also two topics:

- The linkage of information literacy to subject teaching.
- Relationship between curriculum goals and information literacy.

5.2.1. Information Skills Process

There were two topics touching on information literacy and the Information Skills Process. Although the elements of the Information Skills Process as defined by the Association of College and Research Libraries (2000) are found widely and in different forms (as example Braxton, 2004; Smith, 2007), throughout the training the model chosen for the explanation of the Information Skills Process was the Big6 model of Eisenberg (2006). The first topic then found was the Big6 as a process.

A major part of the methodology of the training was to lead the students into designing lessons using the Information Skills Process, and, more particularly,

that of the Big6. The second topic thus found in this category was the actual use of the Big6 in planning lessons.

5.2.1.1. The Big6 as a process

The comments by the students on the Big6 model were mainly positive and focused on the effectiveness, flexibility and usability within the training context. Typical of this are the following comments by S2: " … die Big6 is 'n proses wat in enige leerarea toegepas kan word, veral baie effektief in Wiskunde." *(Trans: ... the Big6 is a process that can be applied in any Learning Area, particularly very effective in Mathematics.)*

This comment shows the perception that the Big6 is not only effective as a model, but particularly as a process. Significant in this recognition of the Big6 as a process was the interesting perception that came from S3 who found that " ... die Big6 is nou verband met tegnologiese aspekte en stappe." *(Trans: … the Big6 is closely related to technological aspects and steps.)*

In the analysis of the different curricula of the Learning Areas (chapter 2), it was pointed out that there was a close relationship between the Technological Process as described in the National Curriculum Statement for Technology (DoE, 2001i) and the steps as outlined in the Information Skills Process. The recognition by the student of this in practical terms showed a good grasp of both processes. In particular it showed an understanding of the process nature of each of the two processes, and that there was a commonality derived both from the process nature, as well as the nature of being learning processes.

Student S4 commented on the fact that the Big6 was a process, but also that it can be more broadly seen that the process forms a strategy for problem-solving: "Sommige noem die Big6 'n inligting probleemoplossingstrategie. Die prosesbenadering van … Eisenberg verseker dat [differensiasie] meer effektief

kan word." *(Trans: Some call the Big6 an information problem solving strategy. The process approach of … Eisenberg ensures that [differentiation] can be more effective.)*

Again important is the comment that the use of the process leads to a more effective application of a desired outcome within the teaching context.

In general the comments made showed a positive view of the Big6 model as a process. There is also support for the idea that a process model such as the Big6 can lead to greater effectiveness, not only within certain subjects, but also in the attainment of educational goals desired in the lesson.

5.2.1.2. The Big6 as a basis for lesson planning

One of the most positive statements made about the Big6 as a basis for lesson planning was from S4 who stated: "Die Big6 het my oë veral oopgemaak en ek gebruik dit baie as riglyn om my lesse op te stel." *(Trans: The Big6 in particular opened my eyes and I use it often as guide in setting up my lessons.)* As this was one of the elements that the research was hoping to find, it showed the successful internalization by the student of the value of the Information Skills Process as a methodology on which lesson planning can be based.

This idea of a base on which lessons can be planned was echoed by S6 who stated: "My opinie en siening oor die Big6 het geweldig verander die jaar. Ek dink dis 'n uitstekende manier van beplan en klas gee" *(Trans: My opinion and views on the Big6 have changed tremendously this year. I think that it is an excellent way of planning and teaching.)* This comment shows both the idea of using the Big6 as a teaching methodology, and, more importantly, that it was seen that it could be used as a basis on which the lesson could be planned. The use as a base for planning was echoed by S1, who claimed that "Dit dien ook as grondlyn

vir die opvoeder tydens sy beplanning." *(Trans: It also acts as a base-line for the educator during planning.)*

The linkage between planning using the Big6 and using the steps in giving the lesson was expressed by S3: "My standpunt is egter dat ons as onderwysers die big six as voorbeeld sal gebruik om les volgens die stappe aan te bied." *(Trans: It is my opinion, however, that we as teachers will use the big six as an example to give the lesson according to the steps.)* The use of the word "voorbeeld" *(example)* in this comment is significant as it shows the move from considering the Big6 to be relevant only to specific situations or lessons, to being an example on which lessons in general can be based.

The one negative comment came more in the practical application of the model by S5 who stated that it was " … moeilik om te verseker dat die regte proses ook tydens die les plaasgevind het: *(Trans:… difficult to ensure that the correct process also took place during the lesson.)* Despite the overall negative tone of the comment, there is an underlying positivity about the process itself: it is the application in the classroom that is seen as being difficult. This should also be seen within the context of the constraints that the system normally places on teaching, and that were mentioned by the group in its main presentation. The main constraint was the time needed for the process to unfold and it is this aspect that is most responsible for the comment above. The value of the model itself in the lesson planning is not being questioned.

5.2.2. Curricular linkage

In the second category there was a more subject focused approach to the topics. As the emphasis during the selection process had been to ensure a wide coverage of major subjects in the students' choice, the emphasis during the training had also been on a subject approach to information literacy and the Information Skills Process, with the lessons being given being in the students'

major subjects. Within this category, therefore, it was not surprising that the students covered the use of the Information Skills Process within the different subjects as well as the linkages between information literacy and the subjects themselves. In addition, however, there were also comments on the achievement of curricular goals through the use of the Big6 model.

5.2.2.1. Linkage to subjects

The comments on the linkages to the different subjects were on the whole positive again. There was a clear understanding of the use of the Big6 model in certain subjects, as shown above in the comments on Mathematics and Technology, but there were also positive comments on the general applicability of the model within all Learning Areas. As S4 indicated: " … sodoende kan mens dit integreer met die ander leerareas." *(Trans :… by doing this a person can integrate it [the subject taught in the lesson] with other Learning Areas.)* This comment shows a clear understanding that the process, when used, is a vehicle for planning the lesson, and, due to its general applicability, the vehicle allows the lesson to be integrated with other Learning Areas.

S1 further supports this by stating that: "Terme wat ons behandel het tydens die lesuur het geintegreer met die ander vakke." *(Trans: Terms that we dealt with in the period integrated with the other subjects.)*

In section 5.2.1.1 specific comments were made about the suitability of use within Mathematics and Technology. The use within Technology was further highlighted by S1 as it was seen that "Die Big6 is ingebore in Leeruitkoms 1 van die Leerarea Tegnologie." *(Trans: The Big6 is born into Learning Outcome 1 of the Learning Area Technology.)* Earlier in the analysis in section 2.2.3.4 the strong linkage between Technology Learning Outcome 1 and the Information Skills Process was also highlighted. But, as with Mathematics and Technology, Social Sciences were also seen as being Learning Areas in which the model could be

used. This was stated by S4 as: “Sosiale Wetenskappe is een van die leerareas wat voorwaar ‘n uitstekende vak is om die Big6 model effektief toe te pas.” *(Trans: Social Sciences is one of the Learning Areas which is really a subject to effectively apply the Big6 model.)*

However the same student who saw the linkages between Technology Learning Outcome 1 and the Big6 model also saw past this specific relationship to the essential embedding of the Information Skills Process in each of the Learning Areas in the curriculum and indicated that “Eisenberg se model…kan geimplimenteer word in alle leerareas van die Suid-Afrikaanse kurrikulum.” *(Trans: Eisenberg’s model can be implemented in all the Learning Areas of the South African curriculum.)*This comment also shows that the model is seen essentially as an applicable tool, thus linked to the subjects in the form of skills, and not limited by content.

Finally, the South African curriculum is divided into different phases, but the following comment showed that the student perceived this process as being not restricted to a particular phase: “Die Big6 vaardighede kan ook gebruik word by alle leerareas, regdeur al die grade.” *(Trans: The Big6 skills can be used by all Learning Areas, throughout all the grades.)*

These comments, including those made in the first section on Mathematics and Technology, clearly show an understanding of the value of the use of the Information Skills Process within the teaching of different subjects, which, again, was one of the aims of the training of the students during the research process.

5.2.2.2. Linkage to curricular goals

In the discussion on the South African Curriculum in sections 2.2.2.1.–2.2.3.8. it was pointed out that the curriculum had goals at two levels: those of the Learning Areas, and those of the Critical Cross-Field Outcomes (later known as critical and

developmental outcomes). These were recognized as “goal statements” (Spady, 2004:166) and a further exposition of their implications showed that they were designed to bridge the gap between effective functioning within the classroom and effective functioning in life, a distinction which Spady feels can be achieved by better use of the potential that he sees in these outcomes (Spady, 2004:176-177).

In this context, several of the comments about the Information Skills Process and the Big6 showed a perception that this process was also able to meet the underlying nature and goals of the curriculum. Thus student S4 says that: “In Suid-Afrika word hierdie strategie ook tot ‘n mate toegepas deur die uitkomsgebaseerde beginsels van ons kurrikulum.” *(Trans: In South Africa this strategy is also applied to a certain degree by the outcomes-based principles of our curriculum.)* The key to this comment thus lies in the perception that the strategy (here describing the Information Skills Process) is applied by the curriculum as a whole, thus helping the curricular goals to be met.

Again, as Spady (2004:177) points out, the South African curriculum is designed to be a curriculum in which the critical cross-field outcomes can be analyzed to lead to his postulated five Life Role Outcomes. Within this context, then,there is a statement by S6 that “ … die Big6 … kan ook daarna gekyk word as ‘n stel basiese, essensiele lewensvaardighede.” *(Trans:… The Big6 … can also be looked at as a set of basic, essential lifeskills.)* This shows how the Big6 can be perceived as a set of life skills which will meet the demands in the Critical Cross-Field Outcomes.

A third comment showing how the students linked the process to the achievement of the goals in the specific lesson being taught, was the comment by S5 that: “Die nodige Leeruitkomstes en Assessering Standaarde is aan die einde van die les bereik.” *(Trans: The necessary Learning Outcomes and Assessment Standards were achieved by the end of the lesson.)* This addresses

the learning outcomes in particular as being the linkage that is important and achieved by the use of the process.

Thus the use of the process to achieve the outcomes as expressed by the curriculum, particularly with regard to the Critical Cross-Field Outcomes, was expressed by the students and showed a perception that use of the Big6 is not only within a specific subject context, but also as a tool within the wider curricular context.

In general, then, the comments on the use of the Information Skills Process, and the Big6 in particular, within a specific subject and as a means of planning particular lessons, showed that this was well understood and appreciated by the students. In addition the wider curricular and didactic implications of the use of the model were also explored and appreciated by some students.

5.3. Initial understanding of students before the research process

As the research process was designed to develop the thinking of the students, it is important that their own thinking as they perceived it at the beginning of the research process should also be identified. This thinking had developed during the training that they had already undergone during their first three years. In analyzing the documents it was clear that the students reflected both on specific aspects of their knowledge, as well as more general thoughts on teaching in general.

5.3.1. Understanding of teaching terms and concepts

Within this group of comments there were also comments made on the concepts dealt with. These comments were both about knowledge of concepts in general, as well as about certain specific terms that were dealt with during the research

process, in particular the concepts dealing with the basis of differentiation in teaching, as well as those dealing with multiple intelligences and learning styles.

5.3.1.1. Teaching knowledge

In their comments on their understanding of terms and concepts used during the research process, it was found that the students perceived their knowledge as being deficient at the start of the training. It was found, in fact, that they found that these concepts were strange to them. In particular these comments were about their perceived lack of knowledge of the concepts themselves, but also about the practical application of these concepts in teaching.

The first of these can be found in several comments such as that by S4: " … woorde wat se betekenis aan my onbekend was." *(Trans.…: words whose meaning was unknown to me.)* Whereas this comment merely indicated that the concepts themselves were unknown, the following by S2 showed that this lack of knowledge was seen as being problematic within the complete training that they had received up to date: "[Ek was] vaag oor die idee want daar was 'n leemte in my onderrig mondering." *(Trans: [I was] vague about the idea because there was a gap in my teaching equipment.)*

Other students found the concepts completely new – despite assurances from the lecturers that these concepts had been dealt with in earlier training. One example of this is in the statement of student S6: "Wat vir my nuut was, was die tipe differensiasies en ook die Big6." *(Trans: What were new to me were the types of differentiation and the Big6.)* This student also said: "Om eerlik te wees, die eerste keer toe daar van die Big6 gepraat was het ek gedink dis Grieks en nie regtig verstaan hoe dit werk nie." *(Trans: To be honest, the first time that the Big6 was talked about, I thought it was Greek and did not really understand how it worked.)*

Although it was expected that the Big6 would be new to the students, it was surprising that differentiation, although treated and understood as a concept, still held many facets that were new to the student. In particular the different forms of differentiation were seen as new, and these should have been understood.

It was not only the term Big6 that was strange to the students. As S5 stated: “Die begrip probleemoplossingsproses was ‘n redelike nuwe konsep vir my om tydens ‘n les te moet toepas.” *(Trans: the concept problem solving process was a relatively new concept for me to apply during a lesson.)* The concept itself was not as strange as having to apply it during a lesson – thus it is not only the concept but its practical application that was strange. Considering that these students had already done six practice spells in schools, and had had three years of Professional Studies training which was designed to concentrate on the practical side of teaching, this gap in knowledge was surprising.

Although not directly linked to concepts, it was also surprising that students commented on teaching materials that were unknown to them. S1 was surprised that the researcher “ … [het] handleidings gewys waarvan ek nie eers geweet het nie.” *(Trans:… showed textbooks that I was not even aware of.)* This lack of awareness was despite specific lessons in the first-year training covering materials in the library given in both Education and Professional Studies and, more importantly, Subject Didactics which should have shown the students the available material. However this comment was also misleading in that the student was not unaware of the existence of the material, but rather unaware of how the material could best be used for learning.

5.3.1.2. Differentiation

As the emphasis during the research training was on the actualization of the didactic principle of differentiation through the use of the Information Skills Process, it was expected that the students would comment on their

understanding of the concept. The Big6 has also been linked to differentitaion (Jansen, 2009; Haddrell, 2011) and it also could have been expected that this would have been commented on. As shown above, S6 was one of the students that commented on their understanding, or lack of it, of the term differentiation.

The same student also showed that this lack of understanding of the concept also applied to the practical application of the concept: “Ek het eerlik nie geweet daar is soveel verskillende vorme van differensiasie nie.” *(Trans: I honestly did not know that there are so many different forms of differentiation.)* This comment showed that the concept had been heard of, but not to the depth of understanding that the student learnt during the research process. This was also found in S4 who stated that: “ ... my algemene kennis rondom differensiasie baie klein is.” *(Trans: … my general knowledge of differentiation is very small.)*

What is poignantly significant in this comment is the reference to “algemene kennis” *(general knowledge)* by a fourth year student whom one would have thought would have been well trained and seen that this knowledge would not be general knowledge, but part of the essential subject knowledge by the fourth year of teacher training.

What was also interesting was the perception that this lack of knowledge of a key concept and the necessary underpinning was not confined to themselves as students. The idea of different learning styles was one that was often used during discussion of the practical application of differentiation, and S4 commented, rather self-righteously: “ … meeste onderwysers nadat hulle gevra is nie eers die leerstyle kon opnoem nie.” *(Trans :… most teachers after they had been asked could not even name the learning styles.)* This comment is significant in that it is underpinned by a realization by the student that this lack of knowledge is common amongst those in teaching, and it could only have been prompted by the student’s realization of an own lack of knowledge at the beginning of the research process.

This comment on the teacher's lack of knowledge was considered important enough to be included in the group presentation where they stated that: "Onderwysers het ongenoegsame kennis van differensiasie." *(Trans: Teachers do not have enough knowledge of differentiation.)* As with the earlier statement, there is the undertone that they as a group now had a better understanding, and that other teachers (which probably included fellow students) lacked this.

5.3.1.3. Multiple intelligences and learning styles

Further concepts that emerged during the research training as key concepts were those of multiple intelligences and learning styles. Although, unlike differentiation, not directly indicated by students as being something that they had not known about or understood it is clear from the comments made that these were concepts that they had learnt and whose application in teaching they had come to appreciate during the research process.

Typical of this type of comment is that by S3:

> … het ek besef dat die rede egter vir UGO in die nuwe kurrikulum is dat dit so geskryf is dat die leerders baie van self hul eie leerstyle bepaal en toepas." *(Trans:… I realized that the reason for Outcomes-Based Education in the new curriculum is that it is written so that the learners largely by themselves will determine and apply their own learning styles.)*

This comment shows, on the surface, that the student's knowledge of learning styles and its linkages to OBE were something learnt during the research process. However, on a deeper level it also shows a process during which not only learning, but also internalization of knowledge took place.

This internalization of the importance of learning styles was very evident from several comments made by other students, with that of S5 being the strongest: " … word daar onreg gepleeg indien daar slegs op een tipe intelligensie gefokus word." *(Trans: … it will be an injustice if there is focused on only one type of intelligence.)* This comment is significant not only for the content which shows the

strong feelings around the use of multiple intelligences, but for the tone of the comment which has a feeling of self-righteousness in it. This tone is typical of comments made by those who have recently come to a new or broader understanding of concepts, and thus again shows that this student was not aware of the meaning and application of this concept before the start of the process.

Thus in the comments by the students on their knowledge of certain concepts and their application, including the concepts of differentiation, multiple intelligences and learning styles, it is found that these concepts were not well understood. Although total ignorance of the comments was postulated by some students, these concepts had been part of the training in the first three years, but had obviously not been internalized by the students to the extent that they understood, appreciated and could apply them in practice. The reason for this became clearer when looking at their comments on teaching methodology and teaching philosophy in general.

5.3.2. Overall ideas in teaching as learnt

Comments made on the students' ideas about teaching methodologies and teaching philosophy in general did not always state clearly how this changed during the training. In particular there were seldom direct references to the state of these at the start of training. However, from comments made, quite a lot can be deduced indirectly about the students' ideas on both methodology and philosophy before the research process started. These ideas on teaching and their teaching styles are of cardinal importance to the succesful implementation of the use of information skills (Hart, 2000:2).

As the emphasis in the research process had been on the practical applications within lessons, the comments made, as expected, were more aimed at teaching methodology. In particular there were comments on the methodology that the students wished to employ in their practice teaching lessons, but there were also

comments on teaching methodology in general. These comments were often directly linked to the way students considered the use of the Big6 in actual teaching in the school as opposed to what they originally thought.

However, there were also thoughts on their philosophy of teaching in general. Usually expressed as dictums, it is from these comments in particular that the original state of thinking of the students can be deduced.

5.3.2.1. Teaching methodology

The comments made regarding teaching methodology were often significant in what they implied about the students' knowledge of and application of teaching methodologies at the start of the training process. Typical of these comments was that by S5: " … ek meer effektiewe lesse kan gee." *(Trans: I can give more effective lessons.)* The use of the word "meer effektiewe" *(more effective)* to describe the effects of the teaching methodology employed as a result of learning that took place during the research process showed that the student felt that the knowledge of teaching methodologies at the start of the process was in some ways deficient.

Similarly, when reflecting on the Information Skills Process, S4 expressed the feeling that the process could be seen as part of a larger, more encompassing strategy that they as students could now understand and use to better effect: "Hierdie strategie wat ek tydens die les-ure opgedoen het, beskou ek van groot waarde." *(Trans: I consider this strategy that I learnt through these periods as being of great value.)* Again, the implication behind this statement is that the initial training may have included strategies, but that the value of this strategy now learnt was such that it lessened the value the student placed on the initial knowledge of methodology before the research process.

A similar implication can be found in this comment that, on the face of it, deals with S4's own perception of progress: "Hierdie navorsing het 'n mens se oë oopgemaak vir die oneindige moontlikhede wat toegepas kan word in die klaskamer." *(Trans: This research opens a person's eyes to the endless possibilities that can be applied in the classroom.)* The comment that it was the training that opened the student's eyes to the many possibilities, by implication states that previous methodologies taught to the students were limiting in their application and scope.

The comments made by the students, therefore, indicated that in their previous training the methodologies that they had learnt were limiting, and, on the face of it, were less effective.

5.3.2.2. Teaching philosophy

Closely linked to the students' perceptions and comments on the teaching methodology, comments are also made about their general view of teaching and learning. The students had already, through three years of training, been exposed to specific ideas about teaching. Comments made, as with the methodology, showed for the first time an interrogation of what had already been learnt.

Similarly to the comments on teaching methodology, those on teaching philosophy were not made about their state before the research process started, but rather on the progression they felt. By looking at the comments, then, the position that the students started from at the beginning of the training can be seen.

Although the emphasis throughout the training was on the curricular use of the Information Skills Process as a methodology and the educational basis of the curriculum was therefore not interrogated, there were comments made that

showed the students' deeper questioning of the approaches to teaching and learning that they had already developed. It is significant that these comments showed in most cases a positive side as being the result of the training, but were also couched in terms that indicated a mandatory unquestioning approach. Thus, for example, S4 stated that: "Tydens 'n les moet jy as onderwyser jou rol ken en kan doen … die leerders se rol moet ook duidelik aan hulle gegee word." *(Trans: During a lesson you as teacher must know and can perform your role … the learners role must also be given clearly to them.)*

This rather dogmatic approach to teaching and learning with its unquestioning acceptance of separate roles for learners and teachers, is actually in contrast to the same student's later assertion that: "Ek het gedink dat daar net sekere goed is wat jy met 'n klas kan doen … ek [hoop] van harte dat dit die boks waarin ek dink net verder sal oopbreek" *(Trans: I used to think that were only certain things that you could do with a class... and I sincerely [hope] that it will further break open the box within which I think.)*

Juxtaposing these two statements it can be deduced that the original philosophy of teaching is that in the first statement and that this philosophy shows adherence to a rigid conceptual framework, in this case of the relationship between teacher and learner. This shows further that the training seemed to produce students that did not question traditional views.

Again the following statement by S2 also says a lot about the original philosophy held: "Dit laat my besef van watter kardinale belang elke leerder se behoeftes is en dat dit afsonderlik aangespreek moet word om optimale leer te bewerkstellig." *(Trans: It made me realize the cardinal importance of each learners' needs and that they must be addressed separately to promote optimal learning.)* This comment shows that the student's original thinking did not take individualized needs into account. This again shows the limited thinking present in some of the students.

There were comments, however, that gave no indication that there had been a change in their thinking. S6, for example, stated categorically: “Ek glo dat kinders beter by mekaar leer soms as by die onderwyser.” *(Trans: I believe that children sometimes learn better from each other than from the teacher.)* Similarly, S4 stated: “Opvoeders behoort ook kennis te neem van areas van uitnemendheid.” *(Trans: Educators should also take notice of areas of excellence.)*

Both of these comments shared the dogmatic tone of the first comments that could be ascribed to their original thoughts on teaching. In both these cases the teacher is seen as a key figure within the process, and, in the second, even as the person responsible for the way teaching takes place.

The comments on their original teaching philosophy, then, showed that the students had a philosophy given to them and showed a dogmatic approach to underlying philosophies of education and teaching. Questioning and development of an own comprehensive and cohesive philosophy would appear not to have taken place.

5.4. Understanding of students after the research process

Linked to the third research question, the understanding of the different concepts, teaching methodology and philosophy and, in particular, the value of the Big6 formed a large part of the reflective comments of the students. In addition, the students looked beyond themselves and also looked at the value the use of the Big6 process had on the learners in the class, as well as its potential for fellow students.

5.4.1. Changes in understanding

Changes in understanding that took place during the research process were seen as very important by the students, and could be seen clearly from their comments. These changes were found in their teaching knowledge, teaching methodology and teaching philosophy in general, but also the Big6 in particular.

5.4.1.1. Teaching knowledge

Taking this even further the following comment by S4 shows that after the training of the students done during the research process these concepts became more internalized and understood by the students: “Ek kyk nou heel anders na die konsepte wat hul aan die begin vir ons verduidelik het.” *(Trans: I now look completely differently at the concepts that were explained to us at the beginning.)*

The perceived lack of knowledge of these concepts was felt by many of the students to be one of the aspects of learning that they underwent – an aspect that they felt valuable and that gave insight into both the unknown concepts as well as concepts that they had been familiar with but now experienced a deeper understanding. An example of this is found in the concept of assessment where S4 says:

> Ek het besef dat jy nie noodwendig iets moet neerskryf om as assessering te dien nie en dat die metode van assessering is bloot om voort te vorder met die les. *(Trans: I realized that you don’t have to write something down for it to be seen as assessment and that the method of assessment is merely to move forward with the lesson.)*

The realization expressed by the student shows the growth that took place within the student as part of the training, and a recognition that previously held assumptions about the application of a basic educational concept such as assessment were challenged and found to be false.

Specific concepts were also the subject of comments that indicated a growth in understanding during the research process. In particular, as expected, the concepts of differentiation and multiple intelligences received comments. In the students' joint presentation this was highlighted by them as one of the areas in which growth and understanding took place. One of the slides, with appropriate discussion places these two in juxtaposition: "Differensiasie: multi-intelligensies." *(Trans: Differentiation: multiple intelligences.)*

The use of the terms differentiation linked to multiple-intelligence types was also used by them in their lesson planning. As an example, S2, in her July lesson, used the following to describe the activities that the learners would do:

Differensiasie: Linguistiese
Ruimtelik
Interpersoonlik
Logies-wiskundig
Liggaamlik-kineties
(Trans: Differentiation Linguistic
Spatial
Inter-personal
Logical-mathematical
Bio-kinetic.)

This was the same student who in reflection stated that the research process " … het my laat besef van watter kardinale belang elke leerder se behoeftes is" *(Trans: … let me realize what cardinal importance each learner's needs play.)*

The use of these multiple-intelligences in the lesson planning, together with the admission of her realization of the importance of learners' needs, thus showed that knowledge of the concepts used in differentiation, and more particularly, multiple intelligences had grown dramatically during the process, to the extent that they could be used in the actual lesson planning and teaching.

Similarly S6 reflected on her lesson by stating that: "Verskillende intelligensies wat tydens die les aangespreek was is Interpersoonlike, Linguistiese en Naturalistiese intelligensie." *(Trans: Different intelligences that were addressed during the lesson included Inter=personal, Linguistic and Naturalistic.)* And on the

success of the groupwork in the lesson: “Leerders se interpersoonlike intelligensie het dus hier ‘n groot rol gespeel.” *(Trans: Learner’s Interpersonal intelligence therefore played a large role.)* This student had commented: “Dit het my laat besef hoe baie ek werklik die jaar geleer het.” *(Trans: It let me realize how much I had really learnt this year.)*

From the reflection it is clear that much of this learning had been about the concepts contained in multiple intelligences theory, and also, more importantly, how these concepts were used practically.

The growth in understanding of concepts was often linked to the growth of understanding in their practical application. This was seen particularly in their growth in understanding and use of teaching methodologies.

5.4.1.2. Teaching methodology

As stated in both the preceding section as well as section 5.3.2.1 which looked at the students’ initial thinking on teaching methodologies, the initial state could often be deduced from the growth expressed. An example is the already quoted comment by S5: “ … ek meer effektiewe lesse kan gee.” *(Trans: … I can give more effective lessons.)* This showed both the initial state, as well as the growth that was felt.

The comments made showed also a growth in understanding that teaching methodology includes different facets. Thus there were comments made on the growth in understanding of the planning phase and how this phase should incorporate new ideas. S5 stated: “Dit is vir elke onderwyser belangrik om nuwe maniere aan te leer om lesse uit te werk.” *(Trans: It is important for every teacher to find new methods of working out lessons.)* More specifically S4 saw that this phase needed to incorporate the idea of learning styles: “Opvoeders moet bewus wees van die verskillende leerstyle wat in hulle klaskamers aanwesig is en moet

daarvolgens beplan." *(Trans: Educators must be aware of the different learning styles present in their classrooms and plan accordingly.)* In both cases it can be seen that the process has brought about a change in their thinking with regard to the planning phase – and that there is a realization that this phase requires an open mind and use of concepts other than those learnt in their first three years.

However, there were also strong thoughts on the actual teaching process in the class. In this regard there was an increased awareness of the importance of the processes that take place in the class. There were different ways of stating this, including the bold statement by S5 that: "My benadering teenoor lesse gaan in die toekoms anders wees en ek sal meer gebruik maak van die prosesbenadering." *(Trans: My approach to lessons will be different in the future and I will make more use of the process approach.)*

This shows that the change is recognised and that it is the approach that will be different in future. The statement is also very positive in its tone, showing that the student felt that this was a definite improvement in capacity for teaching.

A more indirect statement was found in the comment by S6 that they should: " ... fokus op die proses, sowel as die inhoud. *(Trans: … focus on the process as well as the content.)* But the same student also commented that: "Elke aanbiedingstrategie wat gevolg word, moet gepaard gaan met 'n prosesbenadering." *(Trans: Every presentation strategy that is followed, must be accompanied with a process approach.)* A further comment by the same student was: "Ek voel dat ek dus meer effektiewe lesse in die klaskamer sal kan gee, sodat al die leerders betrek kan word." *(Trans: I feel that I will therefore be able to give more effective lessons in the classroom, so that all the learners can be involved.)*

Again, the use of the word "effektiewe" *(effective)* is significant. Taken together, then, the students' comments show a new value placed by the students on using

a process approach in actual teaching, and a feeling that the focus on process will lead to better learner involvement and, therefore, more effective teaching and learning. The tone is again a positive one, showing that underlying these statements is an improved confidence in ability to teach effectively.

The emphasis in the research process training placed on differentiation is clear from the above two sets of comments which both showed an internalization of the concept, as well as a clear understanding of the linkage to successful teaching. A similar understanding of the importance, but without a linkage to the actual results of the action is found in S3's statement that it is "Belangrik om klas aan te bied dat dit elke leerder insluit." *(Trans: Important to give the class so that it includes each learner.)*

Also in the presentation by the group there was a negative reflection in that the group criticized the "One size fits all – leerstyle." *(Trans: One size fits all learning styles.)* They felt that this had typified their previous ideas of teaching and planning lessons. They then contrasted this with the newly learnt: "Positiewe resultate (multivlakkige onderwysmetodes)." *(Trans: Positive results (Multi-level teaching methods.)*

This showed that, from the group as a whole, there was a definite change in thinking about teaching methodologies. Largely, there was a greater understanding of the role of process and of differentiation in actual lesson planning and presentation, but a deeper change was also displayed in that there were undertones showing an awakening of critical faculties, which led them not only to question previous training, but also to realize that teaching was an ongoing process of renewal and innovation.

This was stated very clearly by S2 who, in reflection on what had been learnt, included the comment that: "Die onderwysberoep is kompleks en voortdurende vernuwing is essensieel om dinamiese en effektiewe leer te verseker." *(Trans:*

The teaching career is complex and continual innovation is essential to ensure dynamic and effective learning.) The tone of this comment is almost one of wonderment, of having discovered something surprising and unknown. It is this realization that also lay beneath the obvious research questions and goals of the research – the awakening within the students of a wider understanding and thinking about teaching methodologies and also teaching in general.

5.4.1.3. Teaching philosophy

As shown in the previous section on the students' changes in thinking about teaching methodology, comments that showed how the students changed their thinking also showed how they felt before the research process. This was also true in comments made about their teaching philosophy.

Thus the comments made about their philosophy of teaching need to be interrogated closely to understand the growth, if any, that took place in their understanding. For example, the statement by S1 that:"Uitkomsgebaseerde onderwys stel die leerders in staat om op hul eie tempo te leer." *(Trans: Outcomes-based education enables the learners to learn at their own pace.)* This must be seen in the context of an initial analysis of Outcomes-based education as being " ... 'n verandering in die onderwyser se rol." *(Trans:… a change in the role of the teacher.)* The students' philosophy thus moved from an initial concern with the teacher, to one of seeing that it should be learner-centred.

The teacher-centred nature of thinking was not unique to this student. S3 showed great concern with the teacher's role, first defining it as: "Ons is daar om hulp te verleen." *(Trans: We are there to give help.)* Then the student stated:

> Elke onderwyser [sal] die volgende vrae moet vra:
> Het die leerders vandag iets nuut gedoen?
> Is enige aard van leer toegepas?
> Het effektiewe leer plaasgevind?
> Het die leerders gebruik gemaak van bronne?
> *(Trans: Every teacher [should] ask the following questions:*
> *Did the learners do something new today?*

> *Was any type of learning applied?*
> *Did effective learning take place?*
> *Did the learners use sources?)*

Even in consideration of the different learning styles the student stated: “Aandag aan verskillende leerstyle bevorder leer.” *(Trans: Attention to different learning styles promotes learning.)*

In all of these an emphasis on the centrality of the teacher in the student’s understanding of education is found. The last statement was particularly significant in that, even when considering the different learning styles, they are seen from the viewpoint of the educator and the educator is seen as being the person responsible for the learning of the learners through his intervention.

This is in contrast to S4 who looks at the same situation but states that: “Elke leerder het sy unieke leerstyl.” *(Trans: Each learner has their own unique learning style.)* This places the emphasis on the learner.

The same emphasis on the role of the teacher being of paramount importance is found in the statement by S2 that:

> Ek is van mening dat die skool tot dusver slegs gefokus het op die linguistiese en logies-wiskundige intelligensie ten koste van die ander intelligensievorme waarin die leerder dalk uitblink. *(Trans: I am of the opinion that the school has up to now focused only on the linguistic and logical-mathematical intelligences at the cost of the other intelligence forms in which the learner might excel.)*

It is also found in another statement by the same student: “ … dat dit afsonderlik aangespreek moet word om optimale leer te bewerkstellig”. *(Trans: … it must be addressed separately in order to obtain maximum learning.)* This was echoed by S6’s statement that: “Wat ons moet doen, is om slimmer te werk en nie vinniger nie.” *(Trans: What we need to do is work cleverer and not faster.)* Again, S6 further stated on the same theme: “Ek is nie mal oor die idee om kinders als met ‘n lepel in te gee nie, want op een of ander stadium gaan dit tot hul nadeel wees.” *(Trans: I am not crazy about the idea of giving everything to children with a spoon because at one stage or another it is going to be to their detriment.)*

In all of these statements these two students focused on the role of the teacher, either personally (as in the last comment) or in the context of the school. In the latter case (the first comment) it is significant that in referring to the school the student meant the teaching staff: the learners were not seen as the school's central component, but rather the staff. The other two comments also placed the students' perception of their own place in education as being among the teaching staff, seen as a group. Despite the emphasis in the research process on the centrality of the learner, these students' previous exposure had been to a curriculum founded on the roles of the educators (Onderwyskollege Boland, n.d.). Thus it is unfortunate, but not surprising, that this tenet of their philosophy was not challenged sufficiently for them to question the centrality of the teacher.

However, despite the centrality of the teacher, the comments also displayed a move towards the idea of differentiation and catering for individual differences, as well as a look at the learners' own role (in the last comment) where the inference is on the learner being led to learn, rather than the teacher being the imparter of wisdom.

Thus, in general, the students' philosophy of teaching tended to remain teacher-focused, but with a wider understanding of the importance of learner differences. Unlike the methodology, then, the research process did not make a ground-breaking impact on their overall philosophy. However, as stated earlier, this was not the main aim of the research training which was more focused on challenging methodological assumptions. It does raise questions, however, about the extent to which enquiry and questioning of the basic understanding of teaching are built into the present curriculum of the student training.

5.4.1.4. Big6 process

As the main aim was a growth in methodological thinking as expressed in the previous two sections, it was also to be expected that the vehicle used, the Big6,

would also have specific comments attached to it. In sections 5.4.1.1 and 5.4.1.2 several of the comments that were analyzed showed the large change in understanding that took place within the students about the model and its applicability in the teaching situation. Comments by S4 and S6 indicated both the change in their opinion and their enthusiastic support for the use of the Big6 in teaching.

However, the change in attitude is probably best summed up by S3, who stated:

> Tydens ons eerste les is daar vir ons die Big6 gewys. Op daardie stadium om eerlik waar te sê het ek gedink dit is nou seker weer een of ander ding wat aan ons gegee is om tyd om te kry. Hiermee trek ek my woorde terug. Ek het geweldig baie geleer. *(Trans: In our first lesson we were shown the Big6. At that stage to be honest I thought that it was probably some or other thing that was given to us to pass the time. I withdraw my words. I learnt a tremendous amount.)*

This comment is honest about the original skepticism, and about the fact that the usability of the Big6 model taught the students a lot. As shown in the previous two sections, this learning was essentially about the use of the model for teaching, and less about their philosophy of teaching.

The understanding of the methodological advantages in using the Big6 system were also found extensively in the lesson plans and discussions that took place after each practice teaching session, and that ultimately led to the type of comment above. Typical of the type of comment was the following comment made by the researcher to S5 on her lesson planning form: “Mooi aangepas by SGL deur proses.” *(Trans: Well-adapted to SDL [self-directed learning] through the process.)* This commented on the student’s use of the Big6 process to enable the learners to work individually in pursuit of the goals of the lesson.

However what was particularly significant was the group realization that the use of the process as a teaching methodology requires proper planning, but that with this planning the Big6 can be an effective vehicle. In the group presentation this was expressed by them as follows on the slide: “Big6 + deeglike beplanning →

positiewe resultate.” *(Trans: Big6 + thorough planning → positive results.)* It is significant that they used the Big6 instead of talking about a process.

Although not surprising as the Big6 had been the vehicle for the training, it again emphasized that they understood and appreciated the Big6 as a process. It also showed that they saw it as a generalised process that was not restricted to information literacy or achieving the information literacy standards on their own, but rather as being able to get positive results from the general teaching situation.

This positive attitude to the Big6 was obviously reinforced by the response to its use during the teaching practice period, and led to the ultimate acceptance by the students of the efficacy of the use of the Big6 within the generalized teaching situations.

5.4.2. Value perceived during teaching

The growth in understanding of the students during the research process with regard to the concepts and, more importantly, the methodology and in particular the use of the Big6 was particularly linked to the use of the Big6 during the two periods of teaching practice. In both of these periods the students taught a lesson using the Big6 process as the vehicle. These lessons were observed and discussed with the students and in all cases the change and growth in understanding of the use of the process by the students from the April session to the July session was significant.

In addition, in their reflection the students commented on the way these lessons were seen by the learners by reflecting on the responses of the learners themselves. In addition, there were general reflections on how they would have preferred the knowledge of the process to have been given to them, and its applicability in their previous training.

5.4.2.1. Learners' response

In the context of teaching and learning, the previous groups of comments were linked to teaching and were from the perspective of the students as teachers; this group of comments is linked to the perception of the learning that took place within the learners in the classes that the students taught using the Information Skills Process as a teaching methodology.

In most cases these comments were positive. Typical of the comments was that by S1 who saw that "die leerders neem goed deel." *(Trans: The learners took part well.)* What is significant about this comment is that it showed the importance within this student's perception of the participation of the learners within the process: a learner-centered and not teacher-centered philosophy. The comment should also be against the context of the lesson which was in Technology, a practically based Learning Area. Participation was therefore expected, but in the comment this has been modified to indicate that the participation was good. The value judgment of the level of participation is important. It shows that the student saw in the participation engendered by the lesson a positivity that was seen as beneficial.

It is therefore significant that the same student uses this consideration and the use of the Information Skills Process as being integral parts of "die sukses van die les." *(Trans: the success of the lesson.)* Although not clearly expressed, the didactic principle of self-work is shown to be an important product of the use of the Information Skills Process (together with the previously mentioned advantages of fulfillment of the principles of individualization and differentiation). The actualization of this principle within the lesson is determined by the participation of the learners in the activities of the lesson; their successful participation is seen as signifying success within the learning of the learners.

The success of the lesson was also important to S4 who analysed the results of the learning and stated that: "… van die 35 leerders in die klas was daar slegs 3 leerders wat nie die stappe in die korrekte volgorde kon plaas nie." *(Trans: ... of the 35 learners in the class there were only 3 who could not put the steps in the right order.)* This referred to a lesson given with knowledge of the steps of the milking process as the aim. The student went on to say that there was: "… ongelooflike positiewe terugvoering van die leerders ontvang." *(Trans:... unbelievably positive feedback received from the learners.)* These two comments show that positive response from the learners was also founded in overwhelmingly successful attainment of the aims of the lesson.

It is interesting, though, that half of the comments made on the learners' reactions to the lesson emphasized their enjoyment. S5 stated: "Die leerders het die les geniet, veral omdat dit anders as gewone lesse verloop het." *(Trans: The learners enjoyed the lesson, particularly as it did not take the normal course.)* S4 observed the lesson given by S3 and stated that the " … leerders was opgewonde." *(Trans:… the learners were excited.)* The researcher's own comments on S4's own lessons stated that: "Leerders geniet dit." *(Trans: Learners enjoy it.)* In S4's reflection on the same class it was stated: "Die leerders het hierdie les voorwaar geniet." *(Trans: The learners really enjoyed this lesson.)*

This emphasis on learner's enjoyment particularly linked to innovation as in the first comment, shows that there is a level of disillusionment with "gewone" *(normal)* lessons. This speaks to the idea of normal lessons that underpins the students comment as being something with a negative connotation for learners.

In one case, that of S4, this enjoyment was linked to a positive aspect of the lesson, rather than the negative that S5 had shown: "Die leerders geniet die opdrag wat in hul voorkeur leerstyl aangebied word." *(Trans: The learners enjoyed the assignment which was offered in their preferred learning style.)* Thus

enjoyment is linked to the four different learning styles built into the lesson by the student. The student has also managed to link the enjoyment of the lesson to learning styles which was one of the concepts that underpinned differentiation, and which was facilitated, in this case, by the lesson planned using the Big6 process as its underpinning.

The comments on the learner's response to the lessons given planned by using the Big6 process, were overwhelmingly positive. The comments also showed that the learners' positive response to the lesson using the Information Skills Process was seen to lead to a better educational experience from their own perspective. In addition the ability to use this process, in the form of the Big6, is seen as important for the teacher.

5.4.2.2. Training in information skills in teacher training

It was not entirely unexpected that there would be comments on the Big6 and general training in teaching methods. Although only commented on once by a student, the suggested timing of this training links very closely to what was found in the interviews of the lecturers as discussed in section 4.3.4.2. There the majority found that training in the Information Skills Process should take place as early in the first year as possible, with others stating that this training should be repeated in subsequent years.

The student's comment on the timing of this training was by S1: "Ek sal net voorstel dat dit in 'n vroeër jaargroep geimplimenteer moet word." *(Trans: I would just like to propose that it be implemented in an earlier year group.)* The underlying implication of the value of the training is clear: the timing however was felt even by this student to have taken place too late within their overall curriculum. This also shows that the student appreciated the change in thinking and knowledge that took place during the research process and felt it valuable enough that it was suggested that it should be done earlier, i.e. that it form an

underpinning to understanding, rather than being an add-on done in the final year.

More generally, S5 suggested that this training be done on a wider scale: “Dit beteken dat fasiliteerders dus intensiewe opleiding behoort te ontvang om verskeidenheid in hul fasiliteringstrategie in te bou.” *(Trans: It means that facilitators should receive training to be able to build in variety into their facilitation strategy.)* In essence, the plea is not that the students be taught specific methods or strategies, but rather the ability to build variety into what they use as facilitation strategy. The underlying sense of the comment seems to be that in the initial training this variety, and the ability to incorporate it was lacking. Further, that through the research process undertaken by the students, the importance of this variety became evident.

The student also made the conceptual leap that it is the general ability to harness variety that is important, and not necessarily knowledge of the methodologies. This sentiment echoes that stated earlier in section 5.4.1.2 by S2 that: “Die onderwysberoep is kompleks en voortdurende vernuwing is essensieel om dinamiese en effektiewe leer te verseker.” *(Trans: The teaching career is complex and continual innovation is essential to ensure dynamic and effective learning.)*

The difference here is that S5 sees that there needs to be training in how to leverage the “voortdurende vernuwing” (*continual innovation)* – and that it is therefore essential that teachers be trained in it. However, as this comment is from a final year student, there is also a tone of wistfulness in which it can be detected that the student would have wished this training to have been part of what they had undergone during their overall training as teachers. This comment was also consistent with the idea that teachers should see themselves as constant learners (Reddy, 2011:9).

The attitude towards their training thus expressed was also found in comments that the students made about the training intervention itself.

5.5. Perception of the training intervention

The fourth theme found in the comments was about the training that the students underwent. Although not directly linked to one of the research questions, this was definitely linked to the “process of personal transformation” that was postulated as underpinning the methodology of this research. Within this only one grouping of comments is found, that being those on the process followed in the training.

5.5.1. Process followed in the training of the research participants

The participants in the research were all student teachers in their final year of training and actively engaged in the research study. Therefore it was expected that there would be comments on how they experienced the research, and, in particular, the way it was conducted with regard to them as participants. It was interesting that there were also a large number of comments made on their work as a group rather than individuals.

The school curriculum, as outlined above in chapter 2, places greater emphasis on group work in teaching. As the students were therefore already sensitive to the nature and demands of group work it is perhaps not that surprising that the group based nature of the research elicited as much response as it did.

5.5.1.1. Group dynamics

All the comments made on the work as a group and the group dynamics in general were positive. The use of the group as a vehicle for increasing the understanding of the different individuals was seen as being very important, as with Campello and Abreu’s research in Brazil (2005). However the students’

emphasis varied from the improved understanding of the participants, to the mutual assistance that could be offered in increasing this understanding. The main emphasis, however, was on the effectiveness of the group work approach. S4 expressed this as follows: “Die feit dat ons die eerste aktitwiteit as ‘n groep gedoen het en nuwe begrippe deur groepbespreking kon aanleer was baie effektief.” *(Trans: The fact that we did the first activity as a group and we could learn new concepts through group discussion was very effective.)*

Although this was limited to the first learning experience, and the concepts that made up that first session, the perception of the group interaction as being the vehicle for effective learning by the participants was also echoed by S2: “Die feit dat ons ‘n klein groepie studente was, was ’n positiewe ervaring, want ons het mekaar gehelp en raad gegee waar nodig.” *(Trans: The fact that we were a small group of students was positive experience, because we helped each other and gave advice where necessary.)*

However this comment also showed that this group dynamic extended beyond the first session, and also included discussions between the group members as to the lessons they were preparing and how best to use the Information Skills Process within the lesson planning itself. S1 emphasized the exchange of ideas, linked to the lesson planning, rather than only in the learning of and understanding of the concepts where it was stated: “Dit was lekker om deel van ‘n klein groepie te wees en idees uit te ruil.” *(Trans: It was nice being part of a small group and exchanging ideas.)*

It is significant that although the group sessions were offered using the Information Skills Process by the researcher, and emphasis has been placed on the ability of this approach to cater for the individual, the students found that even in this context, work as a group was not only possible, but also desirable. The context of the group work was that the students were involved in similar projects, i.e. lesson planning, but that each was working separately as well as that each

planned different lessons. Despite this difference in product, the nature of the process assisted the students in working as a group through the process. Thus the talk is of “ruil” (*Trans: exchange)* and “raad gee” *(Trans: give advice)* rather than on sharing or working together which would be the case if a single product was being worked on.

5.5.1.2. Perceived value of participation

Besides the positive comments on the activity in the group, positive comments were also given on the perceived value of the participation by the students in the research process. These comments were on both the outcome, with the emphasis on the learning that took place, as well as on the process followed which included the actual classes as well as the design of the training of the students.

The students’ comments on their own learning during the process were one of the main features of their reflection. These comments included that by S2: “… ’n baie leersame ervaring.” *(Trans: … a very instructive experience.)* S3 also experienced learning with the comment: “…ongelooflik baie geleer.” *(Trans:… learnt unbelievably lots.)* Again, S4 stated: “…ek het voorwaar baie geleer.” *(Trans: I really did learn a lot.)*

All of these showed the importance that the students themselves placed on learning taking place. As one of the potential ethical problems was the perception by the students that they would be wasting their time in taking part in the research, these positive comments were particularly welcome as they showed that the students found the participation positive.

In several cases the comments about the learning and positive experience were linked to the active nature of the participation by the students. This active nature of participation was seen in both the practical work linked to the theory that the

students had undertaken, as well as the active participation in the class. As an example of the latter S3 said: “Ek het die tyd in die klas baie geniet en kan sê aktiewe leer het in elke lesuur plaasgevind.” *(Trans: I enjoyed my time in the class and can say that active learning took place in every period.)*

This active learning, seen as required in information literacy by De Jager (2004), was perceived by S1 as not only being important, but also as an exemplar of the use of the Information Skills Process that they were being trained in. To this extent the student realized that their training in the class was designed to help them form an understanding of the process: “Ons het self ‘n proses gevolg en was as ‘t ware deel van die navorsing.” *(Trans: We ourselves followed a process and were in truth a part of the research.)*

This comment therefore also reflected on the design of the training of the students and saw this as being positive. Further comments about the design of the training were also positive, and this was particularly in relationship to the practical application by the students themselves through their lessons during teaching practice of the theory that was being taught in the class. As S2 put it:

> Ek waardeer dat ons prosesnavorsing ‘n praktiese navorsing was, waar ons self ons teorie in die praktyk kon gaan toepas [en dat dit] baie meer leersaam [was] teenoor ‘n teoretiese navorsing sonder enige proefneming, resultate en evaluering. *(Trans: I appreciate that our process research was a practical research where we ourselves could go and apply our theory in practice [and is was] more educational than a theoretical approach without any experimentation, results and evaluation.)*

The closing part of this comment also showed that the students became aware of the importance of evaluation as part of any process used in order to facilitate learning. As evaluation has as its aim the determination of the achievement of the goals set out, a comment by S1 that the classes were seen as “doelgerig” *(Trans: purposeful)* showed that the students felt that this was true of the training itself.

Certain comments other than those already mentioned in this section were made with regard to the actual classes themselves and how the students felt about participating in them. S1 stated that: “Die atmosfeer het bygedra dat ek

entoesiasties geraak het.” *(Trans: the atmosphere contributed to my becoming enthusiastic.)* This positive comment is also linked to those on group dynamics in the previous section in that the structure of the research group (in terms of the group dynamics) and the atmosphere within the group (in the above comment) would appear to have been one of the key factors that led to the generally positive way in which the students perceived the research process and the principles on which it was based.

Finally, there were two comments made that both emphasized the value felt by the students, and their vision for the future of what they had learnt. Both of these were made by S1 as he contemplated what had been learnt in anticipation of the practice teaching lesson. The first was linked to the planning phase where the student: “Ek sien uit om my opdrag te implementeer.” *(Trans: I am looking forward to carrying out the assignment.)* The second was made after the planning had been done: “ Ek het nou uitgesien om die les aan te bied.” *(Trans: I am now looking forward to giving the lesson.)*

In both cases there is not only the surface appreciation shown for what was learnt and how it made the student more positive about teaching, but a deeper underlying meaning which showed a change of attitude to the profession and its demands in general, with the student now anticipating eagerly the demands of the profession. The implication is also that prior to the research process, there was not this keen anticipation and looking forward to the implementation in the practice.

Thus the general feeling among the students was that the process of learning which they were part of was a positive one in both the way the programme was structured internally as well as the way it played out with group participation and individual practical application of theories. As the process used in the training of students during the research was based on the application of the Information

Skills Process itself, as shown in chapter 3, this was a reinforcement of the positive effect of the use of the Information Skills Process.

5.6. Summary of chapter

The analysis of the documents obtained from the students, with the emphasis on their reflection, provides rich evidence to answer the three research questions that were formulated. However, this analysis goes further, and enables conclusions to be drawn and recommendations to be made on more issues than those that were raised in the research questions.

The analysis first showed the students' positive perception of the Big6, including its linkages to the curriculum, and the ability to use it in teaching. In this context it was found that the use in lesson planning was seen as positive, but difficulty with regard to its application also expressed. Both the linkages to the general curriculum, as well as to specific subjects was identified and seen as positive.

The analysis also looked at the students' initial understanding with regard to certain concepts, as well as their overall teaching and methodological views. As this was often derived from reflections done after the process, these understandings and views had to be deduced. The lack of knowledge with regard to certain concepts, such as differentiation, problem-solving process, the Big6 and with regard to existing teaching materials was established. The position with regard to their dogmatic teaching philosophy, dangerously close to the "banking" conception of teaching (Hart, 2000), and narrow methodological focus was also laid open.

Following on this, the analysis of their position after the research process showed the new views and understanding with regard to the concepts as well as methodologies, and philosophy of teaching. Finally there was a concern that the training that had taken place should have been earlier in the training, and there

was also strong support for the methodology used during the training, involving both group work and active learning by all the participants.

It is these findings, together with those of the analysis of the curriculum documents and the lecturers' interviews, which can be used to draw conclusions and make recommendations ion the next chapter.

Chapter 6: Conclusions and recommendations

6.0. Introduction

This study posed three research questions that it was felt needed to be answered:

- How are information skills reflected within the prescribed South African curriculum for the Intermediate and Senior Phases of the General Education and Training Band?

- How are student teachers trained in order to facilitate learners' acquisition and use of these skills within the specific Learning Areas and subjects?

- Can student teachers be led to an understanding of the generic applicability of the Information Skills Process as a teaching method?

These questions were then re-formulated in terms of the objectives that this study was planned to reach. These objectives focused firmly on the posed questions, but also described them in terms of the overall aim of the research as expressed in the title of the study. These objectives were thus formulated as follows:

- To determine the place of information skills and the Information Skills Process within the framework of the Senior and Intermediate Phases of the General Education and Training band as stated by the National Department of Education in the Revised National Curriculum Statement and the Curriculum and Assessment Policy Statement.

- To determine the understanding of student teachers in their final year of training of the appropriate use of information skills, including its use as a methodology.

- To gauge the value placed on the practical use of the Information Skills Process as a teaching methodology by student teachers trained in its use.

Three separate forms of data gathering were used to obtain the answers to the questions and reach the objectives. Curriculum documents were analysed, lecturers were interviewed and a course of action research undertaken with a group of students. In this chapter the results and findings obtained from the three research processes can be used to both determine the answers to the research questions and to come to conclusions regarding the research objectives.

In addition, during the course of the research, unanticipated findings have occurred which enable further conclusions to be drawn other than those expected from answering the research questions. Finally, from both the expected and unexpected conclusions, recommendations for the future can be made.

6.1. information skills in the curriculum

The first question thus addressed was that of the curricular place of information literacy skills. This was limited to the Intermediate and Senior Phases of the General Education and Training Band as specified in the South African Revised National Curriculum Statement and the Curriculum and Assessment policy Statement, although earlier South African curricular Statements were also addressed. However it was not only the actual place of information skills within the curricula, but also the implications of the place for the training of teachers that was looked at.

6.1.1. Information literacy skills in the curriculum documents

The place of information skills in the South African National Curriculum applicable to the Intermediate and Senior Phases of the General Education and Training Band was determined by analysing the different curricular documents that have been relevant since 1994, the year that saw the reorganization of education nationally.

These documents were the “Core Teaching Programme for information skills” as analysed by Moll (1999), the Draft Revised National Curriculum Statement for Grades R-9 published in terms of Government Notice 1445 in October 1997 (DoE, 2002g:5) and the Revised National Curriculum Statement (RNCS) (now known as the National Curriculum Statement) (DoE, 2002g:6) as well as its successor, the Curriculum and Assessment Policy Statement of 2010.

As the RNCS set of documents were the ones prevailing at the time that the research took place and it was these documents that had informed the students involved in the research, they were seen as the more important of the documents, and thus also analysed in more detail.

The analysis was done in order to determine whether the Information Skills Process, and the individual skills within the process (as outlined in the Eisenberg Big6 model) were present. The analysis then found that the information literacy skills were present in the curriculum in three important places:

- In the Critical and Developmental Outcomes.
- In the Outcomes of the different Learning Areas.
- In the Assessment Standards of the different Learning Areas.

Thus the conclusion can be drawn that information literacy skills can be said to permeate the curriculum, and are an integral part of what the learner is expected to be able to learn, particularly in the light of the importance placed on enskilling.

To this extent, then, it is important that these skills be recognised not only as discrete skills, but as part of the Information Skills Process.

6.1.2. Implications for teacher training

It is also important that teachers have an understanding of the Information Skills Process. In this regard a model such as the Big6 skills can be used as a convenient vehicle. However, as these skills are not an end in themselves, but rather a means of reaching the Learning Areas' Outcomes and Assessment Standards, the teacher also needs an understanding of how to use these in lesson planning.

This is in agreement with Murray (2008:10) who described how teachers are trained to use Big6 to achieve national technology and information literacy standards as well as state, and/or national content standards in the USA. However, in that work the emphasis was on teachers already teaching in schools, and the analysis of the documents points to a much earlier need of understanding – a need that should be addressed in pre-service training of teachers.

However, where teachers were trained pre-1994, their understanding is also limited to the curriculum of that time. In that regard the student teachers who would present lessons during practice teaching might have a problem explaining to the teachers what they were planning. In order to prevent this problem arising during the practice teaching, serving teachers would also need to be led to an understanding in the use of the Information Skills Process and its place within the curriculum. In the light of recent agitation in South Africa for the reintroduction of school libraries as centres for learning, this has become even more urgent (Bloch, 2010).

6.2. Student teacher training in information skills

The training given to student teachers in the Information Skills Process as a vehicle for use to achieve these aims was also interrogated in this study. The results of this were triangulated from interviews with the lecturers of the students, as well as the students' own reflection. Directly interrogating students on particular lecturers' statements and actions would have raised ethical concerns, and so the emphasis was more on the students' perceptions of their own growth. As these perceptions were based on an initial state, it was possible to discover the students' perceptions of their initial exposure to the Information Skills Process in their initial training by the different lecturers.

In this regard there were conclusions made with regard to:

- The understanding of the place of the Information Skills Process in the curriculum.
- The training in the individual skills contained in the Information Skills Process.
- The use of the Information Skills Process as a teaching methodology.

For each of these there were different views expressed, sometimes based on the subject discipline, but overall conclusions were possible.

6.2.1. Information Skills Process in the curriculum

The responses by the lecturers to interview questions on their understanding of this, overall as well as to their subjects in particular, showed an overwhelming positive response to the presence of individual skills in the curriculum. However, significantly, four lecturers found that the Information Skills Process had no place in their subject's curriculum in the schools. The majority also felt that the process was not being used practically in schools.

This understanding of the place of the Information Skills Process was not echoed by the students' own perceptions. By their own admission, they had a lack of knowledge. The Big6, which is the most common school based model, was not known, and one student even indicated that the idea of a problem-solving process was unknown.

The overall conclusion, then, is that, although the lecturers might be aware of the place of the Information Skills Process in the curriculum, this knowledge is not being transferred to the students.

6.2.2. Student training in information skills in Wellington

The training in individual skills is indicated by the lecturers as taking place in the form of individual skills. Only four subjects indicated that training in the process as a whole had taken place. In two of these subjects – namely Languages and Technology, the process is taken in the form in which it appears in the curriculum documents outlined above. In the case of Language, this process only appeared in the first Curriculum 2005 documents, with it being missing in the Revised National Curriculum Statement (DoE, 2002g) and the Curriculum and Assessment Policy Statement (South Africa:Department of Basic Education, 2010c).

The positive statement of the lecturer in Education that this process was taught in the third year should have led to the students knowing the process. As fourth-year students they had all taken Education as a subject the previous year. The fact that they did not show knowledge of the curricular place of the Information Skills Process points then to a problematic approach to the teaching of the process in Education.

From the responses of the lecturers, then, it can be seen that training in the Information Skills Process as a process would appear to take place. This training

is more commonly done as a form of enskilling the students, rather than giving them an understanding of the curricular place of the Information Skills Process. The students reflect this in that they were cognizant of some of the skills themselves, but not of the process as a whole. In particular it is significant that in their comments on the curricular use of the Big6 model, it was apparent that the use of a process was new to most of them. Only in Technology, a subject curriculated on the basis of use of a process, was the use of the Information Skills Process seen as being familiar.

From this it can be concluded that the training in the skills as experienced by the students was also a reason for the lack of transfer of this knowledge. More importantly, instruction, or lack of instruction, in the use of the whole process also sheds light on the apparent lack of understanding by the students.

6.2.3. The use as a teaching methodology

As to be expected, then, responses to the use of the Information Skills Process as a teaching methodology were problematic. The responses by the lecturers indicated that the process as a methodology was viable, and also positively needed within each subject: but it was not being taught as such. Reasons given for this lack of teaching were mainly focused on its place within the teacher-training curriculum, and the difficulty of teaching it within the prevailing conditions.

The students reflected this by their lack of understanding of its use as a teaching method. The differences shown in the lessons in April and June, which showed the growth in understanding, were key indicators of this. There was an obvious lack of initial understanding of its application, but as a result of the intervention that took place after the April session, the lessons planned and taught in July showed a marked improvement.

It can be concluded that in the training of the students there was little attention paid to the use of the Information Skills Process as a methodology. Further, when exposed to this, the students were able to understand and use it.

6.3. Potential of the Information Skills Process

In the previous section it was concluded that the training of the students as reflected by the lecturers' answers and the students' own statements on their initial understanding, showed certain problems. The action research process undertaken with the students was designed to address some of these, and the reflections of the students after the process can be used to answer the question as to whether they could be brought to an understanding of the value of the process. However, it is important not to lose sight of the answers by the lecturers in this regard as well, as they also reflected on the importance of the Information Skills Process.

Again, the conclusions can be looked at with regard to the following:

- The understanding of the place of the Information Skills Process in the curriculum.
- The training in the individual skills contained in the Information Skills Process.
- The use of the Information Skills Process as a teaching methodology.

For each of these there are individual differences based on the different subjects taught by the lecturers and taken by the students, but there is a far greater uniformity to be found in the students' answers than in the earlier section.

6.3.1. Information Skills Process in the curriculum

As stated in section 4.3.3, the majority of lecturers acknowledged the place of the Information Skills Process within the school curriculum of their subject, with only

two subject lecturers stating that it was not needed. However, in the students' reflection on the place of the Information Skills Process, they found it universally applicable. Specific comments were made on its usefulness in their subjects taught, but there was also an understanding of its general curricular applicability.

In discussing the place of the Information Skills Process in the curricular documents, the Information Skills Process was shown to be found in various ways in all the different Learning Areas in the Revised National Curriculum Statement and the Curriculum and Assessment Policy Statement, as well as in the Critical and Developmental outcomes of the RNCS and aims of CAPS. There were comments made by the students which showed that they had come to understand this.

This enables the conclusion to be drawn that the Information Skills Process not only has a place within the curriculum as described in the RNCS and CAPS, but actaully forms an important underpinning to all sections of these curriculums as expressed in the vraious documents on each subject.

It was also found that students were able to learn the importance of process as opposed to product. As the emphasis in the Information Skills Process is on the process use, but lecturers stating that schools were more interested in product, this was an important step.

It can be concluded that through this change of thinking, students would be able to be led to change their focus from product to process through the use of the Information Skills Process. This would have the advantages in being able to foster both critical thinking and differentiation (Killen, 2007:259).

6.3.2. The place of training in the skills in the teacher training curriculum

Having determined that knowledge of the Information Skills Process was important to their own understanding of teaching, the students also commented on the place of this within their training. However, it was the lecturers that commented in more detail on the actual training of the students, and by extension, of teachers, in the Information Skills Process.

In both cases it was found that the training in the Information Skills Process was necessary earlier in the students' initial teacher training curriculum. The lecturers saw this as needing to be during the first year, or at the beginning of the training. The students were not as pointed as the lecturers in this, only suggesting that it takes place earlier than their experience which was during the final fourth year of their training.

More important than the timing, though, was the idea that this training should not be a restrictive one. The lecturers, although in most cases stating Professional Studies to be responsible for the training, did see that there needed to be a better coordination and understanding of the teacher training curriculum as a whole. This would enable training in methods such as the Information Skills Process that were done in Professional Studies, to be included in the different subject approaches as well. The students agreed with this approach and saw that these skills should be applied wider than in a particular subject.

The problems highlighted by the lecturers in this regard were more organizational than conceptual. Although many saw Professional Studies as being the place for training, it was also stated that this could take place in English as information literacy formed one of the Specific Outcomes of the Language, Literacy and Communication Learning Area in Curriculum 2005. This is reminiscent of the situation previously prevailing in South African schools where in determining the

responsibility for the school library “It is common practice for the English teacher to be given the responsibility” (Bawa, 1993:11).

It can therefore be concluded that not only should the training of these skills be placed firmly within the curriculum of teacher training, but that there also needs to be a determination of where in the curriculum it should be placed, and whose responsibility it should be.

Finally, an important finding for the training of students is that there is a need for students to be trained not only in individual methodologies, but in the ability to empower their own renewal. Students became aware through the research process of the changing nature of education and lack of permanent formulaic solutions. Although it was found that their philosophy of education did not change to a large extent, there was an awareness that they needed to be prepared for change, and to be equipped to handle it. This was lacking in the lecturers answers. In their case the curriculum for student training was seen as being fundamentally one of training in existing school curricula and the skills needed to cope with teaching as it was experienced within schools.

It can be concluded that there is an expressed need by the students for training in how to adapt to change, but the manner and place will require further investigation

6.3.3. The format of training in the skills in the teacher training curriculum

However, unlike the lecturers, the students also made comments on characteristics that they saw as being important within the training in methodologies. Two important characteristics were the inclusion of practical application of concepts and skills and the experience of working in a group. The individual application of these skills in the work context was found to be

particularly useful. This supports the statement that: “Teachers want more hands-on time to practise their skills” (Kong, 2007:59).

In addition, the synergy created through a small group working together on understanding, but individually on application was also found to be particularly useful. As teachers would, typically, form part of a staff which worked in this particular manner, it was a significant finding for the organization of the students’ training programme.

From this it can be concluded that the format of training with regard to both practical application of concepts (and the concomitant theoretical underpinning of practice) as well as use of group techniques, should form part of the approach to teacher training.

6.3.4. The use as a teaching methodology

Surprisingly, though, the lecturers were found to give strong support for the use of the Information Skills Process as a teaching methodology. It was, again, the organizational place and, in some cases, their own need of training in its use that they saw as a prerequisite. The students, however, were not concerned with these issues. They felt that the use of the Information Skills Process as a teaching methodology was important, and needed to be incorporated within their training.

Although this methodology is only one of several that can be used, the findings indicate that the students were extremely positive about its use. This positive attitude stemmed both from their appreciation of the Information Skills Process itself, as well as their realization of gaps in their training. They also found that there were problems in its application – this again being organizational in terms of making certain that it was applied properly and that adequate time be given to preparation for its use to be successful.

However, despite the organizational problems, it can be concluded that student training in the use of the Information Skills Process is not only desirable, but important.

6.3.5. Articulation between practice and theory in teacher training

The enthusiasm for the use of the Information Skills Process also pointed to an overall finding regarding the curriculum of the students. The desire for being enskilled to cope with change has already been mentioned – in this case there was a feeling that they needed training in the wider strategic application of the methodology. As shown in 3.4.1., the training of the students follows two main paths: the professional subjects of Education and Professional Studies, and the choice subjects encompassing subjects aligned to Learning Areas of the curriculum. The students showed clearly that they felt there was a lack of articulation between these different components. This lack of articulation was problematic in the context of the methodology as they felt that it needed to be understood and applied in all these separate components, and not only in a narrower, subject only application.

This lack of articulation was also evident in the lecturers' feelings about the correct place for the students to learn both of the methodology and its application. Over-reliance was placed on Professional Studies, but at the same time standardization, coordination and mutual understanding were needed. It was unclear, however, who should be considered as being responsible for this.

However, we can conclude that this articulation is important and where there is lack of this articulation in teacher training, this needs to be addressed both in terms of organization as well as curriculation.

6.4. Recommendations

Based on the above findings, there are several recommendations for application that can be made from this study. In addition, several fields for further study have become clear as well, and recommendations can also be made in this regard. As the study took place at the Cape Peninsula University of Technology's Education Faculty at Wellington, these recommendations have particular applicability within that context. However, there are recommendations that should have a wider impact on the training of teachers as it is practised in South Africa in particular, and also more generally.

One of the limitations of the research as explained earlier in sections 1.4. and 3.3.2. is that the research has taken place within a specific context – that of the Faculty of Education at the Wellington Campus of the Cape Peninsula Univeristy of Technology.in The recommendations can be used by teacher trainers to reflect critically on their particular curriculum and organization, with regard to implementation. However, as each country's education curriculum is different, there would need to be adaptations in certain cases to fit with that country's particular educational culture. Lack of this adaptation can only lead to misunderstandings arising from a lack of understanding of culturally specific ways of looking at education (Badke, 2002:62).

Where in the following recommendations there is specific reference to the Faculty of Education at Wellington, they are aimed at specific actions to be implemented within the training framework as found there. However, as the recommendations do contain elements with a wider commonality, these recommendations, too, should be interrogated more widely to see application in general.

The recommendations for teacher training fall into two broad categories:

- Recommendations on the content of the curriculum.

- Recommendations on the organization and presentation of the curriculum.

The distinction between these might appear to be slight, but each underpins specific aspects of the findings and conclusions and, due to the nature of the research, essential weaknesses of the training as offered at Wellington. These weaknesses are identifiable from the students' and lecturers' comments and answers, as well as a comparison of these to show disjoints. Within each of the categories, recommendations are made for implementation, as well as for further research. The first five recommendations below fall into the first category; the next three into the second.

6.4.1. Recommendation #1

The Information Skills Process should be used from the beginning of the teacher training as a vehicle for encouraging critical thinking.

The curriculum as presented at Wellington has both professional subjects (Education and Professional Studies), and choice subjects. In each choice subject at third and fourth year level, the subject includes the didactics of that particular subject. From the students' responses and also from the lecturers, it would appear that the curriculum of each of these lacks the elements of critical thinking. The attitude towards critical thinking on the Wellington Campus was investigated during the HSRC study and it was found that there was: "No institutional position on critical thinking on their campus" (Gordon, 2009:126).

As the Information Skills Process is not only a means of teaching research skills, information skills or problem-solving, but also lends itself to the creation of meaning for those following it, it lends itself to the fostering of critical thinking (Wong, 2010:114). In addition, the underpinning of all training in South Africa by the Critical and Developmental Outcomes (originally known as Critical Cross-

Field Outcomes) include the concept of information handling as used in the Information Skills Process, and it has been expressed that: “Student-teachers should be able to demonstrate that they can process information” (Du Toit, G, 2010:12).

6.4.2. Recommendation #2

Education students should be taught to use the Information Skills Process as a teaching methodology.

Teacher training has the unique distinction in involving training those that will themselves do training. In this regard, then, the Information Skills Process should not only be seen as a vehicle to be used by the lecturers in training the students so that critical thinking can be infused into the curriculum, but also something that the students should learn to use practically in the classroom. All student teachers should be able to produce effective lessons that can be used to teach information literacy (Kovalik et al., 2010:149). The Information Skills Process should also be seen as one of the means of organising systematic learning (Morrow, 2003:84). It is important to understand that learning is a process and that this also requires that the teacher must consider the skills needed to process information (Du Toit, E, 2010:161). Again, the fact that the same Critical and Developmental Outcomes underpin the training of teachers as well as the curriculum offered in the schools makes the Information Skills Process an ideal vehicle for this.

6.4.3. Recommendation #3

There should be a greater cooperation between lecturers presenting subject didactics and the Professional Subjects so as to make clear the application in the subject didactics of the theory from Education and the general application taught in Professional Studies.

The previous recommendations were concerned with the content of the curriculum that is being offered to trainee teachers. However there are also recommendations with regard to the way the content is organized within the curriculum, and also with regard to the way the curriculum is taught.

A common theme through both responses from the lecturers and the students was the lack of organizational coherence in the curriculum. In particular there was a feeling that there was a disjoint between the two professional subjects as well as between them and the choice subjects, in particular the subject didactics. At this stage the subject didactics, Professional Studies and Education are all taught by different lecturers, with little or no ongoing consultation and cooperation. This will need to be addressed. Again, in the draft policy this is also seen as being necessary with an emphasis on: “The importance of the interconnections between different types of knowledge and practices” (DoHET, 2010:9).

6.4.4. Recommendation #4

Education lecturers should be trained in the use of the Information Skills Process, particularly as a methodology for use in the classroom and be encouraged to use the Information Skills Process as a methodology in their own teaching.

From the research process there was also a strong feeling from the students that the success of training was partly the result of the way the training took place. As this was based on principles embodied within the Information Skills Process, it is these principles that can be used effectively by the lecturers. It has been found elsewhere that “Many lecturers know as little or even less than their students about how to use a library (Gentil, 1999:31).

This agrees with the lecturers' answers which showed that they themselves are not all certain in their knowledge of the Information Skills Process. This lack of knowledge has been found to be one of the major hurdles that education faculties in the USA identified to the integration of information literacy skills and standards into the teacher training curriculum (Kovalik et al., 2010:162). In the interviews with the Wellington lecturers they also indicated unfamiliarity with the use of the Information Skills Process as a teaching methodology.

In research done in South Africa it has been suggested that student teachers' experience of the teaching styles and attitudes of the lecturers concerned with teacher-training reinforces the negative perception that they have of the use of libraries (Olën, 1993:35). This can only be changed by changing the way that lecturers understand and use information literacy and the Information Skills Process, a change that should lead to an "Enduring change in the connection between learning, libraries and literacies" (Moore, 2001:12).

6.4.5. Recommendation #5

The teacher training curriculum should make more use of group work with Individualised applications.

The majority of teachers serve on the staff of schools. In this context they work as a group on common understandings, as well as individually in their own classrooms. In the Carnegie Corporation's prospectus *Teachers for a new era* (2005) in which the ideal teacher's characteristics are described, they include participation among teachers in groups so as to learn informally how to improve their teaching. In the research process the style of group work with individualised applications was seen as one of the strengths and aided in understanding, both of the theory and of its application in the individualised contexts of the students.

Although the same form of work organization was used in some cases in the teacher training, it was not accepted by all at Wellington, and its extended adoption could lead to a better preparedness for the actual work context as well as improved academic performance. Although the group work in the research project was with only with a small group of six, LaBounty (1999) shows that this can be done within larger contexts.

6.4.6. Recommendation #6

The teacher training curriculum should be interrogated to ensure that it enables students to critically reflect on the application of theory in the classroom.

The previous recommendations were made with regard to their implementation within the teacher training. However, there is a further recommendation that also emerged from the findings. In particular, the students showed a lack of understanding of certain basic concepts and their ramifications. The concept of differentiation through learning styles is a case in point. However, there is a lack of clarity as to whether this is due to these concepts not being dealt with in the curriculum, or whether the content of the curriculum is presented in such a way that the students do not internalize these concepts. In this regard we also have the significant finding of the HSRC study that::“Teaching practice emphasizes teaching and lesson plans rather than considering the theory-practice dynamic” (Gordon, 2009:114).

In particular, therefore, the focus on the application of theoretical aspects within the practice teaching period, as opposed to the focus on practical teaching aspects needs to be investigated, and the content of the curriculum in this regard critically interrogated. This type of ongoing research into the curriculum that serves teacher education is needed so that there can be a better understanding of what values and skills are being instilled (Henson, 2006:51) since, as has been

stated “no matter what philosophy underlies a curriculum, or what methodologies are on the cutting edge of classroom practice, teachers can only teach what and how they know” (Nykiel-Herbert, 2004:252).

6.4.7. Recommendation #7

The teacher training curriculum should be interrogated to ensure that it contains an integrated information literacy program to enable students to be able to cope with change during their teaching careers.

The curriculum’s ability to prepare students to cope with the demand of constant change also needs to be determined. Excelling teachers attribute success to a teaching mindset “willing to change” (Phumi Mthiyane quoted by Morgan, 2011:7). Much of the criticism of the lack of success in South African schools is blamed on the lack of preparedness. In the *Draft policy on minimum requirements for teacher education qualifications selected from the HEQF* (DoHET, 2010:55) newly qualified teachers are expected to have the basic competence to “adapt…to evolving circumstances” and in the same document present curricula are criticised for being so focused on preparing students for the present school curriculum that their ability to adapt to future changes “could be severely compromised” (DoHET, 2010:5).

In this regard it is important to note that the goal of development of an integrated information literacy program for preservice teachers was: “Preparing prospective teachers for ongoing self-renewal in terms of life-long learning” (Miner, quoted by Carr, 1999:3). It is therefore also important from the point of view of being prepared to cope with change that student teachers have the skills associated with information literacy built into their curriculum.

6.4.8. Recommendation #8

The way to enable serving teachers to be assisted to an understanding of the Information Skills Process, both as a means of improving information literacy and a teaching methodology, needs to be investigated.

Finally, as there was a distinct lack of knowledge of the Information Skills Process by the students, and even the lecturers showed uncertainty, it would be important to find out what serving teachers understand. As they are responsible for delivery of the curriculum, with its information literacy rich outcomes and assessments, it is also important that they have an understanding of the role and use of the Information Skills Process.

This is even more important in the South African context where there is a lack of teacher-librarians, who would typically be the staff member responsible for working with the class teacher in integrating the Information Skills Process. It has been shown that this cooperation between teacher-librarians and class teachers leads to better results (Abell, 1999:23) and promotes effective teaching and learning (Hopkins, 1999:1) and helps with independent learning in students (Leung, 1991:10).

However this presence and role of a teacher librarian is often taken for granted (Morrison, 1999:27; Moore, 2001:5). Thus the assumption that this cooperation exists and is dependent upon there being both school librarians and teachers (Johnson & O'English, 2003:129), is problematic in the South African context with its lack of teacher-librarians. In South Africa, therefore, this cooperation will need to take place within the same individual. However this cannot be left to chance: it requires proper planning and implementation (Henri, 1997:31:Rotherham & Willingham, 2009:20). The training offered should improve the skills, their knowledge but also their ability to integrate information literacy into their teaching. It should also be ongoing, as this is an essential need for success to be

sustained (Smith, 1999:40). It should also be flexible so that serving teachers can arrange their own professional development at a pace suitable for themselves (Kong, 2007:69).

In the South African context this training could also fall naturally into place in the proposed Professional Development Points for teachers in South Africa (Samuel & Morrow, 2004:6). However there are specific problems with and challenges facing training in townships and rural areas (Fourie & Krauss, 2010:109) and in the teachers already in the system who would need assistance in developing the ability to handle the cognitive demands of the curriculum (Skuy et al., 2001:3). Addressing these properly could lead us to achieving the ideal of “Having an information literate teacher works corps … in all geographic areas of South Africa” (Fourie & Krauss, 2010:110).

6.5. Summary of chapter

The analysis of the curriculum documents, interviews of the lecturers and students reflection on the research process together with associated documents, enabled the researcher to draw conclusions with regard to all three research questions. The place of information skills in the school curriculum, Information Skills Process training in the teacher education curriculum, and the potential for understanding by students after focused intervention was all addressed.

Based on these conclusions and current research, recommendations for implementation in the teacher education curriculum, as well as recommendations for further research could be made. These recommendations fall into two broad categories: those relating to the content of the curriculum, and those relating to the organization of teacher training, and within each of these categories there are both recommendations made for implementation as well as for further research.

In the former there were specific recommendations with regard to the inclusion of the Information Skills Process within the curriculum, both as a vehicle for encouraging critical thinking as well as a teaching methodology.. With regard to the organization and presentation of the curriculum, recommendations were made with regard to greater cooperation and coordination within the course, lecturers' own understanding and use of the Information Skills Process, including its use as a teaching methodology as well as the use of group work.

The recommendations for further analysis and research into the present teacher education curriculum includes its approach to enabling students' critical reflection as well as ability to cope with change. Finally, a recommendation was also made for further research into serving teachers' understanding of the Information Skills Process.

It is hoped that these recommendations will be used by those concerned. This study in itself may be important and show the path forward with regard to the full use of the Information Skills Process within teacher-training, but it is only with the implementation of the recommendations that the full benefits will be realized. Underlying this research are the sentiments as expressed by Meyer (2009:58):

> The lesson we take from this…is a revitalization of our commitment to teaching…and a renewed dedication to working together to bring about positive change in our schools.

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Appendix A
Schedule of interviews

				Thursday 1/11/07	
09:00				Mrs Sanet Cox	
09:45					
11:15				Mr Deon Prins	

	Monday 5/11/07	Tuesday 6/11/07	Wednesday 7/11/07	Thursday 8/11/07	Friday 9/11/07
09:00	Mr Thys Odendal	Mr Charles Kitching	Prof Johan Anker	Mr Chris Pienaar	Mrs Zelda de Beer
09:45	Dr Chris Hattingh		Mr Gerhard van Dyk		Mr Louis Conradie
11:15	Dr Erika Jordaan	Mr Albert Hoek	Mr Retief Cloete		

	Monday 12/11/07		Wednesday 14/11/07	Thursday 15/11/07	Friday 16/11/07
09:00	Mr Chris Jacobs		Mr Kavin Whittles		Mr Andre Serfontein
09:45	Mrs Geo Westraadt			Dr Jurie Joubert	
11:15	Dr Susan de Jager				Mr Tommy O'Kennedy

Appendix B

Questions used in the interview.

Afrikaans questions

1. Watter vak gee u?
   Watter vakdidaktieke?

2. Tot watter mate lei u studente op in jou vak in die inligtingsvaardighede wat ons in die Inligtingsvaardighede proses vind, dws
   - Die identifisering van ‘n inligtingsbehoefte
   - Om toegang te verkry tot inligting
   - Om inligting te evalueer
   - Om inligting te gebruik
   - Wettige en etiese gebruike van inligting (verwysings, bronnelys)
     - Spesifiek, plagiaat?

3. Wat sê die NKV oor navorsing/take wat deur die kurrikulum in jou spesifieke vak gevra word?

   In jou ondervinding, word hierdie take wel gedoen?

   Waar die take wel gegee word, gebruik die onderwysers die inligtingsvaardigheidsproses om die leerders te lei? *(Waar geen take gegee word nie, word hierdie as ‘n hipotetiese vraag gevra*)

4. Tot watter mate is dit belangrik dat studente in jou vak die inligtingsvaardighede proses vir take moet kan gebruik?

   Waar, hoe en deur wie moet die opleiding in hierdie vaardighede geskied?

5. Tot watter mate is dit belangrik vir studente in jou vak om geleer te word om die inligtingsvaardighede proses as onderwysmetode te gebruik?

   Waar, hoe en deur wie moet die opleiding in hierdie proses geskied?

English questions

1. What subject do you teach?
   What subject didactics?

2. To what extent do you train students in these subjects in information skills in the Information Skills Process, i.e.
   - The identifying of a need for information
   - Accessing information
   - Evaluating information
   - Using information
   - Legitimate use (references, bibliography)
     - Specifically, plagiarism?

3. What does the RCS state about research/tasks required by the curriculum in your specific subject?

   In your experience, are these tasks being done?

   Where the tasks are being given, are teachers using the Information Skills Process to guide the learners? (If no tasks are given, ask this as a hypothetical question)

4. To what extent is it important for students in your subject to be able to use the Information Skills Process to do tasks?

   Where, how and by whom should the training for these skills take place?

5. To what extent is it important for students in your subject to be taught how to use the Information Skills Process as a teaching method?

   Where, how and by whom should this process be taught?

Appendix C

Evaluation of Information Skills Process

Afrikaans form

Evalueringsvorm vir lesse. Student:……Evalueerder:……

Groot 6 elemente	Onderwyser se aksie	Leerders se aksie	Metode van assessering
1.1 Definieer die probleem			
1.2. Identifiseer watter inligting nodig is			
2.1 Identifiseer alle bronne			
2.2 Kies die bestes			
3.1 Bepaal waar om die bronne te kry			
3.2 Vind die inligting in die bronne.			
4.1 Gebruik die bronne			
4.2 Haal relevante inligting uit			
5. Maak bymekaar uit verskillende bronne			
5.2 Bied die inligting aan			
6.1 Evalueer die produk			
6.2 Evalueer die proses			
Algemene kommentaar			

(Adapted from the Big6 Information Skills Process (Eisenberg, 2006))

English form

Evaluation form for lessons: Student……..Evaluator…….

Big 6 elements	Teachers actions	Learners actions	Assessment method
1.1 Define the problem			
1.2. Identify what information will be needed			
2.1 Identify all sources			
2.2 Choose the best			
3.1 Determine where to find the sources			
3.2 Find the information in the sources			
4.1 Use the sources			
4.2 Take out relevant information			
5. Put together from different sources			
5.2 Present the information			
6.1 Evaluate the product			
6.2 Evaluate the process			
General comments			

(Adapted from the Big6 Information Skills Process (Eisenberg, 2006))

Appendix D

Application form by students

Form in Afrikaans

Navorsingsprojek B. Ed. 4 2008 **M Moll**

Daar is geleentheid vir studente om aansoek te doen om deel te wees van ‘n groep wat gaan deelneem aan ‘n navorsingsprojek oor die gebruik van ‘n spesifieke onderwys-metodologie as hulle deel van Professionele Studie se navorsing gedurende 2008. Hierdie groep sal gekies word om ‘n verskeidenheid vakke te verteenwoordig en sal uit 5 (maksimum 6) studente bestaan.

Die program vir hierdie groep se Prof Studie navorsing sal dan soos volg lyk:

1. Daar sal klasse wees in die Prof Studie lesure, met die nodige leeswerk.
2. Daar sal gekyk word na lesbeplanning, met klem op differensiasie.
3. ‘n Dagboek sal gehou word met refleksie oor kennis, leer en ervarings.
4. Gedurende die April proeftyd sal ‘n les gegee word wat waargeneem sal word.
5. Na die April proef sal refleksie oor die lesse gedoen word.
6. Die studente sal weer ‘n les beplan en gee, die keer in die Julie proeftyd.
7. Na die proeftyd sal verslag en refleksie gedoen word oor die les.
8. Elke student sal dan ‘n artikel skryf oor die hele leerervaring, met beklemtoning van die vak waarin die les gegee is.
9. Daar sal ook ‘n gesamentlike aanbieding voorberei word.

Studente wat belangstel om deel van hierdie groep te wees, moet die onderstaande invul en voor die einde van die week by my in die biblioteek kom ingee.

Naam:……. Kursus:……

Hoofvakke:……

Proefskool/plek in April:……Proefskool/plek in Julie:…….

Form in English

Research project B. Ed. 4 2008 **M Moll**

There is an opportunity for students to apply to become part of a group that will take part in a research project on a specific teaching methodology as their part of Professional Studies research during 2008. This group will be chosen to represent a variety of subjects and will consist of 5 (maximum 6) students.

The program for this group's Prof Study research will then look as follows:

1. There will be classes in the Prof Study periods, with the necessary reading work.
2. Lesson planning will be looked at, with the emphasis on differentiation.
3. A diary will be kept with reflection on knowledge, learning and experiences.
4. During the April practice teaching session a lesson will be given that will be observed.
5. After the April practice teaching reflection will be done on the lessons.
6. The students will again plan and give a lesson, this time in the July practice teaching time.
7. After practice teaching a report and reflection on the lesson will be done.
8. Each student will then write an article on the whole learning experience, with emphasis on the subject in which the lesson was given.
9. A joint presentation will also be prepared.

Students that are interested in becoming part of this group must fill in the form below and come give it to me in the library before the end of the week.

Name:…… Course:……

Main subjects:……

Practice school/place in April:……Practice school/place in July:……